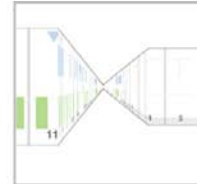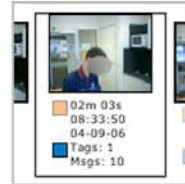# Designing Communication Appliances to Support Aging in Place

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Thèse présentée le 15 Septembre 2008
pour l'obtention des titres de

Docteur de l'Université Paris Sud
Spécialité Informatique

Préparée au sein du laboratoires :
IN SITU, INRIA/Université Paris-Sud, FRANCE

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“A Vaincre Sans Péril On Triomphe Sans Gloire.”
Corneille, Le Cid

Abstract

Eldercare is already becoming a key challenge for our society, and the situation will degrade rapidly with the shortage of trained personal and the rising proportion of elderly people. Innovative approaches are needed to help elders remain at home longer and safer, to age in place. Researchers in Human Computer Interaction (HCI) contribute to seeking solutions to this problem by studying how technologies can support elders and caregivers needs. Monitoring systems have gained popularity in HCI, but remain designed to support the caregivers' task, rather than directly supporting the elders' smooth aging. To seek alternative to monitoring solution, this thesis explores how communication appliances —*i.e.* computer-based devices allowing small groups of intimate people to communicate— can provide a socially acceptable support for aging in place.

This research studies aspects of elders independent living are influenced by communication, and the role of communication in their well-being and safety. A user study with 14 elderly participants living independently explored the role of communication plays in maintaining their independence and well-being. Results of this study highlighted the role of peer support behaviors called PeerCare in providing reciprocal care amongst elderly friends, neighbors and club members. It also highlighted elders' needs for non-intrusive communication means with their social networks and families in particular. In addition, this study highlighted the role of routines and rhythms awareness in building awareness of each others' activities and status. These concepts suggest that communication appliances can help establish and maintain PeerCare behaviors by supporting an awareness of environmental and personal cues which serve as a basis for establishing and maintaining reciprocal rhythms awareness.

To explore these aspects further, we conducted two studies involving two communication appliances, *i.e.* mirrorSpace and markerClock, which we used as technology probes to gather data in real settings with elderly participants. Initially designed by Roussel *et al.* [2004a], mirrorSpace is a video-based always-on communication device which uses proximity to adjust privacy using a blur filtration. Designed in this thesis, markerClock is an augmented clock permitting the ambient communication of motion information reflecting people's home activities and the direct communication of symbolic codes. We designed markerClock specifically to support rhythms awareness by using the implicit mapping of the communication history on the clock. These studies confirmed the role of rhythm awareness in peer support, and highlighted the need for value in direct communication. We specifically explored the concept of value in a series of participatory design sessions which suggested the influence of sensuality, effort and empathy.

We conclude this work by describing two studies exploring the role and usage of technology probes as a research and design methodology. In these studies, we highlighted the role of technology probes for easing users' engagement in participatory processes and introduced a new interactive visualization method called Mélange for exploring log data issued from technology probes.

This work has implications for the design of communication appliances for aging in place and the technology probes methodology. It provides suggestions regarding the design of communication devices to help elders better age in place by relying on existing socially acceptable behaviors.

Acknowledgments

I would like first to thank my supervisor, Dr. Wendy Mackay, who made me learn so many new things during these four years of collaboration. I would also like to thank my committee who annotated it and gave me constructive, helpful feedback on my manuscript. In particular, I would like to thank both examiners, Philip Gray and Alan Newell, who came all the way from Scotland to see me perform my thesis' defense in Orsay. I would also like to thank Philippe Palanque who came all the way from Toulouse to preside the defense's jury. Finally, I would like to thank Yacine Bellik who attended the defense's jury and provided insghtful and interesting questions.

I could never have gone through this thesis without the help of my dear wife, Nathalie. She was not only a support in the last few years, but also a source of inspiration and an example in many aspects. We spent quite many hours talking about our respective works, comforting each other, encouraging each other, and disagreeing with each other. I will never thank her enough for her support through the best, enjoyable and the worst, darkest moments of this thesis.

I would like to thank my family: my parents Jeannine and Daniel, my sister Aline, my brother Denoël, my in laws Andrée and Christian. All were considerable source of support throughout this journey spending countless hours providing distractions, advices, encouragements, never failing to believe in me, and feeding me good food. My sister allegedly even took a six month internship in a company manufacturing chocolate so she could bring heaps back home. Thank you very much.

I would like to address special warm thanks to Jean-Daniel Fekete, who not only supported sitting next to me for a year and a half, shouldering without grudge my constant requirements for technical advices, but became a friend and provided countless advices and support. Jean Virgule, despite his capillary problem, is a great human being.

I would like to thank a few gray haired veterans who helped me through this thesis as well: Stephen and Matthew. Stephen provided support and encouragements, never failed to trust or have faith in me. I had a great time collaborating with him, and I could not have completed this journey without him. Actually, I would probably never have started this journey without him. Matthew shared with me many sleepless nights and I discovered the true meaning of remote collaboration working with him through a few sleepless nights, a world between us. I also enjoyed our many nights spent drinking beer and discussing life and work mixed up, illustrating our shared passion for what we do and live.

I would like to thank Christian Jacquemin who also provided guidance in some of the hurdles I faced during this thesis. I am thankful for the time he dedicated to helping me overcome those obstacles. His efforts have not been wasted: Here I stand, with a thesis in hand, and that's also thanks to him. This is also true for Bastien, who was there to listen to me and share advices and guidance when it became necessary.

I would like to thank my friends and colleagues, both at the Université Paris Sud and the University of Queensland. Sharing this experience with them made me better, learning as much as I could, sharing laughs, coffees and sometimes candies or chocolate (yes, I shared some of my bounty), sharing sleepless nights, exchanging advices, and, in general, supporting one another. In particular, I would like to thank Pascal, Emmanuel, Nicolas, Evelyn, Jean-Baptiste and Aurélien who took an active part in my work, assisting me in various workshops or interviews, and who provided helpful suggestions. Thank you guys! Thanks

List Of Publications

Peer Review Conference Publications

YANN RICHE, MATTHEW SIMPSON AND STEPHEN VILLER Zebra : Exploring participatory design engagement in fieldwork (2008) *Proceedings of the 2008 Conference on Designing Interactive Systems (DIS'08)*, ACM Press
Chapter 7

NIKLAS ELMQUIST, NATHALIE HENRY, YANN RICHE AND JEAN-DANIEL FEKETE (2008) Mélange: Space Folding for Multi-Focus Interaction, *Proceedings of the 2008 Conference on Human Factors in Computing Systems (CHI'08)*, ACM Press
Chapter 8

YANN RICHE AND WENDY MACKAY (2007) markerClock : A Communicating Augmented Clock for Elderly *Lecture Notes in Computer Science - INTERACT 2007 Conference (short paper)*, Springer-Verlag
Chapter 5

YANN RICHE AND WENDY MACKAY (2007) Une horloge communicante pour les séniors *Proceedings of the 2007 French-Speaking Conference of Human-Computer Interaction (demonstration paper)*, ACM Press
Chapter 5

Doctoral Consortium

YANN RICHE (2007) PeerCare, Challenging the Monitoring Approach *Lecture Notes in Computer Science - INTERACT 2007 Conference*, Springer-Verlag
Chapters 3, 4 and 5

Workshop Papers

YANN RICHE, WENDY MACKAY (2005) PeerCare: Challenging the Monitoring Approach to Care for the Elderly *BCS HCI'05 Workshop on HCI and the Older Population*
Chapter 3

WENDY MACKAY, YANN RICHE AND JEAN-BAPTISTE LABRUNE, (2005) Communication Appliances: Shared Awareness for Intimate Social Networks, *CHI'05 Workshop on Awareness Systems: Known results, theory, concepts and future challenges*
Chapters 2 and 3

Technical Report

YANN RICHE (2007) Technology Probes for the Design of a Communication Systems for Seniors *Report at the University of Queensland, Brisbane, Australia*
Chapters 3, 4 and 7

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Introduction

Chapter 1

Contents

How will we communicate tomorrow? The evolution of computer technologies in industrialized countries has led to an important change in ways people conceive interpersonal communications. The constant expansion of computer technologies and information networks has led to interpersonal communication being present almost anywhere. The standard phone, widespread since the 70s, is now slowly being replaced by mobile phones. Mobile phones themselves have evolved to provide additional communicative capabilities, including Instant Messaging and emails, which were unavailable before the 80s, and were restricted to desktop computers up until recently. Today, a large proportion of the population in developed countries owns from one to many computing devices, ranging from mobile phones to laptop computers, as well as access to the Internet. For instance, in France in 2006, 49% of the population was Internet users, against 69% in the USA and 21% worldwide[1]. Internet-based communication systems developed for supporting businesses and industries, such as emails and teleconferences, have found their way home, while new ones are emerging, specifically designed for home use.

Shaping how well communication technologies will support our daily lives is left to researchers and designers who are studying the use and impact of communication technologies today. The intent of this thesis is to contribute to the understanding of elders' current communication practices, and determining how communication technologies can be designed to support elders desire to remain independent and age in place. In particular, we focus on the needs and desires of the growing elderly population by studying the role communication plays in their daily lives and their aging in place. We build upon this knowledge to explore ways in which computer mediated communication can support elders' well-being and independence.

1.1 Human Computer Interaction and Computer Mediated Communication

The Human Computer Interaction (HCI) research field emerged in the 60's, with the spreading of computers and with the desire to optimize the way people interact with them. To understand the role of computers in our lives, Beaudouin-Lafon [2004] introduces three main HCI paradigms: *computer-as-tool*, *computer-as-partner*, and *computer-as-medium*. *Computer-as-tool* refers to the use of computers as a human extension to realize complex tasks that augments physical and cognitive capabilities by providing calculation, automation, etc. *Computer-as-partner* refers to computers as collaborators in tasks that act alongside human operators. Computers can make some decisions and are moderately independent, like artificial intelligence algorithms used in video games. Finally, *computer-as-medium* is the paradigm where computers are used to mediate interaction between humans. This thesis focuses more specifically on the last paradigm, where computers (in a larger sense) are or can be used to mediate communication between humans: Computer Mediated Communication (CMC). While the CMC early focus was on studying the influence of mediated communication on work practices, the recent widespread introduction of communication technologies in the home present new research challenges.

We adopt the CMC paradigm by envisioning the computer as a way to help us communicate with others. In particular, we are interested in investigating the aspects of CMC which affect our daily, personal lives, rather than our professional ones. We believe research in this

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[1]Source: The World Bank Group `http://www.worldbank.org/`

field is crucial as this area of use is only bound to expand exponentially, and that building a better understanding can benefit a large portion of the population, and shape the way CMC technologies are designed and used.

1.2 Communication Appliances

Communication Appliances (CA) [Mackay *et al.*, 2005] are a type of simple-to-use, single-function CMC devices designed to bring together close family and friends over a distance. The concept of CA emerged from research undergone in the in situ laboratory focused on distant intergenerational family communications during the interLiving project[2] [Beaudouin-Lafon *et al.*, 2001, Beaudouin-Lafon *et al.*, 2002a,b, Sundblad *et al.*, 2004]. During this project, several CA were designed to connect distant families, including the messageProbe [Hutchinson *et al.*, 2003], which allows family members to exchange digital handwritten notes, and the videoProbe [Conversy *et al.*, 2003] which permits the automatic exchange of pictures of the daily home life[3].

CA defines CMC which are meant to be used by intimate groups of people, rather than everyone, as appliances such as the phone permit. CA also introduces the importance of integrating gracefully both direct and ambient communication in the mediation. However, the concept of Communication Appliances is broad, and its application has mainly focused on the family context during the interLiving project [Beaudouin-Lafon *et al.*, 2001], or on couples (See Related Work page 48 for more details). Our intent in this thesis is to study the application of the communication appliances' concept to support aging in place. In particular, we are interested in understanding *what types of behaviors can CA support which would promote aging in place? What requirements should be taken into account when designing CA for aging in place?* Building upon the study of communication appliances in the context of family relationships [Beaudouin-Lafon *et al.*, 2001], we seek to explore how CA can address *issues of privacy and integration in the home* in the context of aging in place.

1.3 Thesis

This thesis extends the concept of CA by empirically exploring their design in the context of aging at home. Without dwelling on the usability aspects of human computer interaction for the elderly, it examines how the concept of CA can be adapted to reduce isolation and connect elderly people to their social networks. Through this exploration, we extend the concept of communication appliances in a new area of application. By carrying out user centered and participatory design approaches, we identify new opportunities for using CA to support aging in place, and offer refinements of the CA concept.

This thesis primarily focuses on providing a better understanding of the communication appliances concept by applying it in a different context: support of aging in place. In doing so, we provide new perspectives on how to support populations, and in particular technological interventions to support the role of social networks in elders' well-being and independence.

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[2]The interLiving project was a three-year project started in 2000 and funded by the European Union Disappearing Computer Initiative. Participants in this project included the in—situ— lab in France and the KTH University in Sweden. Collaborations also occurred with the HCILab at the University of Maryland, USA.

[3]Both communication appliances are described further in the Chapter 2

The thesis statement is as follows:

Communication Appliances can support aging in place by providing shared awareness amongst elderly social groups based on the exchange of routines and rhythms. Communication Appliances can allow elderly users and their social networks to remain aware of their respective activities over a distance and thus provide a way to stay in touch and look after one another. Finally, augmenting an existing device into a Communication Appliance, as opposed to designing a new foreign device provides additional opportunities for interaction which can lead to better acceptance and more ambient integration in the home.

1.3.1 Communication Appliances for the Elderly

In this thesis, we define elderly people as people aged 65 and over. While many people in this age group would not categorize themselves as elderly, we provide a distinction that is not related to a physical or psychological condition, but rather on a period in life. People in this age group do not necessarily suffer from major age-related sensorial, cognitive or motor impairments. We consider elderly people as people who are retired, who have ceased their professional activities and entered a new period of their lives. In France, the mean age for retirement is approximatively 61 years and across Europe, most people above 65 are retired [Brugiavini *et al.*, 2005]. In the US, the mean age for retirement is about 62 years [Gendell, 2001], which lead us to believe 65 years to be an adequate threshold for distinguishing people who have ceased their professional activity and entered this new period of their lives.

Therefore, this thesis does not specifically addresses usability issues relative to aged people. Rather, it considers elderly people as a social group likely to share some common experiences including retirement and aged induced impairments. This distinction is similar to the one made for teenagers in the literature, based on age, and the social aspects associated with a period of life. Nevertheless, we would like to underline that while this thesis does not specifically address usability issues, it acknowledges the declining sensorial functions frequently associated with aging in the design process.

1.3.2 Aging in Place

The concept of "aging in place" defines a situation where aged people are encouraged to stay at home to remain independent, as opposed to moving into a specialized institution. Governments and organization have shown a growing interest in the "aging at home" approach, which has led to a number of initiative in the research community [Pollack, 2004]. HCI is also seeking ways to support the aging in place process through technology, including ways to overcome disabilities (assistive approach), and ways to monitor health and remotely provide care (monitoring and telecare approach). Currently, only a limited number of projects have explored how CMC systems could support the aging in place process, while studies in sociology [Broese van Groenou, 1995], gerontology [Giles *et al.*, 2005] and HCI [Forlizzi *et al.*, 2001] have stressed the importance of social networks for elderly health and well-being. This thesis specifically explores how innovative communications can support aging in place by supporting the role of social networks by raising shared awareness [Mackay *et al.*, 2005] with close friends, family members and other informal caregivers.

1.3.3 The Elderly and their Social Networks

While actual life expectancy in industrialized countries is over 78 years [UN Secretariat], by the age of 70, many individuals have encountered the death of friends or a spouse, reducing the size of their social network and accentuating the risk of isolation. Moreover, the frailty induced by aging often motivates older people to change homes in order to gain access to better suited accommodations (*e.g.* reduced number of stairs, closer shops and commodities, better public transport). This relocation often involves a loss of social context, where elders are physically distanced from well-known neighbors and friends, thus making communication and visits more difficult and less frequent and therefore increasing isolation [Gierveld and Perlman, 2006]. This statement is alarming by the threat it describes on the elderly population's mental and physical health. Isolation and loneliness — beyond the mere concern for frail people living on their own — often lead to depression and therefore greatly diminish the independence of older people.

Additionally, studies in sociology underline the role of not only family, but friends and neighbors in the informal caregiving networks of the elderly [Cantor, 1979]. In particular, they highlight the frequent lack of key caregivers in the elderly person's social network [Broese van Groenou, 1995] and the necessity of informal care exchanges for psychological and material well-being [van Tilburg *et al.*, 1995]. Moreover, a study of life expectancy also suggest that elders with dense social network extending beyond strict family ties, is likely to more live longer than elders with fewer numbered friends [Giles *et al.*, 2005].

To further understand how CMC can support the aging in place process, one needs to examine how isolation [Ham, 2002, Treacy *et al.*, 2005, Triggle, 2005] and loneliness [Donaldson and Watson, 1996] amongst the elderly population have become a growing concern for our society. In this thesis, we envision ways of using CMC to reduce isolation, keep loneliness at bay, and even maybe increase life expectancy. We advocate in particular that CMC, and CA, can help people better age in place by providing technologies to help create, maintain and enforce social relationships.

1.4 Methodology

For conducting this work, we used a variety of user-centered and participatory design methods to collect data both in the field and in the lab. In particular, more than 30 interviews of elders were conducted, many of which occurred in their homes. Elders also participated in more than twelve participatory design workshops which allowed participants to create scenarios, to generate and critic design ideas, to discuss key findings from the studies, and to create prototypes, some of which were evaluated during field deployments. Finally, some of our participants took part in a cultural probes study which allowed us to collect both inspirational material and fragmentary data. This set of studies allows us to conduct a triangulation, where we explore our research space from various perspective to validate our findings.

1.4.1 Triangulation

Triangulation by Mackay and Fayard [1997] is a theoretical framework which combines different approaches (social sciences, engineering and design) to provide a cross examination of phenomena in order to validate findings. The framework provides three levels of abstraction which guide the choice of methods and study: observations, designs and the-

ories. Figure 1.1 provides an illustration of the articulation between the three levels of abstraction in HCI, and outlines the relationship between them.
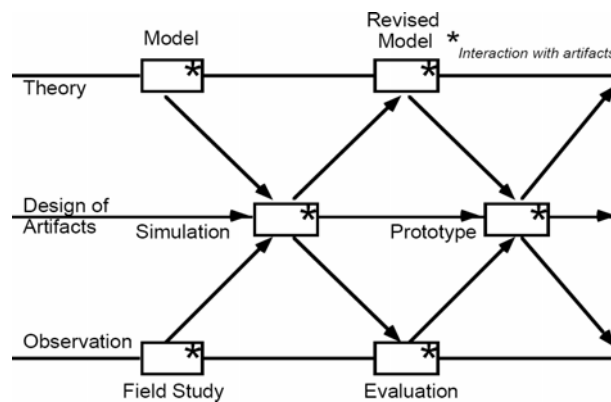
Figure 1.1: Illustration of the articulation of abstraction levels in the triangulation process. Source Mackay and Fayard [1997]

To adopt the triangulation framework, this thesis employs several perspectives addressing the different levels of abstraction:

- A field study which includes interviews of elderly people aging in place and leading to the description of PeerCare, reciprocal peer support amongst elderly, as a key opportunity for design (observation) and the identification of routines awareness as a key aspect of shared awareness (theory),
- An initial technology probe study which allowed us to explore of the concept of PeerCare and its mediation in situ (observation / theory), using a technology probe implemented after the mirrorSpace concept [Roussel *et al.*, 2004a].
- The design of markerClock, an augmented clock for supporting rhythms and routines awareness (design), and a field study which allowed us to explore the role of routines and their mediation in situ (observation / theory), using markerClock as a technology probe, and
- A participatory design study permitting the review of the theory (theory) and the observational exploration of design alternatives for aging in place (design).

In addition to these studies, we conducted a study called the Zebra study to better understand and use the technology probes methodology employed in this thesis, exploring in particular its impact on users' engagement. We finally report on the design and evaluation of a new presentation technique called Mélange, which supports the exploration of large visual spaces such as graphical representation of logged data gathered from technology probes' longitudinal deployments.

The qualitative data issued form these studies included a variety of hand written notes, video footage and audio recordings, photos, and sketches which were in turn analyzed to formulate extract findings regarding the design of communication appliances for aging in place. Our particular approach regarding qualitative data analysis consisted in using Grounded Theory by Strauss and Corbin [1998] in conjunction with triangulation to seek the emergence of concepts to be further investigated.
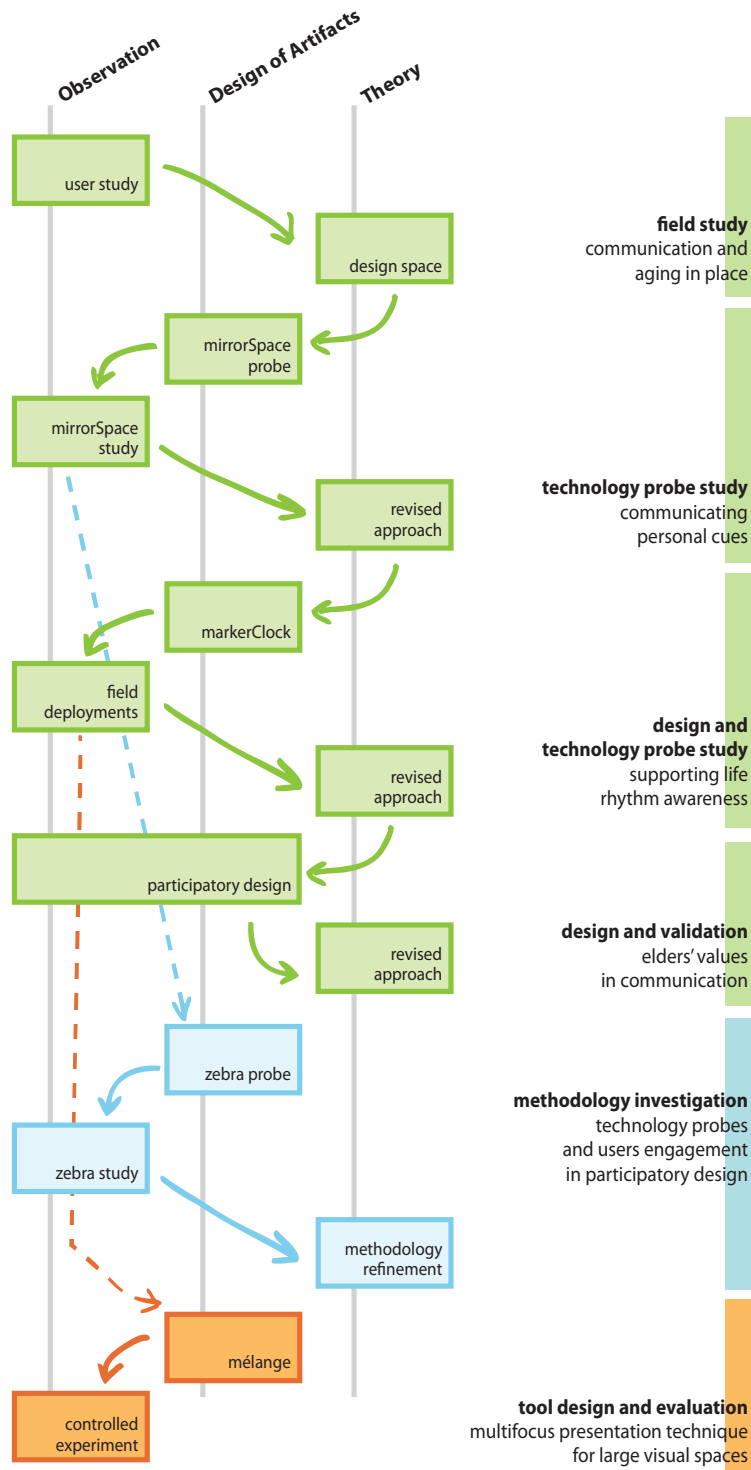
Figure 1.2: This thesis' triangulation process

1.4.2 Analysis Method: Grounded Theory

Grounded theory by Strauss and Corbin [1998] is a method proposed as a summary of a particular set of methods and strategies for describing and analyzing field observations. Different techniques, including interviews, documents and observations, provide heterogeneous data which is in turn coded (categorized). The coding categories are then sorted, critically analyzed, compared amongst themselves and grouped. Finally, coding categories are analyzed by looking at relationships emerging from their descriptions to establish theories.

Grounded theory (GT) is a popular method used in social sciences and HCI (See for instance Brown and Cairns [2004], Fitzpatrick *et al.* [1996], Isenberg *et al.* [2008], Labrune [2007], Razavi and Iverson [2006] for use of GT in the field of HCI), and which provided a comprehensive set of techniques for analyzing data of diverse nature. It is particularly suited to this project as it does not aim to validate theories by using observed phenomena as empirical evidence, but rather highlight emerging phenomena which can be further explored by various studies (in particular using triangulation, see figure 1.2) and re-used in a design context. Because we investigate a novel approach to the issue of aging in place, grounded theory facilitates the emergence of models and concepts issued from observation and leads us to innovate. This technique presents many benefits from our point of view [Fitzpatrick *et al.*, 1996]. Firstly, it provides an open ended approach to the problem at hand and allows us to build upon work done by other researchers in the field[4]. Secondly, it provides an explicit description of our analytic process, presenting both the raw data and our analysis, making salient the bias we may bring to the study. Thirdly, GT is an explicit effort to build an understanding of the concept at hand, extracting a framework which can be used and completed by other works in the field that use a similar technique. Finally, this technique provides results which are easily brought into the design process, due to its condensed nature and the rich details that accompany the findings, which complements Fitzpatrick *et al.* [1996]'s analysis.

> *We believe this type of framework may prove more amenable to the development of general principles for collaborative systems design than the rich descriptive texts of ethnomethodology.* Fitzpatrick *et al.* [1996]

1.5 Overview of the Research Studies

Communication is a natural process, it is not taught but acquired. Rarely are people conscious of their communication behavior, and how technology can support and mediate them. To address how communication appliances can support aging in place, we first need to identify opportunities for design, and gather requirements and necessary trade offs as so to address questions such as : How are the technologies to be applied in this context to be useful? With whom should elderly people be more connected?

This is why we first explored the design space using various user centered design methods, to seek opportunities for design prior to using participatory design with users who might not perceive an immediate need or benefit to this exploration. We used various existing field techniques to generate both user centered and participatory design findings in the

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[4]including in particular the dissertation of Rowan [2005]: Digital Family Portraits: Support for Aging in Place

field.

1.5.1 Field Study: Communications and Aging in Place

This field study aimed at identifying opportunities for design, collecting material for inspiration, and increasing our understanding of the elderly context. We conducted field interviews with 14 elders in their homes, focusing on the following areas:

- Their current communication patterns,
- The composition and role of their social networks,
- The intercommunication patterns with their social networks,
- The strategies they have developed to age in place, and
- The context in which the CA are to be introduced (including type of homes and existing technology).

This study allowed us to identify two main opportunities for the design of CA to support aging in place: PeerCare, and the need for non imposing adult-children/elderly parent relationships. We define by PeerCare the peer to peer reciprocal exchanges of care amongst elderly people. It also allowed us to highlight the role of rhythms and routines awareness in maintaining PeerCare relationship.

1.5.2 Supporting Unremarkable Routines: mirrorSpace

Following the previous study, we conducted an initial technology probe study aimed at exploring how a communication appliance could mediate exchanges of mundane, daily rhythms using personal cues, information broadcasted by our representation in the world: clothing, gait, etc. To this end, we re-implemented and deployed a technology probe based on the mirrorSpace design by [Roussel *et al.*, 2004a] seeking to use video to mediate these cues in elders' homes. This study highlighted functional and aesthetical considerations when integrating technology in the home and suggested the augmentation of existing appliances into communication appliances as a key element in integrating ubiquitous communication in elders' homes. Moreover, it suggested technological, privacy and awareness issues related to video-based awareness systems for the home, as well as technical and methodological difficulties in using technology probe in the design process.

1.5.3 Supporting Life Rhythm Awareness: markerClock

Based on our field study and findings from the mirrorSpace study, in particular the role of rhythm and routines in maintaining PeerCare relationships, we designed markerClock a communicating clock allowing elderly users to be easily connected to close friends and family members. By supporting the role of rhythms and routines observed in the first study, markerClock allows us to further explore their mediation and their role in aging in place.

Subsequently, markerClock was implemented and used as a technology probe to involve and provoke users into the design space, while building our understanding of rhythms and routines awareness and its mediation. MarkerClock allowed us to explore how home rhythms could be communicated, and how they could provide shared awareness while respecting privacy. The study included two month-long deployments in the homes of two pairs of users: an adult-child and an elderly-parent, and a pair of elderly friends. This study illustrated the benefit of augmenting appliances rather than creating new ones, and provided an ecological validation of the role of rhythms communication in shared awareness.

1.5.4 Participatory Design With Seniors

The following study, based on the participatory design approach, allowed us to gain further users' perspectives on how communication systems can be designed to support their needs and desire. This study was composed of a series of six workshops carried out with elderly people. Different activities were used to first introduce participants in the design space and make them aware of the research problem, and then to carry out participatory design exercises for creating two communication systems prototypes. These exercises allowed us to gain a better understanding of elders' perception regarding communication, including the concept of messages' value. This study also allowed us to discuss goals for communication, as well as medium, characteristics and recipients from an elderly point of view, to review the results of our grounded theory analysis uncovered earlier, and to explore design solutions for the identified opportunities.

1.5.5 Understanding Technology Probes: Zebra

To address some issues identified in the mirrorSpace study and related to the role of technology probes in the design process, we conducted a field study of how technology probes facilitate users' engagement in the design process. This study included a two-month deployment of a technology probe in the University of Queensland Interaction Design Research Division laboratory, focusing on the methodology in general prior to applying this concept to our study of communication appliances for elders. During this deployment, we examined the way technology probes allowed participants (in this case members of our research lab) to easily gain familiarity with the design concepts. We also examined how this familiarity with the design concepts facilitated participants' involvement in the design discussions, including the generation of alternative designs.

1.5.6 Mélange

Finally, to visually explore the large quantities of data produced by the technology probes, we designed and evaluated a presentation technique called Mélange. Mélange allows users to browse and explore large visual spaces while retaining multiple focus points and an awareness of the intermediate context between those focus points. Our experimental evaluation of Mélange demonstrated its ability improve awareness of context when exploring visual spaces over existing presentation techniques.

1.6 Contributions

The main scientific contribution of the various studies included in this thesis are the following:

- The identification of two design opportunities for applying communication appliances to support aging in place:
  1. Using PeerCare, the support of elderly people's reciprocal care, and
  2. Supporting the non-intrusive adult-child / elderly-parent relationship.

  In particular, PeerCare is offered as an alternative to monitoring solutions that is socially-acceptable and pro-active.
- The description of routines and rhythms as a key element in PeerCare, providing reciprocal support while respecting privacy.

- The proposal of the augmentation of an existing object —such as a clock— as an alternative to standalone devices for communication appliances.
- The design of markerClock, an augmented clock supporting routine awareness, the empirical validation of its ability to raise shared awareness amongst users, and the illustration of the benefit of augmenting an existing object to perform a communication function.
- The description of two approaches for involving the elderly as collaborators in the design process, using a participatory design process, and using technology probes.

1.6.1   Design Opportunities

A major contribution of this work is the study of the role of communications and social networks in the aging in place process, based on literature review and field interviews. Emerging from this study is the identification and description of two main opportunities for designing communication appliances to support aging in place. The first is PeerCare, which describes the peer support relation amongst elderly people living independently. The second relates to the enhancement of reciprocal awareness between elderly parents as well as their adult children, while attempting to reduce the burden on the adult child and the feeling of intrusion by the elderly parent.

1.6.2   Routines, Rhythms and PeerCare

The second major contribution of this thesis is the description of the role played by rhythms and routines awareness in PeerCare. Building upon field observations and interviews, as well as focus groups, this thesis illustrates how shared awareness of respective and shared routines can benefit elders by providing cues into each others' whereabout and general state and suggests that such information can be mediated to support such behaviors over a distance. We triangulate our perspective on this contribution using a technology probe study to gather further empirical data in the field with elderly users.

1.6.3   Communication Appliances as Augmented Objects

Based on the interviews of elderly participants and visits to their homes, this thesis proposes that augmenting existing objects to create communication appliances in the home create additional opportunities for interactions. This is particularly relevant to the support of aging in place through technology, as participants reported anxiety at the prospect of introducing a new technological device in the home.

1.6.4   Design and Implementation of an Augmented Clock

Based on our interviews regarding the importance of routines and rhythm awareness, we introduces markerClock. MarckerClock is an augmented clock which supports the ambient sharing of home rhythms and the exchange of simple information (symbols) as explicit messages. MarkerClock uses routines to support PeerCare relationships over distance, by allowing connected people to compare exchanged rhythms with known routines, to establish and maintain communication routines, and to share a constant link which reinforces presence.

1.6.5 Involving Elderly Users as Collaborators

Involving users in the design process as collaborators can be difficult, in particular in the case of elderly people and communications. To overcome this issue, this thesis introduces a set of exercises for introducing the design space to elderly people and establishing a design and research dialog. Additionally, this thesis suggests that technology probes can help to involve users in the participatory design process, while limiting the cost of this involvement.

1.7 Thesis outline

Chapter 2 (page 36) reviews the existing literature relevant to our problem at hand. The following areas are reviewed:

- Computer Mediated Communication for the Workplace
- Shift of Computer Mediated Communication from the Workplace to the Home
- Communication Appliances
- HCI and Aging in Place
- Computer Mediated Communication for the Elderly

Chapter 3 (page 64) describes the field study which led to the identification of two major opportunities for designing communication appliances to support aging in place: PeerCare and the support of intrusion-free adult-child/elderly-parent relationship, as well as the role of routines in PeerCare. Chapter 4 (page 96) discusses the mirrorSpace study which permitted the exploration of use of a video communication device in the context of PeerCare and provide insight on further designs of communication appliances in this context.

Chapter 5 (page 112) then describes the design and implementation of markerClock, a communicating clock for elderly people based on our findings from both the initial user study and the mirrorSpace study. MarkerClock was subsequently deployed in the field, which provided us with a qualitative evaluation of markerClock, suggested alternative designs, and explored the abstract exchange of routines for raising shared awareness while respecting privacy. Furthermore, chapter 6 (page 137) discusses the participatory design process that helped us to gain a better understanding of the significant characteristics of CA for elderly people.

Building upon the mirrorSpace study and its methodological issues, chapter 7 (page 160) describes the Zebra study exploring the role of technology probes in the engagement of users in the participatory design process. This study is followed by chapter 8 (page 179), describing a presentation method that permits the exploration of large visual spaces, such as the large amount of time based quantitative data collected by technology probes.

Finally, chapter 9 (page 198) concludes by a summary of the contributions of this thesis and perspectives for future work.

Related Work

Chapter 2

Contents

Summary

This chapter describes the literature relevant to designing communication appliances to support aging in place. The first part of this chapter describes the foundation of computer mediated communication, in particular works conducted to support remote collaboration in the workplace. The second part of this chapter describes research studying the mediation of relationships in the home. The third part further describes the concept of communication appliances and its application in various communication systems. Finally, we describe the role of human computer interaction in aging in place, outlining two particular approaches, assistive and monitoring technologies. Further, we build upon the role of elders' social networks to motivate our exploration of communication as a support of aging in place.

In this chapter, we discuss work related to computer mediated communication (CMC) and aging in place. This review is separated in two main parts: the first describes research in computer mediated communication for both the workplace and the home, while the second focuses on aging in place and the role of communication in this context.

In our description of computer mediated communication, we outline the various aspects of awareness in both contexts (workplace and home) and how this awareness can be mediated. We finally describe the concept of communication appliances and how the concepts has been applied in designs for distributed families and couples.

Subsequently, we describe various perspectives in the field of human computer interaction aiming at supporting aging in place. We then highlight the role of social networks in elders' well-being and describe various communication systems designed specifically for elders.

2.1 Computer Mediated Communication for the Workplace

The concept of *communication appliances* and the development of *computer mediated communication for the home* has been largely influenced by the development of *computer mediated communication for the workplace*. This is partly due to the fact that many CMC systems have emerged in the workplace and migrated into homes, such as emails and instant messaging. This section reviews the work relative to computer mediated communication in the workplace and in particular the progression from video conferencing to *awareness systems*. We identify the various aspects of awareness in the workplace and the role of informal communication in work environments, and the role of the mediator in the support of this awareness.

2.1.1 From the 1960's to the 1990's

The mediation of exchanges by computing device cannot provide a full support for the variety of information which we perceive when interacting with others in the same environment [Gutwin and Greenberg, 2004]. Therefore, a choice must be made concerning what type and how information must be exchanged to adequately support awareness. Until the 1960, mediated exchanges for work included mediation through documents (*e.g.* letters, plans) and using the phone, or cable. The first major evolution of computer mediated communication work in the workplace after the introduction of the phone was without doubt the introduction of video to complement phone exchanges in remote conversations in an attempt to lower the feeling of mediation and therefore improve task efficiency.

Supporting Video in Exchanges

Building upon the importance of visual perception in capturing awareness information, researchers have used video as a way to augment distant dialogs usually conducted over the phone. By providing an image of the people in conversation, video could convey information such as gesture and facial expressions.

In 1964, the Bell company released the picturephone [Bell Laboratories], a phone which provided not only audio, but also analog video communication between callers (see Fig.

2.1). At this time, the picture phone transmitted video through an analog channel similar to the one used for audio, using compression to reduce the necessary bandwidth.

Figure 2.1: Bell Telephone Laboratories' Picturephone. Source: The Bell System Memorial `http://www.porticus.org/bell/telephones-picturephone.html`

Building upon Bell Telephone Laboratories' picturephone [Bell Laboratories], researchers and companies have designed many teleconferencing systems where remote collaborators were connected through video communications. Engelbart [1968] introduced in 1968 one of the first groupware application called the NLS system, a remote collaboration system allowing users to share not only voice and video, but also computer applications and "telepointers".

In fact, teleconferences, despite their promise, never really replaced face-to-face meetings. Egido [1988] suggested that, on many occasions, the teleconferencing system did not match the users' needs or culture, and that its high cost did not really provide substantial benefit for the organizations adopting it. This study also reported that in 1988 — more than 20 years after Bell's picturephone — only around 210 video conferencing systems were in use in the USA. As a response, various studies emerged, exploring computer mediated communication beyond a support of tasks, to encompass work culture, awareness, and social behavior.

2.1.2   Supporting Awareness and Social Behavior

In the late 1980's, a new approach to supporting remote group collaboration emerged, probably influenced by the introduction the theory of *Situated Action* by Suchman [1987]. The theory of situated action was developed in reaction to the importance of the field of Artificial Intelligence which proposed the use of "intelligent" systems to replace humans in certain situations. As a critic, Lucy Suchman demonstrated that the agency of human actions can not be predicted, and is the output of a rich interaction between humans and their social and physical environment which cannot be fully captured or modeled. Similarly, the nature of information which provides a support to collaboration can not be defined. Rather, resources in the environment, including technologies and communication systems, provide ways to constantly adapt and negotiate actions [Suchman, 2007]. In addition, the theory of *coadaptation* by Mackay [1990] supports this approach by suggesting that people

and technologies coadapt, reciprocally affecting each other to fit possibilities offered by technologies and users' needs. Technology is adapted and used in unexpected ways while people adapt their practice to the technology available to them.

Both theories have challenged existing ways to analyze work practices, like task analysis, to better understand the role of situations and context, and to capture coadaptative phenomenon. [Grudin, 1988] suggest that the failure of technologies such as video conferencing is due in part to the disparities between the people making decisions regarding the design (managers who want to save money on travels) and the larger population of people who actually benefit from the design (the worker who wants to meet his colleagues). This led researchers to seek a better understanding of the social constructs in which work practices evolve [Heath and Luff, 1991, Hughes *et al.*, 1995], and the influence of technology interventions in them. This change of focus also led researchers in computer mediated communication to explore the support of awareness and social behaviors in the workplace by mediating information not only in the direct focus of the users, *e.g.* while conducting a meeting, but also using mediating peripheral information in the work environment.

When people interact with each other in a collocated environment, they draw not only direct exchanges (conversations, emails, etc.) but also upon a rich context which increases the interactional bandwidth [Abowd *et al.*, 1999] and which we has been defined as *peripheral information* [Maglio and Campbell, 2000]. Researchers have discussed the role of this peripheral information in allowing people to work together and developed various systems designed to support remote collaboration. The type of awareness required in these systems and supported by the exchange of peripheral information allows people working together to know about each other's activities, whereabouts, and status [Bly *et al.*, 1993]. This type of awareness in group collaboration is called *group awareness* and is crucial to help people to coordinate activities and tasks [Gutwin and Greenberg, 2004, Simpson and Viller, 2004], but also to build a social entity with a shared culture and values [Dourish, 1993, Gutwin and Greenberg, 2004].

The Media Spaces

As a result, in the late 1980's, researchers at Xerox PARC explored further use of video to mediate for collaboration using media spaces: *"An electronic setting in which groups of people can work together, even when they are no resident in the same place or present at the same time"* [Bly *et al.*, 1993]. Media spaces aimed not only at allowing people to collaborate remotely during meetings, but all the time, by permitting continuous connections between distant colleagues and office public spaces using audio-video channels. The initial media space included the connection of public spaces (*e.g.* coffee rooms) and private offices (*e.g.* John's and Jennifer's) within and between two labs at different locations (Palo Alto, CA and Portland, OR). In establishing this a constant ambient synchronous link, media spaces went beyond the task orientation of teleconferencing to explore the potential role of video to support work culture and informal communication [Dourish, 1993, Wendy E., 1999], and to mediate peripheral information.

This experience shed a new light on the mediation of awareness, advocating the role of CMC to support work cultures and activities. During the use of the media space, social behaviors which were not possible before in remote collaboration emerged: *awareness*, where people remained aware of colleagues' activities, *chance encounters*, where people

would start impromptu conversations through the media space, *colleagues' localization*, and *social activities* such as lunch or Christmas parties [Bly *et al.*, 1993].

However, this increased awareness often came at the cost of privacy [Bellotti and Sellen, 1993]. In his study of affordances in the RAVE media space, Gaver [1992]suggests that part of the issue is due to the use of a system which is similar to the way we perceive each other in collocated space and yet not equivalent. Social behaviors often influence the way we interact and provide means to reinforce privacy, yet many cannot be supported in the media space and thus new privacy issues emerge.

In particular, the success of the media space highlighted the need for awareness in remote collaboration which goes beyond the support of tasks, to encompass other aspects of collocated collaboration such as social practices and interpersonal exchanges. A significant example of such behavior is the role of informal communication in building a shared culture and providing smooth coordination in the workplace [Kraut *et al.*, 1990].

Supporting Informal Communication

In parallel with the emergence of media spaces, many other projects emerged looking at ways to support social practices in the workplace. In particular, informal communication was described as essential to *"accomplish work, transmit organizational culture and knowledge, and maintain the loyalty and good will of their members"* [Fish *et al.*, 1993]. As a result, various communication systems were designed to support this practice [Fish *et al.*, 1993, Kraut *et al.*, 1990], and essentially focused on providing ways to communicate at different levels of engagement, from lightweight chats to work meetings, and permitting to increase awareness between colleagues.

Similarly, Tang and Rua [1994], Tang *et al.* [1994] designed Montage, a communication systems to encourage informal interaction and lessen privacy concerns emerging from the use of media spaces. Montage supports a socially acceptable establishment of video communications by embedding a glance feature. Glances are designed to allow users to check the availability of their colleague before establishing a video communication. By glancing, a caller establishes a video link which only lasts 3 seconds unless the recipient acknowledges the call. This mechanism is derived from the metaphor of the office space, where people can drop by and have a look in your office to see if you are available.

Privacy

Work on media spaces were also followed by various projects trying to address privacy issues, in particular using filtering mechanisms [Boyle *et al.*, 2000, In Press (expected Fall 2008, Neustaedter *et al.*, 2006] or context-aware systems [Neustaedter and Greenberg, 2003]. While sharing peripheral information, and always-on communication increase awareness amongst remote collaborators, it might also provide too much information, or sensitive information. Deteriorating the signal in always-on communication provides a way to dynamically change the information bandwidth, and therefore moderate the ambient exchange of sensitive information. On the other hand, it is unclear what type of information should or should not be filtered, and when changes in filtering levels should be made. In particular, people in always-on communication tend to forget the communication link

[Gaver, 1992] and therefore fail to adapt the information bandwidth. To address this issue, researchers used two main approaches to affect the amount or type of information being shared: supporting users' control, and using cues in the environment to change it automatically.

For instance, Neustaedter and Greenberg [2003] explored how inputs could be provided to allow users to affect the filtration of their video signal, or the field of view of the camera. Buxton [1997] also studied how physical cues could assist in adapting communication bandwidth to protect privacy, such as a door opening. Neustaedter and Greenberg [2003] used peripheral information to automatically adapt communication bandwidth, using for instance a motion detector to detect someone entering the room or pressure sensors on seats to play or pause video communication.

Projects have also emerged supporting awareness using medium other than video in an attempt to shift from the non-mediation to transparency in the mediation.

2.1.3 From Non Mediation to Transparency

The mid 1990's saw a change in ways communication and awareness were conceived. A new perspective emerged from the concept of Calm Technologies by Weiser and Brown [1997] which describes a paradigm where technology is transparent in use and disappears in the fabric of everyday life. Calm technology describes an approach of ubiquitous computing, which studies the numerous integration of technologies in our lives. It advocates for the design of technologies that *"move easily from the periphery of our attention, to the center, and back"* [Weiser and Brown, 1997].
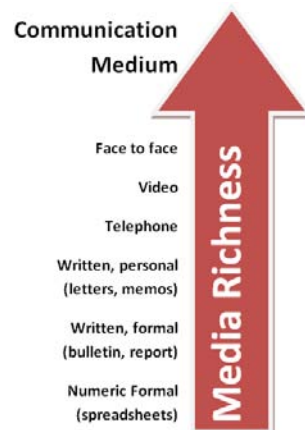
Figure 2.2: The media richness scale, adapted from [Suh, 1999]

Prior to approaches like calm technologies, two theories influenced the design of computer mediated communication: Media Richness theory by Daft and Lengel [1986] and Social Presence by Short *et al.* [1976]. Both theories provided frameworks for evaluating the suitability of a mediation to conduct a particular task, as opposed to mediating peripheral information. On one hand, the Social Presence theory states that the effect of a particular medium is caused by its ability to affect the awareness of presence of the users, their personal characteristics and state. In other words, if a medium allows the system to transmit more personal characteristics, the social presence of the parties involved is increased and

they can more easily undertake their tasks. On the other hand, the media richness theory classifies the appropriateness of media for conducting different tasks depending on their richness (See Figure 2.2). Richness is in turn determined by the medium's ability to provide *"immediate feedback, number of senses involved, personalization and language variety"* [Rice, 1992].

Both theories focus on the medium's ability to transmit characteristics of the people who are communicating to lower the impact of the mediation on exchanges in direct communication. Both have been widely used to justify the design of systems using richer medium for conducting tasks, in an attempt to remove the feeling of mediation [Lombard and Ditton, 1997]. Gutwin and Greenberg [2004], however, suggest that the mediation cannot become transparent because computer systems are limited in their ability to capture and represent contextual information used in collocated exchanges. As a result, new approaches to computer mediated communication have emerged, which do not try to hide the mediation, but to make it transparent in use. New communication systems using media other than video also emerged, as well as a new approach for understanding the role of medium in the mediation: *multiscale communication* [Roussel and Gueddana, 2007].

Multiscale Communication and Ambiguity

Recently, the concept of multiscale communication by Roussel and Gueddana [2007] offered a different approach to the role of medium in the communication: the design of communication systems which support *"a variable degree of engagement, smooth transitions between degrees and integration with other media"* [Roussel and Gueddana, 2007]. Here, the quality of communication not only depends on media richness or synchronicity, but on the flexible set of medium and their transitions required to achieve the desired level of engagement between both parties, according to their changing needs. This theory is the extension of various work which have advocated the use of various medium, at varying richness, to communicate. In particular, it reflects the position of Pagani and Mackay [1993], who in their study of video media spaces in two real world settings, suggested the need to integrate always-on video with other media like images and audio, and to provide smooth transitions.

It is desirable to achieve the adequate level of engagement, and this level is dynamic and always negotiated between parties. For example, Aoki and Woodruff [2005] outline the importance of a certain balance between *"the utility of ambiguity against the utility of usability and communicative clarity"* [Aoki and Woodruff, 2005]. In their study they describe situations in which a person wants to call another person, whom in turn is not willing to communicate. By refusing the call, the receiver indicates to the emitter that he (or she) is not available, without giving any detail as to why. The use of media which do not necessarily imitate real life exchanges, but rather create new types of exchanges based on existing social needs and desires, challenges the approach of non-mediation to advocate for more *transparent* and ubiquitous communication and provide support for *plausible deniability* [Nardi *et al.*, 2000].

2.1.4 Implication for this Thesis

In this thesis, we build upon the work conducted on media spaces and informal communication to study how computer mediated communication can be designed to support *social*

behaviors. We explore how *peripheral information* present in people's daily life can be mediated to support their role beyond direct communication. We further build upon the media space use of *always-on communication* in supporting *ambient communication* to support shared awareness in aging in place, in particular looking at existing practices regarding *peripheral information* and how we can support them *transparently*. In the same time, we are concerned about how computer mediated communication in the home may affect people's *privacy*, and how social behaviors, sensors, users' control, and ambiguity can address these issues.

2.2 Awareness and Communication in the Home

Computer Mediated Communication in the workplace largely focused on providing collaborators with an awareness of location, activity, and status, as well as means to communicate directly with each other [Bardram *et al.*, 2006]. The following section explores how these aspects are present in the home and how researchers have used computer mediated communication to support *interpersonal awareness*.

Awareness information can be exchanged using various means. The approach used in our everyday lives is in using peripheral information in establishing where people are, what they are doing. Peripheral information is exchanged implicitly between the people, without requiring actions from people to send a message (*e.g.* the door is open, the light is on, Tom looks tense, etc.). While peripheral information is available in collocated environments, they are absent in distant relationships, where information are only exchanged through explicit, direct communication such as phone calls, letters, emails, and instant messaging.

This section explores work related to the notion of awareness in the home, and the role of direct communication for relationships.

2.2.1 Awareness in the Home

The concept of interpersonal awareness, devised by Neustaedter [2007] extends the literature on awareness in the workplace to the home. In the workplace, a number of projects studied how peripheral information could be mediated between distant workers to improve their collaboration. In particular, CMC systems were designed to share work cultures and values [Bly *et al.*, 1993, Dourish, 1993, Fish *et al.*, 1993], support awareness of location and activity of colleagues [Bly *et al.*, 1993, Sellen *et al.*, 2006], to coordinate activities, tasks and communication [Greenberg and Rounding, 2001, McEwan and Greenberg, 2005], and to support informal interactions [Handel and Herbsleb, 2002, Kraut *et al.*, 1990].

In the context of home, the role of awareness differs. Where awareness for work focuses on supporting work practices, studies in the home context have essentially focused on how interpersonal awareness could support coordination [Neustaedter and Brush, 2006, Plaisant *et al.*, 2006], connectedness, and intimacy [Neustaedter, 2007, Strong and Gaver, 1996]. Similar to the workplace, awareness in the home had been classified in three categories [Neustaedter, 2007]:

> • *Location: where a social contact is, has been, or is planning to be, including knowledge of presence;*
> • *Activity: the current, past, or upcoming social or work activities of a social contact, along with knowledge of availability; and,*
> • *Status: the current or past emotions, attitudes, or well-being of a social contact, including knowledge of ones health.*
>
> [Neustaedter, 2007] p.33

We point out that this list remains highly similar to the categorization made in the workplace [Bly *et al.*, 1993]. To better understand how these aspects differ, we will explore various projects which designed awareness systems for the home to support these various aspects of awareness.

Awareness of Location

Location information can be either communicated directly in a conversation, or communicated indirectly by gathering information in the environment (*e.g.* John's sport bag is missing, he must be at the soccer field). Systems have started to emerge which support location awareness using technologies, in particular mobile phones. We suggest that while awareness of location in the work essentially focuses on helping coordinate activities, awareness of location in the home differs in that it also supports feelings of connectedness and intimacy.

For instance, Brown *et al.* [2007], Sellen *et al.* [2006] have designed and field tested a system for sharing location information within a family : the Whereabouts Clock. The system allows users to tag particular locations using their mobile phones and according to the following categories: home, work, school or unknown. The location is then automatically reported to a display in the home showing users location within those tagged locations. Participants in the field study of the Whereabouts Clock reported an increased feeling of connectedness. In particular, parents reported feeling an increased peace of mind by having the information on where the kids where, being able to check if they were still at school or on their way home.

Bentley and Metcalf [2007] also designed Motion Presence, an application for mobile phones which allows relatives and friends to know each others' motion status: *moving* or *not moving*. Their field trials of this application suggested that users reported few privacy issues regarding sharing motion information with close people. It described that the ambient exchange of information (no input is required from users for their motion status to be updated) provided a feeling of connectedness and allowed users to infer locations and activities, thus feeling more aware of each others' whereabouts.

These studies provide a ground for understanding how awareness of location provides support for relationships in the home. In particular, it demonstrated the ability of location awareness to provide peace of mind to parents and partners. It also helped gain an awareness of activity [Brown *et al.*, 2007] resulting in a better coordination, and the sharing of this information also supported the feeling of intimacy [Bentley and Metcalf, 2007, Brown *et al.*, 2007].

Awareness of Activity

Awareness of activity in the home helps people coordinate events, but is also part of the information shared within groups. For example, one might wonder what Tom is doing when s/he wants to call him, if he's available or not. The awareness of activity influences the way people exchange, but also the way people perceive each other. Similarly to awareness of location, awareness of activities can be used among close people to coordinate activities, or assess each other's whereabouts and status.

Various projects have studied the design of digital calendars for supporting coordination in the home. Digital calendars allow users to share upcoming events and thus better coordinate on a daily basis. Neustaedter's LINC calendar [Neustaedter, 2007, Neustaedter and Brush, 2006] provided users with a better way to coordinate. The field trial of the LINC calendar [Neustaedter *et al.*, 2007] highlighted the benefit of having a digital calendar which is readable from various locations, and yet still employs the classical interaction of paper calendars (*i.e.* stylus input). The LINC promoted a stronger interaction of family members with the calendar, resulting in better coordination.

The interLiving project also explored this aspect of family life by designing and field testing a digital calendar [Plaisant *et al.*, 2006]. This calendar aimed at allowing all remotely located family members to share a family calendar. In particular, their symmetrical approach (the calendar can be edited and seen by all users) allowed elderly parents to become more aware of their adult children and grandchildren's whereabouts and activities, resulting in an increased feeling of connectedness.

Awareness of Status

Awareness of status defines people's knowledge of each others' state of mind, mood, health, etc. Such awareness is more difficult to achieve as it is essentially based on subjective information (*e.g.* emotions) or subtle, mostly private information (*e.g.* health and well-being). This type of awareness is generally passed on during social exchange where people share these information amongst others [Neustaedter, 2007] and heavily related to what is happening in their lives. In particular, awareness of activity or location, can partially support awareness of state by suggesting that everything is happening as usual. For instance, during the deployment of the MotionPresence [Bentley and Metcalf, 2007], a wife reported being able to deduce that everything was going as planned as her husband was on the moving after work at the usual time, whereas a delay could have meant that he had had a stressful day at work and had to stay a little later than usual.

The Nabaztag, commercialized by the French company Violet[1], is an electronic companion, resembling a rabbit, which provides various functionalities, from reading news RSS feeds to ambiguous communication. In particular, it allows people connected through their nabaztag to exchange messages using the position of the hears of the rabbit. For instance, by moving the ears down, someone can signal that he is not feeling well.

We suggest that awareness of status is largely achieved through direct communication, including conversations, emails, and more abstract ways like the Nabaztag. However, this type of awareness is also deduced from the awareness of location and activity.

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[1] More on the Nabaztag at `http://www.nabaztag.com`

Summary

The research on the support of awareness for the home has focused on the three follow-ing aspects: awareness of activity, awareness of location, and awareness of status. Beyond supporting tasks in the home, such as coordination of activities, these works have demon-strated a benefit in supporting this type of awareness to enhance close people's feeling of connectedness [Bentley and Metcalf, 2007, Brown *et al.*, 2007] and involvement in the fam-ily life [Neustaedter, 2007]. We seek to extend this work by specifically exploring the need of elders in terms of awareness with their close social network. In particular, what aspects are used to get awareness of status among elders?

2.2.2 Lightweight Direct Communication

Beyond awareness and ambient communication, many projects in HCI have also fo-cused on the support of direct communication in the home. In this context, the focus has largely been to support informal communication for keeping in touch, and intimacy.

Keeping in Touch

Keeping in touch in an essential aspect of communication in the home. It includes exchanging news and telling someone about their day, their lives. It is part of how social links are maintained when people are physically separated [Nardi *et al.*, 2000].

Langdale *et al.* [2006] have designed a system called Keep in Touch (KiT), seeking to ease the use of digital communications within the home. KiT functions as a standalone device providing means for children and grandparents to communicate easily using direct communication by means of asynchronous voice messages. The aim of this device was essentially to allow a direct communication between users which might have a difficulty to manipulate existing computer systems, young children and their grandparents.

The Hermes@Home system [Cheverst *et al.*, 2007, Saslis-Lagoudakis *et al.*, 2006] is a messaging system designed for family members on work travel. Based upon the earlier SPAM system [Cheverst *et al.*, 2003], a ambient messaging system for caregivers, the Her-mes@Home system allows users to send messages to peripheral displays in each others' en-vironment, thus providing an asynchronous ambient communication system for intra-family awareness.

Markopoulos *et al.* [2004] also designed the ASTRA system, a communication system which allows family members to exchange simple messages and picture using their mobile phones. The aim of ASTRA is to allow family members to share stories of their daily life with home inhabitants while mobile. The messages are displayed at home in an ambient display available for all family member. Using the ambient display, users can then explore and revisit messages history and possibly reconstruct narratives. Participants fitted with the ASTRA system reported thinking about each other more often and an increase of awareness of each others' situation [van Baren *et al.*, 2003]. They also reported feeling more connected to each other, and thought they were sharing more experiences.

These projects outline the interest of lightweight, asynchronous communication for keeping in touch. This type of interaction is widely used in the home, where for instance, one can leave a note to someone. However, current computer mediated communication

are limited in their ability to convey such informal messages. Phones are primarily used for synchronous, rich communication, while emails are mainly available on computers and therefore fail to be integrated in the environment.

Intimacy

The need to mediate intimacy has been largely explored in the study of communication among intimate couples. When couples are separated, they can sometimes feel emotionally disconnected from one another. To address this issue, Strong and Gaver [1996] have designed three devices which allow to mediate intimacy: Feather, Scent and Shaker. All three devices are subtle, delicate ways of communicating a private emotion when a partner is traveling. The first two designs, Feather and Scent, allow the traveling partner to indicate he is thinking about the other by touching a picture frame representing the distant partner. In the case of Feather, when the frame is touched, a feather lifts off the top of a furniture in the home (See Figure 2.3 a). In the case of Scent, the touch of the frame triggers the heating of a bowl containing essential oil, thus spreading smells around the home (See Figure 2.3 b). Eventually shaver represents a two way communication were both partners hold a pair of devices designed to send and receive shakes (little hand movements) (See Figure 2.3 c). Strong and Gaver explain: *"Feather, Scent, and Shaker build on notions of awareness. They avoid explicit symbolism, relying instead on more immediate visual, olfactory, and tactile links."* [Strong and Gaver, 1996]. In these designs, the intimacy relies on an direct communication being sent by one partner, and received peripherally by the other. The exchange is therefore not balanced (direct/ambient) and does not require a reply or acknowledgment from the recipient. The recipient might have missed the message, or ignored it.

Figure 2.3: (a) Feather, (b) Scent and (c) Shaker, artistic, poetic ways to mediate intimacy. Source: Strong and Gaver [1996]

Various projects have subsequently emerged to explore the mediation of relationships. Similar to Strong and Gaver, Vetere *et al.* [2005] studied the mediation of intimacy in a family setting, highlighting the need for private communication amongst partners and the potential of mobile technologies for this effect. Chang *et al.* [2001] also designed Lumi-Touch, a pair of lamps which, if touched, would trigger its distant peer to light up to meditate

intimacy within an intimate distant couple. Kaye *et al.* [2005] also designed a desktop application called the Virtual Intimate Object which allowed users to exchange simple, symbolic "thoughts" to mediate intimacy (See figure 2.4).
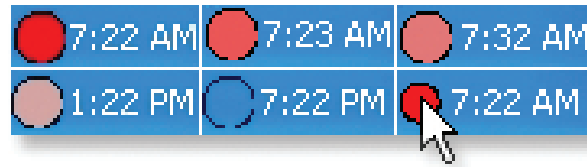
Figure 2.4: The Virtual Intimate Object, device to mediate intimacy amongst partners. Color changes over a twelve hour period. The top line represents the initial rapid fading. The final image shows the appearance of the remote partners button on mouseover. Source : Kaye *et al.* [2005]

Summary

Many projects have focused on developing communication systems to help people to stay in touch, maintain intimacy or coordinate in the home. These work highlight the need for home communication to support lightweight messages to allow exchange of message beyond the exchange of information, to support relationships. In our work, we seek to explore how concepts of communication for intimacy and keeping in touch translate to elders' needs and desires. We further study the type and nature of existing lightweight direct communication and how these can be supported or augmented by communication appliances.

2.3   Communication Appliances

The work in this thesis is particularly influenced by the Interliving project, which explored the design of CMC to support intergenerational family communications [Beaudouin-Lafon *et al.*, 2001, Beaudouin-Lafon *et al.*, 2002a,b, Hutchinson *et al.*, 2003], and the concept of *Communication Appliance* in particular. In this 3-year EU funded project, researchers from various disciplines produced both methods to design home CMC (e.g. the technology probes, see chapter 4 and 7 for more details), and design concepts of communication devices supporting distant families relationships. This project explored issues collaboratively with French, American and Swedish families, using user-centered and participatory design techniques. One of the major conceptual output of the interLiving project was the definition of a type of CMC systems called *communication appliances* [Mackay *et al.*, 2005].

> *Designed as extremely simple, single-function devices,* [communication appliances] *allow close friends and family members to stay in touch, by exchanging a variety of media (text, graphics, video, images, sound, etc.) over a continuously available link.*
>
> [Labrune and Mackay, 2006] p.58

Examples of communication appliances developed during the interLiving project include the VideoProbe, the messageProbe, and MirrorSpace. *VideoProbe* designed by Con-

versy *et al.* [2003] is a communication device which exchanges pictures of the different homes connected together. The automatic capture of pictures occurs three seconds after detecting a change in device's camera field of view, allowing an asynchronous exchange of picture without requiring users to directly communicate. The VideoProbe embeds an aging mechanism, which alter images over time (typically a couple a days), allowing images to fade until they disappear. Pictures can be reviewed on the VideoProbe using the built-in screen and a remote, and can be archived to prevent their aging or immediately deleted. *MessageProbe* is a messaging application allowing users to share handwritten digital notes [Hutchinson *et al.*, 2003, Sundblad *et al.*, 2004]. Similarly to the VideoProbe, an aging mechanism is embedded in the messages, where a given message will gradually fade to disappear, unless it is explicitly archived by users. *MirrorSpace* designed by Roussel *et al.* [2004b] is a two way video communication device which allows users to communicate using video. MirrorSpace uses body distance to mediate privacy (see Figure 2.5(a)) by blurring the image captured by the device when no object is found in front of it. Therefore, the farther the user is to the MirrorSpace, the more blurry his image will be shown on the MirrorSpace. MirrorSpace also not only displays the image of the distant partner, but also overlays the image of the user to ease self-identification (see Figure 2.5(b)), but also to allow users to see what information they are exchanging and how they are represented through the connection. The *Tokitok* [Sundblad *et al.*, 2004] is a wooden box, which transmits people's knocks to another distant tokitok, allowing people to communicate ambiguously using sound.

Figure 2.5: (a) Proximity as interface for video communication: the further users are from the device, the more blurry their images are. (b) Two people using the MirrorSpace simultaneously, their images are overlaid. Pictures courtesy of Nicolas Roussel.

More recently, other projects in our lab have adopted the communication appliances approach. *Pêle-Mêle*, designed by Gueddana and Roussel [2006] (see fig. 2.6) is a communication appliance illustrating multiscale communication and designed to allow distant groups to communicate using a video media space, which video signal is altered depending on the level of activity that is measured in each site. Pêle-Mêle allows to review videos of moments with intense activity, allowing the same type of interaction as the VideoProbe, where communication can be both direct (people record video on purpose) or ambient (Pêle-Mêle records peripheral activity and shares it). Users can then browse through to review past videos, allowing asynchronous communication, but can also communicate synchronously. Pêle-Mêle is affected by activity occurring in the field of view of its camera, and alter its display according to that activity. So changes in activity are reflected synchronously on

connected Pêle-Mêle devices. Similarly, *WeMe* designed by Masson and Journaux allows close people to communicate using either ambient sound or hand gesture, and represents this information as bubbles in a liquid bowl situated in a public space of the house.

Other people in our research group have also studied the use of communication appliances to support long distant couples. *Nightboard* designed by Wauthier [2006] is a graphical representation of a sky, projected on the ceiling above a bed. Users can interact with the representation using a laser pointer to create or move clouds. Connected nighboards are expected to allow couples to share a "digital sky" and enhance their intimacy while at a distance. *MissU*, designed by Lottridge *et al.* [2008], is a shared audio system, connecting distant couples using both music and ambient sounds to enhance their intimacy without necessarily requiring high levels of engagement. It allows couple to share their sound environment, and, if they desire, to start a conversation.

Figure 2.6: Pêle Mêle, a multiscale communication appliance. Picture courtesy of Sofiane Gueddana.

Communication appliances lower privacy concerns by exchanging information uniquely with trusted, intimate people, close friends and family members. The communication appliances do not allow the user to connect be connected to everyone, as the telephone or the email does, but allows the connection to trusted networks. To ease the establishment of this trusted network of friends and relative, Mackay and Beaudouin Lafon also designed an interaction paradigm for managing and connecting groups of trusted people using tangible interfaces and cards, called *familyNet* [Mackay and Beaudouin-Lafon, 2005, Mackay *et al.*, 2004b]. The concept of *telebeads* by Labrune and Mackay [2006], extended the concept of familyNet by designing augmented beads which allow teenagers to connect to their friends.

2.3.1 Summary

The aim of the communication appliances is to support relationship between groups of close people (typically family and friends) and raise their respective awareness. This

awareness might be relative to many aspects *i.e.* activities, locations, feelings and health, depending on the social relations of the connected parties and the type of mediation between them. This awareness already emerges in people's daily interaction with each other, and in their physical environment. The exchange of both direct communications and peripheral information (*e.g.* ambient sound) embedded in communication appliances seeks to support this type of awareness between people and remote members of their social network.

The communication appliances provide a way to increase awareness through a variety of direct and ambient communication (*i.e.* VideoProbe, MirrorSpace, Pêle-Mêle) and by adopting several mechanism for exchanging the information, both asynchronous and synchronous (*i.e.* MessageProbe, Pêle-Mêle). However, only few of these systems have been deployed outside the lab (*i.e.* VideoProbe, MessageProbe, MissU). In particular, different types of ambient communication for close relationship require a different type of peripheral information to be mediated. Therefore, we need to better understand the type of peripheral information which is relevant to mediate meaningful relations in aging in place.

To be able to design communication appliances for elders, many issues need to be addressed, including: What aspects of awareness information could benefit elders aging in place? With whom would elders benefit from an increased awareness? How should this awareness information be exchanged? In general, what role can communication appliances play in aging in place?

To further explore these issues, we review in the next sections the literature relative to aging in place, the technology designed to support aging in place, the social networks of elders, and computer mediated communication designed for the elderly. This review allows us to highlight the potential benefit of communication appliances for aging in place, and provide us with a starting point for our exploration.

2.4 Aging in Place

In the past 50 years, the proportion of World population aged 60 and more has significantly increased [UN Secretariat, US Census Bureau]. This increase is particularly important in developed countries, where people live longer and healthier. Current predictions show that between now and 2050, the proportion of the population aged 60 and over will grow from 21% to 34%. In the USA only, this proportion will increase by 79% to reach 26.8% in 2050.

With the prospect of the World's population growing older, current elderly care systems are undergoing important changes to accommodate the need growing demand. Traditional ways of caring for the elderly are becoming less appropriate. Family care becomes obsolete as families become more widespread and women, traditionally key providers of informal eldercare, now generally have jobs and can not attend to this task. Finally, retirement houses are increasingly expensive, and fail to address the needs of a part of the elderly population who lives longer and healthier.

To overcome these issues, governments and institutions are seeking alternative ways to support the elderly. One particular solution is the promotion of aging in place, where help is provided to promote elders' independence and safety in their home [Pollack, 2004]. Aging in place presents many benefits, including the maintenance of the person in a familiar environment and the promotion of their independence. In aging in place, particular needs of elders still need to be met to ensure their safety and increase their independence. Homes

must be adapted to help overcome frailties induced by the aging process, such as sight or hearing impairments and address health issues.

To date, elders willing to age in place receive the support of professional or family caregivers [Cantor, 1979]. They are also offered the opportunity to relocate to a residence specifically designed for elders and which provides services specific for this user population [Cannuscio *et al.*, 2003]. However, the shortage of trained professional caregivers [Medical News Today] and the lack of family caregivers [Baillie *et al.*, 1988, Schulz and Beach, 1999] have motivated institutions and researchers to seek new solutions and technologies for supporting aging in place [Pollack, 2004].

2.4.1   Technologies to Support Aging in Place

The research related to aging in the field of *Human Computer Interaction* (HCI) has been extensively focused on providing assistive or monitoring technologies to overcome issues induced by aging [Mynatt *et al.*, 2000, Newell and Gregor, 2005, Pollack, 2004]. Assistive technology overcome the many disabilities appearing in the aging process: sensory impairment (*e.g.* sight, hearing), physical impairments (*e.g.* strength, coordination) and cognitive impairments (*e.g.* memory losses, dementia). Monitoring technologies, on the other hand, assist the caregivers in the monitoring of the elders' well-being by providing remote data and automated alarms. Monitoring therefore indirect supports elderly well-being by helping the helper, rather than the elders themselves.

2.4.2   The Assistive Approach

The first major approach for designing technologies to support aging in place is to help the elderly people overcome the impairments induced by the aging process : Assistive technologies. Elderly assistive technologies have been developed to overcome various types of disabilities, including cognitive, sensory and physical impairments. These impairments prevent the elderly people from aging in place by limiting their independence and presenting risks to their safety. This section will briefly describe each type of impairment before exploring assistive technologies designed to help elders overcome them.

Cognitive impairments are commonly found amongst elderly people [American Psychological Association, Mann, 2004]. In particular, memory is affected by the normal neurodegenerative process induced by the aging process [Nilsson, 2003] and memory loss is a common symptom of cognitive disabilities. About 10% of people aged 65 and more have cognitive impairments which impede their ability to complete everyday tasks [Mann, 2004]. These cognitive impairments might provoke confusion disorientation, limited attention and decreased ability for learning.

Most elderly people also suffer from a decrease in their auditive and visual capabilities. Those impairments affect their ability to interact with common interactive systems such as classic Window Icon Mouse Pointer (WIMP) interfaces. For vision, color perception can be affected by the yellow tinting of the eye-lens, the extent to which the pupil dilates decreases, and contrasts are harder to perceive [The Eye Digest].

Cataracts are also frequent within the elderly population, and requires eye surgery to avoid blindness. In general, most elderly people require a vision-correcting device, such as spectacles or magnifying glass, to perform tasks requiring vision, like reading or watching TV. For hearing, one of the most common problem amongst elders is presbyacusis, which

induces a deafening of high tones. Other factors can also affect the hearing of elderly people, including exposure to noise, diseases and blood pressure [US Congress].

Finally, elderly people are prone to severe changes in their motor skills. Arthritis is a major source of disability in the US, and induces a stiffening of the joints [Lawrence *et al.*, 2007]. This condition severely reduces the mobility and physical activity of elders. Age also induces a decrease in muscle strength [Hortobagyi *et al.*, 1995], and control. This leads to a lower mobility and greatly impacts the elders' ability to use traditional mouse and keyboard devices. The loss of mobility also influences the development and maintenance of the social network of elderly and contributes to the feeling of isolation and dependence [Mann, 2004].

Assistive Technology for Cognition

Over the past two decades, researchers and clinicians have studied the use of technologies to assist people with cognitive impairments [LoPresti *et al.*, 2004]. LoPresti *et al.* [2004] describe four major areas in which technology has been sought to assist people: memory compensation, problem solving and planning, context awareness, and sensory processing, social and behavioral issues. In the context of aging in place, the major effort has been put on the support of elders with Alzeihmers' disease.

Morris *et al.* [2003, 2004] have explored how ubiquitous computing can help elderly people suffering from dementia to age in place. In [Morris *et al.*, 2003] they build upon field studies to design four prototypes of devices, intended to help elders and their caregivers to manage their cognitive decline. Informed by interviews and field observations, these designs offer a broad range of purposes, to address different stages of dementia and accommodate the various problems brought by each stage. Out of those four designs, two are assistive technology aimed at supporting memory management and planning: A system to ease face and name recognition, and a system to assist in daily routines.

Other recent systems designed to assist elders with cognitive decline include the Cook's collage by Tran and Mynatt [2002], for supporting task planning. The Cook's Collage is a task reminder which assists elders in their cooking tasks. The system records user's actions and prompts him/her with the next step to be undertaken. A similar system, called COACH [Pollack, 2004] provides cues to help cognitively impaired elders wash their hands without missing or mixing any steps of the procedure. Extending COACH, Autominder [Pollack *et al.*, 2003] is a system aimed at providing cues and reminders not on any particular tasks, but on any task the cognitive impaired elder is willing to undertake. Autominder monitors users' action in an attempt to recognize its activity and the task being undertaken (*e.g.* putting on a coat). When a task is recognized, it tracks users' advance in the sequence of action which leads to the completion of the task, and if necessary, provides a reminder of the next step required.

Assistive Technology for Sensory Impairments

Many technologies developed specifically for older users have been designed to address elders' specific sensory deficiencies. Few projects are specifically targeted toward the assistance of elders sensory impairments *per se*, but rather take the sensory impairments into

account in the design process. For instance, MAGUI[2] is a communication system designed for elders, using very large buttons and strong contrasts to address poor sight. Traditional assistive devices for sensory impairments include corrective glasses and hearing aids.

Assistive Technology for Motor Impairments

Motor impairment is also usually addressed in design choices, rather than specifically in a project. For instance, to help elders with difficulties interacting with a traditional graphic user interface, which require the use of a mouse pointer, computers like MAGUI use a touch screen with large buttons. However, some projects specifically address the needs of elders with motor impairments. Shklovski *et al.* [2004] have developed a robot designed to provide assistance during a walk by providing physical support and directions. Similarly, Care-O-Bot [Graf, 2001] is a robot providing walking assistance for the frail elderly by assisting them in walking task and embedding an obstacle avoidance system. Care-O-bot is also capable of fetching and carrying objects, for example to carry a heavy chair. While the Care-O-Bot system has been tested in public environments like museums [Graf and Hägele, 2001], little research has been done to evaluate it with elderly people in a real home.

Summary

These disabilities are also more critical when designing complex interactive systems, such as email clients or web browsers. For instance Dickinson *et al.* [2005] designed a custom email client and Internet Browser [Dickinson *et al.*, 2007] for elderly users, taking into account their limited familiarity with computer paradigms such as hypertext, as well as vision and motor impairments by providing an usable interface with large text and clear contrasts.

Despite their necessity, assistive solutions often stigmatize their users as being disabled and therefore are poorly accepted by the elderly [Forlizzi *et al.*, 2001]. Such disabilities must nevertheless be taken into account when designing communication appliance in order to ensure they remain usable by the elderly population. In particular, sensory and motor skills greatly affect the experience of older users regarding interactive technologies, and the design of interfaces for this population must somewhat take these aspects in consideration. Acknowledging the difficulty in involving elderly users in a design process of assistive technologies, Rice *et al.* [2007] used role-playing with actors based on realistic scenarios and intended to raise discussions with users.

This research project, however, does not restrict the users' population to people having limited physical impairments and mild or no cognitive impairment. Usability (*i.e.* tailoring the interface for a given population), while being a key element to adoption and efficiency of a technology, is not the primary focus of this work. Rather, we seek to explore new systems which support aging in place without stigmatizing elders. Similarly to Forlizzi *et al.* [2001] we envision that system adapted to elders would answer issues critical to their needs, but which could be useful for a larger population.

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[2]More on MAGUI at `http://www.magui.fr/`.

2.4.3 The Monitoring Approach

The second major approach in designing technology to help elderly people age in place is monitoring. Monitoring differ from assistive technologies in that it supports the caregivers' tasks (help the helper) instead of the elderly people themselves. Monitoring for the elderly takes many forms, including smart homes, robots and less intrusive solutions like the Digital Family Portrait [Mynatt *et al.*, 2001] and the CareNet display [Consolvo *et al.*, 2004]. The common aim of monitoring systems is to be able to let frail older people age in place while providing a close care by means of monitoring and communication technologies.

Smart Homes and Telecare

Smart homes have also been developed over the past decade to help monitor elders in their homes. Rialle *et al.* [2001] designed a smart health home designed to monitor elder's health. It provides medical staff with a summary of vital signs and raises alarms to signal a potential threat. The recent evaluation of this system [Rumeau *et al.*, 2006] essentially focused on the correctness and appropriateness of the monitoring technology, while issues of acceptability and loss of social contact have been partially addressed in the work of Ghorayeb [2007].

In the UK, British Telecom, the Anchor Trust and the Housing Corporation developed, implemented and deployed a trial intelligent home service [Sixsmith and Sixsmith, 2000]. The system was composed of between 9 and 12 low cost sensors (including infrared motion detectors, contact sensors and temperature sensors), a home unit to centralize sensor data and communicate it to the control unit, and a control center to gather and interpret the data. The control center was able to recognize alerts and send subsequent alarms to either carer or client. The 3 months long field trial of this system with 22 elders resulted in participants reporting feeling safer in their homes.

At the Georgia Institute of Technology, the AwareHome [Kidd *et al.*, 1999] has been designed to provide researchers with a laboratory where they could test monitoring technologies in a real environment. The AwareHome is designed to accommodate people to allow them to live in the home for a period of time, giving the opportunity for researchers to gather real life experiences about the interaction between people and the technology, on both the caregivers and the patients' perspective.

Field trials and deployment of smart home technology reported various reactions from caregivers and elders. Family caregivers have been generally positive about the experience [Rowan and Mynatt, 2005, Scharnberg, 2006, Sixsmith and Sixsmith, 2000]. Elders'reactions were more heterogeneous, praising the added feeling of security [Sixsmith and Sixsmith, 2000] or criticizing the intrusiveness of these solutions [Scharnberg, 2006].

Alternatively, a number of commercial monitoring solution have emerged to support aging in place. The most common ones are certainly Personal Emergency Response Systems [3] which includes a portable button which allows users to contact emergency services instantly when pressed. The QuietCare company [4] also offers family caregivers with home

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[3]More on Personal Emergency Response Systems at `http://www.ftc.gov/bcp/edu/pubs/consumer/products/pro24.shtm`

[4]More on the QuietCare company at `http://www.quietcare.com/`

monitoring technologies aimed at reacting to health issues before they become emergencies. It includes monitoring of wake up times, bathroom falls, medication usage, meals preparation, and sleep habits using various wireless sensors.

Important issues remain in smart home, telecare and monitoring solutions in general. In particular, the study by Sixsmith and Sixsmith [2000] uncovered several concerns including the loss of human contact by distributing the care, and the cost of smart home systems. The particular issue of cost effectiveness is further explored by Whitten *et al.* [2002] review of literature on home monitoring systems reported finding no substantial evidence of the cost benefit of telemedecine. Another study by Whitten *et al.* [1998] revealed other issues dealing for these systems, related to ethics, where an economic approach is taken to caring for elders, privacy, where elders sacrifice their privacy to a caregiver in return for added safety, and acceptability. Additionally, based on his experience with the TeleCare system in the UK, Banahan [2004] reports that monitoring is not elderly care, and can lead to the loss of the important human contact which should be established between caregiver and elder.

Robots

Carnegie Mellon's Nursebot (Figure 2.7) [Baltus *et al.*, 2000, Pineau *et al.*, 2003], is a domestic robot intended as an assistive device for cognitive impairments, an observation device recording relevant information for caregivers, a telecare device allowing medical caregivers to remotely assess patient's health, and a device facilitating social interaction. Nursebot, is both an assistive device, providing cognitive (*e.g.* Autominder [Pollack *et al.*, 2003]) and physical (*e.g.* walking aid) assistance to the elderly, and a monitoring device. It is designed to monitor activities of elderly patients and to compare them to a learned schedule and learned routines.
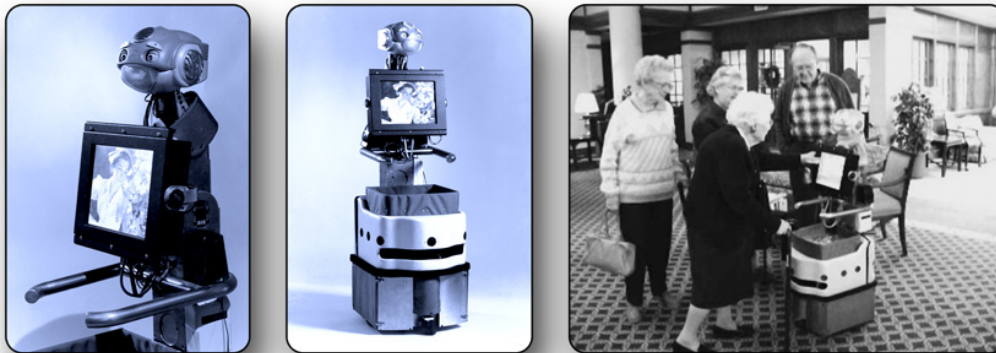
Figure 2.7: Nursebot, a robot to assist and monitor elderly
©Carnegie Mellon University used with permission.

The JPL Robot [Fiorini *et al.*, 1997] provides medical staff with a mobile robot equipped with a manipulator arm which allows them to remotely perform basic interventions in the elders environment. Dr Robot [Ellison *et al.*, 2004] is a robot designed to serve as a physical extender to physicians in hospitals which is expected to be used for telerounds (post surgery doctor's rounds). Dr. Robot was proved efficient at facilitating physicians' work

and improving patients' overall satisfaction. However, it is unclear how this might affect the quality of the medical work or the long term relationship with patients.

In many projects involving robots, the issue of acceptability has not been addressed. Some studies suggest that elderly participants responded favorably to the long-term introduction of a robot in their environment [Wada *et al.*, 2005], or even for a short term [Hans *et al.*, 2002, Pollack *et al.*, 2002]. Others report that acceptance of robots is low and uncover ethical and moral issues [Haigh and Yanco, 2002] dealing with the artificiality of the exchanges, and the lack of social engagement they might induce.

Nursebot's acceptance, for example, was only tested during the realization of scenarios lasting a few hours where the robot had to find the patient, remind him of a meeting, help him/her walk to the meeting, and provide a reminder when arrived at destination [Pineau *et al.*, 2003]. This short evaluation covered a functional aspect of the robot functionalities but failed to address the general question of acceptance.

Other Monitoring Approaches

Mynatt *et al.* [2001] have explored some less intrusive monitoring approaches and designed the Digital Family Portrait [Mynatt *et al.*, 2001, Rowan and Mynatt, 2005] (See figure 2.8). The digital family portrait supports the peace of mind of adult children by keeping them aware of activities in the house of their elderly parent. The digital family portrait consists in a digital picture frame showing the photo of the elderly parent, surrounded by a frame of made of 28 symbols, each summarizing on day of activity. The size of each symbols size represents a daily activity of the distant elder, measured using various sensors disposed in his/her house.

Figure 2.8: The Digital Family Portrait: an augmented picture frame for providing peace of mind to extended family members. Each butterfly around the frame represents a "level" of activity measured by sensors in the elderly parent's home. © Georgia University of Technology, used with permission

During the initial Wizard of Oz evaluation of the digital family portrait [Mynatt *et al.*, 2001], two devices were placed in the home of respectively the adult child and the elderly mother. The activity of each connected user was measured by researchers probing users

on the phone, and reported on the digital frame as an icon of varying size. Each user was therefore presented with information about each other in a bilateral and balanced way. The outcomes of this first study outlined the role of the digital family portrait for reassuring the adult child, but also provided them with a *"context in which conversations can be started"* [Mynatt *et al.*, 2001].

Later stages in the project saw the disappearance of the digital family portrait placed in the elder's home, removing awareness of his/her distant adult child [Rowan and Mynatt, 2005]. Whereas the initial bilateral design provided a means to increase social connectedness, the unilateral solution adopted by the project turned it into a monitoring system, providing the distant person with information about his/her parent activities to help with caregiving.

This latter approach was the basis for the design of the CareNet display [Consolvo *et al.*, 2004], a digital picture frame designed to help care givers in their task. The CareNet system gathers data in the elders' environment (*e.g.* medication intake and time in bed) and provides a summary of that information on picture frames placed in the caregivers' home. The CareNet system also provides the opportunity for caregivers to coordinate their activities by informing each other of their actions (*e.g.* Has someone taken Mum to the psyiotherapist?). The field deployment of the CareNet display used multiple daily phone interviews to simulate the collection of data. The results of this study outlined the benefit gained by the caregivers, especially regarding their relationship with the elderly person. Because of the data provided by CareNet, they did not have to ask trivial, embarrassing questions to the elder and thus felt they were less intrusive in his/her privacy, and could focus more time on the elder's well-being.

2.4.4 Summary

Assistive and monitoring solutions are required in many cases, and provide ways to help people age in place longer. However, they often fail to acknowledge the need of elders for social contacts [Sixsmith and Sixsmith, 2000], and the role of informal exchanges in their daily well-being. They are often stigmatizing, intrusive, and poorly accepted.

Moreover, Whitten *et al.* [2002] point out that elders' acceptance of monitoring systems differs depending on their perception of their dependence. Therefore, people with limited mobility reported seeing a real benefit in the system, while people with higher mobility were overall not interested in the system, seeing no real benefit. In this thesis, we argue that monitoring technology is usually adopted by elders who have already lost their independence and are concerned about their own health. In this regard, home monitoring systems are adopted as a reactive solution to an existing crisis, rather than in as a proactive approach.

2.5 Elders and Social Networks

As an alternative, Forlizzi *et al.* [2001], Morris *et al.* [2004] suggest that more could be done to support elder's desire to exchange with members of their social networks. In particular, Morris *et al.* highlight the need for elders for reciprocal relationships [Morris *et al.*, 2004]. Blythe *et al.* [2005] also suggest that technology developed for the elderly population should reduce isolation and take the broader social context into account. The following section reviews the literature relative to the role of social networks to aging in place. In particular, we review the role of social connectedness for elders' well-being.

2.5.1 Elders' Social Networks and Their Role

Giles *et al.* [2005] conducted an epidemiological study on the influence of social networks over the life expectancy of older adults in Australia. In their study, they interviewed 1,477 people aged 70 and more and showed, using covariate analysis of the data collected, that people with larger networks of friends had significantly longer life expectancy. The impact of children and relatives was not significant, which suggests that not only friends plays an important role in the well being of elderly, but it also has a positive influence on their life expectancy.

The study by Broese van Groenou [1995] of proximate networks described the nature and role of the social networks of the elderly, especially of key supporters (people geographically, socially and physically apt to provide support). The results showed that around 53% of 4,029 elderly participants had no potential key supporter in their social networks. Moreover, this study underlines that a significant proportion of the elderly population lives far from their close social networks, and especially care-providers in this network, thus heightening the potential role of communications.

van Tilburg *et al.* [1995] provide a similar argument, describing how social relationships play a significant role in elderly lives. They described two kinds of support exchanged within the network: instrumental support in which *"material goods can be transferred or help can be provided"*, and emotional support that includes *"conversations in which one person shows understanding for the other person's situation"*. The study examines the exchange of both emotional and instrumental support for 4,059 elderly. The results showed that people living with a partner have more relationships and more support exchanges than people living on their own. It also showed that people living in institutions had a lower exchange of support with their personal networks.

These work further contribute to our belief that enhancing the connectedness of elders with their informal support networks and encouraging bilateral exchanges can be beneficial to aging in place. By using appropriate technology, we hope to help members of the elders' social networks to be more involved in their daily lives. Because building new relationships in later stages of life is difficult, we envision helping elders maintain contact with distant friends, for instance after change of residence. These people could then in turn become potential sources of support, and in any case support social contact.

Moreover, in this thesis, we believe *reciprocity in communication* and *reinforcement of social (or even human) contacts* are essential aspects to avoid stigmatization and help elders to be better connected with their social network. Communication devices could be adopted early in the course of the aging process, and thus be considered not as a way to exchange care, but as a way to be in contact with people who matter. Elders could benefit from enhanced communications, to increase their ties with their social networks and as a result avoid isolation and loneliness.

2.5.2 Supporting Elders' Relationship With Their Social Networks

This section reviews works related to the design of communication technologies for elders and to support aging in place. It first emphasizes various projects which designed communication to support aging in place, and the current trend toward monitoring. It then describes the work done in relation with elders and their communities, and finally review works relative to the support of elders' relation with family and friends.

Communication for Monitoring

In her thesis, Broese van Groenou [1995] studied the design of communication systems to be integrated to a smart home system. She reports on elders' desire for better communication with their loved ones, family and friends, and also the role of communication in the task of professional caregivers. From this project emerged the concept of ECOVIP, a communication system for seniors allowing them to stay in touch with up to five members of their social network equipped with the similar device. ECOVIP supports audio / video, and text communication between the different users, and a context awareness platform informing users of their respective states. This approach considers elders, family, friends, and a remote caregiver as users of the system and suggests the use of automated privacy systems and activity inference algorithms to address the various needs of each user, in particular to reinforce privacy, and to ensure elder's well being.

The design of ECOVIP was motivated by the need to address the lack of communication systems in telecare and monitoring systems. The scenario based evaluation of ECOVIP outlined the satisfaction of elderly users toward the simplified and tailored approach of the system. However, no field deployments were conducted, which could have helped validating the approach for context awareness and privacy, two key aspects in the design of computer mediated communication.

Like ECOVIP, who supports the remote caregivers' task and provides communication, the ShareComp necklace [Chen *et al.*, 2005] not only displays and captures pictures, but is also fitted with a GPS to indicate the elder's location to their family caregivers. Projects which were initiated to study communication systems for elderly people with their families, evolved to become a monitoring system for family members to stay aware of the elderly people's well-being.

Mynatt *et al.* [2001] initially designed the digital family portrait (see The Monitoring Approach p.57) as a two way awareness system connecting the elderly parents and their children's homes. Later iterations of the digital family portrait focused on *"supporting peace of mind"* of the adult child by monitoring the activity of the elderly parents, and the digital frame placed in their home was considered unnecessary *"because* [the elderly parent] *had expressed no interest in it"*. By removing the second digital family portrait from the elders' home, the project has gained a different perspective, focusing on monitoring by the adult child, rather than on supporting social exchanges.

Similarly, Metaxas *et al.* [2007] studied the type of communication elderly parents and their adult children wanted, exploring various medium and types of messages. While several lightweight communications were explored, such as a simple courteous hand wave, the Daily Activities Diary acts as a monitoring system, drawing from sensors in the elderly parents' home to create narratives about their activities for the benefit of the adult children. No information from the adult children's household is exchanged. There is no bilateral exchange of information.

Both the Digital Family Portrait and the Daily Activities Diary emerged from the need for elderly people to communicate, but evolved into a one way communication device. By adopting this change, they become a lightweight monitoring system which supports the adult children's peace of mind. While their evaluations suggest their benefit for supporting adult children's peace of mind, and in some case elders' peace of mind, they do not specifically support the need for elderly people to communicate more easily with distant loved

ones and "stay in touch". This thesis builds upon this work by exploring how communication systems can support bilateral reciprocal exchanges.

Supporting Elderly People in Communities

Beyond the support of caregiving, communication systems can also help elders be part of a community. Mynatt *et al.* study of elderly online communities [Ito *et al.*, 2001, Mynatt *et al.*, 1999, 2000] outlined the role of communities for elders. In particular, this study reports that seniors had a felt a particular relationship with fellow seniors, which lead them into communities where communication was easier. Seniors, however, where reluctant to be categorized as seniors outside the community.

Elderly people are brought together by common experiences and interests [Mynatt *et al.*, 2000] in online communities, where they find satisfying types of exchanges and relationships. Furthermore, Mynatt *et al.* [1998] describe communities as being local, based on meaningful and multi-layered relationships, and dynamic by nature. Communities are built around shared values and experiences which are meaningful to the elders, in particular regarding the nature of the exchanges [Mynatt *et al.*, 1998].

Moving beyond online communities, Brunette *et al.* [2005] designed Meeteetse to support the link between elderly people and their local communities. Meeteetse is a system which provides information about local community events to isolated elders in their homes. Meeteetse provides the agenda of local events, informing elders of possible interesting events they might want to attend, and other information related to past events, such as digital pictures taken by the community. Pictures are curated by community members on a large public display in the community center before being shared with the isolated elderly. We suggest that while this system provides an interesting way to provide isolated elders with information about what is happening in the community, Meeteetse does not provide them with a way to act within the community and thus take an active role within it.

Communicating with Family and Friends

The social networks of elders is also composed of family and friends who form their closest contacts [Forlizzi *et al.*, 2001, Ghorayeb, 2007]. To support elders exchanges with family and friends, Chen *et al.* [2005] designed ShareComp, a system providing an elder-friendly way to digitalize and share pictures. A digital frame allows elders to digitalize pictures by inserting them in a slot, and serves as a display for showing photos. A necklace complements this frame by allowing elderly people to carry photos with them all the time and also allowing to capture new photos or videos of events, people, or objects. Eventually, a web service allows people in the elderly' social networks (family and friends) as well as the elderly people themselves to review photos posted through the system.

Similarly, Langdale *et al.* [2006] have created a communication booth which allows elderly users and their families to easily communicate through voice messages. A common interface, placed on a dedicated device, allows family members, including elderly people, to exchange stories and events of daily life. This system still remains to be tested in situ to understand how long term use would affect elders' relationship with their families.

The Hug, designed by DiSalvo *et al.* [2003], Gemperle *et al.* [2003], is a cushion which

allows users to exchange hugs by communicating pressure that is applied to it to a paired cushion, which in turn embraces the person holding it. The Hug has been primarily designed for establishing a particular tangible link between grandparents and their grandchildren, supporting this particular relationship.

2.5.3 Summary

Various projects have explored the design of communication systems for elderly people from different perspectives: supporting caregiving, community exchanges, and relationships with family and friends. Most of these projects, however, fail to address both the need for bilateral social exchanges, and the ambient exchange of contextual information for interpersonal awareness. To date, few projects have used ambient communication to support awareness rather than monitoring.

In this thesis, we extend the work of Mynatt *et al.* [1998] by looking at the role of groups in aging in place (*i.e.* friends, neighbors, clubs), and how computer mediated communication can support them. Moreover, this thesis explores the interaction between elders and their social networks at large, as well as their role for aging in place.

2.6 Conclusion

In this chapter, we have described work related to *Computer Mediated Communication* and *Aging in Place*. We have first described research in computer mediated communication for the workplace. We have outlined the role social behaviors in the workplace, supported by awareness and informal communication. We have also described the medium's role in the communication systems, in particular the role of always-on communication and communication ambiguity for ensuring a transparent use of communication systems in routine activities.

Furthermore, we have described how the concept of awareness and informal interaction identified in the workplace also emerge in the home. We have highlighted how this awareness can be mediated for family or intimate relationships, and how a combination of *ambient and direct communication* can support both *informal exchanges* and *awareness*. We have described how the concept of *communication appliances* can provide a support for those exchanges. We have outlined the need for a better understanding of the role of awareness in aging in place.

Finally, we have described how existing research to support aging in place have essentially focused on assistive or monitoring approaches. We have described work highlighting the benefits of elders' relationship with their social networks and suggested that communication systems could be designed to support these relationships using reciprocal, direct and ambient communications, in contrast with current approaches essentially focused on supporting direct communication between elders and their families.

Building upon this work, this thesis explores how communication appliances can support aging in place. To undergo this exploration, the next chapter of this thesis studies the nature and role of elders' social networks in their well-being.

Field Study: Communication and Aging in Place

Chapter 3

Contents

Summary

This chapter describes the field study exploring the current uses of communication amongst elderly people. This study explored the nature and role of the support networks of elderly participants, its composition and interaction, and allowed the collection of "successful strategies": situations in which either social networks or communications are or were used to support aging in place. In particular, this study allowed us to identify opportunities for designing communication appliances to support aging in place. We describe the concept of PeerCare, the peer support relationship observed amongst elderly participants and the relationship observed between the elderly participants and their families, in particular adult children, and the issue of intrusion. We also discuss the role of some social structures and activities regarding the support of aging in place, and the role of rhythm and routines awareness on PeerCare. The findings of this study offer that communication appliances can provide an alternative to monitoring or assistive technologies for supporting aging in place. Building on these findings, this chapter suggests design implications for supporting existing, socially-acceptable and well-established relationships using Communication Appliances.

How can innovative communication systems support the aging in place process?

To answer this question, we conducted a field user study in the initial stages of this thesis to gain insights from real situations and users. Considering elderly people as the primary stakeholders of this project, this study focused on understanding their communication patterns, the role and composition of their social networks, their different sources of support, and the context of use of potential new technologies. It employed a range of user-centered design techniques to gather qualitative data about the target users.

Our method of qualitative analysis for qualitative data is Grounded Theory described by Strauss and Corbin [1998], meaning that our approach seeks the emergence of theories from our investigation rather than the verification of a pre-established theory. In particular, we used grounded theory as a way to inductively gather categories from our data and using microanalysis on our initial data. This microanalysis required us to examine closely the initial data (many times over), generating initial codes based on this analysis. Rather than using a given taxonomy for these codes, we extracted recurrent salient themes in the data. We then used these codes to analyze the rest of the collected data, adding new codes when necessary. Eventually, a cross examination of these codes allowed us to group them into categories, and provide a description of the multiple aspects of a given phenomenon using these categories to instantiate various aspects of the phenomenon, as illustrated by the variety of codes inherited by those categories. We then explored the relations between those categories to understand how the phenomena interacted.

Because of the number of people involved in this research, only one researcher identified and propagated the codes throughout the data, meaning that another person, e.g, researcher, did not validate this coding scheme though a cross examination. Rather, we discussed these phenomena, their interpretations and their interactions frequently with participants to validate our analysis and, if necessary, identify new aspects to explore further. While this does not provide a systematic review of our coding scheme by a third party, it allowed us to further confirm our analysis. Moreover, in conjunction with our triangulation approach, this process supports the cross validation of our findings while involving the end users in the interpretation of the data. This method, however, still reflects our bias in the results of the study, thus the findings have, as for any qualitative method, to be considered as a constructed understanding from our point of view, to be refined, revised and confronted by other studies and analysis.

Finally, to optimize the emergence of understanding of a given phenomenon, it is recommended to involve participants who have a rich experience it, in our case aging in place. To that effect, we recruited elderly people living independently in their homes, with various experiences and approaches for maintaining their independence.

3.1 Participants

Recruiting participants for this study provided a greater challenge than anticipated. Many people we approached often lacked motivation for participating in the study, or refused because they did not see any direct benefit for themselves. People often conceived our focus on elders as excluding them, and did not feel concerned. We adapted by approaching and convincing people who would serve as intermediary between us and other elders. The key members in clubs were particularly efficient in selecting and approaching other club members who would be willing to participate.

Fifteen (15) women and one (1) man aged from 66 to 89 years participated in this study. All lived independently in either their own house (n=6), or in an apartment (n=10). Participants included a couple, one woman still living with her husband (who was not interviewed), and thirteen (13) participants were either single or widowed. All were in reasonably good health and required no medical supervision. However, each had some impairment or disability, either induced by age, accident, or disease, and affecting hearing, mobility, hand control or eyesight. At the time of our study, seven (7) participants were receiving support for home chores, *e.g.*, house cleaning, ironing. Four (4) of these women owned a computer, with a usage ranging from typing mail to accounting. Only one (1) owned an Internet connection : a dial-in connection which allowed her to exchange emails and digital photos with family and friends.

Participants were mostly recruited through two different local clubs (n=11) in the southern Parisian suburb area. Three (3) women were recruited within a sheltered housing facility and an elderly couple was introduced by one these women for two workshop activities. Participants in the sheltered housing do not receive formal care, but rather live independently in an environment designed for the needs of elderly people.

For our analysis, we group our participants into three groups of elders, the Gang of Four, the Club Members, and the Sheltered Housing Residents. Each group is composed according to the type of relation, or situation of the participants. The Gang of Four are neighbors and very connected, club members all participate in elderly clubs, and sheltered housing residents have all moved from their previous accommodation to live in a community of elders. Each individual in these three groups were interviewed individually, but are grouped in our analysis to reflect their particular similarities regarding relationships, communities and living environments.

We selected these participants as they had achieved various level of success in aging in place. Our intent was to understand what difficulty they were facing in remaining independent in their own homes, and what strategies they had developed to do so. In this chapter, we describe their situations and how their *success stories* can inspire the design of technologies to support their strategies and offer it as a solution to other people with similar needs.

3.2   Methods

This study combined field study techniques and workshops to gather qualitative information about the target users: elderly people living independently. The goal was to identify key aspects of their lives which affected their independence and well-being.

3.2.1   Interviews

For the first part of this study, we interviewed the 14 women participants[1] in their homes. We divided interviews in two parts. The first part included a critical incident interview [Edvardsson and Roos, 2001] which captured recent and detailed data about their daily lives, communications and interactions with people and technologies. We used the critical incident technique to encourage participants to reveal a high level of detail about their activities. In particular, we sought to capture events which, while participants felt they were not important or even irrelevant, could prove of importance to this project. Because events which

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[1] The couple was only introduced during two of our workshops by one of our initial participants

were meaningful to us might not appear interesting to our participants, we asked them to recall their previous day in detail. This exercise illustrated our need for exhaustive and precise recollections of events, rather that vague and abstract description of events they thought would be relevant. Examples of questions were:

- · Tell me about what you did yesterday. Try to give me as much detail as possible, for instance what you ate, who you talked to, etc.

- · Did you meet anyone? Who? Did you talk for long? For how long have you known him/her/them? Do you consider yourselves as close?

- · Have you exchanged phone calls? Who initiated the call, you or the other person?

The second part of the interview was designed as a semi-structured interview, with questions focusing on their communications and social networks (in particular family and friends). This part of the interview served to explore interesting points raised during the critical incident and discuss the topic more broadly, without solely focusing on recent events. Questions in this part of the interview included :

- · Do you remember the last time you were sick? What happened? Who knew about it? How many people inquired about your recovery?

- · Do you have problems in your daily life? How do you overcome them?

- · Do you travel often? How far? What means do you use? For how long do you stay? Do you get assisted in your travel?

- · Have you always lived here? Have you kept in touch with people from where you used to live? What did it mean for you to move?

Overall, the interviews focused on what strategies these women had adopted to maintain their independence, and particularly the role of communication and their social networks in their lives. Conducting the interviews in the homes of the participants also allowed us to observe which technology they currently owned, how it was included in their homes, and the context in which potentially new communication appliances would be deployed. These interviews were recorded either on digital video or digital audio files for later analysis and additional note taking or transcription.

3.2.2 Workshops

Because the interviews only gave individual perspectives, a series of workshops was organized to refine ideas and concepts in groups. Two groups of three (3) were formed amongst all participants according to their respective relationships. Each group was involved in two workshops, each lasting between one and two hours. Workshops created opportunities for participants to discuss findings from the interviews, and allowed the creation of scenarios which stimulated discussions amongst participants and researchers. Workshops also served as an opportunity to discuss the technological preferences of the participants, their views regarding the integration of technologies in their homes and the types of media they felt were suitable for communication.

The workshops were organized as follow:

- Introduction of the points of interest issued from the interviews.
- Discussion with participants.
- Creation of scenarios.
- Discussion on technologies and communication medium.

3.2.3 Cultural Probes

To gather inspirational data from the users, five packs of cultural probes, derived from Gaver and Dunne [1999], were created and distributed. Cultural Probes are artifacts designed to ask participants to gather data from their own familiar environment. They can be made to gather inspirational material [Gaver and Dunne, 1999] or qualitative data in settings where other investigation methods (such as field observations) are inappropriate [Crabtree *et al.*, 2003]. The probes kit for this study was inspired by both the original cultural probes kit [Gaver and Dunne, 1999] and the communication probes from interLiving [Beaudouin-Lafon *et al.*, 2001]. At first, two probes were selected from previous probes study to be reused: a repackaged disposable camera and a set of postcards. A brainstorming session with colleagues in the lab was organized to define questions to be asked to the participants for both probes. Probes were designed to gather intimate home data, in ways similar to the probes deployed by Crabtree *et al.* [2003] but also left room to gather inspirational information from users [Gaver *et al.*, 2004].

Their design reflect these mixed intentions by asking both direct and open questions. The probes pack included: Six (6) postcards, each carrying a particular question and illustrated to provoke participants to "fill the void" (See figure 3.1.a.), disposable cameras repackaged with suggestions of photos written on them (See figure 3.1.b.). For more details about the probes kit, see figure 3.1.c. and consult the appendices 10.1.

Figure 3.1: a. Illustrations of the postcards from the probes kit. b. Repackaged camera included in the probes kit. c. Overview of the whole kit

Participants were handed the kit with a brief description of the task and a booklet to comment on photos, or write us feedback on the other probes, or the study in general. The outcomes of the first three probes and the interviews highlighted the need to better understand the composition of the elders' social networks from their own perspectives. Forlizzi *et al.* [2001]'s map of elderly caregivers from the ELDer project inspired the design of a third probe aimed at allowing people to map their social networks (See illustration of this probe figure 3.5).

The probe was composed of concentric circles on which participants were asked to label and place their friends, relatives, neighbors and other people of importance. Participants

placed people they felt they interacted very frequently with on the innermost ring, while people they interacted less frequently with were placed respectively on the other circles. Participants were asked to fill in details about each person placed, including their relationship. This probe was handed in with instructions to think about relationships in different ways: temporal, geographic and emotional importance.

3.2.4 Data Analysis

Throughout this study, a variety of data was collected, including the notes from the interviews, more than 10 hours of video and audio recordings from both interviews and workshops and the data collected by users using the probes' kit. Grounded theory (GT) was then used to extract insights induced by the collected data. To achieve this analysis, occurrences of micro-phenomena of interest to our study were identified and categorized (open coding). These categories were then compared against each other throughout the different observed situations in order to look for common themes among these categories (axial coding). Finally, we analyzed the concepts looking for relationships between the concepts (selective coding).

In collecting our data, we initially defined two main areas of investigation on communications and aging in place:

- **Situations** of the elderly participants and their social network. This includes the geographical, physical and temporal environment in which communication take place. We build the concept of situated action by Suchman [1987] which advocates that actions are influenced by the situation in which they take place. According to Suchman, actions are the products of the interrelations between situations and intentions. Therefore, analyzing situations is critical in understanding actions.
- **Exchanges** occurring in these situations, including in particular communication, and which support their aging in place. In capturing exchanges, we pay particular attention to artifacts and strategies which are used to mediate or coordinate exchanges. In particular, we build upon the theory of *coadaptation* introduced Mackay [1990], which advocates that the relationship between people and technology is a coadaptive phenomenon where both users and technology adapt to one another. To this end, we are seeking situations in which people modified or "hacked" existing technologies to fulfill their particular needs.

The objective of this analysis was to identify what role communication plays in aging in place, including properties and dimensions of the interaction between participants and their social networks, and the impact of the home in these exchanges. In the following section, each of our three groups (*i.e.* Gang of Four, Club Members and Sheltered Housing Residents) is first described according to the two different aspects: situations and exchanges. We then describe salient aspects within these groups issued from the open coding.

3.3 The Gang of Four

This initial investigation involved three[2] of our participants who were neighbors and friends.

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[2]One of the members of this group, Nicole, did not wish to participate in our project.

3.3.1 Situation

Béatrice, Gertrude, Hélène and Nicole[3] form a group of four elderly women who call themselves "the Gang of Four"[4] (GoF). All women are aged between 65 and 79 and live in apartments situated in two adjacent buildings in the center of their town. All women have recently —within the past four years— left a house to move into this new accommodation, following the death of their husbands. Of these four women, three took part in this study, participating in interviews and two workshops, and used the probes' kit[5].

When her husband died two years ago, Béatrice moved into her new apartment closer to facilities like supermarkets and doctors. While she had no children, she explained that she regularly exchanged phone calls and visits with her siblings and their children. However, when asked who she would seek for help in case of emergency, she mentioned three of her neighbors with whom she interacts regularly.

Figure 3.2: The participating members of the gang of four during interviews and workshops.

Gertrude used to be a teacher and lived in a house in the north of France. She moved into an apartment closer to her son at his request when her husband passed away. She reports that at first she found it distressing to arrive in a new environment where she knew no one. Where she used to live, she knew her neighbors well, four of them even had the key to her home. However, her son was worried about having her staying "alone" so far from him once her husband died, so he asked her to move into this apartment, while encouraging her to remain as independent as possible. She considers that it is up to the children to take care of their parents when they age. Nevertheless, she acknowledges having found comfort and support amongst her new neighbors and friends, which allows her not to depend on her son too much.

Hélène used to live in a house in a nearby town. At the death of her husband, she found it increasingly difficult to maintain her house and moved into a smaller apartment, closer to commodities like supermarkets and doctors. While some of her children live close by, she has found comfort through her interaction with the other members of the Gang of Four. As she points out herself: *"What would I have done all by myself otherwise? While we see each other from time to time, usually everyday, and have a chat* [. . .]."

Béatrice lives in the apartment facing Hélène's, while Gertrude and Nicole live in the adjacent building at different levels. Each apartment is comprised of one or two bedrooms, a living room, a kitchen, and a bathroom. Apartments are equipped with wooden furniture, some of which are inherited. Many knickknacks can be found on top of furniture and some

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[3]Reported names are pseudonyms used to ensure the anonymity of the participants.
[4]La Bande Des Quatre
[5]Two of these women also took part in the technology probe study described in chapter 4.

paintings on the walls. Both Hélène and Gertrude have picture frames of loved ones in the living room. During our study, the member of the GoF reported feeling concerned about the intrusion of technology in their homes, the room it takes, how unpleasant it looks and how foreign it feels.

3.3.2 Exchanges

The Gang of Four

The three women who participated in the study reported having felt lost when they moved in their new apartments. The change of geographical context induced isolation, because they arrived in a place where they hardly knew anyone. Fortunately, they met through a local club which organizes excursions, and events for elderly people, hosts card or board games, and maintains a choir and a library.

During the interviews, they reported communicating on a daily basis with one another, keeping each other informed. Their exchanges were mostly brief chats, but contained detailed information about each others' situation and whereabouts. These exchanges typically occurred over the phone, face to face or using the intercom connecting the hall of each building to the apartments. They also tell each other about upcoming appointments so that others do not get worried if they cannot contact them: *"We ask after each other, we know where each goes"* (Béatrice).

In case of problems, they reported relying on each other for help. For example, as Béatrice was recovering from a stroke, Helen, Gertrude and Nicole took turns to help her in the morning and at night to prepare meals and maintain her home. Every morning since the stroke, Béatrice also signals Hélène that she is awake and feeling fine by ringing her phone three times. The morning of our interview, Hélène had called Béatrice to check on her because she had *"not heard the phone ringing"* and thus called her to be reassured of her well-being. They have also exchanged keys so that one of them could enter their flat if they suspected something had happened to them, as well as emergency contact information to be able to act swiftly should it be required.

During our workshops, all three women highlighted the benefit of relying on a group of four persons instead of two. When one of them is not available, the others can still function as a support group. Moreover, they stressed the relief they had felt when they had formed this group, being able to rely on each other.

Families

Gertrude and Hélène both have children living close by, while Béatrice mostly has nieces and nephews living in the general area. Gertrude communicates regularly with her son, who lives in the same town. He often comes to help his mother with paperwork, or for services like changing a light bulb. Because of her recent move and the loss of her previous social context, she has come to rely on her son for many things, especially in case of emergencies. For example, she described that soon after she moved in, she felt helpless when her son went on holiday and she had no one to care for her in case of need. To overcome that problem, she asked a neighbor to contact her son, should anything happen. In case of emergency, Gertrude has also asked her son to setup the quick-dial function of her mobile phone to facilitate her access to him and the other members of the GoF. However, Gertrude

points out that she should not burden her son's family, and tries to avoid disturbing him.

Hélène has three children, one living in the same town and two others living within 50 kilometers of her apartment. Hélène reported communicating regularly with her children, often by phone. For example, the day before our interview, her daughter had called to hear about the medical examination she had had on the day. Her older son also visits her regularly (every Friday) while she usually exchanges phone calls with her daughter every week.

Others

All women reported having cordial relations with their neighbors. For example Gertrude regularly meets with an elderly couple to have tea, as well as an elderly man with whom she regularly exchanges greetings in the lift and visits on occasions. Most exchanges include cordial greetings and informal chats, less often invitations for a social event.

These women also regularly chat with people in shops and other services. Most of them have regular visits to shops or to the physical therapist (once a week). The cleaning lady comes to help them with house chores between one and three times a week. Gertrude also reported communicating regularly on the phone with friends from the region where she used to live, in particular those she had met in her previous seniors' club. They exchange their life events, joys and worries. She also exchanges letters periodically with some of these friends, as well as a former student who worries if she does not write back within a couple of weeks and call her to check if she is going well.

Figure 3.3: Artifacts found in the homes of our participants, reminding them of travels, moments, people, etc. or used for communication.

Artifacts

From these interviews, the main artifact used to mediate communication is the phone. However, letters are used periodically, by Gertrude in particular. Moreover, two coadaptative phenomena are observable: The use of the intercom and the phone ring. As described earlier, the members of the GoF use the intercom as a substitute for the telephone in order to save money on their telephone bill. When the members that live on the other building walk in the streets on their ways to the shops, they stop by to have a chat with the women

next door. Béatrice and Hélène have also developed a code since Béatrice suffered a stroke. Using the phone, Béatrice rings Hélène three times every morning around 8AM to signal her she has waken up and is feeling fine. Finally, each woman reported being quite fond of their furniture, which they have either purchased over the course of their lives, or inherited. The tops of furniture were crowded with knick knacks, souvenirs and pictures, and walls fitted with reproduction of paintings or photographs (see Figure 3.3).

3.3.3 Results

We have identified key concepts issued from our interviews and organized them in categories: Peer Care, Awareness of Routines, Co-Adaptive Phenomenon, Regular Exchanges, Mediation for Keeping in Touch and Close Social Network. Each resulting concept is illustrated with quotes from our interviews[6]. At the end of this chapter, each category is then compared to each other to merge or identify new categories and sort out the conceptual mapping.

PeerCare

I was happy to meet a person of my age. Because otherwise what would have I done on my own like that?
Gertrude explaining when she was introduced to Béatrice and Hélène.

Everyday we ask after each other.
Béatrice explaining the reciprocal support.

Upon their arrival in their new apartment, the members of the Gang of Four have created an explicit peer support group which provides reassurance, increases safety and keeps loneliness at bay. The roles within this peer care group fluctuate depending on the members' needs and availability. When Béatrice had her stroke, she was unable to provide much care, but others in the GoF cared for her more intensively. Once Béatrice recovered, the volume of care she received decreased, as it had become unnecessary. The exchanges of care are highly dynamic, and specific behaviors are adopted to overcome difficulties of the GoF members. When one of the women has an appointment with the doctor, at least one member of the gang will phone her to find out how it went. Additionally, the number of members (four) ensures that in most cases, at least one member will be able to care for the others.

Building upon this observation, we define the concept of PeerCare as an approach to support aging in place which relies on the reciprocal support of elderly peers. By exploring different perspectives to aging in place, we will seek to explore the various PeerCare behaviors and aspects of communication which affect it.

Awareness of Routines

Hélène started playing Scrabble. Every time that a game of Scrabble happens on Monday we go there.
Gertrude talking about an activity shared with Hélène.

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[6]The notes from the interviews (in French) can be found in Appendices 10.2.1.

Béatrice always goes to the seniors club on Tuesdays, and sometimes she comes with us when we play Scrabble but she plays cards.
Gerturde describing Béatrice's routines.

I haven't met with Gertrude neither this morning nor yesterday morning because she is with her cleaning lady, I think.
Hélène describing Gertrude's routine.

During our interaction with the members of the Gang of Four, they revealed having an important awareness of each others' routines. For instance, it was common for them to know the times when the cleaning lady would visit one of them, as well as doctor appointments. This awareness of routines allows members of the Gang of Four to remain aware of each others' planned whereabouts and activities. During the planning of our workshops, they demonstrated using this information to coordinate meetings. In interviews, they described situations where they used their awareness of each others' activities and whereabouts to communicate, in particular when one of them was coming back from a visit to the doctor. Information about routines include regular activities like physical therapist appointments, or specific events like a visit from a distant friend. The sharing of routines is done by the members themselves, communicating their routines to one or many other members, which may in turn propagate the information to the whole Gang of Four. We suggest that routine awareness can also emerge from experience, having witnessed a regular pattern in each other's activities, based on their regular communications.

The following points describe the nature of routines and routine awareness:
- **Nature: Regular events**: House chores, shopping, regular appointments and meetings (club meetings, physical therapy appointment)
- **Nature: Irregular events**: Meetings and appointments, events (visit of family, etc.)
- **Level of details**: Number of known routines, precision of hours and dates
- **Usage**: Coordination, general awareness, evaluation of well-being

Co-Adaptative Phenomena

Every morning since I had this stroke, we have a code with my neighbor. [. . .] I ring three times and she does not answer. So she knows I am awake and safe.
Béatrice describing the morning code with her neighbor.

She often comes by in the morning to say hi through the intercom.
Hélène mentioning Gerturde's visits.

The use of both intercom and the phone ring are coadaptative phenomena where devices have been used in unexpected ways to serve the GoF's purpose. The use of the intercom allows free, impromptu conversation between members when one or more of them is in the street going to shops for example. The use of the phone ring as a status message is also unusual and highlights a specific peer support strategy these woman have developed, to care for the different persons relatively to their frailties. These behavior highlight the need for communication devices which allow them to communicate with one another informally, even though they live in adjacent buildings. It further highlight the need for devices which supports simple message exchange on a regular basis.

Regular Exchanges

We see each other often, every day in fact.
Hélène talking about the members of the GoF.

Everyday, if I do not see her [Hélène], it's the same, we worry about each other.
Béatrice talking about her exchanges with Hélène.

We do not visit our children every Sunday, they have their own life. So we call each other on the phone and we ask who is also staying home?
Gertrude explaining the Sunday activities coordination.

Figure 3.4: Snapshots of some of the Gang of Four meetings. Photos taken by the participants using the camera included in the probes' kit.

The life of the Gang of Four is also made up of regular exchanges and activities (See figure 3.4). These regular meetings are ways to stay up to date with each others' activities and state, but also a way to share friendship and combat loneliness. The members of the GoF have daily exchanges of at least a few minutes, and regular shared activities on various days of the week: Hélène, Gertrude and sometimes Béatrice go to the local senior club on Mondays and Thursdays, and all of them usually meet on Sundays to have a walk in the park. We believe they are key elements in maintaining the social construct of the PeerCare relation.

- **Regularity:** Daily, weekly, monthly, yearly
- **Duration:** A few minutes to a few hours
- **Activity:** Board games, discussions, walks
- **Coordination:** Planned / unplanned
- **Initiation:** Who initiates the exchange?

Mediation for Keeping in Touch

The phone, in some ways, helps to combat loneliness.
Gertrude explaining the importance of the phone.

Encompassing more than regular exchanges, we studied what means of communication these women were using on a daily basis. While different media are used by the GoF to communicate, the main medium remains the telephone. Its ease of use and flexibility makes it highly attractive. Letters are rarely used, and postcards are regularly sent while on holidays. The availability of the medium is also interesting. The phone is highly available,

being present in each of their homes, and sometimes in their pockets (mobile phones). However, the intercom is also a direct link from the caller on the ground level of the building to the home of the recipient. Finally, the sole unidirectional communication we observed is the phone ring Béatrice sends to Hélène every morning. It is a specific signal used for care purposes, a sort of monitoring by a friend and peer.

- **Device:** Phone, Intercom, Letter
- **Media Synchonousity:** Synchronous (phone), Asynchronous (letter)
- **Media Richness:** Poor (*e.g.* phone ring) → Rich (*e.g.* voice, sight)
- **Direction:** Unidirectional (Communicating with the other without receiving anything in return), bi-directional (exchanges between both parties)
- **Availability:** At home, in the street, in the building

Close Social Network

The observation of the social relationships of the GoF highlight the role of physical proximity for care situations (See figure 3.5). Moreover, their similar situations — widowed, recently changed homes, similar age groups, similar interests, etc. — acts as a solidarity bond and enhance their respective trust. In particular, the peer relationship in the group reflects that each woman awareness of their interdependence, and their desire for solidarity.

Their links with the other club members of their seniors clubs are similar, though more distant. A certain friendliness and solidarity is present, while less interaction occurs between them than within the Gang of Four. Neighbors are often mentioned as a source of cordial social relations, with some neighbors being closer therefore more reliable in case of emergencies.

For Gertrude, and to a lesser extend for Hélène, family members living in close proximity also play an important role in supporting their aging in place. Gertrude in particular relies on her son for many services like paperwork or some minor manual work.

Members of their social networks are also sometimes represented by objects in their homes. Knick knacks can remind them of the person who offered it, or of a particular moment shared with him/her. For instance, family members —essentially children and grandchildren— are commonly represented by framed photos in the living rooms of the GoF. These objects, placed in the daily environment of the elderly woman, serves as a proxy for their relationship and therefore potentially tightens their relationship.

- **Cordiality**
- **Physical Distance:** Close (*e.g.* neighbors) → Far (*e.g.* other part of France)
- **Status Distance:** Close (similar situations, *e.g.* retired, widowed) → Far
- **Social Link:** Family, friendship, neighborship, club members
- **Tokens:** Photo Frame, knick knacks, letter

3.4   Club members

The situation for the club members is similar to that of the Gang of Four. They are brought together by their similarities such as age and activities. They primarily meet for

Figure 3.5: Gertrude's Social Map showing the frequency at which she contacts people. (activity included in the probes' kit.)

social events, chats and activities, but also to be in solidarity, share companionship and possibly volunteer to look after fellow club members.

This part of the study allowed us to enlarge our understanding of the PeerCare relationship, as well as the way routines and their awareness contribute to the independence of the elderly people aging in place. In particular, we focused on the aspect of group and club membership, as well as neighborship. While we kept using previous categories for our coding, we also introduced codes related to routines, environmental cues awareness, peer support, specific strategies and regular exchanges.

This study aimed at validating and precising our previous findings in a different context by looking for similar occurrences of phenomena. We refined these concepts and looked for new ones introduced by this new set of interviews. The results of the interview and of the coding are presented in terms of similarities and dissimilarities in the situations and exchanges observed, which lead to either the validation, the refinement or the introduction of concepts. A more comprehensive summary of the interviews and the interview notes in French are available in Appendices 10.2.2.

3.4.1 Situation Summary

For this study, we investigated two seniors clubs, each situated in a different town and including between 60 and 200 members. The primary objective of these clubs is the organization of weekly activities with members, and occasional excursions and trips. Eight participants were recruited from these clubs, all women aged between 66 and 88. Annabelle, Dorothée, Françoise and Kathy live in apartments, while Christine, Émilie, Irène and Josiane lives in houses not too far from the center of town. All homes are situated near the shops and close to public transport in a dense urban area. The homes are often fitted with framed pictures of loved ones, as well as *"knick knacks"* placed on furniture.

All participants are members of senior clubs in their town and live independently. One woman still lives with her husband. None suffers from major impairment though most of them suffer from some physical or sensory impairment, which in some occasions limits their mobility. Three of these women still drive a car, while others rely on public transport. All women but one have family members either living in the same town, in another Parisian suburb, or in Paris. Josiane on the other hand, has very few family members living close by and has moved in this town to live in the house of her deceased sister, next to Irène.

3.4.2 Exchanges Summary

Club Members

Club 1 organizes weekly meetings on Tuesdays and game afternoons on Thursdays. It also sometimes organizes day-trips in the Paris area, and a dinner at least once a year. Club 2 also organizes game afternoons and day-trips, but also a trip once a year to a different country for holidays. Both clubs aim to provide opportunities for elderly people to meet and share activities.

Club 1 promotes solidarity by offering services to people with disabilities. Members of the club, elderly people in particular, are encouraged to volunteer to help people who need assistance. Christine is a key member of Club 1 and manages the volunteers. She often spends time on the phone with people who need help and sometimes does their shopping,
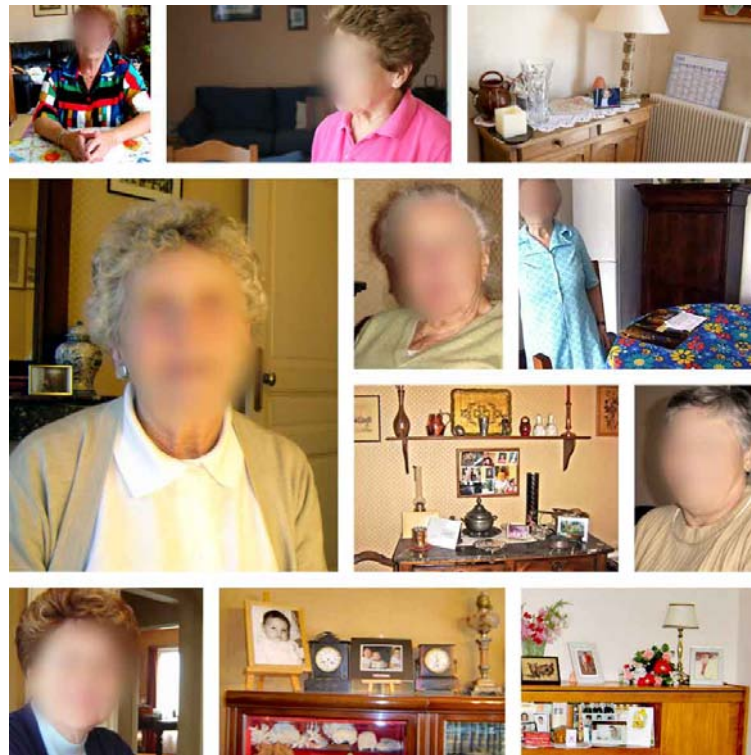
Figure 3.6: Some participants from the Clubs, in their apartment during the interviews and some views of their furniture top showing knick knacks, appliances, photo frames, etc.

or visits them at the hospital. Dorothée, Emilie and Francoise are volunteers of the club. Every Wednesday, Dorothée visits an elderly woman with heavy sight impairment to either walk with her in the park, or read to her. Emilie and Françoise visit an elderly woman with whom they both play Scrabble every Friday afternoon. Christine also points out that it is not rare to see people who meet through the club to become friends and visit each other outside club activities.

Club 2 is more focused on organizing social events. Irène is the president of the club, which requires much time from her to organize events and manage the day to day tasks of the club. She has befriended a few members from the club and has contact with some former club members who moved away. Josiane and Kathy are also members of the Club 2, and Josiane is the secretary of a third club, while Kathy is also involved in the local church. These responsibilities means they have opportunities to exchanges with other elderly people and to make new friends.

In many cases, the club meetings are opportunities to meet with other people living in the same town and make friends. For example, during a trip to the coast, Kathy befriended an elderly woman who lives in the building next door. Similarly, Emilie and Francoise have now become friends with the woman they play Scrabble with on Fridays.

Families

As in our previous observations, we noticed that our participants were cautious about the place they took in their children's lives. They also reported lending a hand when possible, *e.g.* to babysit their grandchildren. Annabelle and Irène both have daughters living in Paris. They visit them regularly and also exchange phone calls many times a week. Annabelle has less contacts with her other children because she is concerned about intruding in their privacy. Similarly, Irène is less in contact with her son who lives further away. She is very concerned about intruding in his privacy, but wants to make sure he knows that she would be there in case of need.

Françoise's sons all live in the same town as her and she has frequent exchanges with them. She often visits them for lunch and spends the afternoon with them. She tries not to intrude up on her sons' life and therefore she is reluctant to ask for their help. When she loses her independence, she would rather be in an institution than to have to be a charge for them. She also contacts her siblings who live far away (more than 300km), each week on the phone. She visits them once a year for the end of the year celebrations.

Neighbors

Emilie communicates daily with a woman who lives close to her house. They meet every evening for a chat if they have not already met during the day. They are good friends and have each others' key so that they could help each other in case of emergency.

Irène likes caring for her garden, which gives her the opportunity to talk with Josiane, her next door neighbor. They have been good friends for 20 years and see each other every day. When one is sick, the other systematically checks to see if everything is fine and offers to help if appropriate. Both also regularly chat with their neighbors and invite neighbors' children to play in their gardens. Irène has regular exchanges with her neighbor across the street with whom she swaps keys when either of them goes on holidays. She reports that she does not want to intrude in the privacy of her neighbors, especially since many of them are not retired and still work during the day, so she feels going to meet with them would bother them too much. She has cordial relations with all of them and trusts them to know they can count on her in case of need. Josiane has a particular acquaintance who requires her support when her children are away on holidays. While she does not consider her as a friend, she still helps her and checks regularly to make sure she is all right.

Friends

Emilie walks to friends' houses twice a week to play games and chat. When one of these friends is sick in hospital, she visits her in the hospital instead, to keep her company. Françoise also has a few friends, some of whom now live far away (more than 300km) and who she calls every week for at least 15 minutes. Another friend lives closer by and they exchange at least one phone call a week, and every Monday, she visits a friend who lives in town. She would like to visit her friends more often but rather uses the phone which is cheaper and more convenient.

Josiane has made friends with a group of woman who she met when a common friend developed a critical illness, and finally deceased. Since then they meet regularly, usually at

Josiane's home, and exchange phone calls. Through the club, Josiane has also made many friends, who she meets regularly either during club activities, or events like a local show, diners or birthdays.

Kathy has made many friends through her club activities. Living in the center of town, it is not rare for her to meet with acquaintances during her walks with her dog, or when going to the market. She also has closer friends who she travels with regularly. They have a strong solidarity so when one of them is sick and can not attend weekly club events, they visit her more often and call to have a chat and make sure everything is fine.

Others

Similarly to the GoF, the participants often have regular shops they go to, some for more than 30 years. Dorothée likes to go to the market, where she usually meets other members of the club and talks with the shopkeeper to whom she is a regular customer. Françoise also has regular shops she visits at the market and whose owner know her. Emilie shops every second day at the bakery next to her house, and whose owner is a familiar acquaintance and always expects her around the same time.

Artifacts

In this case, as in the case of the Gang of Four, picture frames are often found in the living rooms of our participants (See figure 3.6). They usually represent relatives, children and grandchildren. Also, some participants reported using photo albums to remind them of close relatives. When these relatives come for a visit, they are pleased to browse the albums together.

Josiane, Irène and their neighbors sometimes drop a message to in each other's mailbox, when they need to exchange a message or documents. Sharing a fence, they also sometimes leave messages in plastic bags on the fence when the other is away. This way, the urgent message will be noticed as soon as the person gets back and dealt with.

Finally, many participants reported exchanging their keys with friends living close or neighbors. This is intended to allow them to access their home should it be required, this is also a sign of trust and a gesture that is often returned.

Routines

Irène reports that over the years, she has unconsciously learned some of the routines of her neighbors, for instance when their shutters are shut or open. With them, she has also developed a code so that they do not worry if she is not back at night. When she has something planned for the evening, she only closes half of her shutters to signal to them that she will be back late.

All women are also involved in many routines, in particular shared activities. Club activities are attended regularly and when a member is absent, it is often noticed by other group members and the person is contacted on the phone. Similarly, friends who live close by often meet on a regular basis, and those living further away are often called on the phone.

3.4.3   Results

Family Intrusions

> *I try not to interfere because I know they are very busy. [...] I privilege their privacy.*
> *[...] I interfere as little as possible. If they have a problem, they know I am here.*
> Irène describing her relationship with her children.

Similar to Gertrude of the Gang of Four, Irène and other participants with children living close by reported being wary of not interfering on their privacy. While Gertrude considers that she needs her son, Irène wants to make sure they know she is there in case of need. Most participants with grandchildren also reported watching after them when requested by their children. Depending on the level of independence of the participants, they either considered themselves as a source of support or as a recipient of support, sometimes as both. Françoise, for example, considers her sons as her main source of support since her husband passed away. Finally, the participants often characterized the type of relationship they had with their families based on who initiated the communication, *e.g.* 'I am usually the one calling'.

- **Initiation of communication**
- **Dependence:** Children relying on elderly parent / Elderly parent relying on children
- **Not being a burden**

Flexibility of Support

On many occasions, participants reported relying on friends for support, or providing support to friends. For example, Kathy and Emilie visited their friends more often when they were sick, at home or at the hospital. This support is explicitly withdrawn when it is no longer required, in which case the relationships revert to the normal friendship exchanges. Again, many PeerCare groups like the GoF seem to emerge from our interview, though not as explicitly. For example, Josiane has a circle of friends who she meets with on a regular basis, and a close friend and neighbor on whom she relies.

These observations highlight two aspects of PeerCare networks' flexibility. First, the exchange of care within these networks are highly dynamic, depending on the individual needs, such as diseases or other issues. Second, PeerCare network includes a variety of groups which might not know each other, although they might know about each other. Communication appliances supporting PeerCare should address the need for both a dynamic change in levels of communication, and allow elders to be in contact with various groups which might not communicate with each other.

Personal and Environmental Cues

> *Systematically in the morning, when I open my door, I notice if my neighbor's shutters*
> *are opened or closed. And I do the same unintentionally with my neighbors across the*
> *street.*
> Irène describing her neighbors' routines.

Our interviews illustrates the fact that information is not necessarily exchanged or used in explicit ways. Our participants reported capturing information in their environment (con-

Figure 3.7: Example of environmental cues: Irène and Josiane's respective gardens, photos from their probes' package.

sciously or not) to serve in their interpersonal relationships. Such information can include the car being parked in the driveway, the house lights being on, the lawn being freshly cut (See figure 3.7), etc. We distinguish two types of information exchanged: *Personal cues* and *environmental cues*. Personal cues are information involuntarily revealed by someone's behavior or appearance. They include information such as voice tone and gait, which are used by people around to determine if you are happy, or if you have hurt your ankle. Environmental cues are information that emerges from our interaction with our environment. For example, when you turn on the light in your living room at night, a neighbor coming back home might notice that you are still awake. Reciprocally, when you leave your home, you might notice that your neighbor's car is not in the driveway.

Over time, people build expectations about behaviors of people around them based on the perception of personal and environmental cues, as well as social exchanges. Subsequently, people become aware of patterns and use those patterns to coordinate interactions and evaluate each other's state. Routines become salient in our behaviors or interaction with the world and others become aware of by being exposed to them.

Club Support, Cordiality and Solidarity

Beyond the specific relationship that exists in the Gang of Four, the interviews with these participants highlighted the role of clubs in providing support. In many occasions, the club was a vector for creating and maintaining friendship. In particular, relationships with peers is important in this community and goes beyond friendship: the club members are in solidarity. Many members of club 1 also volunteer to help elderly people in need. For instance, Dorothée, Christine or Émilie all visit other elderly people who are less mobile to keep them company. Solidarity also emerges between neighbors, where cordial relations can provide a ground for asking for services or help.

The description of these peer behaviors extend the concept of PeerCare identified with the Gang of Four. Peer support occurs between neighbors, and can possibly appear within a community of elders, like clubs. Club activities in particular provide opportunities for building relationships, and gathering environmental cues. Where the relationship of the Gang of Four members is based on friendship, on some occasions, club members support each other for solidarity.

- **Neighborship:** Environmental cues, unremarkable routines
- **Shared Activities:** Tea, club activities, games

- **Solidarity:** Transport, sickness, safety

3.5   Sheltered Housing

To better understand the role of the home situation in PeerCare and routine awareness, we conducted a short series of interviews in a sheltered housing complex in a Parisian suburb. Similar to the previous interviews, we focused on our participants' sources of support, as well as the role of the social networks in their well being and independence. We also explored the reasons that had led to their move from their previous home to the institution, and how this affected their lives.

The three women who participated in this study, Lucienne, Marie and Noémie, all live in the same residence. While this residence is specifically designed for seniors, it limits elders stigmatization by building communities of elders, and providing support to them, but no formal care to them.
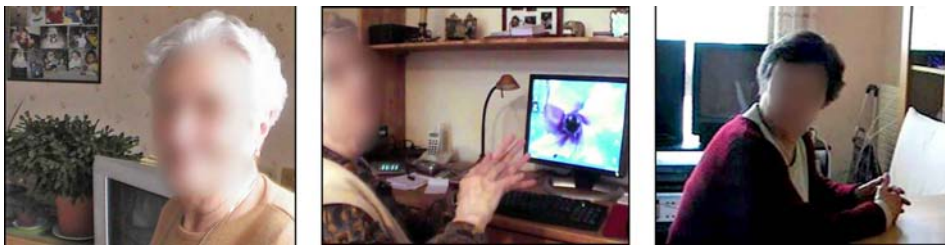
Figure 3.8: Participants from the Sheltered Housing Residence, in their apartments, during the interviews.

3.5.1   Situations

The women who participated in this study, Lucienne, Marie and Noémie (See figure 3.8), are all living in the same residence. The residence is a housing complex designed for elderly people, with someone on watch 24 hours per day, activities and games organized daily, and workshops and courses to maintain physical and cognitive health. The accommodation consists of individual apartments rented to elders, in which personal items and furniture can be brought.

Lucienne is a 79 year-old woman who has been living in the sheltered housing residence for the past four years. She lived in a larger house in another part of town before moving into the institution. She decided to move to the residence because it had become expensive and tedious for her to pay rent and maintain her house and its garden. It was a difficult decision, but she does not regret it, she feels safer and has less chores to take care of. Lucienne's accommodation is fairly small, consisting of a flat with a living room, a bedroom, kitchen and bathroom. Lucienne is also member of Club 2 and goes on daily trips when possible.

Marie has only recently moved in the residence. While she is 82, she is still independent, but after two years of reflection, she had decided that she was too lonely and needed to be more in contact with other people. She lives in her flat, similar to Lucienne's, which is populated with her furniture and decorated with knick knacks and picture frames. Marie owns a computer connected to the Internet through a dialup connection. Every day she

reads email, surfs on the Internet and uses her computer to handle digital photographs taken with her digital camera.

Noémie is one of the most senior residents, having lived here for almost 14 years. She lived for 40 years in a house in the same town, but moved out when her friend and neighbor moved, and was replaced by people she did not get along with. She has no regrets because it was expansive and tedious for her to maintain her house, and because here she is still in her own home, independent, with her own furniture. Moreover, there are many people around and she does not feel lonely. Her children live either in the same town or close by, and she has many opportunities to see them.

3.5.2 Exchanges

Family

All three woman are rather emotionally close to their family, and in particular children and grand children. They receive regular visits from children (of whom many live in the area), and also exchange phonecalls on a weekly basis. One of Lucienne's sons comes every week for dinner, sometimes with his son. Her other children often come over the weekend for a family lunch. Her niece and nephew also call almost every week to chat and inquire about her well being.

Marie eats regularly with her children and also exchanges emails and digital photos with them. Noémie has few phone calls during the day. Her children live in close proximity and visit more easily than call. Her daughter used to work as a night watch at the residence for 14 years, and she saw her every morning at the end of her shift. Her son also visits regularly, as he works in town and is often close by. She is not worried when one of them does not show for a few days, because she knows they would be here in case of need, and they have their own lives to attend to.

Friends

All three women reported having fewer friends over time. Due to their age, many friends have passed away and they find themselves lonelier. However, all still have intimate friends they exchange regularly with. Lucienne has a close friend from her childhood who she calls on the phone every week and visits every year. Marie also has friends from high school living within a few kilometers from her. She communicates with them over email and over the phone, and they visit each other regularly. It is not rare for them to exchange every day, either through email or phone. Noémie knows many people through her activities in the various clubs. However, she misses the relationship she used to have with her neighbors before moving to the sheltered housing.

Former Neighbors

Prior to moving into the residence, Lucienne, Marie and Noémie all had people living in close proximity with who they were in good terms. They could rely on them and were providing each other assistance. Lucienne used to get along well with most of her neighbors, even though they were not necessarily friends. Many of them still mention the fact that they

miss her when she meets them at the market, and inquire about her. Her in-laws also used to live in her neighborhood and helped her when she lost her husband. When she moved into the residence, she missed her neighbors, but gained some safety and reassurance.

Marie used to live in a large apartment in a town further away. After living there for many years, she had befriended the owner of the shop across the street. When her husband died, the owner took the habit of checking on her shutters to make sure she was alright and offered his help in case of need. Marie reports having found it comforting to have someone looking after you in case of need. Once she moved to a smaller apartment[7], she did not get to know her neighbors as well. While she greeted them on occasion, and even exchanged services and chats with her neighbor below, most of her neighbors were still working and therefore absent most of the day. This situation convinced her to move out into the residence where she could have many neighbors and people to interact with.

Neighbors in the Sheltered Housing

Lucienne, Marie and Noémie all have made friends with fellow seniors living in the sheltered housing residence. Lucienne regularly shops for fellow residents who are not very mobile. While visiting them, she usually chats with them and takes this opportunity to make sure they are all right. She regularly talks to a number of women who she has befriended in the residence, and usually meet with them around activities such as games or daily trips. While she regrets her neighbors from the time she used to live in a house, Lucienne recognizes that by moving into the residence, she has gained safety and comfort. One of the major advantages is that there is always someone on duty in the residence in case anything happens to her. As the residence staff is here, she does not have to ask a friend or neighbor for help.

Marie also met people in the residence with whom she has become friends, soon after she moved in. She regularly eats with the same people at the restaurant, which provides an opportunity for chats. She also attends various activities such as card and board games, where she meets acquaintances. Moving into the residence, she has found a crowd of people who she interacts with on a daily basis, solving her solitude problem. Noémie has been living in the residence for more than 14 years. She knows most people from the residence, as well as many people from the outside. She has a particular relationship with both her next door neighbors, with whom she plays scrabble almost everyday.

3.5.3   Results

Everyday Exchanges and Activities

I say hello and goodnight to those who sit in the lobby during the afternoon.
Lucienne mentioning her daily lightweight interaction with some of the residents.

When I go to lunch, I always go to the same table, so I meet with the same people with whom I talk while I eat.
Marie talking about her lunch with fellow residents.

---

[7]in the same city as the one she lives in now

> *We meet people in the street, we chat with them. I personally know a lot of people. Firstly we do the gymnastics here on Monday and Tuesday, and a lot of people from the outside come to participate, which allows us to talk with them.*
> Noémie mentioning her wide social network.

In their daily life, all three women have regular everyday exchanges with people from the residence, but also people from the outside (acquaintances, former neighbors, shop-keepers). These exchanges allow routines awareness to emerge. For example, when Lucienne does the shopping for her fellow residents, she will notice if they have been eating. These exchanges are part of a routine established between Lucienne and these residents, and changes in this routine will be noticed, such as failure from Lucienne to come, or failure from one of the resident to answer the door bell.

Some other routines we noticed during this part of the study are the set of activities organized by the residence, which serve as a way for residents to avoid boredom, to exercise their body and minds, and to meet with other people. Through activities, they have regular exchanges with people from within and outside the residence, and occasionally they form friendships. Such activities include the weekly gymnastics and memory exercises, and games organized in the common room.

Solidarity Amongst Friends and Residents

> *I sometimes visit people, but to do their shopping, things like that.*
> Lucienne talking about the help she provides to other residents.

> *He was telling me: 'If you have any problem, you can call me even at night.'. [. . .] He is not in my home. He knows how I live and all and that if it [the situation] is otherwise, it means there is a problem.*
> Marie mentioning her former neighbor offering help.

> *She was sick last week, so I went to visit her to see how she was going.*
> Noémie talking about her relationship with her next door neighbor.

Similar to the solidarity within the Gang of Four, and the solidarity among club members, we observed here much solidarity amongst people living in the residence, but also with neighbors and friends. While the relationship (friendship for example) is probably a strong motivator for caring for one another, it is not necessary. For example, Lucienne helps people with their groceries even though she does not necessarily consider them as friends, but out of solidarity. If a time comes that she has difficulty taking care of her own grocery shopping, she expects someone to help her as she helps others. While helping people with their groceries, she also checks on them and sees how they are doing. These exchanges are however limited to these visits, whereas exchanges with friends —especially those living close by— and neighbors are likely to be more frequent and thus create more intimacy and shared awareness of each others' state and whereabouts. Marie's former neighbor is a clear example of that. As she mentions, he knew what her life was like by living next to her and could detect unusual situations in her daily routines. He was not intruding in her privacy, but was still able to provide support which made her feel safe.

> *She* [her friend] *is really in an institution, whereas here it is a residence, it's really not the same. We pay our rent, where the others pay a monthly fee. It's really not the same. But they get provided with though, whereas we have our own furniture, we have everything. We are as if we were in an apartment in another residence.*
> Noémie comparing the residence to an institution.

During the interview, but in particular during workshops, participants mentioned on many occasions the advantage of the residence over an institution: their independence. In this residence, they are surrounded by people with whom they can interact, and there is a person on duty around the clock. They feel safe and not lonely, and remain independent. They can come in and out when they want, they do their own shopping and can cook (even though they have a restaurant as part of the residence). In particular, the fact that they can bring their own furniture was stressed as an important plus, making them feel at home, in their own place.

3.6   Axial and Selective Coding

In this phase of the Grounded Theory approach, we seek to group together concepts extracted during the open coding in order to identify emerging themes throughout these concepts. In order to facilitate this process, we report here the results of the open coding. The axial coding is realized using a concept map, which help us organize the open coding categories together (See Figure 3.9).

While this axial coding allows us to describe the organization of open codes into higher level concepts, it does little to characterize the interrelation between the concepts. To achieve the analysis process of the Grounded Theory, we describe the high level concepts in more detail and describe how they relate to each other to define our design space. This space, grounded in our data, provides a set of guidelines and opportunities for designing communication appliances to support aging in place, and to better understand the nature of communication appliances.

3.6.1   PeerCare

During this study, we have identified the concept of PeerCare, peer support amongst our elderly participants and their social networks. The nature of this peer support is very heterogeneous depending on the people concerned, their relation with their social networks, and the physical distance. PeerCare is not necessarily an explicit behavior among elders, but rather an implicit understanding that one must look after each others. The social relationship provides motivation for looking after each other, but also opportunities for a informal exchange of information which allows them to remain aware of each others.

On some occasions, new behaviors are adopted specifically to look after one another. The women in the Gang of Four rely on the availability of the group members to detect and react to emergencies. They have exchanged keys so that one of them could enter their flat if they suspected something had happened. They also exchanged emergency contact information to be able to contact the appropriate people. Similarly, members of Club 1 are organized as a peer support group, explicitly acknowledging this need for solidarity. In case of need, the group actively functions as a support group.
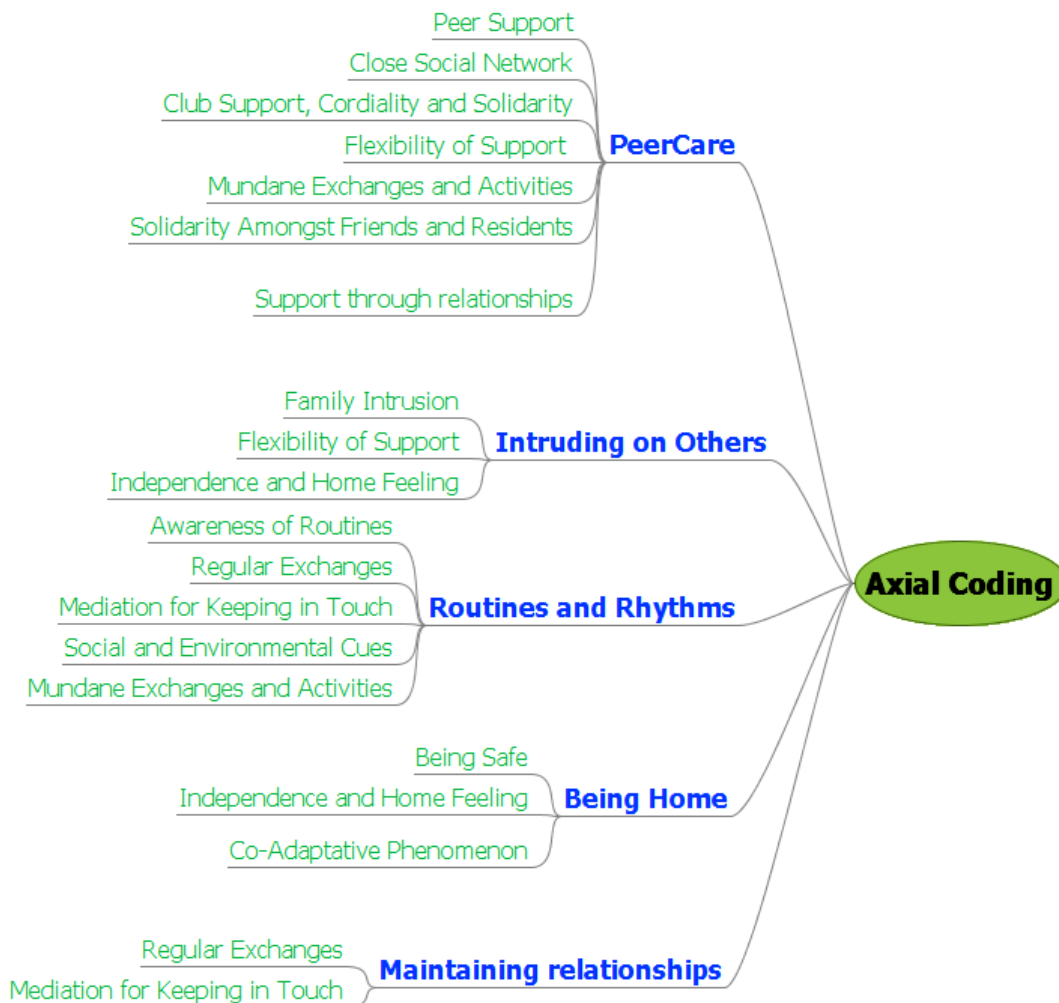
Figure 3.9: Concept map of the axial coding. Concepts which fits in more than one meta concept are duplicated.

As described next, we believe that the PeerCare relationship takes advantage of people's awareness of each others' routines and rhythms. Palen and Aaløkke [2006] describe how routines are used by elderly people to conduct sequential actions and support their memory. Also, they describe how caregivers help in establishing these routines, and use them to assess the elder's adherence to their medication.

3.6.2 Routines and Rhythms

We define *routines* as the set of events which people plan in their agenda. Routines encompass *habits*, *e.g.*, John usually picks up his newspaper right after it has arrived, *regular events*, *e.g.* John receives the visit of a caregiver every Tuesday afternoon, and *planned events*, *e.g.* John has an appointment to the doctors next Wednesday. Many routines are regular, and are repeated at a given periodicity (daily, weekly, monthly, etc).

In contrast, we define *rhythms* as the patterns of awareness cues emerging from people's interaction in their environment. Awareness cues composing rhythms are essentially made

of *environmental and personal cues*, described earlier in this chapter. In other words, routines represent what someone should be doing, what s/he planned, whereas the rhythm is a representation of what the person is actually doing or has done, and which consequences are perceivable by other. For instance, Irène can deduce that Josiane is not home when her car is not in the driveway.

People might become aware of routines by noticing a repetitive pattern in someone's rhythm. This type of routine, one that emerges from rhythm awareness, is what we described earlier as habit. Routines awareness also emerges when people explicitly tell each other about their schedule, their events, their plans. As reported earlier, we observed this explicit exchange of routines amongst elders in PeerCare situations, and in particular the Gang of Four. For instance, when organizing the schedule for our interviews, Béatrice was able to suggest suitable times for us to contact Gertrude according to her routines *e.g.* cleaning day, meals habits, wake up times, etc. Most participants we interviewed revealed knowing routines and habits of members of their social networks, and using this knowledge to organize interactions. For instance, while we were interviewing Béatrice, Gertrude came to talk to her over the intercom. In their discussion, Gertrude revealed that she had waited to contact her so that she had less chances of interrupting our interview. Gertrude had been told that we would be here and used this information to coordinate her intervention.

A particular type of routine made of regular events is what we describe as *communication routines*, which are made of regular exchanges between people. During our interview, many elders reported having regular exchanges with neighbors, friends or family members. Many exchanges with members in these social networks are regular, with frequency ranging from many times a day to once a year, and durations ranging from a few seconds (*e.g.* a hand wave) to a few hours (*e.g.* a shared activity). These routines are important as they are shared between people involved in the exchange, and thus disruption in these routines can be perceived by any of them. We highlight in particular two types of communication routines: lightweight informal exchanges and shared activities.

Depending on their relationship and frequency of communication, participants had varying levels of awareness of their respective routines. For example, Béatrice and Hélène are direct neighbors and consider themselves closer to each other than to the other two members of the GoF. Hélène and Béatrice have an intimate knowledge of each others' routines. They share many routines together; like taking the garbage down in the morning. When being interviewed, Hélène told us that Béatrice would go to the gym on Wednesdays at 2 PM unless she had a doctor's appointment, which had happened the day of her stroke. In general, shared activities represent key opportunities for interacting, and are often part of the weekly routines (*e.g.* weekly scrabble game, club meeting).

This sharing of information is often informal and is not explicitly done for PeerCare, but rather as part of keeping each other aware of what they are up to, how they feel, and to maintain connectedness. This can be done during conversations with the people involved, but also by gathering information through a third person (*e.g.*, "Have you learned about what happened to Justine?").

We argue that routines and rhythms play an important role in PeerCare by allowing people to remain aware of each others' activities and whereabouts. Routines are explicitly shared amongst elderly peers, or habits are perceived, and used to assess a given situation based on the current rhythm. If the rhythm does not match a routine which was supposed to happen, it might be perceived as a potential hazardous situation and lead to an appropriate

reaction. Sharing routines is also part of a relationship with close people, it is a part of intimacy which is voluntarily shared by telling each other about their daily lives.

This aspect of routines extends the work by Crabtree and Rodden [2004] and Palen and Aaløkke [2006] which identified routines as regular patterns of use of the space in which people interact in their home, and for Palen's case, in the home of the elderly people. Routines are identified as a way people organize their space and their actions in a familiar space, and their works suggest that these habits can be used for designing interactive devices for the home. On the other hand, Begole *et al.* [2002] as well as Nagel [2006] suggest that routines can be used as a way to help people coordinate their interactions, to avoid undesired interruptions both in home and work contexts. However, none of this research specifically addressed the use of routines as an information to be mediated in order to raise shared awareness, connectedness and intimacy, and in our case, to support PeerCare. The role of routines and rhythm awareness regarding privacy in the home is discussed further in chapter 5 which describes markerClock, a communication appliance to support routine and rhythm awareness within groups of close family and friends.

3.6.3 Being Home

Aging in place is much about remaining independent, and living in a place elders can call home. In our interviews, objects like knick knacks and furniture, picture frames and artworks, are all part of feeling at home. They are often related to a memory: a person, a voyage, a part of life. Participants regard the institutions as a foreign place where independence is reduced, furniture is provided, and the number of personal objects allowed is reduced. Thus it is not considered as a potential home, but rather as a place where one goes when everything else fails. Home is therefore represented by the place, and how it is appropriated by the elderly people. Furniture and decorative objects are an important part of this appropriation. They represent life histories (*e.g.* a clock which has been in the family for three generations) and often a lifelong investment (the nice table they saved for). The neighborhood also influences the feeling of home. There is a sense of belonging in a community, alongside other people. For example, Marie moved out of her previous apartment to have more opportunities to meet with people, and Noémie moved out because her new neighbors were unfriendly.

These aspects of elders' attachment to home influence the way we address the design of communication appliances for elders to age in place. We believe that objects present in the home are more easily accepted when they are related to a memory, or a person. We suggest that a communication appliance, because it represents a link uniquely to a set of close family and friends, can be representative of a group of people and their connection, like someone's framed picture or someone's gift. To reinforce that connection, we suggest allowing people to accentuate this connection by customizing the communication appliance. In general, the device introduced in the home should not disrupt, but complement the emotional organization of objects and appliances in the home.

3.6.4 Keeping in Touch

When analyzing the types and means of communication of our participants, we noticed that many of their exchanges with people often intended to keep in touch. Through regular exchanges, they maintained their relationship with one another and kept alive this connection. Depending on the relationship and other factor such as the distance between them,

participants would communicate with people in their social network more or less regularly, for few minutes to a few hours. This interaction is crucial in considering someone as being active in their social network. Similarly to work done for the home [Langdale *et al.*, 2006], we envision using direct communication in communication appliances for elders to permit lightweight informal exchanges with their social networks, to keep in touch. In particular, we envision using these exchanges, thus allowing elders to establish and maintain lightweight communication routines which we suggest supports the group cohesion and provides support for PeerCare behaviors.

3.6.5   Coadaptation and PeerCare

On several occasions, we noticed that our participants had developed coadaptive behaviors with communication technologies, and some parts of their environments, to support PeerCare relationships. First, Béatrice uses her phone as a signaling device, informing Hélène of her wake up time. Second, the members of the Gang Of Four use intercoms to facilitate informal exchanges, and chat from the streets to the individual apartments without having to impose themselves in the physical place. Third, Irène and her neighbors have developed a use of her shutters to signal that she will be away for the evening, and that they do not need to be concerned about a change in her routines. The first and third reported behaviors illustrate the development of a custom symbolic vocabulary to communicate directly in periphery of the communication recipient. We envision exploring how such exchanges can be further supported by communication appliances.

3.6.6   Intruding on Others

On many occasions, we realized that our participants were self conscious about the attitude they had toward members in their social network, in particular their families. They were highly concerned about making sure they did not intrude on their privacy or their lives. This sometimes meant that they did not pay them as many visits or did not contact them as often or as long as they would like. The adult children of the elderly have their own lives and our participants did not want to be a burden or become too big a responsibility. On the other hand, they are also concerned about who might intrude on their own privacy, and therefore who they invite in their home. Noémie always chooses not to invite people in her little apartment in the sheltered home residence, but rather to meet with friends in the common areas for games and other activities. Béatrice and the other members of the Gang of Four recognize being really careful about who they let in, for safety, but also to ensure they are not disturbed all the time.

3.7   Implications for Communication Appliances

Based on our study, we suggest that communication devices, and communication appliances in particular, could be designed to encourage, support and maintain PeerCare behaviors amongst groups of elderly people. Current PeerCare behaviors emerge when people live in close proximity. This is partly due to the increased opportunity for informal communication, the overlap of social networks, the possible reliance on shared activities, and the exposure to both personal and environmental cues. Communication appliances could further support these interactions by mediating personal or environmental cues, offering new kinds of activities, and encouraging informal exchanges. This would in turn help elders es-

cape isolation and permit the detection of particular, unusual situations which might require intervention, *e.g.* emergency. Moreover, communication appliances could support Peer-Care behaviors over greater distances, for instance in situations where an elder relocates and leaves his local social network with which this PeerCare usually occurred.

In particular, we underline various aspects of existing PeerCare behaviors which could be supported by communication appliances: awareness of rhythm, communication routines, and shared activities. The use of people's shared knowledge of routines is useful in PeerCare if people are aware of rhythms against which known routines can be compared. Because elderly people tell each other about some of their respective routines, using the phone for instance, communication appliances could provide an awareness of whether this routine was reflected in the person's rhythm. Moreover, by supporting shared activities and lightweight interactions, communication appliances could support PeerCare behaviors by encouraging interaction and facilitating informal communication. This could in turn provide opportunities for creating new routines, shared by the people involved in the communication, and which would increase their respective awareness.

Communication appliances can also be designed to allow a compromise in communicating with people that would reduce the intrusions on each other's privacy and daily life. This being a strong concern from our study, we believe that exploring the variety of media and possible interaction could allow the creation of devices offering exchanges which are less demanding of attention and engagement, while allowing people to stay in touch.

3.8 Conclusion

This chapter reported on our initial user study which provided many insights regarding the design of communication appliances to support aging in place, in particular:

- **the identification of PeerCare**, peer support behaviors, as an opportunity for design,
- **the description of routines and rhythm awareness** as a key factor in looking after one another in PeerCare,
- **the description of the role of personal cues, environmental cues, and communication routines** in supporting rhythm awareness, and routines discovery or creation,
- **the identification of the issue of intrusiveness** as an opportunity to help elderly people communicate with others, and in particular adult children.
- **the identification of the need for communication appliances to fit in home life** as a design requirements for our design, by supporting home routines and respecting the home space aesthetically and ethically.

Communicating Personal Cues: mirrorSpace

Contents

Summary

This chapter first describes our implementation of a computer appliance based on the mirrorSpace design of Roussel *et al.* [2004a]. We used this device as a technology probe to explore the use of video-based communication appliances to support the awareness of unremarkable, mundane routines perceived through frequent interactions and exchanges with someone [Tolmie *et al.*, 2002]. Our study, which involved two workshops and a two-week long deployment, provided opportunities to interact and discuss the issues related to using video as a medium, as well as the technology probes technique. Finally, we suggest that the augmentation of familiar objects in the home could provide and ease the transparent integration of technologies in the home.

Our initial field study (chapter 3) described the importance of *personal cues* amongst elders living in close proximity to assess each other's physical and moral state (see page 82 and 89). We also underlined the role these cues in establishing an awareness of daily habits which reflect people's state. Moreover, we have described how *regular, informal exchanges* played a role in maintaining connectedness amongst people in PeerCare situations, creating communication routines and giving opportunities for exchanges of personal cues.

This chapter focuses on exploring how personal cues can be mediated to support peer assessment over a distance during informal communications, and how communication routines can be supported in PeerCare networks. We first describe work related to the mediation of personal cues, in particular using pictures and video. We will then discuss the issues of privacy relative to these communication systems and how various projects have tried to address them. This chapter will then briefly describe the technology probes [Hutchinson *et al.*, 2003] methodology we used for our investigation, and report on the design and implementation of our mirrorSpace-based [Roussel *et al.*, 2004a] technology probe. We finally report on the study of the mediation of personal cues for PeerCare using this technology probe both in workshop with elders and in a field deployment.

4.1 Communicating Personal Cues

As described in chapter 3: *"personal cues are information involuntarily revealed by someone's behavior or appearance"* (page 83). These cues can be used when people interact to assess each other's state of body or mind, *e.g.* a person speaking weakly might be sick, and another person who usually enjoys talking is silent might be stressed. Over time, people build expectations about people in their environments, about how they look, what they dress like, etc. These cues are highly difficult to mediate, mainly because they are personal —their nature diverges from one person to another—, and are not explicit —people do not regard them explicitly as routines [Tolmie *et al.*, 2002]. They are also largely based on what people perceive: essentially how people look and sound.

Different communication systems designed either for the workplace or the home can be used to mediate personal cues. The phone, for example, allows people to detect changes in the normal voice tone of a familiar person. The issue with systems like the phone, however, is that it implies that personal cues are exchanged during direct communications. In collocated situations, personal cues are exchanged seamlessly, by various means, on many occasions and not only during desired interactions.

4.1.1 Using Pictures

Systems like the videoProbe [Conversy *et al.*, 2003]partially provide support for communicating additional personal visual cues over a distance. With the videoProbe, pictures are taken automatically in the users' home according to the detected motion and made public to people in the social network. These pictures can be later reviewed by all members of the social network and curated if necessary. Because these images are not necessarily taken explicitly by the people in the home (though they can be), personal cues beyond what someone explicitly wants to send can be shared with close family members. This aspect, however, also poses clear concerns regarding privacy.

The impact of the videoProbe is limited to the capture of static information whereas more dynamic cues can be collected (*e.g.* speed or gait). In particular, video-based com-

munication systems can play an important role in presenting personal cues, but also in supporting opportunistic, frequent, informal exchanges.

4.1.2   Using Video

Xerox PARC's Media Space [Bly *et al.*, 1993] was one of the pioneers in using video for mediating awareness. Using always-on video and audio links established between public spaces, as well as between individual offices, researchers in both the Palo Alto (CA) and Portland (OR) labs were able to share a common work culture. In particular, the Media Space was successful in mediating social exchanges, such as daily greetings and birthday parties. Media Spaces, when deployed in work environments, already present issues of privacy [Bellotti and Sellen, 1993, Dourish, 1993]. It is therefore difficult to foresee how such system could be accepted in the home environment which is, by nature, more private.

4.1.3   Video and Privacy

Since the 90's various systems have been designed to maintain the types of awareness and interactions that the Media Space offers while limiting their impact on privacy. The PortHoles [Dourish and Bly, 1992] used mosaics of frequently updated pictures, instead of videos streams, to mediate pictures dynamically and regularly. More recently, Boyle *et al.* [2000] have explored how the filtering of video (*e.g.* blur filtering) could successfully support various levels of privacy in home media spaces. Furthermore, Neustaedter and Greenberg also studied the design of a context-aware media space for addressing the issues of privacy within the home with always-on media spaces. Boyle *et al.* [In Press (expected Fall 2008] further describe how various media spaces have been designed to further address privacy concerns. The current approach, however, clearly advocates for the use of both video filtration and physical context to reinforce privacy within the design of the video-based media space.

4.1.4   Moving to Elders' Homes

While these systems and their privacy issues have been studied for the workplace and in the general context of home, our initial observation of elders have already described how they shared personal, sensitive information (*e.g.*, medical condition, concerns) as part of the trust which binds the PeerCare groups, such as the Gang of Four [1]. Moreover, some of our participants were already willing to exchange private information —and thus sacrifice some privacy— for ensuring their safety; given that it is shared with people they trust and care for reciprocally. We are interested in studying how video-based media spaces would mediate personal cues and encourage frequent, informal interactions in the elders' home. We sought to explore issues of privacy, but also the benefit of the type of awareness gained. To realize this, we designed and implemented a technology probe, based on mirrorSpace from Roussel *et al.* [2004a] which we exposed to users both in workshops and field deployments.

4.2   Technology Probes

The mirrorSpace implementation described later in this chapter was designed to be used as a technology probe to gather insights and inspiration about the use of video-mediated

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[1]a group of elderly friends introduced earlier in Chapter 3

communication for mediating awareness cues. Technology Probes (TP) [Beaudouin-Lafon *et al.*, 2001, Hutchinson *et al.*, 2003] are a recent research technique for user-centered designs. TP are probes, devices deployed in the field intended to gather various types of data to explore a phenomenon. As such TP are robust devices implemented to work and gather data in conditions outside the laboratory.

Similarly to Cultural Probes by Gaver and Dunne [1999], TPs are expected to provoke users to *"reflect on their lives in different ways"* [Hutchinson *et al.*, 2003], encouraging imagination and creativity. By exposing users to a working unfamiliar technology, we also believe that TPs can play an important role in facilitating the design dialog between the users and the designer, as suggested by Hutchinson *et al.* [2003]. Thus they support both designers and users in their creative design process.

TP also records users' interaction and collect both qualitative and quantitative usage data. It provides data that can be analyzed using exploratory data analysis, descriptive or inferential statistics, and other methods for qualitative data (such as Grounded Theory [Strauss and Corbin, 1998], described earlier in chapters 1 and 3). The use of TP is largely exploratory, seeking to inform further design iterations and to uncover new and interesting phenomenon. TPs can be designed to: capture physical, narrative and interaction context; provide ways to explore patterns of use; and encourage users to reflect on their own patterns and usage. Therefore, they allow designers to introduce design concepts in real life settings to test and evaluate them. Finally, TPs allow researchers to set up, test and evaluate a technology in "real" settings.

Summarizing the work of the interLiving project [Beaudouin-Lafon *et al.*, 2001, Hutchinson *et al.*, 2003], we suggest the following goals for using TP in a design process: Inspire both users and designers; Collect data of the use of a particular technology by intended users; Collect data from the real world environment of a user; Share concepts between researchers and users; Provide users with a firsthand experience on these concepts; Evaluate technology requirements for real life deployment; and Test a given technology *in situ*. Following these goals, technology probes can provide support for the following four aspects of HCI research and practice:

- Observation of the context in which technology is to be designed, both physical and social;
- Capture of contextual user experience with a concept/technology;
- Evaluation of a technology in real life settings; and
- Provision of a tool for design dialog between users and designers, providing inspiration to both designers and users.

In our exploration, we use the technology probe technique as a way to explore how always-on video communication could support the awareness of personal cues in the context of PeerCare. As such, the aim was to capture a users' experience with a given technology to inform our design process, and to observe how the technology fitted in the elders' home and general life.

4.3   MirrorSpace

MirrorSpace is a device allowing users to communicate synchronously using video. It was designed during the interLiving project [Beaudouin-Lafon *et al.*, 2002a] to connect

together distant family members, possibly across different generations. Video is captured by a webcam placed inside a LCD screen. The images are then sent to another device and laid over its own video feed using alpha blending. Communication is synchronous and can be either direct or ambient. Direct communication is identified as situations where one or more people are actively seeking to communicate to others using the device. Ambient communication is identified as gathering peripheral information from the video link (*e.g.* light in the room). MirrorSpace uses proximity to mediate privacy by blurring the image captured by the device according to the relative distance of the user (See Figure 4.1). This mechanism is expected to reinforce privacy and to allow a continuous shift from ambient to direct communication. Blurred video still allows users to extract environmental cues, while hampering the ability to see details of the other's home.
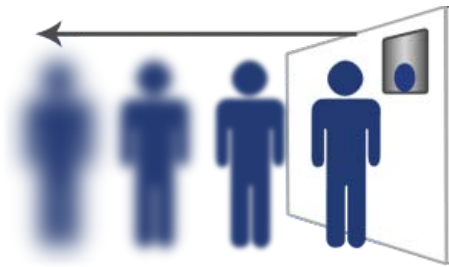
Figure 4.1: MirrorSpace: Using proximity as interface for ensuring privacy in always-on video mediated communication

We chose mirrorSpace because its always-on connection allows for both planned and unplanned communication. A user can just happen to pass by it and notice the other user standing in front of it and initiate a conversation. Moreover, mirrorSpace allows information to be shared about the living environment of the users. Salient features in the blurred images can still be noticed, such as lighting conditions (day or night for example) and general activity in the room where the mirrorSpace is placed by noticing changes in the other's video. All these aspects lead us to consider mirrorSpace as a good vector for mediating personal awareness cues, and therefore supporting awareness of unremarkable routines [Tolmie *et al.*, 2002].

4.3.1 Implementation

The analysis of the existing high level prototype of mirrorSpace underlined the lack of some important features necessary for our work. This implementation did not feature logging which would allow us to collect data of use of the device. Secondly, the prototype transmitted using reliable network protocols (TCP) which were highly functional when used in Local Area Networks (LAN) but would have induced increasing delays if deployed on the Internet. Finally, access to engineering and design resources required to reproduce the prototypes were not available.

The **hardware** we used to re-implement mirrorSpaces for our experiments included Apple Power PC Mac mini computers. These computers allowed us to introduce smaller form factors and thus limit the intrusion of the device compared to the use of a full-sized desktop computer. We used Logitech Pro 4000 digital cameras and 15-inch Dell LCD monitors to capture and display video signals. Finally, we measured proximity of objects

to the mirrorSpace using ultrasound proximity sensors, connected to the Mac mini using Phidgets[2] interface kits.
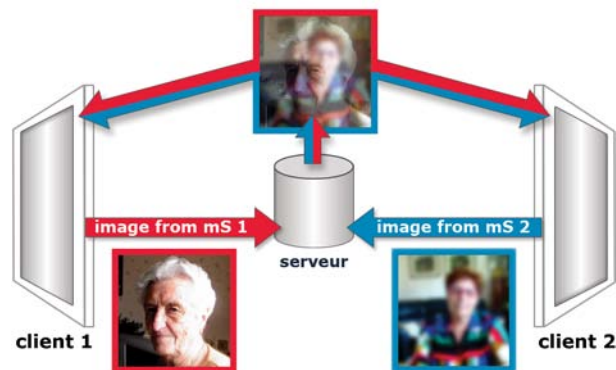
Figure 4.2: MirrorSpace: client / server architecture.

We used a **client-server architecture** to limit the processing required by each clients, and the necessary bandwidth when connecting more than two mirrorSpaces. A server permitted to link clients together, to merge the images they were sending, and to relay the images back to the clients (See Figure 4.2). The software for the probe was entirely rewritten to accommodate this architecture, using the C++ programming language and Roussel's núcleo toolkit[3] for video capture and transmission, and the OpenCV library[4] for video analysis and motion detection.
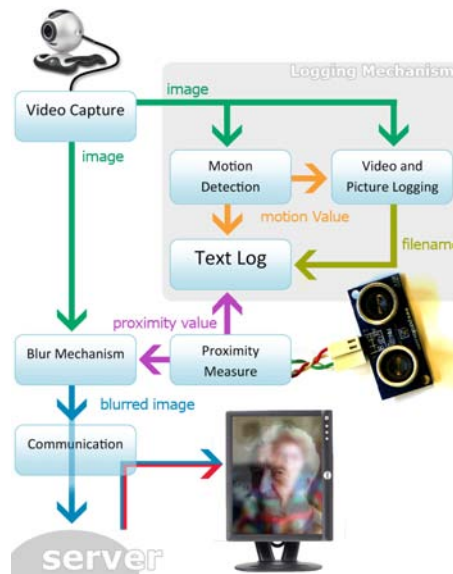
Figure 4.3: MirrorSpace: Components of the client software

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[2]Phidgets are designed to easily interface analog or digital sensors to computers: `http://www.phidgets.com`

[3]More on núcleo at : `http://insitu.lri.fr/~roussel/projects/nucleo`

[4]More on the OpenCV Library at : `http://sourceforge.net/projects/OpenCV`

Server Side

On the server-side, the software permitted the use of a non reliable protocol (UDP) in order to improve efficiency of communication over Internet connections. The software also included a TCP server managing the connections of clients. This part of the software received connection requests from clients, and opened an UDP port to receive the clients' images. The client's UDP port number on the server was then sent to the client to start the streaming of images. Similarly, when connecting to a server, the client opened an UDP port for receiving images from the server and communicated this port number to the server using the TCP connection.

Using OpenGL, the server software overlaid the image received from the clients with varying opacity to ensure similar visibility of signals from all clients. It then transmitted the composed image to all clients using their respective UDP ports.

This setup allowed clients to receive only one composited image as an aggregate of all clients' images. The original implementation used peer to peer connections, which forced clients to emit images to and receive images from every clients it was connected to, thus requiring a larger communication bandwidth.

Client Side

We designed the mirrorSpace client to be power efficient, to prevent noise disturbance due to the computer handling too much processing and needing to use cooling fans. We separated the software in six parts: video capture, motion detection, proximity detection and blurring, video, pictures and sensor values logging, communication, and display (see Figure 4.3).

We realized **video capture** using the núcleo toolkit which provided an interface to capture video from a webcam, and to transmit it over an UDP network protocol. Upon their capture, the software then analyzed the individual frames of the video for motion detection.

The client used the OpenCV library for **motion detection**. The library allowed us to measure a value of movement based on the calculation of optical flow in various parts of the image, and provided motion vectors for each part. In our case, we wanted a robust yet simple motion value. We used the size of the vector resulting from the sum of all motion vectors in the picture. We aggregated motion values into 4 discrete levels from 0 to 3, 0 meaning no movement and 3 meaning important movement in order to ease or interpretation.

We implemented **proximity detection** using a commercial ultrasound telemeter interfaced with the Mac mini using a Phidget InterfaceKit. The software filtered sensor values using a low pass filter which provided proximity values from 0 to 3, 3 being far away and 0 close-by. We used a hysteresis to avoid unstable states at the frontier between the various states. The client then handled the proximity values to the blurring mechanism, to alter the image using a weighted convolution blur[5] prior to sending it to the server. We provided smooth transitions between blur levels for the different proximity values using intermediary blur steps.

Data logging included the capture of three types of data: sensor values, pictures, and videos. A text log allowed us to capture the history of values of motion and proximity

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[5]The weighted convolution blur is provided by the núcleo toolkit

(from 0 to 3 each) (See Figure 4.4). To log videos and pictures of the interaction, we used the motion values of the sensor to trigger recording when motion was detected. Clips of interaction lasted as long as motion appeared, until no motion was detected for 5 seconds. When no video was recorded, the client would capture snapshots of the scene every five minutes in order to allow for reconstruct actions even in absence of video clips. Each change in either motion or proximity triggered an entry in the text log, with values from both sensors as well as the current picture or video file.

Date	Time	MOVE	CLOSE	Blur	User	Filename	TStamp	Duration
06/03/2006	15:00:42	1	2	11	Beatrice	/Users/yann/	3487309211	111
06/03/2006	15:00:42	3	2	9	Beatrice	/Users/yann/	3487309292	81
06/03/2006	15:00:43	3	3	7	Beatrice	/Users/yann/	3487309614	322
06/03/2006	15:00:44	2	3	0	Beatrice	/Users/yann/	3487311475	1861
06/03/2006	15:00:45	3	3	0	Beatrice	/Users/yann/	3487311683	208
06/03/2006	15:00:51	2	3	0	Beatrice	/Users/yann/	3487317689	6006
06/03/2006	15:00:51	1	3	0	Beatrice	/Users/yann/	3487317886	197
06/03/2006	15:00:51	2	3	0	Beatrice	/Users/yann/	3487318082	196
06/03/2006	15:00:51	3	3	0	Beatrice	/Users/yann/	3487318485	403

Figure 4.4: MirrorSpace: Example of text Log File

The communication module connected clients to the server, exchanging port numbers for UDP connections and ensuring that the client remains connected. The module received a blurred image from the blur mechanism and sent it to the server through the UDP connection. It also received the overlaid images from the server and displayed them on the LCD screen.

4.3.2 Getting it to Work

We conducted both the development and initial tests of the mirrorSpace technology probe in our lab. To further test the software and hardware in real settings, the system was field-tested between the researcher's home and the lab. This allowed for raising potential design issues prior to using the devices as technology probes in participants' homes. These field-tests uncovered many issues which impede the ease of deployment of such device:

- **Firewalls** are the basic defense on WAN networks against intrusions. They are also a major issue when designing communicating software. Most residential broadband connections are now fitted with a built-in firewall which must be configured to allow the client-server dialog.
- **Reliability of signal** is difficult to achieve on the Internet. Our experience shows that available bandwidth between homes and server can widely fluctuate depending on time of the day, geographical situation and Internet provider.
- **Reliability of software** requires extensive time and iterations. The mirrorSpace was notably fitted with a motion detection algorithm to allow the capture of meaningful clips of users interacting with it and thus avoiding the constant capture of video. The reliability of this feature in low lights setting with commercial webcams is challenging because in such condition, the gain used by the camera induces a large amount of digital noise, which initially resulted in a number of logged videos during the night where no actual movement was occurring. To partially solve this problem, we designed a motion detection algorithm that merged grayscale version of the previous 3 images into a composite image, and used optical flow tracking on the resulting image. This lowered the sensibility of the motion detection algorithm, especially in dark conditions where the digital camera would use generate noisy images through important digital gain.

4.4   Workshops

Prior to deploying the mirrorSpace probe, we organized two workshops with elderly participants and caregivers to gain first insights on the design. Workshops lasted about 2 hours, during which the mirrorSpace probe was described and setup so that participants could interact with it. The first workshop took place with Béatrice[6] and Gertrude, who later participated in the deployment, in Béatrice's home. The second took place in the sheltered housing residence with both residents and caregivers (family members and professional caregivers). During these workshops, we raised discussions with the participants concerning the mirrorSpace design and implementation, as well as its potential role in the elders' home. We also provoked discussions about issues of privacy, interaction, and the efficiency of video as medium for both direct and ambient communication.

4.4.1   Results and Preliminary Discussion

The following part of the chapter describes the outcomes of the workshops we conducted with elders and caregivers. Three main issues are outlined: Using video for informal communication; video and monitoring; and integration in the home.

Despite the blurring mechanism, participants in both workshops felt concerned about how the mirrorSpace would affect their **privacy**. In particular, they reported worrying about the camera capturing them in a situation which could lead to their embarrassment. In addition, Béatrice explained that she did not like looking at herself in the mirrorSpace, because it reminded her of how she was perceived by others, and that she looked old. She could not use it in her nightgown and had to make sure her apartment was tidy and in order when interacting with it, so that the person she would be connected to would not see "her mess". Moreover others participants reported the feeling of "being seen" when in the field of view of the camera. Despite the blur, being visible on the screen made them feel watched and self-conscious.

While some participants in the workshops felt reassured by the blur mechanism for reenforcing their **privacy**, others felt it was still too intrusive. They were doubtful the blur would protect their privacy : *"If you have some imagination, it isn't hard to guess who is on the other side and what they are doing."* This particular aspect reinforces the idea that blur does not efficiently protect privacy, as described by Neustaedter *et al.* [2006].

Furthermore, the use of always-on video seemed to induce a **monitoring perspective**. Gertrude pointed out that she would rather have something less obvious, like a telealarm: a button on a necklace which triggers an alarm when pressed. Caregivers and elderly participants in the workshops also pointed out that the mirrorSpace could be made more useful if it integrated more monitoring functionalities, including fall detection, tracking, etc.

During both workshops, participants expressed concerns for the way the device would be **integrated in their home**, in terms of place, aesthetic and practical aspect. For example, Marie explained that she would gladly accept this type of device if she was living in a bigger home, where she could choose to avoid it if she wanted. In her apartment, it would be too bulky. Furthermore, the size of her home does not allow to introduce large pieces of equipment: *"I already have my computer and my TV, I just do not have the room for that kind of equipment. [. . .] Moreover, there are so many wires."* During the other workshop, Béatrice and Gertrude voiced similar concerns: the probe was not aesthetically suitable,

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[6]Reported names are pseudonyms used to ensure the anonymity of the participants.

showed too many wires (causing Béatrice to wonder about fire hazard) and was too large. As a result, we integrated the probe in a case which could hide most of the cables. For the deployment, we asked both Gertrude and Béatrice if they were willing to accept the disruption of the probe in an attempt to see if their opinion would change over time.

4.5 In Situ Deployment

In addition to the workshops, we deployed the mirrorSpace probes in the homes of two of our elderly participants (Béatrice and Gertrude) to observe their reactions to and interaction with the device. The deployment lasted two weeks, during which they were encouraged to pay attention to the probe and to try to interact with one another through it. Both women were interviewed once a week about their opinions toward the device and its ability to support awareness. Additionally, we gave them a diary on which they could note their impressions and feedback about the device and its use. The diary task was not compulsory and was introduced as a way to help them give us feedback, and organize their thoughts. Finally, we conducted a debriefing interview with both participants to gather their impressions on the experience.

4.5.1 Setup

For this deployment, we purchased and installed two commercial Internet ADSL plans to connect Béatrice and Gertrude with the probes. The mirrorSpace probes were deployed in their respective living rooms, in close proximity to their phones. We encouraged this placement in the living room, because they considered it as the most public room of their homes, a room where they feel good (supported by our probes' study described in chapter 3) and receive visitors. It is also a place where they undergo many activities, from watching TV to knitting.

4.5.2 Results

While we placed the device for over two weeks in participants' home, technical issues, especially regarding network communication, prevented it from establishing the communication between the users over the Internet. Over the course of the deployment, both probes communicated effectively around one and a half day. The results described above therefore reflect users reactions to the device, without it being fully functional. These results are still interesting in that they underline various aspects of the device which are of interest: its integration in the home, its role as a social proxy, its technical challenges. In particular, we build upon participants' experience with the probe to elicit reactions regarding privacy and design for the home, and upon the log to discuss the issue of the place of the device in the home.

Technical Issues

Over the course of the deployment, many technical problems occurred, underlining the difficulty of deploying lab technologies in situ for research studies both on a technical level, and on a participatory design level. Establishing the Internet connection required several visits from us, and a visit from a ISP's technician, which increased the intrusion of the study in the participants' daily lives. Failure of the equipment (modem-router) also required us

to intervene over the weekend in one of the homes for replacing the defective part. As researchers had to come more often than expected to intervene on the equipment during the two weeks deployment, the participants' reaction went from curiosity to annoyance.

Moreover, the software, tested in the lab and in the researchers' homes, did not perform as expected once placed in the field. The network suffered various severe losses of bandwidth, which in turn drastically limited the ability of the probes to communicate with one another. While investigating ways to overcome this problem, we moved the server side of the setup onto one of the client's computer, in an attempt to limit network issues. This problem underlines the difficulty in developing synchronous communications using rich medium, which require a lot of bandwidth.

Video Log

The video log collected 9,225 videos for a total length of over 29 hours of video. Videos taken with Béatrice's mirrorSpace accounted for less than 11% of the overall number of videos, for a total duration of 3 hours and 48 minutes (13% of the overall duration). Gertrude's mirrorSpace videos accounted for over 25 hours. The difference between both logs can be explained by many factors, which we will discuss later in this section.

For coding and qualitative analysis, we selected 372 videos (5% of the entire collection) with the longest duration, representing over five and a half hours of videos in total (19% of the whole video log in duration). Videos in this range were 33 seconds and more in duration. We chose to pay a particular attention to this set of videos because the long duration meant there were more likely to represent interactions of participants with the device, as opposed to the participants mainly passing by the device. After removing videos related to the researchers' visits to the participants, we obtained and coded 300 videos, for a total duration of 4 hours 16 minutes. 54 of these videos originated from Béatrice's device (47 minutes) and 246 from Gertrude's (3 hours 29 minutes).

We coded the selected videos manually using a combination of sixty (60) codes which included events portrayed in the clips, actors (*e.g.* son, Hélène, cleaning lady), activities (*e.g.* on the phone, watching TV), and interactions with the device (*e.g.* hand wave, talking).

Activities

The types of activities captured in the movies we analyzed differed greatly from one woman to another. In the clips, Gertrude was often seen working on her living room table (n=106 clips out of 372), either her back close to the device, or facing it from further away. Both women were occasionally seen using the phone (n=30). Béatrice's phone was situated next to the device while Gertrude's phone was on the other end of the room, which means Béatrice was more likely to interact with the mirrorSpace while on the phone than Gertrude, though we also noticed times were Gertrude would seem to be waving from a distance while placing a call. In the clips we analyzed in details, Béatrice was often seen looking directly at the device while talking over the phone.

Interactions

In of the total number of videos analyzed (372) both Gertrude and Béatrice were often recorded waving at the device (n=61), in a probable intent to either check the device was working (is it showing them waving back?) or in an attempt to communicate with the other and get her attention (Figure 4.5 d & e). Both participants were also recorded showing the device to other people, including friends (Béatrice showed it to Hélène and Gertrude to Nicole), Gertrude's son and the cleaning ladies (Figure 4.5 a, b &c). On such occasions, they demonstrated how the distance influenced the sharpness of the image, and thus demonstrated their understanding of such mechanism. On one occasion, Gertrude pulled out a set of objects and showed them to the camera while talking about them, in what seems to be an attempt to share thoughts on objects.
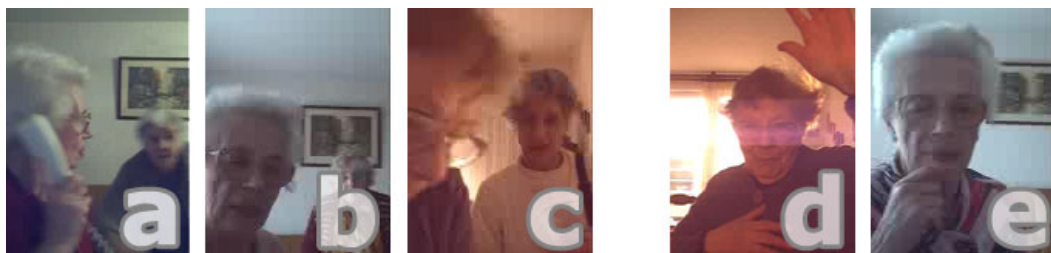
Figure 4.5: MirrorSpace: Example of logged videos: Béatrice and Gertrude are showing the mirrorSpace probe to their friends (a, b, c) and gesturing at each other (d, e).

Interviews

As part of our study, we conducted post deployment interviews separately with both participants, in order to capture their overall impression on the probe, and capture some stories of their experience. Both Gertrude and Béatrice reported looking at the device mainly when they were in its proximity and reminded of it by its salient position in the room. Because mainly to *"see if it is working"*. Gertrude also accidentally moved an object close to the proximity detection which made her image sharp rather than blurry, independently from her own position relatively to the device.

The mirrorSpace probe was the subject of their attention many times a day, where they would place themselves in front of it and watch it. They would sometimes wave or signal at the device, either to verify if they could see their own gesture reflected on the screen or in an attempt to signal at each other. Often, these interactions occurred while they were on the phone.

4.6 Discussion

Building upon the results of this study, we initiate a discussion around the use of video as always-on medium for home awareness, the role of position in the home for the efficiency of such device, and the role of technology probes in the design process.

Video, Privacy and Richness

Building upon the results of both the workshops and the deployments, we observed that despite the blur mechanism of mirrorSpace, privacy issues still arise. We believe this is due to different aspects of the mirrorSpace, and in the use of video as medium. MirrorSpace does not mimic the capture of information in the environment which occurs in real life, because the communication happens inside the home and systematically. Thus the video information, even blurred, shows aspects of the home which people do not necessarily want disclosed. Moreover, the sharing of accidental non-blurred video (someone walking past, an object interfering with the proximity detection) is perceived as a potential threat. We suggest that video as a medium for always-on communication might be too rich and placing it within the home requires intimacy which does not necessarily exists between potential PeerCare users.

For mediating personal cues, video is also a very rich medium which hardly allows for acquisition of information at a glance. The motion in the video can attract unwanted attention. In general, the video transmitted possesses semantic noise, where a lot of information is presented while little is directly useful or perceived. We suggest that the use of more abstract data for ambient communication could benefit privacy, while allowing designs to focus on certain aspects of the environment, which the communication should share (motion, proximity, sound levels, etc.). This could also provide a more pre-attentive awareness of the communication, thus a more transparent presence in the home.

Placement in the Homes

The discrepancy in the volume of video captured by the logging mechanism between Gertrude (87% in duration and 89% in number of clips) and Béatrice (13% in duration and 11% in number of clips) can be partially explained by the placement of the device in their respective living rooms. Béatrice's mirrorSpace was placed facing a couch, next to her phone. There was little passage involved in front of the device and the device was mainly visible from the couch itself. On the other hand, Gertrude's device was placed in the passageway between the entrance, the kitchen and the rest of the apartment. Thus it was a place where more activity occurred and where Gertrude was more likely to interact with it opportunistically as she passed by, or worked on her living room table. Therefore we suggest that placement in communication appliances can greatly influence their role and use, especially regarding ambient communication (what is it actually gathering and communicating in terms of peripheral information) and opportunistic exchanges.

Role of Technology Probes in a User Centered Design Process

The difficulties met when deploying the technology probe in situ highlighted issues related to our understanding of the interrelation between the method and the overall user centered design process. In this study, the use of the technology probe generated frustration from users, and highlighted the difficulty in analyzing large volumes of video logs. While it should have facilitated users' engagement, it partially failed to do so, and generated massive amounts of data for which only a limited number of tools exist to assist the exploration, in particular with large collections of video data. A number of projects exist for analyzing field

data. For instance, Gray *et al.* [2004]'s GRUMPS logging and analytic framework allows the capture, storage and analysis of usage log, but do not support visual exploration. The DIVA's system by Mackay and Beaudouin-Lafon [1998] provides support for exploratory studies both video data and sensors' data streams, but the software is not available anymore.

4.7 Implication for Design

As a result of this study, we draw some implications for our subsequent design of communication appliances for elders. Two main insights emerged from this study: The emphasis on augmenting familiar home objects rather than introducing new ones, and the need to explore different media for communicating awareness, and ambient communication in general.

4.7.1 Augmenting Familiar Objects

Both workshops and deployments highlighted the difficulty of introducing a new device in the home. This is particularly true with our mirrorSpace probe, which was rather bulky, displaying many cables and in general seemed complex and technical. Building upon the notion of calm technologies by Weiser and Brown [1995], we are seeking ways to make communication appliances part of everyday life, for them to disappear in the fabric of daily routines [Crabtree and Rodden, 2004]. We envision that rather than creating new devices to be placed in elders' home, home appliances should be augmented to become communication appliances. This aspect of design can build upon the role of objects found in elders' home (See chapter 3 to mediate relationships). The concept of mirror fits this home focus, but might fails to integrate in elders' home, because elderly women we discussed with reported being self-conscious about their appearance and do not want to see themselves reflected in the device. In fact, we during our initial study, mirrors were not found in the living rooms we visited.

Augmenting familiar objects has been used in the context of health monitoring with the digital family portrait by Mynatt *et al.* [2001] and the CareNet by Consolvo *et al.* [2004] which are picture frames augmented with information about the elderly person under care. However, these designs were ultimately used by caregivers, rather than the elderly themselves. We envision this concept as a way to augment home appliances into communication devices, and to support explicit awareness of routines. This is particularly significant when designing for elderly users, who have a limited space available for new appliances in the home and are reluctant to the introduction of foreign technologies in their homes.

4.7.2 Different Media

Building upon this study, we suggest that using video for shared awareness presents many difficulties, in particular due to the richness of the medium. In accordance with the multiscale communication approach by Roussel and Gueddana [2007], we believe that a rich medium requires too much attention for it to be used as peripheral information. A poor medium could in turn lower the attention needed for the capture of the information, and therefore provide a better solution to develop awareness displays which blend into the home environment. We suggest that using a medium carrying less information could reduce the threats to privacy. In turn, it could provide simple ambient cues, in addition to existing communication, and on which people knowing each other (like people in a PeerCare net-

work) could draw to remain more aware of each other. These cues could, however, be hard to interpret without prior knowledge of each other.

This approach has been studied in contexts other than computer mediated communication. In particular, the notion of Informative Art by Redström *et al.* [2000] explored the augmentation of aesthetic displays using data visualization of communication occurring in workspaces. It included the design of an interactive painting displaying the number of emails sent or received by a person (see figure 4.6) inspired by Mondrian's painting. Here, the size of the colored rectangles indicates the number of messages exchanged.
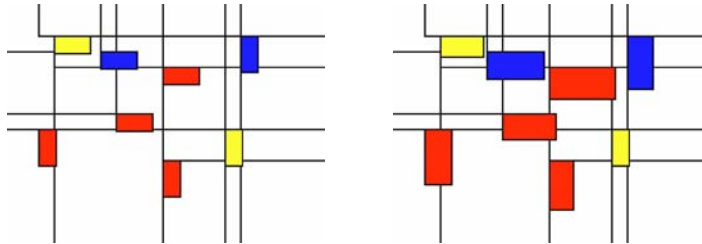
Figure 4.6: Informative Art: A visualization of people's email traffic using a visualization inspired by the painter Mondrian. The left image shows an initial state of the display, while the right image shows the state of the display after emails have been sent and received by people. Each colored square represents a different person. Source: [Redström *et al.*, 2000]

The purpose of this work is to raise awareness of communication flows within a group. The merge of information visualization and art is an approach which could suit the need for appliances to fit in the home. This approach also advocates the use of ambient awareness of information, avoiding explicit indications but rather giving ambiguous information.

Other projects have used abstracts representations to communicate information in users' periphery. Both Feather and Scent by Strong and Gaver [1996] are ambient outputs of communication, while the input is explicit.

4.8 Conclusion

This chapter explored the use of a video-based always-on communication appliance, MirrorSpace, to mediate personal cues amongst elderly people. It outlined difficulties regarding the use of technology probes in a design process, in particular regarding the reliability of software designed in the lab and the involvement of users in longitudinal studies in their home. It also suggested that the video medium presents inherent difficulties privacy and the mediation of personal cues in always-on communication. This exploration finally suggested that augmenting familiar home appliances could provide a way to ease the introduction of interactive technologies in elders' homes.

Supporting Life Rhythm Awareness: markerClock

Chapter 5

Contents

Summary

This chapter describes the design of the markerClock communication appliance based on the results of the initial user study as well as the outcomes of the mirrorSpace study, which explored the design of CA to support aging in place. In particular, it describes concepts and properties related to designing CA for aging in place which are embedded in markerClock and their expected benefits. Eventually, this chapter describes field evaluations of markerClock in two different settings: in the homes of an adult son and his elderly mother and the homes of two elderly friends. The potential benefits of markerClock for supporting aging in place are explored and general concepts included in markerClock are discussed.

How can communication appliances support routines awareness?

In our initial field study (Chapter 3), we have identified the importance of *environmental cues* amongst people living in close proximity in building *shared awareness* (See pages 82 and 89). We established the role of this shared awareness for aging in place, in particular in the context of *PeerCare*, where elders form a peer support group. Furthermore, we described the role of the *rhythm and routine awareness* in providing this peer support amongst elders, and in particular the importance of *lightweight communication routines* using informal exchanges. Finally, we outlined the difficulty of some of our participants in *managing their relationships with their adult child* without intruding in their daily lives.

In our mirrorSpace probe study (Chapter 4), we have explored the use of *video* to mediate the *personal cues*. Personal cues are expected to support *unremarkable routines awareness*, habits of daily lives, in the context of elders' homes. As an outcome, we suggested that video, as a rich medium, presented many difficulties regarding the mediation of in-home routines. We suggest that these difficulties are due to the threats to privacy and the quantity of exchanged as opposed to useful information. We finally suggested that communication appliances could benefit from being embedded into an object which already belongs in the home of elderly people to ease its acceptance and integration in daily routines.

Building upon both studies, this chapter explores the mediation of environmental cues using communication appliances. We derive the following design requirements:

- A device supporting the awareness of environmental cues;
- A device allowing the perception of routines in these cues;
- A device providing ways to create and maintain lightweight communication routines;
- A medium presenting lesser threats to privacy;
- A medium encompassing a low level of information to avoid large amounts of semantic noise, were raw information is provided and yet only a small amount of it is useful; and
- The augmentation of an familiar device to ease adoption and integration in the home.

This chapter first reviews literature relevant to the communication of environmental cues and the use of rhythms and routines. It then presents the design and implementation of markerClock, a communication appliance for elderly people allowing the establishment and maintenance of awareness of routines in the context of aging in place. Finally, we describe two month-long field studies involving markerClock as a technology probe which allowed us to partially confirm our previous findings and imply design implication.

5.1 Related Work

5.1.1 Communicating Environmental Cues

The use of cues from the environment has been explored in various contexts. The most popular approach in HCI is called context aware computing [Gray and Salber, 2001, Moran and Dourish, 2001], where interactive systems are aware of the physical (and social) environment of the user and adapts its behavior accordingly. More recently, researchers have designed devices to support awareness of environmental cues. For instance, the Spectrograph and Positional Ripple by ling Ho-Ching *et al.* [2003] are ambient displays designed

to convey information about ambient sounds to deaf people in their office environment. Other researchers have specifically designed devices for using environmental cues in the home, particularly in monitoring appliances for aging in place and social exchanges.

Environmental Cues for Elders' Monitoring

The Digital Family Portrait by Rowan and Mynatt [2005] is a digital picture frame showing a measure of the elder's activity to family caregivers to support their "*peace of mind*". This measure of activity is realized using the aggregation of information captured by various sensors placed in the elder's home. The resulting value is then displayed as an icon placed on the frame and which size summarizes the measured activity for a given day. Twenty-eight (28) of these icons are drawn around the frame to display the history of the previous 27 days in addition to the current day. The field trial of the Digital Family Portrait with an elderly woman reported that her son felt a greater "peace of mind" in knowing more about his mother's activity, and that the information displayed on the frame had on occasions provoked the son to call his mother.

Similarly, the CareNet display by Consolvo *et al.* [2004] provides information about the elder to one or many local caregivers based on the information transmitted by sensors in the elder's home. Here, however, the information is displayed below the picture using seven icons representing different types of information: meals, medications, outings, activities, mood, falls, and calendar. Through interaction, users of CareNet can gain further details on the data captured in the elder's home as well as a seven-day history. Participants in the field deployment of the CareNet display reported feeling a reduced stress from having to care for the elders, thus resulting in an improvement in their relationships.

These uses of environmental cues relies on the capture of meaningful information by various sensors. The choice of information to be captured is grounded in the caregivers' needs, but its presentation represents an abstraction of the captured data and inferred elder's states. This use of environmental cues therefore relies on the accuracy of the inference model and can be error-prone. For instance, if the pressure sensor placed on the bed does not signal any change during the day, does it mean the elder did not sleep, or that he was visiting a friend? Finally, as shown in our field study, the use of such cues can be based on knowledge of routines and perception of rhythms, which is currently not supported by these designs.

Moreover, both works focus on supporting the caregiving task, and do not specifically support communication. The information is shared unilaterally and explicitly for care purposes, which draws us to categorize them as monitoring technologies. Like other monitoring technologies, we are concerned the stigmatization induced by such devices, regarding the elders' dependence. We suggest that social rather than care behaviors should drive the exchange of information. While they support the caregivers' peace of mind, it is unsure how these devices provides direct support to the elder regarding their connectedness with their family, and the issue of loneliness[1].

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[1]See section on aging in Chapter 1 page 26 and section on the role of elders social networks Chapter 2 page 2.5

Environmental Cues for Social Behaviors

Other works have more recently focused on the exchange of awareness cues in the home, not specifically targeted at elderly users, and for social purposes rather than monitoring purposes. Bentley and Metcalf [2007] designed a mobile application which tracks users mobility and broadcasts it to friends or family members. Following users' change of location based on the GSM cell used by their mobile phone, the application displays mobility status (mobile, not mobile and the duration for which the given status has been active) to the members of the users' social network. The deployment with real users has confirmed that this information was used to infer states of people in their daily activities as known by other people, and in some cases enhanced their feeling of connectedness.

Brown *et al.* [2007] have designed another device for the home, the Whereabouts Clock, based on users' locations rather than mobility. Using an application on their mobile phones, users can tag their current location as either work, school or home. The place is then automatically recognized using the cell phone tower unique identifier. Location of users according to their tags (home, work, school or elsewhere) is then displayed in the home on a screen showing participants' representation within defined zones (See figure 5.1). Field deployments of the Whereabouts Clock showed clear benefits for users in terms of connectedness, but also in terms of peace of mind and sense of intimacy.
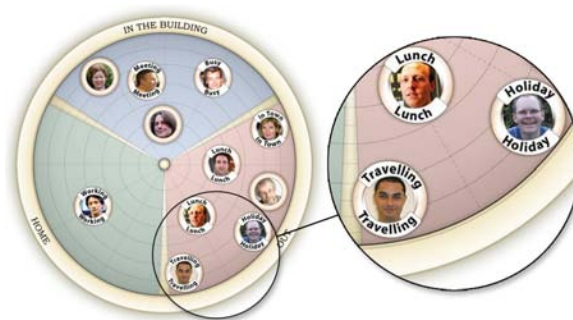
Figure 5.1: The Whereabouts Clock showing users' locations according to the tag they have assigned to them.

While these works demonstrate the usefulness of mediating environmental cues for social relationships, they do not provide an explicit support of rhythms and routines. However, they acknowledge that the interpretation of these cues are based on the knowledge users have of their respective routines. No specific support of routines and rhythms is provided, since no history of information is available. Also, while the awareness cues exchanged by these designs provided interesting results with active people, friends and families, they were not designed with elders in mind and it is unclear how these systems would apply to the particular population we are studying.

5.1.2 Homes and Routines

Home is a location in which routines are particularly important. Crabtree *et al.* [2003] explored how routines shape home activities and how communication is organized and situated within these routines. As an example, they describe how mail might be dropped in a basket in the entrance so that people coming from work or school see it as they come

in. These routines are suggested as an indicator when considering the placement of ubiquitous computing in the home to make them part of existing routines. This observation is supported by the work of Tolmie *et al.* [2002] which suggests that embedding technology within the routines of home can help them become *"invisible in use"* and thus achieve Weiser' vision of *calm technologies* [Weiser and Brown, 1997]. Similarly, Nagel [2006]' study acknowledges the role of routines in managing domestic activities and how routines can be predictors of interruptibility in the home.

Palen and Aaløkke [2006] underline how routines, both spatial and temporal, provide a support for elders in taking their medication. They also report on how home health workers help in establishing these routines to support medication intake. In particular, they highlight the strong correlation between spatial and temporal routines, as people might execute a daily routine by accessing different places in a sequential order, or use the placement of object to determine the sequence in which they must be used[2].

Routines Awareness

Crabtree *et al.* [2003] also underline how people in the home are aware of each other's routines and use this knowledge to coordinate event or communication. Similarly, Elliot *et al.* [2005] have studied how people in the home use their respective knowledge of routines for placement of messages. Depending on individual routines of the message's recipient, the message will be placed in a meaningful location. For example, a mother wants her child to tidy his room as soon as he gets back from home. Knowing that he usually watches his favorite TV show before starting his homework, she will place it on the TV screen to be sure he will read the message. The fact that it is placed in the way of his daily routines will emphasis the importance of the message and ensures its reception. More specifically for elders, Palen and Aaløkke also report on how caregivers use their awareness of elders' routines to infer general state. By assessing that these routines are done as usual, they are for example reassured that elders have taken their medication. Tolmie *et al.* [2002] provide similar accounts of how people in a social network might be aware of each other's routines and use them to coordinate and interact.

These studies have provided the ground for understanding the way routines shape the way we interact with objects, places and people in the home. They also describe the way people build their knowledge of other inhabitants' states and activities depending on the reflection of their routines in the home. In doing this, they provide a ground for using routines as a way to support design practice and activities in the home.

Routines for Communications

The awareness of routines is also important in interpersonal communication. In particular, Nagel [2006] underline the role of routines in predicting someone's availability for communication in the home, and Begole *et al.* [2002] provides similar accounts for the workplace. In Nagel's work, routines are used in context-aware computing devices as a way to recommend periods of time during which calls might be inappropriate. Similarly, Begole *et al.* [2004] have designed an Instant Messaging application in which users' status

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[2]very much like a cook lining up the ingredients of a recipe in the order in which it must be used

can be automatically changed based on routines inferred from the capture of environmental cues including door status, motion, phone use and sound. However, these works do not offer an exchange of awareness cues, but rather a computer generated inference of unavailability from readings of sensors.

We argue that while this use of routines provides an automated way to establish online state, it only partially supports ways people use awareness cues, rhythms and routines to interact with one another in collocated situations. Moreover, the workplace is drastically different to the home, in particular regarding the types of exchanges and activities communication is sought to support. Domestic communication based on awareness cues should serve a different purpose than to predict unavailability, as described by the PeerCare aspect in particular.

We believe that inference-based use of environmental cues and routines is noisy and error prone, due to its reliance of pre-defined models which cannot encompass the complex assessment of environmental cues which occurs when collocated. Therefore, our exploration explicitly avoids this approach to focus on the exchange of awareness cues between elders and members of their social network, as well as their appropriation and interpretation in practice.

5.2   MarkerClock

Building upon the requirements drawn from our previous study and described in the introduction of this chapter (page 113), as well as the work described above, we designed a communication appliance called markerClock which allows the sharing of awareness cues between elders and their social networks. The following section describes the iterative design of markerClock, and is followed by a technology probe study of its use in the field.

5.2.1   Initial Design

MarkerClock is a hand-based clock, designed to be hang on a wall. Moreover, it is similar to the clocks found in the homes of our participants. We based its initial design on the idea of providing an ambient communication of people's environmental cues. To support awareness of routines and rhythms, markerClock is able to capture cues in the users' environment (such as light intensity or motion) and displays the information and its history on a clock.

The clock is already a ubiquitous device in home environments, and provides an explicit, well known mapping between angular position and time. This use of the inherent mapping between time and space was already at the core of the SpiraClock design [Dragicevic and Huot, 2002], which displays calendar events on a clock using a spiral. MarkerClock makes use of that existing knowledge by placing information around the clock at the angular position corresponding to the time of the represented information. For example an information sent at 3PM will be displayed in front of the number 3 on the clock.

Sharing Information

The initial prototype of markerClock consists of two clocks connected to each other. Each clock was responsible for displaying the activity measured in the home of the other

person on a spiral wrapped around the clock's center. Figure 5.2 provides an illustration of the initial design of markerClock. Each clock in a pair of clocks displays the information captured by the other clock. The colored spiral on the clock represents the events captured in the home where the other clock is placed. While later in our design we used motion sensing , environmental cues can be also captured using a variety of sensors such as motion detection, pressure sensors, etc.

We call *trace* the history of information regarding the environmental cues. According to its inherent angular / time mapping, a turn of the spiral represents 12 hours of trace. Because this iteration of markerClock can only display the information of one other clock, a trace can represent up to 3 days of history using six concentric spirals of 12 hours each. Precision of the representation reduces in the central spiral they are smaller than outer ones and thus display less information. The color of the trace represent different measured states, depending on the nature of the information exchanged. Additional information about the other's environment is also displayed on the clock. In this illustration, the local weather is shown on the center of the clock.

Analysis

This prototype of markerClock embeds the ambient communication of environmental awareness cues. However, it does not provide the support for the type of direct, simple communication observed during our user study such as when Béatrice rings Hélène's phone three times in the morning or when Irène leaves one of her shutters opened. These interaction allow for a specific Peer-Care behavior to emerge out of simple, non-explicit, non-specific and non-intrusive exchanges of messages.

Figure 5.2: MarkerClock: Initial design. Each clock displays the activity of the home in which its paired clock is placed.

Moreover, this clock only allows to mediate the relationship between two users, whereas our user study highlighted the importance of multiple, intricate social networks in the PeerCare approach. A different approach regarding the representation of the information must be undertaken to allow multiple users to be displayed on markerClock. Moreover, after analysis, we regarded the lack of feedback to the user of what information is shared about him/her as a potential privacy issue. Therefore we considered the need for a way for users to see their own information in the next iteration of markerClock.

5.2.2   First Iteration

History Display

In this iteration of markerClock, the exchange of routines was significantly modified. These modifications allowed users to see not only the trace of their friends, but also their own. By allowing users to see their own trace, we provided them with the ability to see what they are sharing with the people they are connected to and a way to reflect on their own routines. To accommodate this change, and to increase the readability of the display, we chose to only keep the last 12 hours of history. This allowed for more than one trace to

be displayed at one time on the clock, thus allowing the connection of up to four connected clock comfortably. Each user is represented by his or her clock's trace: a spiral, whose color and rank are consistently used across the various clocks. Users can be separated into groups so that the friends do not see what the neighbor sends. This is particularly important as the social networks of elders are often made of many sub-networks, which do not necessarily communicate with each other.

To easily distinguish between present and past information, the thickness of the spiral depicting awareness information decreases toward the end of the history. The age of a portion of trace is also emphasized by decreasing its saturation as time advances.

Exchanging Directly

In this prototype, direct communication was embedded by allowing users to drop colored dots on the trace. When a user touched the clock, a colored dot appeared on the trace at the current time. Different-sized dots could be used to create different messages or various emphasis of the same message. User could create larger dots by touching the clock many times within a short period. This prototype allowed users to create their own code for symbolic messages. This use of codes was expected to allow them to feel part of a community by sharing a dedicated language.

By using the familiar mapping between time and geometry, markerClock enhances the role of time in messages and makes the time context salient. This use of time to provide explicit context for communication extends existing asynchronous/synchronous paradigms found in the literature. For example, if the clock is situated in her friends living room, Béatrice will know that if a motion occurred between 4 and 5am, this is not a night snack. This may show a sleep disorder due to her friends upcoming surgery. Beatrice can clearly see when her friend was up during the night because the information is not lost (the old information is replaced by a newer one) and is readily available.

Analysis

We discussed the markerClock design with fellow researchers who had had the opportunity to interact first hand with a working prototype. This working prototype used motion detection on a digital camera signal to trace activities. These discussions supported our approach regarding routines awareness, but suggested changes to emphasize the difference between past and present time. The granularity of the information (the period of time between two exchanges of peripheral information) was also adjusted depending on users feedback to increase the readability of the design. A discussion with an elderly user around the markerClock concept suggested that colored dots were not particularly suited for creating a shared vocabulary.

5.2.3   Second Iteration

History Trace

To further avoid confusion between past and present communication at the proximity of the hour hand, we designed the clock so that the last half hour of information would

fade to disappear totally (See figure 5.3). In this iteration, we also changed the granularity of the ambient information from one minute to five minutes[3]. We expected this change of granularity to ease readability, especially from a distance, when markerClock is used as an ambient display. Moreover, to allow users to explore patterns which could be representative of routines, this iteration integrated an interaction to re-visit past history beyond the available last 12 hours. Finally, we coded motion values in five transparency values of the user's color, from no motion to motion (See figure 5.3 from no to motion).

Figure 5.3: MarkerClock: A. Coding of the motion values as different transparency values, B. Fading of the trace at the last hour, as well as a unsaturation of colors in the last six hours of history.

To explore the history, users can drag the hands of markerClock to "roll back time". When doing so, the hands representing the current time are displayed as gray semi transparent hands, whereas the hands being manipulated designate the time from which the 12 hours history is displayed. To help this exploration, the time represented by the hands being dragged is displayed at the bottom left corner of the screen. In this mode, colors of the trace are also altered to reflect the change in perspective from current time to history browsing. When the hands are left in place for more than 10 seconds, the perspective returns to the normal time.

Figure 5.4: MarkerClock: A. Symbols used as communication markers, B. Example of combination of symbols.

Symbols

To replace the existing circles of various size used for direct communication, this design uses symbols designed to serve as markers on the trace. Three symbols are provided (with the possibility to integrate more if required): a triangle, a lozenge and a drop. These shapes all possess a part which can be used to point precisely at the trace. In order to facilitate a combination of these symbols to be used together to create a vocabulary, the symbols are displayed as semi transparent with a solid outline, as show figure 5.4.

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[3]A granularity of one minute means a trace is composed of 12 x 60 = 3600 samples, whereas a granularity of five minutes means that it is composed of 1440 samples.
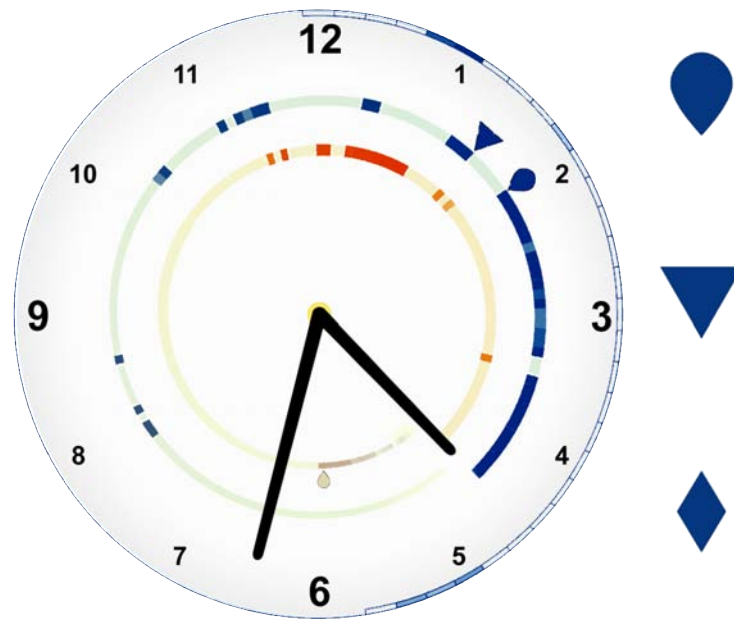
Figure 5.5: MarkerClock: Illustration of the second iteration of the markerClock design

5.2.4 Implementation

MarkerClock is implemented using the Trolltech Qt API[4] in C++. Qt provides a cross-platform compatible solution for using hardware graphics acceleration and a simple callback mechanism for handling events. Activity is measured using a motion detection on a video feed provided by a webcam connected to the clock. Motion detection is done using Roussel's núcleo toolkit[5] for capturing and handling video signals on both Linux and MacOS X systems, and the intel OpenCV library[6] for computer vision. The network communication was done using Nars' Circa toolkit[7] [Nars, 2007] for managing groups, their connections and communications.

Display

The display of the markerClock is implemented as a separate class which handles the layout of the information, as well as users' interactions. The layout is composed of a set of images composing the skin of the clock, and which users can customize by using other skins (See figure 5.6 A. and D. for an example of skin), and vector drawings automatically generated representing the data exchanged between the clocks (See figure 5.6 C.). The support of skin allow users to adapt the look of the clock to their preferences and the aesthetics of their home, thus easing integration. The activity data of markerClock is drawn as a spiral made of portions of arcs. Each drawn motion sample forming the spiral is an arc of fixed

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[4]Qt is available at: `http://trolltech.com/products/qt`

[5]More on núcleo at: `http://insitu.lri.fr/~roussel/projects/nucleo/`

[6]The OpenCV library is available at: `http://opencvlibrary.sourceforge.net/`

[7]More Circa at: `http://www.lri.fr/~nars/circawiki/doku.php`
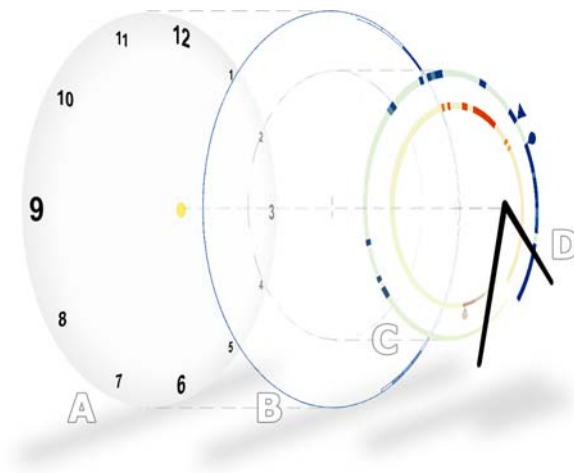
Figure 5.6: MarkerClock: Display layers: A. Customizable background, B. Seconds and local motion detection feedback, C. Motion and Communication markers, D. Customizable hands

width and length, respectively determined by the sample's age and duration. If a motion sample is missing from a markerClock (due to a power failure for example), no motion is drawn, while if the motion received is null, a motion marker (arc) is drawn with a very light hue, allowing the spiral to maintain a continuity representing the fact that the markerClock was functioning at the time (See figure 5.7).
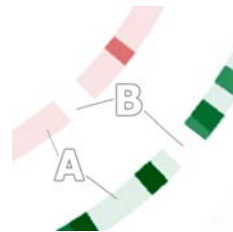
Figure 5.7: MarkerClock: Example of interruption of motion. A. The light color means that no significant motion was captured, B. No information about motion was received.

Buttons representing the communication markers are drawn next to the clock (See figure 5.5), using the user's representative color. They allow users to click on either of them to send the corresponding symbol. While the design is made to be used with touch screens, our prototypes only included a traditional mouse / pointer interaction due to our limited resources. Therefore, we chose to draw the symbols particularly large to accommodate elderly users pointing difficulties due to lack of experience with a mouse pointer or slight motor impairment. To further facilitate the interaction, the symbols are highlighted when the mouse cursor enters them, showing that they can be sent by clicking. The current implementation easily allows for a change of interaction is a touch screen can be accommodated by simply hiding the mouse cursor and if necessary reducing the size of the buttons.

Each information on the clock can be identified by the color which represents a particu-

lar user. A given markerClock also draws seconds using the clock user's color on the outline of the clock as a set of arc portions. The arcs are filled with the user's color according to the immediate motion detected by the markerClock. This allows users to have some feedback over what is measured by their markerClock, and verify if motion is being sensed.

Communication

The messages exchanged are markers, text messages containing the information necessary for each client to store and display the information. Two types of messages are sent, depending on its content: Motion markers or communication markers. While we could have formatted our messages in XML, we chose a rather ad-hoc language for coding the messages.

```
MARKER::OK@@TIME::2007-06-06T09:03:19.569Z@@SIZE::0@@FROM::tristan@@
MOTION::OK@@TIME::2007-06-06T09:07:00.439Z@@SIZE::0@@FROM::rebecca@@MOTIONMIN::0@@MOTIONMAX::0@@SAMP
                                                                LEDURATION::300000@@
```

Figure 5.8: Example of messages exchanged between clocks.

In each message, the time is coded as a character string timestamp representing the Greenwich Median Time. The logging mechanism subsequently parses this string to record the event in a format easily usable for analysis: YEAR; MONTH; DAY; HOUR; MINUTE; SECOND; MILLISECOND. This permits easier operations regarding time and time periods during the analysis. The communication markers include the following data fields: type of marker, TIMESTAMP (nùcleo timestamp in plain text) , SIZE (value of the marker), SENDER (sender of the marker). The motion markers include the following additional fields: MOTIONMIN (minimum measured motion in the time interval of the sample), MOTIONMAX (maximum measured motion in the time interval of the sample), and SAMPLEDURATION (duration of the sample). Figure 5.8 gives two examples of messages exchanged by two markerClocks through the Jabber server. The first marker is a communication marker sent by Tristan at 10:03AM (9:03AM GMT in the log), while the second is a motion marker sent by Rebecca at 10:07AM showing that no motion occurred during five minutes prior to the message (between 10:02 and 10:07AM). Finally, using Circa, markerClocks are organized in groups, which all share their information. This means that when a markerClock sends a message to a group, this message is passed on to other members of this group.

5.3 Deployments

We deployed markerClock as a technology probe between two pairs of homes in order to explore the design of communication appliances to mediate routines and rhythms. One of the deployments took place in an adult child / elderly parent context, allowing us to explore the context of family intrusions. The other took place in a PeerCare context, between two elderly friends. These deployments allowed us to better understand the role of respective rhythm awareness and raise a discussion around the value of symbols as direct communications.

5.3.1 Methods

Each deployment lasted about four weeks. Two weeks before, participants were interviewed to assess their relationship and interactions (both physical and mediated). During the deployment, participants were asked questions related to their prediction about why and how they would use the device and its different features. Each week, we also conducted alternatively phone or face to face interviews to collect qualitative and self-reported qualitative data about participants' interaction with the probe, their physical and mediated interactions and the possible influence of the probe in their relationship or interactions. Additionally, usage data was collected by the probe in order to help us understand how participants interacted with and through the probes. Recorded data included the captured motion information and the symbols sent by each user.

During the second deployment, we also introduced a modified version of the ABC questionnaire developed by van Baren *et al.* [2003] and designed to measure various aspects of a mediated relationship: Personal Effort, Thinking about each other, Sharing Experiences, Staying in Touch, Recognition, Group Attraction, Obligations, Expectations, Invasion of Privacy, Process Effort. To these aspects, we added questions regarding their respective awareness of routines through questions such as "The other knows if I generally go to bed early or late.". This questionnaire provided insights into the impact of the probe, in particular regarding their feeling of privacy.

5.3.2 Participants

Similar to our initial field study (see Chapter 3 page 65), we encountered many challenges to recruit participants for this study[8]. Due to our limited resources, we could not provide Internet connections to participants as we had done in the previous probe study. As a result, we selected elderly people who already owned a broadband Internet connection. Moreover, we selected people who could introduce a friend or relative with whom s/he would be connected using markerClock, and who would therefore already own a similar Internet connection. We also limited our selection so that all the households involved would be situated reasonably near Paris to make it possible for us to provide the technology that needed to be installed in their homes later in the project. These criteria excluded elders who had participated in our earlier studies, as only one had an Internet connection, but which was insufficient for our purpose (*i.e.* dial up).

To advertise our project, we crafted a set of material (*i.e.* brochure, poster, introduction letter, paper file and email describing the project) which we sent to a large number of local senior clubs in this area, some of which we also visited. We posted various messages on online forums dedicated to seniors and contacted some seniors online through social networking websites (*i.e.* Flickr and Facebook). We also posted notices in online mailing lists dedicated to research projects and human computer interaction. Additionally, we contacted the social and cultural services of the city of Paris, who introduced us to local clubs it administrated. In these clubs, we put up posters and distributed brochures advertising our project. We also participated in a number of events, taking the opportunity to advertise

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[8]This is similar to the difficulties encountered by the French research team of the interLiving project who conducted similar studies with distant families. In our case, the type of population we were interested in probably increased the difficulty in that many elders happened to be uncomfortable working with people they did not know, and felt concerned about having to allow us to enter their homes and install our equipment.

our project directly to elders. Finally, we asked friends and lab members to advertise the project to elderly relatives, friends or neighbors who they thought might be interested. We thought that providing an indirect personal connection to the project members (some sort of reference) would help elders come forward.

As a result, around a dozen elders contacted us, mostly by phone though few by email. During this contact, we gave a more in depth description of the project, and the requirements for participating in the study. At this point, many participants told us that they could not participate because they had no Internet connection, reported feeling concerned about the impact of the study on their daily lives, or could not find people with whom they would like to be connected to and who had an Internet connection, lived at a reasonable distance and would be willing to participate. Some of the elders would expressed motivation in our study gave up participating because they failed to find this friend or relative. As a result, we later approached them to participate in our participatory design sessions described in Chapter 6.

Finally, two pairs of households participated in the technology probe study. The first pair was composed of Rebecca[9], a 73-year old woman living independently in a house in a Parisian suburb, and her son Thomas and his family. Rebecca is computer literate and frequently uses computers to send emails, edit her blogs, and edit digital photographs she captures with one of her various digital cameras. She is active, often making daily trips around Paris to take photos or meet with people. Rebecca also often babysits her grandchildren, in particular when they come out of school to drive them to their activities. The second household is composed of Thomas, his wife Sarah, and their two children aged 5 and 7. Thomas is a 41-year old human factors specialist, and Sarah works as a computer helpdesk. All live in an apartment within 10 minutes drive of Rebecca's home and meet with her on a regular basis for activities. When asked about their motivations for participating in this study, both households explained being interested in the innovative and unique aspects of this study and the markerClock. Rebecca also mentioned being interested in investigating ways to feel more connected to her son.

The second pair was composed of Ursula and Veronique, two friends aged respectively 70 and 82. Both women live in apartments in Paris. Ursula lives on her own, while Veronique often hosts grandchildren who are studying in Paris. Ursula very recently bought a computer and has minimal knowledge of its use. She has just started using emails and browsing the Internet. Veronique owns an old computer that she rarely uses, checking her emails around once every two weeks. Both women meet every two weeks with other friends for a discussion around religion and scripture. They also sometimes meet outside this schedule for social events.

5.3.3 Setup

For our deployments, we used the markerClock software on Apple iMac computers. These all-in-one computers provide a minimal design[10] which reduces the room necessary for its installation. It is also reasonably light and only needs a power cable to function, which allows users to move it easily if necessary. Finally, a webcam is fitted in the frame of the screen, which eliminates the need for us to place a very obvious webcam on the top of the frame. The iMac therefore provides both an aesthetical and convenient design for markerClock.

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[9]Reported names are pseudonyms used to ensure the anonymity of the participants.

[10]In the iMac, the computer and the screen are only one device.

For **deploying markerClock in the field**, we added a sleep mechanism which dimmed the clock's display when no motion was detected locally over a certain period of time (typically five minutes). The dimming reduced the light emission which could represent a nuisance to users. Moreover, markerClock was designed to have its appearance customizable. Personalized skins can be defined in a separate folder, and include background images, hands' images, and the color of the sleep mode overlay.

To be able to use the markerClock as a technology probe, it was fitted with a **logging mechanism**. The logging consisted in recording both markers sent and markers received in two different files. To respect participants' privacy, no image captured by the webcam was recorded.

The technical success of the deployments was ensured by re-enforcing the **reliability** of the software through many tests both in the lab and in the field, and the use of redundancy. We used different mechanisms to ensure that the markerClock would be functional for the maximum amount of time in the field. First, we used Circa to recall the history of communications available in the Jabber protocol[11] (about 3 days), thus allowing markerClock to require a partial history of the communication at startup. This mechanism ensured that if the markerClock had to be restarted, for example in case of power failure, the markerClock would gather the information which transited by the server in the meantime. Loss of connectivity with the server was handled by Circa, which automatically reconnects to the server upon disconnection. Additionally, the execution of markerClock was monitored both by an automatic script, which checks every five minutes that markerClock is running and restarts it if necessary, and a monitoring software available on the primary researcher's computer. The monitoring software allowed us to display the status of each clock (connected / disconnected) and automatically emailed us for every change in status. This way, when an interruption occurred without being automatically fixed, we were able to intervene through a remote access protocol (SSH) or to call the participants to evaluate the source of the problem from a distance.

The **installation** of the markerClock probe was relatively easier than the previous installation of the mirrorSpace probe. For our installation, we had to first add the probe to the participants' wireless network, which took between five minutes to an hour, depending on the accessibility of the necessary information. We then configured the users' modem-router provided by their ISP in order to provide us access to the probe through remote shell and remote desktop applications (respectively SSH and Apple Remote Desktop). This last step would not be necessary in a deployment outside our study, since its purpose was to allow us to monitor usage, remotely gather logs, and easily modify the software if needed.

Figure 5.9: MarkerClock: Deployment at Rebbeca's home.

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[11] More on the jabber protocol at `http://www.jabber.org/`

The markerClocks were then installed in the living room of the participants, in a place where it would capture activities of daily life, and where it would be highly visible: the living room. In the first deployment, Thomas's markerClock was installed in front of the main passageway, capturing motion when people were arriving through the main door or accessed either the kitchen or the living room. Rebecca's markerClock was installed facing her living room, capturing activity occurring in it as well as passages between her room, and the other area of the house containing the kitchen and bathroom. During the second deployment, Ursula's markerClock was deployed in her living room, facing most of the room as well as the window. Véronique's markerClock was installed on a piano facing the dining table used for almost all meals. It also allowed the clock to capture passages to the kitchen, and activities in the family room, while remaining visible from almost anywhere in the room.

5.3.4 Results

Supporting Awareness Of Rhythms And Routines

In this study, we explored how simple information, captured regularly and displayed back to the users, could serve to support shared awareness. The motion value captured continuously by each probe during the previous 12 hours displayed around the clock. We were interested in whether or not the information on the clock would be easily interpreted by users, and fit their expectations of what they thought it should show. In particular, we studied whether users were able to notice unusual events from the trace by building upon their existing knowledge of routines. Some participants initially reported having concerns about their ability to read the trace. However, as early as during our first weekly interview, they demonstrated being able to quickly read and partially interpret the traces. In particular, during this interview, Rebecca said: *"It mainly confirms what we already know. It reminds me of things I know"*, suggesting that the representation was successful at presenting information in a meaningful way.

Early in the deployment, participants were also able to deduce the time when the other participants were going in and out of bed. In our first interview, Thomas and Sarah reported having confirmation that Rebecca was often going early to bed, getting out of bed a few times during the night and getting up in the morning. Other salient times were easily identified, including meal times and times were the kids were active, as the motion traced on the clock were more important at these times. Ursula and Véronique, while they had little prior knowledge about their respective routines, were able to easily deduce rise and bed times from the reading of the clock. They even took the habit of greeting each other using the probe's drop symbol in the morning.

The clock allowed for additional information about users' rhythms to be identified. On one occasion Rebecca noticed that there was activity indicated on the clock at the time where Sarah usually takes the kids to the swimming pool. When asked for her interpretation of this surprising information, she offered that Sarah might have reconsidered going because it had been raining. Our subsequent interview with Sarah and Thomas confirmed this guess. Similarly, as Sarah was more aware of Rebecca's excursions and schedule, she was able to deduce from the clock's trace when she had left to go to Paris or to go shopping and come back.

Because they were less knowledgeable about each others' routines, Ursula and Véro-

nique were able to extract few events from the probe's trace. However, they started over time to see the emergence of habits and gained awareness about each others' routines. They also reported calling each other more often and exchanging about their respective whereabouts. Over the course of the deployment, both Ursula and Véronique were able to identify some salient events in the probe's trace. During interviews, Ursula pointed out from the trace that Véronique had had a visitor for a few days. It showed up on the probe as a longer activity trace at meal times. She also pointed out that Véronique's grandchildren would sometimes get up early and show up on the trace before the morning greeting. Véronique, on the other hand, grew frustrated by the activity trace, because the location in Ursula's home meant it was sensitive to fast changes in lighting conditions such as a cloud hiding the sun. This would show up as activity were she was sure Ursula was not there, and lead her to call her friend afterward to relate the event.

Additionally, markerClock provided ways to establish and maintain non-intrusive communication routines using direct asynchronous communication with symbolic codes. With varying levels of success, both groups established such routines by exchanging these symbols regularly. Véronique and Ursula succeeded in establishing in maintaining such routine, by using the drop every morning. On the other hand, Rebecca, Thomas and Sarah failed to do so, even though they never really ceased to use symbols. We believe this is partly due to the lack of mutual understanding about their significance. Moreover, this particular aspect failed to help Rebecca communicate her feelings to her son, which was one of her motivations to enter the study.

Awareness vs. Closeness

Right from the beginning of the study, Rebecca and Thomas used the probe quite differently. At the beginning of the study, Rebecca admitted: *"I sometimes walk in front of the clock to make sure the trace shows activity"*. However, she and Thomas did not discuss what they perceived on the trace, thus suggesting to Rebecca that *"they [Thomas's household] do not pay attention if I am moving during the day or not."* Nevertheless, our discussions with Rebecca, Thomas and Sarah revealed they all paid attention to the clock's data many times a day. Most were able to extract basic information from the clock, thus building an awareness of what the others were up to. For example, in a face-to-face interview, Rebecca reported having noticed that Thomas and Sarah had probably gone to bed around 2am a few nights ago. She suggested that they probably had difficulties getting to bed in time. Similarly, Sarah reported noticing that Rebecca would systematically get up during the night, probably to go to the bathroom.

During the study, Thomas reported feeling comfortable with the level of information captured and displayed with probe, as well as the type and level of information it provided. He appreciated the ability it gave him to *"have an idea of what [Rebecca] is up to"*. Rebecca was more reserved in her experience. While she had expected markerClock to allow her to feel closer to her son, it failed to do so despite the increased awareness. She suggested using more expressive ways of communicating, by replacing the symbols by emotions, or even little pictures. While she gained additional awareness of what was happening at Thomas' household, she did not feel more emotionally connected to him or his family.

On the other hand, Ursula and Véronique reported feeling more connected to each other, because of the constant presence of fresh information about each other. While they had dif-

ficulties interpreting this information, seeing that the trace had changed raised their interest and made them think about each other more often. They would typically look at the clock four to ten times a day, and notice changes in each others' trace. Over time, participants reported feeling closer, but not necessarily on an empathic level: *"It brings some comfort, you get more intimate. [...] It kinds of brings us closer physically, but not emotionally."*

Use Of Symbolic Codes

During the duration of the deployments, all users used the codes regularly. A specific meaning of the symbols was given either by the user, or as a group. The first pair of households, Rebecca and Thomas' family, were not given specific instructions on how to use the symbols, but encouraged to discuss a shared meaning amongst them. However, they decided that they would rather try with minimal discussions about it and see if they could find out what the other meant. Ursula and Véronique, on the other hand, were given a vocabulary to start with and encouraged to modify it according to their needs and desires.

Both approaches induced some frustrations in the exchanges. Rebecca felt that she had difficulties understanding the symbols, and that her son would not understand hers. She interpreted his lack of questioning as a lack of interest and thought a more explicit symbolism would be better suited for her to express her feelings. On the other hand, Ursula and Véronique had compromised for a symbol meaning available and another meaning unavailable. At first, they felt they were constrained to use both symbols systematically and Véronique started reminding Ursula over the phone that she had not notified that she had returned from her errands. Both women felt annoyed by this constraint, and we suggested avoiding the use of symbols in a way that forced obligations over each other. This reduced drastically the use of the symbols during the day, but encouraged a more cordial, social message like greetings.

Rebecca used symbols 21 days out of 27, with a use ranging from one to 27 symbols per day. Thomas' household used symbols 25 days, from one to as many as 206 symbols per day. The large number of symbols in Thomas's household resulted from the kids playing with the probe sending a large number of overlapped symbols (up to 140 in an hour). Symbols within this pair mainly served to precise information displayed on the trace. Typically, Rebecca would use a symbol to indicate that she was leaving her home of back, and also use it for when she was going to bed (leaving) and waking up (back). On the other end, Thomas and Sarah had organized themselves to be identifiable in the codes they were sending. The drop was used only by Thomas, while Sarah used both triangle and lozenge. Typical messages included bed and wake times, and meals.

Ursula used symbols all days of the deployment, from one to 47 symbols per day. Véronique used symbols all days of the deployment but one, from one to 12 per day. Symbols within this pair served at first as indicators of availability, as described earlier. They evolved to become social symbols, including the morning greeting. On at least one occasion, they also used the symbols in an unexpected way. During the deployment, Ursula turned 70 and at this occasion, Véronique placed 7 drops on the clock, spaced every 10 minutes, to celebrate her friend's birthday. Ursula reported having felt very happy about this, and that the special effort Véronique had spent had meant a lot to her.

Longitudinal Use

Over the time of the studies, the clock was functional 95% of the time. The breakdowns were due to the Jabber server situated in the lab losing connection (two occasions) and wrong manipulations by either the researcher or the participant (on one occasion each). Overall, markerClock's reliability allowed users to gain an understanding of its use, and integrate it in their daily lives.

Over time the markerClock became part of the daily routines of the participants, where they would glance at it when waking up, and even greet each other by dropping a symbol (Ursula and Véronique). All participants reported using the clock as a main device for getting time, probably due to its large size. Both Thomas and Rebecca even removed their other clocks from living room because they had become redundant.

Thomas and Sarah reported feeling connected to Rebecca when the clock was present, and missing it at when it was withdrawn at the end of the study. Similarly, Ursula and Veronique felt more connected and reported exchanging more phone calls when marker-Clock was present. They had gotten used to greeting each other through the clock, and reported that the clock had become a familiar object.

Quantitative Data And Exploration

In this study, we were interested in exploring the quantitative data rather than use it to verify pre-defined hypothesis. We used this exploration of data to better understand how the clock was used in practice, and to identify behaviors on which we requested details to participants.

Figure 5.10: MarkerClock: Overview and detail of data slices visualized in Microsoft Excel.

Both field deployments generated 35 619 individual events, spread across just above 56 days. In order to explore this data, we developed a program meant to aggregate the data according to time. Using this tool, an aggregation of the dataset in slices of 30 minutes were created and we created a simple visualization of this data using Microsoft Excel (see figure 5.10). This visualization and the summarized data associated with it provided us with an overview of the overall data but did do not really allow an exploratory analysis of the finely grained data, such as what type of marker were used, in what order. This issue is further described by Tukey [1977], who discusses the benefit of the data visualization over the use of descriptive statistics for exploratory data analysis.

Figure 5.11: MarkerClock: Representation of a day of data using the custom visualization for markerClock data.

As a result, we extended this work by creating a visualization of our quantitative data which allowed to represent all the data without losing details. This visualization was designed to visualize the data as a large visual space showing the data on a timeline spanning over the duration of the data collection. It was configure to allow the data to appear similarly spaced on the timeline to the markerClock display (See figure 5.11). This representation implied that the visual space representing a day of data was extremely large. For instance, for a visual representation similar to markerClock, we set the time mapping to 20 seconds per pixel, which results in 4320 pixels per day, or $120,960$ pixels over four weeks of deployment.

5.4 Discussion

5.4.1 Routines and Rhythms

The use of the markerClock probe demonstrated that rhythm information, coupled with an explicit, social sharing of routines, can enhance awareness. Similarly to our field study, participants used the markerClock information in addition to other sources of information to gain an awareness of each other's whereabouts and activities. Despite the fragmented nature of the exchanged information, and its ambiguity, participants were able to extract meaning from the trace. Based on their respective knowledge of each other's routines, they were able to make guesses about their respective daily activities. Building awareness of activities on the communication of rhythms relies on users explicitly sharing their respective routines. We envision a use for rhythm awareness which extends the current use of activity awareness for coordination of activities and management of interruptions. Rhythms and routines are part of the daily life of a home, and account for a large part of the intimate knowledge and information shared amongst close people, in particular families [Crabtree *et al.*, 2003, Tolmie *et al.*, 2002].

This validates the markerClock approach for supporting routines awareness and reenforces our belief that awareness of routines and rhythms are key components in shared awareness. This awareness can also be supported by computer mediated communication, and communication appliances in general. While this approach to routines is very explicit, we envision other ways to share rhythms which are less explicit, using more artistic representations in order to better integrate devices in the home.

5.4.2   Communication Appliances to Support Aging in Place

In the context of this study, we also considered the more general prospect of using communication appliance to support aging in place. We believe that communication appliances should be considered as part of a wider, complex 'system' of communication and awareness devices. Therefore, they should not be meant to replace existing communication technologies, but rather supplement them and provide a different kind of communication. This is particularly important in the context of aging in place, where people often show a reluctance to trust new, unfamiliar technology. In our technology probe study, we illustrated that people who already interact by meeting or calling each other on the phone can build upon artificial cues to generate awareness. Similarly to how people extract meaning from window shutters' states, they are able to extract meaning from the ambiguous, low detail motion trace. The awareness is built within a wider flow of communication which includes phone calls, chats, visits, etc. The motion trace merely provides another cue which supplements those which are extracted from other sources in order to refine awareness of the other person.

These cues, because of their fragmentary nature, provide a limited amount of peripheral information to be exchanged, and therefore provide little details about each others' activities. Rather, they operate in a wider set of awareness cues brought through other exchanges. Such cues are often exchanged explicitly amongst people in a relationship and privacy is managed by people by providing or hiding explicit cues which are needed to make sense of the other cues. As observed in our study, these multiple cues are already part of the way people assess each other's state, consciously or unconsciously. Therefore, providing more ways for elderly people in PeerCare settings to exchange these cues allows them to be more aware of each other and allows for a better assessment of their state. This unconscious, reciprocal care is part of the social bond which links them, as friends, as neighbors, or as comrades.

5.4.3   Awareness Does Not (Necessarily) Mean Closeness

Many projects studying the use of awareness devices in the home have reported that an increase in awareness also increased participants' feeling of emotional closeness. In our deployments, participants reported feeling more informed about each other, but not necessarily emotionally closer. For example Rebecca reported not feeling more "connected" to her son. Thomas and Sarah also reported feeling no particular change in their closeness to Rebecca. While the markerClock probe supported shared awareness of each other's routines, this awareness did not support their emotional relationship. In this case, we suggest that awareness, though used regularly, is discarded as it does not represent the core motivation for adopting such systems.

This counter example suggests that providing awareness alone does not increase the emotional bond between people. The meaning people make of this awareness information, based on their existing relationship is a key element in using awareness information for the emotional relationship. The role and use of communication devices, as well as their importance, depends on the relationship in which they are used. While markerClock might not satisfy Rebecca's relationship with her son, she suggested it would be more useful with her close friend who lives very far away, and with whom she interacts through emails, photos and letters. The type of relationship they share would provide more mutual interest in each other's activity.

Users' reactions to the markerClock probe suggest a desire for communication devices which support the communication of feelings. In particular, this provides an interesting approach to motivate the acceptance of a device like markerClock. Communication can have many goals: coordinate, exchange information, stay in touch, relate to each other, etc. and communication appliance should be flexible enough to allow its users to achieve as many of these goals as possible. In particular in the home, it should allow for people to feel emotionally closer.

5.4.4 Augmenting an Existing Device

By using a clock as a base for our design, we provided an incentive to participants for using the device. Over the course of the deployments, participants reported watching the clock five to ten times a day to check the time, and on about four of those occasions, they would take the opportunity to look at the information it also displayed.

5.4.5 Exploring Technology Probes' Data

Similarly to our mirrorSpace technology probe study, we encountered difficulties for exploring and exploiting the vast amounts of data provided by markerClock's month-long deployments. This difficulty is in part due to the lack of appropriate tools for visualizing and manipulating these amounts of time-related data, where aggregation and descriptive statistics are often inadequate. The issue of time-related data has gained a larger interest from the HCI community, with in particular works of Catherine Plaisant on visualization and exploration of personal records [Alonso *et al.*, 1998, Plaisant *et al.*, 1996b, Wang *et al.*, 2008], and works of Daassi & Nigay on the visualization and manipulation of time related data [Daassi, 2003, Daassi and Nigay, 2004]. We extend the interest on personal histories to the need of such visualization and interaction tools to explore and analyze time-related data provided by technology probes.

5.5 Conclusion

In this chapter, we have described the design and implementation of markerClock, an augmented clock which allows connected users to communicate rhythms and share routines awareness. We have also reported on the technology probes study involving two month-long deployments of markerClock in the homes of participants in both a PeerCare situation and a adult child / elderly parent situation. This exploration allowed us to ecologically validate markerClock's ability to support routines awareness, and to highlight the need from elders to communicate with close people using medium which allows them to convey feelings. Our next chapter (Chapter 6) explores this issue using participatory design to better understand the notion of value in communication from elderly people's point of view. We also use findings from this research to iterate on the markerClock's design. We also describe various iterations realized in collaboration with the Rebecca / Sarah & Thomas households.

Furthermore, this chapter has highlighted the difficulty in exploring large visual spaces issued from visualizing data from technology probes' deployments. We explore this issue in chapter 8 where we introduce Mélange, a tool for assisting the exploration process of large visual spaces.

Meaningful Communication, A Participatory Design Exploration with Seniors

Chapter 6

Contents

Summary

This chapter describes the series of Participatory Design workshops conducted with seniors and aimed at exploring findings from our previous studies further. In particular, these workshops allowed us to better understand expectations from seniors toward communications, as well as the other properties of communications which were of importance. Building upon these participatory design workshops, this work uncovered aspects of communications related to communication appliances which did not appear in the User Centered study such as the role of "effort/value" in communication, and the issue of keeping memories from communication.

In chapter 3, we have identified opportunities for designing communication appliances for aging in place. In particular, we have described the role communication appliances can play in supporting **PeerCare** behaviors, and raised the issue of **intrusion in adult child / elderly parent relationship**. Additionally, this study highlighted the role of **routine and rhythm awareness** in establishing and maintaining PeerCare behaviors, and described various exchanges which contribute to PeerCare, including **shared activities**.

In chapter 5, we explored the support of rhythms awareness using an augmented clock, and the support of informal communications using symbolic codes. In particular, we explored how simple codes could create a vocabulary to maintain a non-intrusive, privileged connection between people in a close relationship. Our study in this context highlighted elders' need for more expressive ways to communicate, and the desire to communicate feelings.

This chapter explores the design of communication for the aging population in collaboration with elderly users. In particular, we sought to understand which aspects of communication were valued by elders and how digital communication could better communicate feelings. Using participatory design, we brought participants into the design process, allowing a reflective design involving end users. In particular, participants contributed to generating, criticizing and refining design ideas and concepts.

In our triangulation process, this study also provided an opportunity to observe if our previous findings would emerge during the design process. The design outcomes, and the observations made throughout the design process, allowed us to further iterate on the design of markerClock to include more expressivity to the direct communication.

6.1 Participatory Design

Participatory Design is a design approach where users become actors in the design process as described by Mumford [1983, 1984] and also Dix *et al.* [2003] in one of the major Human Computer Interaction textbook. Through various activities, end users become participants in the design process and help designer in the various stages of the design: idea generation, critic, and evaluation. The goal of participatory design is not only to gather ideas and feedback from users, but also reflect on what they do to better understand the design context, and various aspects of the users' needs and desires which are unknown to the designers [Mumford, 1984]. Users, however, are not trained designers and do not necessarily understand the technological opportunities offered by a design. The goal of this study, however, is not so much to extract design solutions from users, but rather to gain insights into the needs and desires of participants. In particular, this participatory design process influence the redesign of markerClock in accordance with insights uncovered during this process.

Muller and Kuhn [1993] define two dimensions for distinguishing design activities in terms of users' participation: Position of the Activity in the Design Process and Who Participates With Whom in What (in other words, are designers participating in the users' worlds or users in the designers' world) (see figure 6.1). This second dimension is particularly interesting in that it distinguishes participatory design from other user centered design process. In standard user-centered design, the user is not expected to participate in the designers' world or activities, designers essentially evolve in the users' world. In Participatory Design, both parties evolve in each others' world to some extent, as illustrated by the continuum of
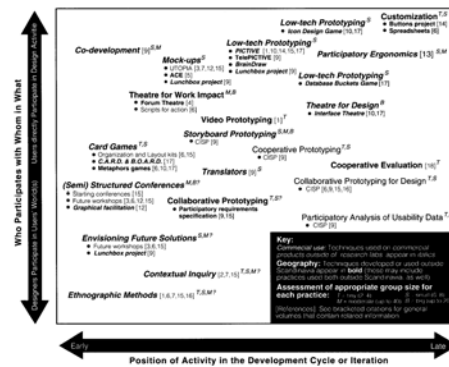
Figure 6.1: A Taxonomy of Participatory Design Activities by Muller and Kuhn [1993]

respective involvement in each other's world Muller and Kuhn [1993] offers. In this study, we involved users gradually in the design process, to allow them to evolve in the designers world with more confidence over time. Moreover, we used participants' reactions and actions to the various activities of our workshops as a way to learn more about them, their needs and desires.

Workshop activities included idea cards —inspired by the interactive thread cards [Mackay, 2004] and the interLiving workshop material [Beaudouin-Lafon *et al.*, 2001]—, which we used to provoke participants' integration in the design process, scenarios [Carroll and Rosson, 1992] which served as a way for users and designers to find a consensus on the design space, various brainstormings [Wilson, 2006] to generate ideas, and low fidelity prototyping [Beaudouin-Lafon and Mackay, 2007] for investigating further particular ideas.

6.2 Workshops Description

This study was broken down into six workshops over a period of eight weeks, each lasting about two hours. Workshops were designed to introduce concepts to elderly participants gradually, while at each stage gathering data about their individual preferences, needs and desires. We decided to organize the study as several workshops limited in duration, to allow users to build upon the activities of each previous workshop during the time between two sessions. At the beginning of each workshop, a summary of the findings from the previous workshop was given, allowing us to discuss its analysis directly with participants, and thus validating some of our interpretations. This organization also allowed us to bring participants in the design process gradually, without them doubting on their ability to contribute to the design.

6.2.1 Organization

An initial agenda was organized for each workshop, which was modified over the course of the study to adapt to the speed of the design sessions, as well as to better suit the team's interests. Initially, the six workshops were planned as follows :

W1 - Introduction of the project and idea card activity
W2 - Explanation of our distinction between direct and ambient communication. Col-

lection of users' stories relative to direct communication. Brainstorming on new devices for direct communication.

W3 - Collection of users' stories relative to ambient communication. Brainstorming on new devices for ambient communication.

W4 - Critic of ideas. Combination of various direct and ambient solutions. Brainstorming on dual approach systems.

W5 - Design of paper prototypes based on selected ideas.

W6 - Presentation of the prototypes with wizard of Oz demonstrations and design walk through for their evaluation.

The duration of some discussions, and the participants' interaction in the design process greatly impacted the organization of the study. Therefore, over the course of the study, the schedule evolved into the following :

W1 - Introduction of the project and idea card activity.

W2 - Explanation of our distinction between direct and ambient communication. Collection of participants' personal experiences with the concepts. Brainstorming for narrowing down of the design space: Communicate with whom? why?

W3 - Design of two scenarios of use. Brainstorming communication devices for each scenario.

W4 - Critic of each idea, benefits and drawbacks.

W5 - Paper prototyping of the chosen idea for each scenario.

W6 - Presentation of the prototypes with wizard of Oz demonstration. Discussion with participants.

Additionally to organizing workshops, we handed out notebooks to participants which could be used during the week for them to write down their thoughts on the topics at hand to share them later with the rest of the group. These notebooks were not gathered at the end of the study, but rather participants were encouraged to use them for themselves as a place to note ideas, thoughts or issues, based on their daily experiences.
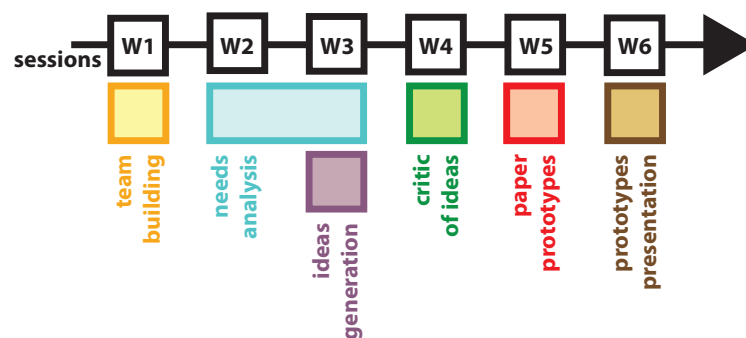
Figure 6.2: Phases of the workshops.

The timeline figure 6.2 shows the various workshops, as well as the phases of design they belong in: team building, needs analysis, ideas generation, critic of ideas, paper prototyping and prototypes presentation. Workshops lasted around two hours and were organized about every two weeks, with 4 weeks a gap between the fifth and the sixth workshop.

6.2.2 Participants

Eight (8) people participated in our study, seven (7) women and one (1) man, all aged between 62 and 88. They were recruited through different means: Tai Chi classes in a local Parisian club (6), Communication with an Internet community (1), distribution of posters and brochures in various key places in Paris (1). All participants lived independently, one (1) was living with her husband while the remaining seven were either widowed (2), single (2) or divorced (3). Seven lived in an apartment in Paris for between five to 33 years, while only one (1) lived in a town house, outside Paris. Five (5) participants owned an Internet connection with which they used emails and occasionally browsed the World Wide Web. Most participants did not know each other before the study, while some had shared Tai Chi lessons.

6.3   W1 - Introduction and Team Building

As explained earlier, the goal of the first workshop was to provide an introduction to the study, discuss various acts of our daily lives which we consider as communication: touch, gesture, etc. In particular, participants were encouraged to share personal stories about various aspects of communication. This workshop also served to bring the participants together in a group for the rest of the activities.

6.3.1 Activities

The first activity of the workshop consisted in *introducing the project and the participants* (See figure 6.3 A.). The scope of the project, its duration and outcomes were described. We then provided a brief introduction to some aspects of communication from our perspective. Subsequently, we encouraged participants to share stories of communication occurring in their daily lives (See figure 6.3 B.). We intended this activity to bring users in the designers' space by giving them a shared vocabulary, and designers in the participants' space by recording their stories.

The second activity of the workshop **involved participants in a design task**. Each participant was given a set of 16 cards, each representing a mean of communication such as touch, whisper, or color (See figure 6.3 C.). Participants were first asked to discuss the cards in two groups, and then to individually select five means of communication they were more interested in. We encouraged participants to select cards which represented an unusual approach to communication, as a personal challenge. For each selected card, we asked participants to write down who they would like to communicate with (recipient), to say what (message) and how (way of using the communication mean).

Medium indicated on the cards included: Touch, Motion, Gesture, Noise / Sound, Voice / Speech, Music / Tune, Vibration, Image / Picture, Light, Video, Object, Text / Words, Whisper, Color, Symbol / Abstract Shape, and a last card on which participants could write down another medium of their choice. The complete workshop handout is given in Appendices **??**.

6.3.2 Results

The introduction of the project raised participants' interest toward the study. It brought participants to consider new perspectives on communication and generated many insightful

discussions between participants and designers. In particular, this workshop illustrated how participants perceived the difference between traditional communication means (phone, letters, visit) and digital ones (email, instant messaging). Discussions allowed us to explore the role of Regularity, Memory and Value in the relationships, as well as the information involuntarily exchanged through direct communication.

Various types of data were collected during this workshop: Notes from the workshop organizers, video recording of the workshop, and idea cards filled in by participants. We first used the video recording of the workshop to complete the notes taken during the workshop. We then collected the idea cards filled in by participants (some of which we collected at the beginning of the next workshop) and analyzed the concerns participants had voiced concerning digital communication and the role of the medium in existing communication. The idea cards activity results also provided a some data concerning the type of people participants wanted to communicate with, and the type of message to be exchanged.

Value in Communication

During our initial discussion, participants reported finding digital communication less attractive than traditional ones (*i.e.* letters, phone). For various reasons, the communication exchanged over digital medium is seen as less valuable because it is easier to realize, and less sensual.

Participants explained finding a special value in the **effort** made by others to create and send a message. A letter, for instance, is harder to send than an email. It must be put in an envelope and posted, and requires more time to arrive to the recipient. Special attentions, those showing that the person has put some effort and thoughts in the communication are appreciated. Digital communication devices are considered as tools designed to make things easier, whereas the effort used to create the message, or the difficulty to send it, is part of the value of the message itself and reflects the engagement of people in the conversation.

Figure 6.3: Overview of the first workshop. A. Introduction of the study, B. Users sharing personal stories, C. Idea cards activity

Additionally, participants consider the digital communications, like email and instant messaging, as missing **sensuality**. Letters have handwriting and voices have tone. Both strongly embody the physicality of the message's creator, and thus embody more of them in the message. Emails are typed using a keyboard and its appearance can be transformed using various fonts. Thus no email is really unique, and they can be easily reproduced.

Overall, participants considered the digital medium as less intimate than the traditional ones. They also believe that appropriating the device to be creative is too difficult, and

requires expertise, whereas they felt capable of creating a collage from pictures, or drawing in the margin.

Symbols and Secret Codes

Symbols also represent an interesting aspect of direct communication. As Xavier[1] and Yolanda pointed out, symbols can be used to create a specific vocabulary for a given group. This symbolic meaning can be shared only within the group and thus *symbols become part of the group identity*. People can then feel part of a particular group, sharing some kind of language. For instance, Yolanda suggested creating a set of symbols which only her and her friends could interpret, like hieroglyphs. *Symbols were also valued as a way to protect their privacy*, as the meaning of the messages could not be easily deciphered by people outside the group. This further confirms our approach taken in markerClock where users reported feeling a particular value for these symbols which only meant something within their relationship.

Storing Memories

Participants were also concerned about not being able to store communication as physical objects. People can keep letters, packages, tapes and photos, whereas participants felt the digital surrogate was not appropriate for keeping souvenirs. An email, even printed out, is not unique and thus there are less incentives for keeping it in a physical form. In the same time, keeping it in a digital form has unclear consequences: how long can people keep them? Can they pass them on to grandchildren later? Can they be lost? How can they be stored, browsed, and manipulated?

Regularity of Communication

Participants also outlined the role of regularity in the exchanges. Exchanges with high value (as described earlier) usually require more effort, and thus are considered as rarer, whereas regular lightweight exchanges are also important in maintaining a relationship. Moreover, we suggest that these types of exchange allow users to establish communication routines, important in PeerCare relationships. This is consistent with our observation in the initial user study, which reported *the role of regular communications in maintaining some relationships*.

Involuntary Exchanges

During our workshops, participants spontaneously pointed out that sometimes, information is involuntarily exchanged during the communication. For instance, when on the phone, one can hear the *noises in the background* (*e.g.* the door bell ringing, or the washing machine). In this specific example, information is also carried by the *intonation of voice*, or ways of speaking. Wanda, one of our participants, pointed out that when she is on the phone, she interprets pauses in the dialog or voice tone to infer the other's state of mind, and steer

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[1]Names used in this section are pseudonyms used to respect participants' anonymity.

the exchange. These information are less controlled in the exchange, and yet useful. Wanda even makes use of this information to send cues to the other person. For instance, when she wants to end a phone call, she sometimes starts making noise in the background, to lead the other person to understand that she has other things to do without explicitly saying it.

6.4   W2 - Direct Communication and Communication Recipients

This workshop served to introduce participants to the *distinction between direct and ambient communication*. We discussed the concept of direct communication with participants, and collected their stories about this particular type of exchange. Furthermore, we conducted several brainstorming sessions to identify recipients with which participants would like to have new ways to communicate.

6.4.1   Activities
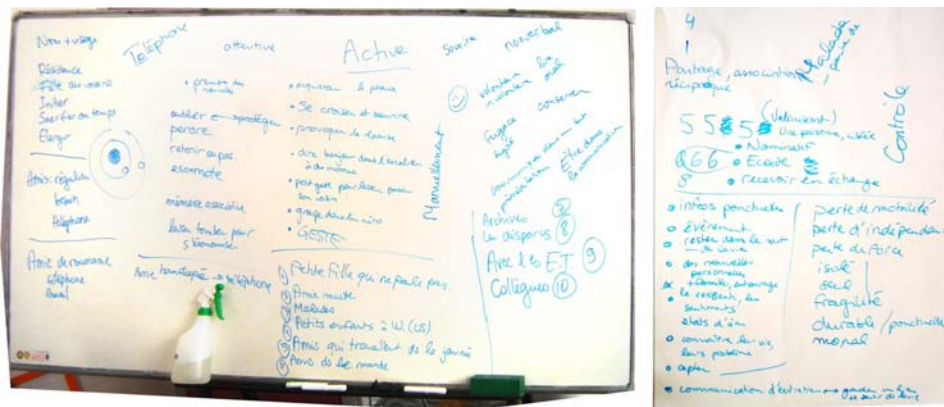
Figure 6.4: Some of the notes taken during the second workshop.

The first discussion about the outcomes of the previous workshop allowed clarifying the main insights we gathered, and to reuse them as basis for further discussion. In particular, we outlined two goals for communication : to bring people emotionally closer, and to maintain a sense of belonging in the same group.

To narrow down the design space, we chose to organize two short brainstorming sessions with participants to choose the context in which the design would take place. Two aspects of the design space were brainstormed: The recipients for communication, and aspects of the relationship to support.

We conducted a first brainstorming aimed at, for each of the goals, briefly describing who participants would like to have more contact with. Participants were divided in two groups, each focusing on a separate goal. The ideas from both groups were then shared with everyone, additional ideas were gathered, and participants voted for the recipient they sought was the most interesting to explore. Two recipients were chosen to be investigated during the rest of the workshop, and to lead the rest of the design process.

Subsequently, we discussed various aims for communication in collaboration with the

participants. The goal of this activity was to narrow down the context for the design. Similarly to the previous brainstorming, but with everyone together rather than in two distinct groups, we organized a brainstorming about various goals of communication with each chosen recipient.

6.4.2 Results

The initial brainstorming (See figure 6.4) allowed focusing our design process on two main recipients for communication: frail friends and close family and friends living overseas. Subsequent brainstorming allowed identifying various goals for communication:

- Sharing everyday life,
- Sending or receiving news,
- Sharing feelings, states of mind,
- Staying up to date with their life,
- Inquiring about issues, and
- Maintaining and enhancing a relationship.

6.5 W3 - Scenarios and Brainstorming

This workshop served to build upon the outcomes of the previous workshop to create two scenarios of use upon which to build our design. Two groups were formed, each focusing on a particular recipient for communication, either a frail friend, or a very distant relative or friend. Based on the participants' personal experience, both scenarios outline a situation in which communication is desired yet not adequately achieved. Subsequently, each group was asked to brainstorm ideas with designers on ways of supporting the actors with the problem outlined in each scenario. Ideas were then ranked according to participants' votes for further critic and discussions.

6.5.1 Scenario 1 : Sick Friend, Maintain a Connection

Marie[2] is 65 years old. She lives in an apartment at St Denis in the Parisian suburban area. Her friend Françoise is aged 75 and lives in a house in a suburb of Lyon —about 600 kilometers from Paris. Marie and Françoise are former colleagues and when Françoise retired, she relocated to live closer to her son who lives in Lyon. Since then, Marie and her friend communicate very regularly, at least a phone call every week. Moreover, on occasions when they find something interesting in the newspaper or magazine, they send each other a letter containing a hand-written note and the article. Each also visits the other at least once a year. Marie visits every year for the opera music festival in Lyon, and Françoise usually visits her when an interesting exhibition is in Paris. Finally, about every second year, they go on holidays together.

At the beginning of the week, Françoise broke her leg by falling from the stepladder while cleaning her windows. While she is usually very active and mobile, she has received surgery and her leg is plastered, and must now stay at home to rest and recover. She is quite upset and sad with the situation.

Marie is aware of Françoise's situation and is trying to cheer her up by contacting her more often. However, it's school holidays, and Marie has her grandchildren over everyday.

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[2]The names are unrelated to the pseudonyms used in our field study.

Thus she is not as available for Françoise as she would like to.

6.5.2 Scenario 1 : Brainstorming

The following ideas are issued from the brainstorming based on the scenario 1. The ideas presented here all received at least two votes from the participants. In these ideas, Françoise is referred to as (F) and Marie as (M).

(I1) Because (F) lives on her own, (M) teases her and sends her the classified section of her newspaper on relationships. (F) sends (M) a fake reply to some of them.

(I2) (M) and (F) can see which TV program the other is watching and therefore discuss what they are watching.

(I3) (M) and (F) both own a pedometer and a device indicating their daily number of steps. This way they can keep an eye on each other's activity, encourage each other and start a friendly competition.

(I4) (M) and (F) can play board games together over a distance.

(I5) (M) and (F) have a cushion which, when hugged, heats up the cushion of the other person. The cushion also changes color when the other is being hugged.

In general, ideas generated by the brainstorming can be categorized using in three types of exchanges they seek to support: Sharing of day to day activities (I2 and I4); staying in intimate contact, to reciprocally know that the other is there (I5); exchanging challenges, motivators, tease (I1 and I5).

6.5.3 Scenario 2 : Close Relative Overseas

The second group of participants focused on creating a scenario describing a situation in which an elder had trouble staying in touch with a relative living overseas.

Pierre, a 77 years old grandfather with a young spirit lives on his own in an apartment in Paris. He owns a computer with an Internet access as well as a webcam. He wants to stay in touch with his daughter living in the Réunion Island and there is a 2 hour time difference between them (the scenario takes place during Spring).

This Saturday afternoon, Pierre is watching TV and falls asleep. Upon waking up, he has the feeling of being lost and of being abandoned. He wonders if people would realize if he did not wake up. He does crosswords and card games to keep himself busy. To have some human contact, and hear a familiar voice, he tries to call his daughter who, he thinks, will care about him. She is not there, so he calls a friend who is not there either. He ponders about this and goes to his computer to write his daughter an email explaining that he had tried to contact her and failed. He wanted to get some fresh news and would be happy if she could contact him as soon as she gets back.

Later that day, Pierre cooks and eats dinner, cleans and stores the dishes. He then tries again to contact his daughter using Instant Messaging and notice that she is not online. That does not surprise him because as it is Saturday at 9PM, she might have gone out. He then realizes that there is a time difference between them and that it is too late to call her.

On Sunday morning, Pierre goes to buy fresh bread. He exchanges a few words with the baker, then meets a neighbor who also comes to buy bread. They exchange a few words and he then comes back home to watch his 11am TV show. After the show, he eats and then goes to check his emails. No new email.

Pierre takes a nap between 2PM and 3PM and then goes out for a healthy walk to the park. He watches other people in their Sunday outside activities and chats with people who sit next to him on the bench. While he is in the park, his daughter unsuccessfully tries to contact him and leaves a message on his answering machine. he comes back directly home from the park and realizes that his daughter had tried to call him. It's 5PM and he is frustrated he missed the call. She said: "How are you doing, Daddy? I hope you are well and you went for your Sunday walk. I will not be here tonight". She worries about his state of mind and will call him on the next day.

6.5.4 Scenario 2 : Brainstorming

The following ideas are issued from the brainstorming based on the scenario 2 described previously. The ideas presented here all received at least two votes from the participants. (P) designate Pierre while (D) designate his daughter.

(I6) (P) and (D) can exchange pictures ambiently on a painting or a picture frame.

(I7) (P) can see what (D) is doing as an hologram displayed in his house, and reciprocally.

(I8) (P) and (D) can send each other postcards without writing but using image and sound.

(I9) (D) wears a jewel or watch which changes color to reflect (P) status: trying to contact you, available.

(I10) (D) and (P) can exchange postcards instantaneously.

Out of the complete group of ideas, we extracted the following three major participants needs and desires for communication devices: Coordinating more easily to establish richer direct contacts (I9); staying connected, feeling each other's presence (I6, I7); and exchanging lightweight messages to stay in touch (I6, I8, I10).

6.6 W4 - Ideas' Review

This workshop was dedicated to discussing the various ideas which had been selected earlier. Each selected idea was described in more detail to the group, and discussed with all participants to describe its advantages and disadvantages. This analysis allowed identifying ideas which would be later prototyped in each group. Moreover, we used this activity to capture criteria of interest when evaluating design ideas.

Overall, participants criticized the ideas regarding their ability to **convey feelings** and **state of mind**, their ability to **share activities** and **presence**, and their impact on **privacy**. The results of the ideas' critics are given in tables 6.1 and 6.2.

Building upon this critical discussion of the various ideas, two ideas were selected to be brought further in the design process : (I2) the shared TV program; and (I6) the digital interactive picture frame. (I2) is a device allowing users to meet and discuss using their TV as a main interface, and to watch simultaneously the same TV program to be able to discuss. (I6) is a digital interactive picture frame which picture is defined by someone it is connected to. Both designs were refined and prototyped during the fifth workshop.

Advantages	Disadvantages
I1 - Classified Ads	
Exchange amusing information	Forced; Lack of spontaneity; Just a joke, superficial; Can not support relationship in the long term
I2 - Shared TV	
Good topic for conversation and exchanges; Sharing of activity	Talking during the show
I3 - Shared Pedometer	
Challenge, stimulating; Maintain good health, related to life; No monitoring but peer encouragements; Proactive exchanges; Control: Users can put it down; Shared activity; Can be a way to call for help, indirectly	Do not specifically support interaction; Can be considered as intrusive
I4 - Board games	
Healthy cognitive exercise; Playful interaction; Bilateral exchanges; Stimulating; Kills time usefully and smartly	Needs further interaction, like a support for conversations
I5 - Shared Cushions	
Tangible object representing the other person; Embodies affective relationships; Allows users to understand without hearing, reading. Body language, more subtle and intimate; Object that can be personalized and that can be offered; Control: can just not use it	Lack of expressivity

Table 6.1 : Participants' critics concerning ideas 1 to 5.

Advantages	Disadvantages
I6 - Shared picture frame	
Images sent by the other; Non intrusive, control: users can decide not to use it (*e.g.* turn it away); Great expressivity, can use heaps of different subjects (culture, daily life, feelings, etc.)	
I7 - Hologram in each home	
	Very intrusive: "*We have it home and others can see in your home.*"; lack of control: sometimes people do not want to be seen. It can be forgotten.; Too much communication; Suggests monitoring
I8 - Postcard without writing but image and sound	
Uses more ambiguous, sensual exchanges	
I9 - Augmented Jewel	
Can be carried all the time; Intimate and personal; Reflects affect; Simple messages; Control: can be worn or not	Limited expressivity; Can be lost
I10 - Instantaneous Postcard	
No delay from having to mail	

Table 6.2 : Participants' critics concerning ideas 6 to 10.

6.7   W5 & W6 - Prototyping and Walkthrough

The fifth workshop was dedicated to refining the two design concepts in groups, and using the scenarios created earlier to ground the situation. For each concept, participants created a paper prototype, which was subsequently used in walkthroughs using the previous scenarios. The following section describes each idea in more details, and provides an illustration as well as the use scenario for each. The shared TV project was codenamed AmiVision, from *ami* (friend in French), and *vision*. The digital interactive picture frame project was codenamed MiraCadre, from *mira* (look at in Spanish) and *cadre* (frame in French) (See figure 6.5).
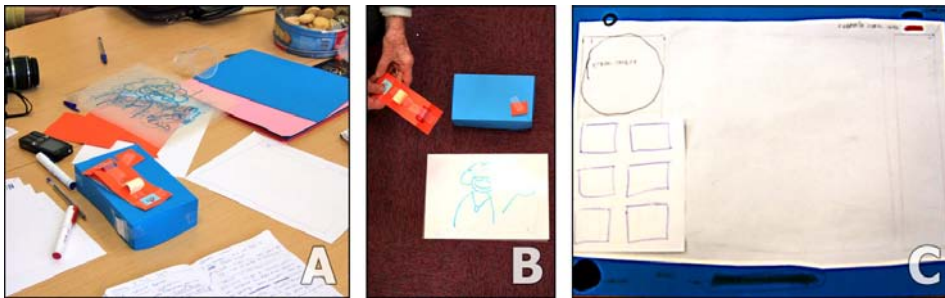
Figure 6.5: Paper prototypes developed with the participants. A. Prototyping equipment; B. AmiVision in use; C. MiraCadre layout

6.7.1   AmiVision

AmiVision is composed of a setup box containing a small video camera (webcam) and connected to the Internet. The setup box is connected to both the TV signal source and the TV. A remote allows users to interact with the setup box to control TV channels and the communication system.

The remote is extremely simple, bringing only the most useful functionalities to the user: change of channel, volume adjustments, communication control, and an on/off button. Each functionality is controlled using a wheel mechanism. Participants suggested that the wheel mechanism would be easier to manipulate for people with poor hand motor skills (See figure 6.6).

The device is pre-programmed for communicating with a particular person. In the case of our scenario, it is pre-programmed to allow both Marie and Françoise to communicate. The device can be easily configured to communicate with other people using the FamilyNet system by Mackay *et al.* [2004a].

Use Scenario

Marie has noticed on the TV program that, next Sunday night, a channel will be broadcasting a documentary on Bizet, the famous French opera composer. She wants to watch it, and knows that Françoise might be interested in watching this program with her, as she is lonely and likes to go to the Opera. Marie calls Françoise on the phone to arrange a meeting, and Françoise agrees to meet using the AmiVision on the day to watch the program together.

Figure 6.6: AmiVision - A Shared TV Communication System. The bottom wheel (labeled *Fr* for *Friend*) allows users to adapt the display to show more or less of the *Friend* on the TV

On the following Sunday, Marie is late for the show and still cleaning dishes. Françoise picks up her remote and turn the communicating wheel (See 6.6 bottom wheel labeled Fr) one notch to the left. AmiVision sends a connection request to Marie, who hears a ring from her AmiVision signaling that Françoise is trying to connect with her. Marie dries her hands on her napkin and grabs the remote on the table. She accepts the request by turning the communication wheel in return. Marie's TV is then turned on by AmiVision, which also automatically selects the program Françoise is watching on Marie's TV. Beside the program's image, an image of Françoise appears (See 6.7 C.), Françoise can now talk to Marie and greets her. Marie greets Françoise in return and tells her that she has to finish the dishes, but will be back as soon as possible, and that Françoise should tell her what she missed once she gets back. She leaves the TV on to be able to hear the program and goes back to the kitchen to finish her chores. When Françoise sees Marie returning to the sofa, she starts summarizing the beginning of the show.

During the first part of the show, Marie and Françoise are captivated and exchange only a few words. However, when the advertisement break arrives, they start chatting about the program, and exchange their impressions. To be able to better focus on her conversation with her friend, Françoise uses the wheel on the remote again to enlarge Marie's image (See 6.7 D.). She keeps an eye on the thumbnail view displayed in the corner to be able to focus back on the program once it returns.

At the end of the show, Marie and Françoise exchange their impressions on Bizet and use the remote to display only each other's video image on the TV screen (See 6.7 E.). They

decide that it would be nice to schedule a visit to the Opéra Bastille in Paris, which is showing a famous Bizet opera.
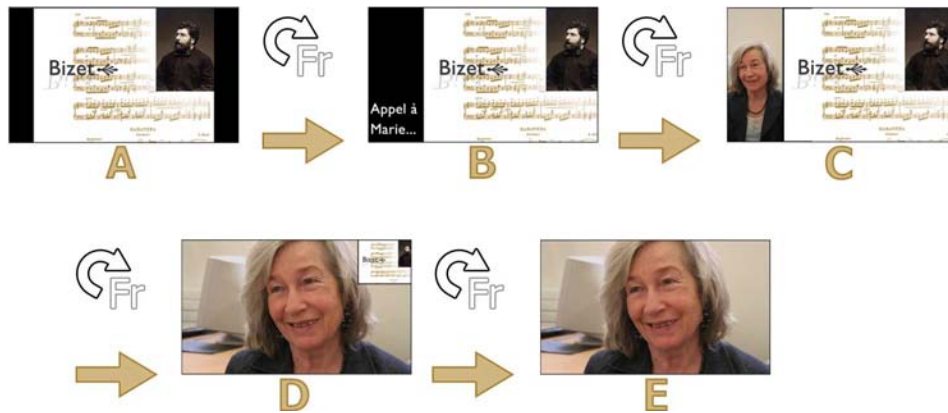
Figure 6.7: AmiVision - Adapting the ratio between the program's image and the friend's image using the remote's friend wheel (Fr).

6.7.2 MiraCadre

MiraCadre (See figure 6.8) is an interactive picture frame composed of a touch screen, and a digital camera. A pair of users can communicate with one another by sending each other pictures which will be displayed on the frame. Users can exchange various types of pictures: photos taken through the camera fitted in the frame, photos taken with their digital camera, or logos and symbols which can be created using the touch screen and stored to be reused.

MiraCadre is composed of two modes, a mode for exchanging and managing pictures, and another for displaying pictures which have been sent by the other person. Users enter the management mode by touching the screen, which will animate to show the various controls, including an history of pictures which have been sent and received. If the user stops interacting with the frame for more than 30 seconds, it will smoothly revert back to the display mode, showing the last picture received from the friend.

MiraCadre allows exchanging a large variety of messages. Photos can show daily events, like the state of the garden or the visit of a common friend, and express feelings, for instance using a portrait of a person looking sad. The additional symbols which users can draw, store and re-use allow users to quickly send messages to the other, for instance to coordinate. Examples of symbols include a phone meaning that the other must call quickly, or a smiley face showing that the user is happy. The vocabulary of symbols is not restricted because users can create new ones by drawing them on the screen using their fingers.

Use Scenario

Pierre is feeling slightly sick and wants to tell his daughter Kate that he is not feeling well. He goes to the miraCadre, which is showing a picture of Kate and her husband taken during their last weekend outing. Pierre touches the screen to enter the interactive mode, but soon wonder about the kind of photo which would convey the fact that he is feeling sick. Coming up with an idea, Pierre leaves the miraCadre to pick up a thermometer in

Figure 6.8: MiraCadre - exchanging photos and symbols between close family and friends. Here showing a prototype of the interactive mode.

the bathroom. When he returns, the miraCadre is back showing the picture of Kate and her husband and he touches the screen to be able to take a photo using the miraCadre's camera. Pierre triggers a three second delayed camera shooting and positions himself in front of the miraCadre, looking at the thermometer looking tired and sad. He is satisfied with the picture and applies it on his daughter's miraCadre.

As he is about to leave the miraCadre, he noticed in the history section that Kate had sent other pictures than the one displayed on the miraCadre from her weekend out. He browses and previews them quickly to know what she has been up to. He is glad to see that she seems happy and is having a good time. Looking at the picture representing the Reunion islands, he wonders if he could not plan a last trip there before he gets too old.

When Pierre wakes up the next day, he notices in the living room that the picture on the miraCadre has changed and Kate has sent the symbol showing a phone and a time 12PM-3PM. This symbol means for them that he has to call her as soon as he is able, preferably between noon and 3PM his time. He sends a symbol of a waving hand using the miraCadre to check if Kate is around her miraCadre. He immediately receives a photo from Kate showing her with doing the thumbs up. He calls her and she convinces him to go to call the doctors just in case the feeling is the symptom of a grave disease.

6.7.3 Summarizing the Design Process and Its Outcomes to Participants

During the sixth and last workshop, prototypes were showcased to the participants using an interactive prototype for amiVision and a prototype of the interface for the miraCadre (See figure 6.8). Participants' reactions to the prototypes were enthusiastic. Participants felt

the prototypes reflected well the vision of the device they had developed during the design phases.

The last part of the last workshop was dedicated to providing a summary of the work realized during the project to the organizations which had supported it by helping us get in touch with elderly participants, and by providing us with place convenient for the workshop both practical and conveniently situated. Participants volunteered to use the paper prototype and demonstrate how they felt the device would be used.

This session also gave the opportunity to provide a summary of the projects outcomes to the participants. We exposed how we started from a simple concept, communication, to building a new way of communicating which responds to some of their needs we identified in group. To provide a written summary of the project, we handed in a quick summary of the design process outcomes providing both scenario and design concepts.

6.8   Discussion

Building upon the project described earlier, we describe how the outcomes of this project also confirmed our PeerCare approach, our identification of the elders' perceived intrusion in family exchanges, and elders' interest in shared activities with peers. Furthermore we describe the concept of communication values in the context of elders' communication, suggest different directions for designing communication devices for seniors. Finally, we explore how our design process provided an inclusive, iterative methodology for engaging and empowering users in the design process.

6.8.1   PeerCare

In chapter 3, we described how elderly peers respective support could promote aging in place. This observation, extracted from our field study, is further validated by the outcomes of our design activities. Participants' interests in peer relations appeared early in the design process (during first workshop), where they suggested friends as recipients of communication. This is aspect is also clearly reflected in the choice made by the whole group to split the focus of the design on the relationship with a frail elderly friend, and on the relationship with relative living at a distance. The scenario 1, and the subsequent design process, clearly reflects the desire for elders to stay connected to peers, elderly friends in particular.

6.8.2   Intruding in the Adult Child's Life

The discussions around the issues of communication outlined the participants' concerns regarding the respect of their adult children's privacy. This is particularly outlined in the second design context which was chosen, the elderly parent trying to stay in touch with his daughter, and the scenario which were created on the topic. The ideas emerging from the brainstorming essentially encompassed asynchronous communication, and lightweight, frequent and informal exchanges rather than synchronous rich exchanges. The hologram (I7) is an exception to this, but the critics regarding the idea reflect the participants' position regarding always-on, rich communication in this context.

6.8.3 Value of Communication

One of the major outcomes of this participatory design study emerged from our discussion with elderly participants regarding the values of communication. Participants were very interested on the type of value associated with the message, and over the course of the project, we outlined various aspects which affect the perceived value of a communication: effort, sensuality, and empathy.

- **Effort** reflects the value perceived in a message which requires a special effort or attention. The perceived investment made by the sender of the message to create a unique, personalized message makes it more valuable to the recipient.
- **Sensuality** reflects the value perceived in a message embodying the message sender's personality. For instance, a hand written letter is more desirable than an email because it shows the senders' hand writing, which is valuable beyond the words it represents.
- **Empathy** reflects the value perceived in a message reflecting empathy, a shared interest, or a shared responsibility. For instance, the idea of the shared pedometer which requires each to look after the other was highly rated by the participants for its mediation of a shared responsibility.

We suggest that designing for communication value could provide elderly users with an increased interest in digital communications. We offer these three aspects : Effort, Sensuality and Empathy as three main directions for this investigation.

6.8.4 Shared Activities

The results of the brainstorming concerning the peer relation clearly outline the interest of participants regarding shared activities, or shared objects. Out of the five ideas which were selected for critic, three are related to sharing activities (I2, I3, and I4) and one to sharing an object (I5). The benefit of sharing activities is in raising subjects of discussion (I2), reciprocal encouragement (I3), reciprocal health support (I3 and I4), and prevents loneliness and boredom (I2, I4).

These results are consistent with earlier results from our field study, where shared activities were suggested as an opportunity for meeting people, avoiding boredom, starting discussions, and as a type of shared routine. We suggest that communication appliances could to support shared activities between elderly users to ease the establishment and maintenance of PeerCare behaviors.

6.8.5 Participatory Design with Elders

In this project, we conducted participatory design sessions using two approaches: a gradual development of shared vocabulary and understanding, and a constant discussion between elderly participants and researchers. Each workshop was designed to introduce and address a new concept in the design process, thus allowing participants to build upon the work conducted in the previous workshops. Each design activity was justified respectively to the outcomes of the previous workshop, which allowed us to firstly summarize their outcomes, validate our impressions and analysis, and secondly to give a clear indication of the process directions.

We suggest that designers and researchers willing to work with elderly users should

empower them by discussing the collected data and its interpretation iteratively in each workshop, giving them the opportunity to critic it with various degrees of confidence and knowledge of the concept at hand. We believe that this process allows researchers to revise its analysis from a user's point of view, thus increasing its ecological validity.

In particular, we used simple design exercises, intended to highlight the value of the participants' experience and impressions in the first stages of our design. This allowed them to grow more confident in their ability to contribute in the design process, and encouraged them to voice their opinions at the different stages of the design. In the same time, these simple activities were the opportunity to shift the participants' perspective from passive to active observer of their own habits and habitats.

6.9   Implications for Design

Based on the results of these workshops, we seek to influence design to focus on the role of self-representation and sensuality in digital communication. In general, we extend the current focus on awareness in computer mediated communication to the role of value in communication, and in particular the role of effort. Communicating should not be necessarily easy, but is part of the way people interrelate and as such communication should reflect the relationship between people, including intensity, intimacy and concern. In this section, we illustrate these concepts by exploring alternatives to markerClock (described in Chapter 5) through two design sessions: one in our lab, another in collaboration with markerClock users.

6.9.1   Iteration on MarkerClock

Based on these workshops and the feedback gathered during our deployments (See Cha. 5), we chose to iterate on the designs of markerClock to extend its ability to convey feelings, to allow users to share activity, or to allow users to share event of daily life.

Method

We conducted two types of iterations which resulted in four alternative designs. The first type of iteration consisted in organizing a short participatory design with one of the group of participants which had been involved in the deployment of markerClock: Rebecca, Sarah and Thomas. This method allowed participants to take advantage of their first hand experience with markerClock to suggest new design and features[3]. During this workshop, we conducted a brainstorming regarding possible modifications of markerClock which could provide a support for the communication of feelings and well-being. The ideas were then discussed and ranked using participants' votes.

The second type of iteration occurred in the lab, were we designed new iterations for markerClock based directly on the findings of the workshop. We focused in particular around the concept of value and sensuality for creating alternative designs of markerClock.

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[3]The benefit of using technology probes in participatory design is further described in chapter 7. This chapter specifically focuses on the role of technology probes to facilitate users' engagement and incorporation in the design process.

Alternative Designs In The Lab

In our lab, we used the outcomes of this study to generate new alternatives to the actual markerClock design. We particularly focused on issues of *value*, experimenting in particular with the notion of *sensuality* and expressivity.

The first alternative was an attempt to allow users to draw on the clock, to modify the background of the correspondents' clock. This alternative, however, means that it can only work with two connected clocks, unless we overlay drawings from the various clocks, thus creating a sort of shared whiteboard, like the one developed by Nars [2007]. Using their fingers, users can draw on the background and the drawing is instantaneously shared with people they are connected to. Only one color is available for users to draw on the clock, which corresponds to the color representing them. In the examples figure 6.9, Rebecca is blue while Sarah and Thomas are orange. To allow users to better understand the time constraint of the communication, we used the constrained ink metaphor [Björn Eiderbäck, 2003], an aging ink (See figure 6.10) which decays over a period of 12 hours, the time necessary for the clock data to be entirely renewed. When using the clock's hands to roll back time and explore past information, the user can also see the past graffiti messages on the clock.
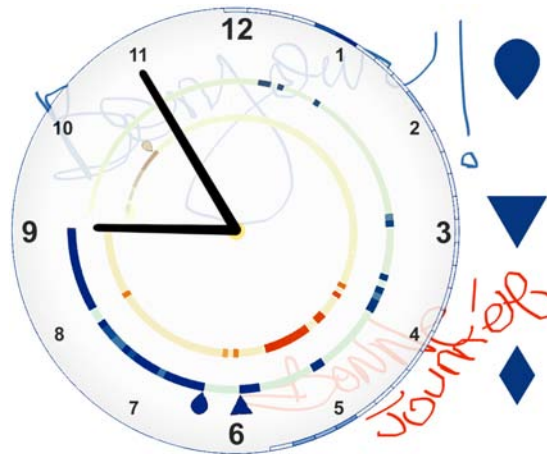
Figure 6.9: MarkerClock alternative - The Scribbable Clock.

This alternative of the clock uses the hand writing as a sensual input, allowing users to sign their messages implicitly. The clock can also then perform as a noteboard between families, permitting to exchange simple hand written messages, and inspired by the messageProbe [Hutchinson *et al.*, 2003].

The second alternative involved providing users with simple lightweight asynchronous shared activities: games. We augmented markerClock with simple games which could be played amongst connected users on an asynchronous basis. Similarly to a chess game which would span over days, the clock allows users to alter the game at their own pace. A set of three games are initially envisioned: the game of Go, a trivia challenge, and a pedometer challenge.

The game of Go (See figure 6.11 A.) functions like a traditional game of Go, only here users move their pieces using the touch screen to move them on the board. A game can

Figure 6.10: The Scribbable Clock Detail: The aging ink. The ink of a message fades over time to disappear entirely after 12 hours.

span over days and a score board allows users to keep scores, and possibly to reset them if necessary. The colors of the pieces on the board are the ones of the users, instead of the traditional black and white color, to reinforce the particular link embedded in the game. Moreover, the game of Go stimulates them mentally and provides users with a friendly competition, like the shared pedometer (I3) or the board games idea (I4). To enter the game mode, the user can touch the thumbnail of the Go board displayed on the bottom right corner of the clock. In the game mode, the clock is overlaid with the larger version of the board, on which users can place a piece by touching the appropriate position on the board. The move is validated by touching the dot highlighting the current users' score. The dot then moves to the orange user and the blue user can close the board by touching the board's thumbnail again.
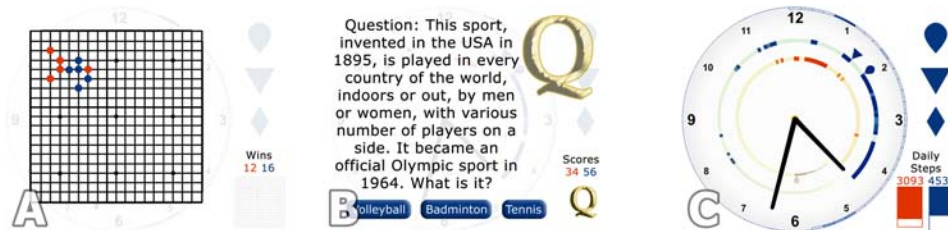
Figure 6.11: The Shared Activity MarkerClock: A. the Go markerClock, B. the trivia markerClock, C. the Pedometer Challenge MarkerClock.

The trivia challenge (See figure 6.11 B.) also stimulates a friendly competition, but also serves as a cognitive exercise. Questions are presented to the players every day, and players have one day to get their answer right. The same questions are given to each user, and at the beginning of each day, the answer to the previously answered question is displayed next to the daily question. When users answer the daily question, their score, displayed on the clock, is automatically updated. The clock indicates that the daily question is available by highlighting the trivia icon (the large Q in the bottom right corner of the clock). The user can open the trivia mode by touching this icon. The daily question is then displayed, and the answer of the previous question is also given next to the trivia thumbnail. If the user has not yet answered the question, s/he can answer the question by touching his/her answer. Otherwise, the user can see his/her answer but cannot change it.

The pedometer challenge is inspired by the shared pedometer (I4) by providing a feedback of each users' number of steps for the day, and the daily average for each of them. Users must be equipped with the pedometer for the system to work. The pedometer measures the number of steps taken by the user and sends it to the clock using a bluetooth

connection.

Alternative Designs With MarkerClock Users

With Rebecca, Sarah, and Thomas, we organized a short workshop exploring alternatives to markerClock which could allow a better exchange of feelings between the two households, therefore increasing empathy. The brainstorming allowed us to extract two main ideas: the use of smiley faces for showing one's mood, or the use of photos for showing important moments and feelings. During the critic of the different ideas, two alternatives of each idea were discussed. The main point of argument was about deciding whether the photo or smiley should be, as a symbol, something which is placed on the clock and disappears over time (See figure 6.12 A.), and can be revisited using the hands, or if it should be something placed on the clock and which does not change unless altered by the user (See figure 6.12 B.). The same debate took place concerning the use of photos instead of symbols (See figure 6.12 C & D.). The use of photos was particularly appreciated by Rebecca who suggested that its flexibility allowed exchanging both daily events and more symbolic images representing moods, such as the painted shell represented here.
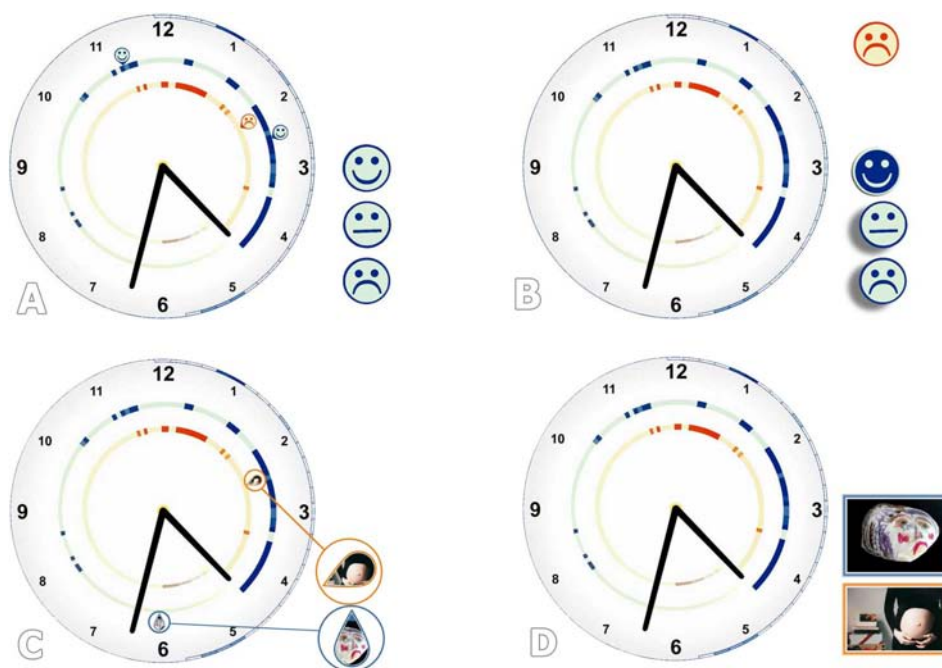
Figure 6.12: MarkerClock alternatives - A. Smileys replace symbols, B. Only the last sent smiley is available, C. Photos replace symbols, touching the photo thumbnail enlarges it on screen, D. Only the last sent photo is displayed.

These alternatives, in particular the photo approach, reflect the design of AmiVision for communicating both daily life events and feelings. An extension of the smiley alternatives could be to allow users to control six degrees of freedom in the smiley's face to express various emotions [Saint-Aim *et al.*, 2007]. This way the range of available emotions could be greater while retaining the ease of use of smileys. The photo alternatives (See figure 6.12 C & D.) provide a markerClock alternative to miraCadre, allowing users to exchange

images of daily events and symbolic logos (using predefined photos).

6.10 Conclusion

In this chapter, we have described the participatory design study which allowed us to uncover the issue of *value in communication* for elders. We also provided an additional validation of our initial findings in collaboration with users, including the role of PeerCare and the interest in shared activities. These workshops also allowed the creation of two key scenarios illustrating situations in which communication is desirable and not well supported, and which served as a basis for our designs. This process provided various design ideas, which can be used to inspire further design explorations, and served to suggest desirable characteristics and goals of communication appliances for elders. The outcomes of this study allowed us to iterate on the design of markerClock both in our lab, and in collaboration with users. Finally, the design of this study provided us with various insights regarding the participatory design with elders, including the use of motivating activities to engage participants into the design process by giving them confidence and control, and gradually promoting their implication and empowerment in the design process.

Understanding Technology Probes: Zebra

Chapter 7

Contents

Summary

This chapter builds upon some methodological difficulties observed in our previous study 4 and describes a study of the role of technology probes in supporting users' engagement in the design process. In particular, we explored how the longitudinal engagement of users with a technology probe supports their design participation by giving them first hand experience of design issues, thus facilitating their inclusion in the design process.

> While the author of this thesis was the main investigator of this work, it was undergone in collaboration with Matthew Simpson and under the supervision of Dr. Stephen Viller. The Zebra probe study took place in the Interaction Design Research Division of the School of Information Technology and Electrical Engineering of the University of Queensland, Australia. Ethical clearance : UQ School of ITEE # 2006-10. This work was also published as a long paper at the 2008 ACM Conference on Designing Interactive Systems (DIS):
>
> Yann Riche, Matthew Simpson and Stephen Viller, *Zebra : Exploring participatory design engagement in fieldwork*, in the Proceedings of DIS2008, The 2008 ACM SIGCHI Conference on Designing Interactive Systems, Cape Town, South Africa (ACM Press).

Previous work suggests that technology probes provide a way to engage users in a design process, permitting to establish a rich design discussion between users and designers. As described in Chapter 4, using technology probes in a user-centered design process is difficult, due to technical issues, and a lack of understanding on how and when technology probes should be applied. All these issues can lead to user frustration which can subsequently affect their engagement in the design process. To better understand the technology probes technique and the role it plays in user-centered design, and in particular in participatory design (PD), this chapter first reviews the literature relevant to technology probes, alongside other techniques, and offers an overview of their role and advantages. Secondly, it describes a study that explores how TP can improve user engagement in the design process.

7.1   Technology Probes in the User-Centered Design

As described in the mirrorSpace chapter (Chapter 4), technology probes can provide support for the following four aspects of HCI research and practice: **(A1)** *Observation of context*, **(A2)** *Observation of contextual user experience with a concept/technology*, **(A3)** *Evaluation of a technology in real life settings*, and **(A4)** *Provision of a tool for design dialog between users and designers*, providing inspiration to both designers and users.

These four aspects are already separately addressed by various techniques used in HCI within a design process. Classic field-observation methods include ethnography, which aims at describing and analyzing activities and situations through field observations in contexts, such as air traffic control rooms [Hughes *et al.*, 1994] (See Blomberg [1995], Crabtree [1998] and Hughes Hughes *et al.* [1995] for more on the inclusion of ethnography in HCI); and contextual inquiry [Wixon *et al.*, 1990], which provides support for gathering and describing users' actions in their context. Both techniques provide ecological descriptions and analysis of behaviors (supports A1, but outside the intervention made by a technological device). However, the use of contextual interviews intends mainly to investigate activities and tasks in business settings, and not necessarily the context in which these activity take place. Ethnography studies, on the other hand, help researchers understand interactions between people, context and artifacts in a given situation, but require extensive amounts of time in the field for data collection.

The evaluation of technology in real life settings usually takes place in later phases of a project through the deployment of a working prototype [Beaudouin-Lafon and Mackay, 2007]. Other techniques can provide interesting insight on technological solutions for later iterations. Such techniques include introspection [Lee, 1997], where the designer reflects on the use of the designed concept, or design walkthrough [Lewis *et al.*, 1990], where the

designs are explored for errors or flaws. While these techniques are useful, they do not test technology in the field, and mainly involve designers, rather than users, in the evaluation. This is partly due to the difficulty and cost of involving users in the process.

Over the years, methods to help designers and users to collaborate in design sessions have emerged, in particular, designers have introduced various methods for helping designers and users communicate. Such methods to enhance design dialog between users and designers include scenarios [Carroll and Rosson, 1992], personas [Grudin and Pruitt, 2002] and Gaver's cultural probes [Gaver and Dunne, 1999, Gaver *et al.*, 2004, Hofmeester *et al.*, 1999]. Scenarios permits to describe realistic situations of use, which can be created or reviewed by users, and serve as a context in which design and evaluation of the design outcomes can take place. Personas are characters which are created to be representative of users and serve, similarly to the scenarios, as a basis for design.

Finally, cultural probes are a set of simple design activities allowing researchers or designers to capture data in sensitive settings (*e.g.* care centers, homes) where the use of observational studies might be limited. A pack of cultural probes is a set of objects and instructions describing design activities. For instance, a common cultural probe is a repackaged disposable camera, on which users can read directions regarding photos to take (*e.g.* something ugly, something beautiful, etc.) as described by Gaver and Dunne [1999] and which we used in our initial field study in Chapter 3. Instead of involving designers in the users' space, cultural probes ask users to collect data in their own surroundings. The original cultural probes [Gaver and Dunne, 1999], served as a resource to gather inspirational material and gain users perspective on situations. Later re-use of the cultural probes technique gathered informational material about usage and users perspectives [Crabtree *et al.*, 2003]. While both aspects (inspirational and informational) are important in a user centered design process, it is unclear how both can be addressed in parallel by one set of cultural probes. Moreover, cultural probes do not provide a technological experience on which users can ground their inspiration.

While those techniques are common in the industry, none encompasses the four aspects of technology probes described earlier. However, the way technology probes addresse these four aspects simultaneously or independently is not clear. Research projects have used the technology probe concept in many different ways. Fitton *et al.* [2004] have used a variation of technology probes as a way to systematically collect data of use in the field (A2, A3) to ground further design discussions. Langdale *et al.* [2006] have used technology probes to test concepts in the lab, using scenarios while capturing data (A2). To address this uncertainty, we have designed a study of technology probes (The Zebra probe study) which explored characteristics of the technique, in particular its role regarding the mediation of the dialog between users and designers (A4).

7.2   User Engagement and Participatory Design

Attempts to engage users in design are frequently limited by the time and commitment available for any activity that will impact their daily lives. In a previous study [Riche *et al.*, 2003, Simpson and Viller, 2004], we conducted fieldwork in architectural firms to explore the physical nature of collaborative design. We were permitted to observe two different architectural offices for a period of two days each. Given this limited time, we decided to use a mix of *"quick and dirty"* ethnography [Hughes *et al.*, 1994] and interviews to gather

maximum data. The aim of the study was to gain initial insights about the design space and identify ideas and general concepts to be investigated further. During the observations, we were sensitive to the impact our work might have on their workflow. At the end of the study, the analysis of the captured video and written data led us to a better understanding of the design space. However, the time spent in the firms had seriously limited our ability to engage users in the design process.

In planning further studies, we decided to investigate other techniques to make better use of limited time with users in their space. We need to find new ways to engage participants more actively in design without unacceptably impacting upon their usual activities. Studies, such as the study of ubiquitous computing in a dentist surgery by Cederman-Haysom and Brereton [2006] highlighted the need for compromises when actively involving users in PD processes. In their study, they improvised, modified, and tailored their methods to suit the schedule of "busy professionals" and achieve a limited level of engagement. They describe how one of the participants was late in his schedule and had to shorten the time he could spare for the study, thus obliging researchers to improvise and change their activities.

Overall, gaining users participation is a difficult task. Design games and other playful activities can help motivate participants and give them better incentives for engaging in the design process [Brandt, 2006, Muller *et al.*, 1994]. Seeing a clear benefit to their involvement in the process also increases users motivation. This is usually the case in designs for the workplace where a system to be replaced is critiqued [Bdker and Grnbk, 1992] or where people have an innate curiosity about new technologies or design. Typically, multiple techniques must be used together to achieve adequate engagement alongside data collection, thus increasing the users required commitment.

We believe technology probes can help researchers and designers lower the burden on user for participating in design activities. While a few studies have used them probes for investigating their design space, such as the study of mirror and video interface by Markopoulos *et al.* [2006], none to date has specifically described how technology probes could support user engagement.

7.3   The Zebra Probe Study

As this study was focused on exploring the technology probes technique, we investigated the design of a *research tool*, intended to provide a compromise between *field observations* and the *engagement of users in reflective and design activities regarding their routines*. To realize this, we studied the design of a **field observation tool**, providing an **automated capture of video data** and **giving users the ability to review, reflect and annotate the captured data**. Designing such a tool, however, presents many technical and methodological challenges such as its reliability in an unknown physical environment [Beaudouin-Lafon *et al.*, 2001], the validity and usefulness of the collected data, and users' reaction (including acceptability issues and engagement). The use of the technology probe served to mediate PD activities with fellow researchers regarding this concept, but also explore these issues regarding the tool itself. We involved HCI researchers in our lab in a PD process using the Zebra probe as a core artifact around which we articulated the activities and discussions. Because of the researchers' busy schedules, we tailored the study to engage them in the design process while limiting the impact of the study on their workload. We developed and deployed the Zebra probe as a naïve implementation of the video obser-

vation tool, designed to engage users longitudinally whilst minimizing intrusion into their daily routines.

7.3.1 Probe's Descriptions

It includes an autonomous video capture device, thus allowing researchers conducting the observational study to be absent or focused on other tasks in the field. It automatically captures images from a camera when motion is detected, and organizes and presents the video clips back to participants for feedback. Direct feedback of the Zebra probe's state is fed to an external display (Figure 7.1). No sound is recorded in order to reduce privacy issues. While audio would definitely be useful for researchers, we felt that people would refuse to have their conversations automatically recorded. To further reinforce privacy, we fitted a button to the side of the feedback screen so participants could disable recording at any time. When triggered, the clip being currently recorded is deleted and the Zebra probe waits for five minutes before starting to record again. We also provide feedback on the screen to indicate when recording is disabled (Figure 7.1.c).

Figure 7.1: Screenshots of the Zebra Feedback display. a. Probe Not recording b. Recording c. Recording Disabled

Automated video capture permits the natural segmentation of video as it is being recorded. It reduces the amount of video collected by automatically discarding moments with no motion, thus facilitating subsequent video analysis. The drawback of using automated video recording is that the viewpoint of the camera is fixed and cannot be directed to record specific events or scenes as a cameraman would do. However, the advantage is that it can systematically record data without requiring anyone to operate the device and can therefore work independently while the researcher is away. The fixed viewpoint can be advantageous in another way: we can detect repetitions and patterns that recur within the scope of the camera's view and we can also generate quantitative data such as who occupies that space at which time. The Zebra Probe can be deployed before and after fieldwork, allowing researchers to capture data over longer periods of time, with only minor disruption for participants.

The Zebra probe uses a web interface to organize and present the video clips, enabling both users and researchers to add meta-data describing the clips (Figure 7.3). It also provides users with a way to review filter and sort the data (Figure 7.2). Feedback can include comments to the researchers (not disclosed to other participants), discussions in a forum (shared with the rest of the participants) and linking tags to video clips to sort and retrieve them (Figure 7.4). These features provide two advantages: first, participants are given the opportunity to add subjectivity, nuances, and missing context to the raw data; second, the comments, discussions and tags are a first step toward categorizing and analyzing the data,

by which researchers benefit from the users' vocabulary and opinions to build their own coding and analysis.

7.3.2 Study

In order to better understand the qualities and issues associated with the introduction of the Zebra Probe in an environment and its role in a design project, we conducted a study in our lab. We aimed to refine our design concepts, capture users' reactions, and detect potential issues and improvements to serve as a basis for the observational tool's design. Our interest was twofold: understanding how such a tool can assist PD fieldwork; and understanding how technology probes can assist in designing the tool. We expected this study to provide initial insights into participants' responses to the introduction of such tool. We also expected participating researchers to build upon their experience of the Zebra probe to engage in the design of the tool itself, as researchers conducting similar fieldwork in their own work. This study allowed us to explore a particular aspect of technology probe of interest to us: its inter-relation with PD. Building upon both of our technology probes studies (see Chapter 4 and Chapter 5), we expect to raise our understanding of how such method can be used to bring users into the design process.

The observation tool in this context was studied as a method for observing the informal interaction in shared spaces between collocated coworkers. This study was to inform and inspire design solutions to support informal interaction in distributed environments. Points of interests included patterns of use of the space, collaboration taking place in the space, key artifacts and habits, and design opportunities.

7.3.3 Methodology

The Zebra probe study lasted for a period of about one month. It included four workshops spread across this period as well as five semi-structured interviews toward the end of the study. The study started with an introductory workshop, which explained to the researchers the nature of our work and the functionality of the device prior to its deployment. The Zebra probe was then deployed to study the informal collaboration taking place in the informal space of our lab, namely the kitchen/coffee room. The feedback interface of the Zebra probe was also deployed on the lab's network. After a period of two weeks, a second workshop was organized that captured participants' feelings, concerns and feedback about the Zebra probe as observees under the scrutiny of the tool. The Zebra probe remained in the coffee room for a period of three weeks. During this time, we modified the feedback interface to resolve usability issues and respond to some participants' insights. During this period, the discussion feature was enabled. A final workshop was organized one week prior to the removal of the Zebra probe from the coffee room, to get additional feedback and insights. This workshop was followed by a set of short interviews with key participants to gather more detailed feedback and examine researchers' view on the Zebra probe. During these interviews, we asked participants to imagine how they could transfer the device into their own research contexts and methods.

7.3.4 Participants

Participants were selected from the researchers in our HCI lab. Around 14 people were actively engaged in this study and attended workshops and interviews. About 20 other people were only peripherally engaged with the device and did not participate in extra design

Figure 7.2: Zebra website's weekly view
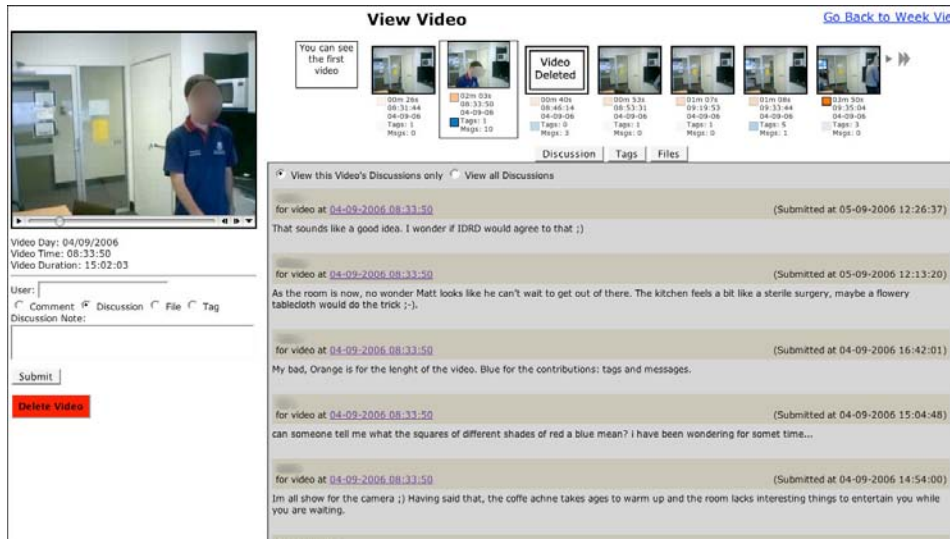
Figure 7.3: Zebra individual video webpage

Figure 7.4: Zebra website's tags cloud. Names have been changed to respect participants' anonymity.

activities. Participants were recruited in our lab through email and informal chats. Their ages ranged from 23 to 45, with expertise in HCI ranging from Masters student to senior researcher. Participants were sampled to include experienced practitioners in the different disciplines of HCI; they included researchers in interaction design, engineering, computer supported cooperative work, human factors, participatory design, anthropology and HCI research students.

Engaging with researchers as participants allowed us to benefit from their expertise in their respective domains as well as get a first insight into users' reaction to the concept. We also acknowledge that working with researcher participants influence the qualitative data regarding their reactions toward the proposed concept in a favorable.

7.3.5 Setup
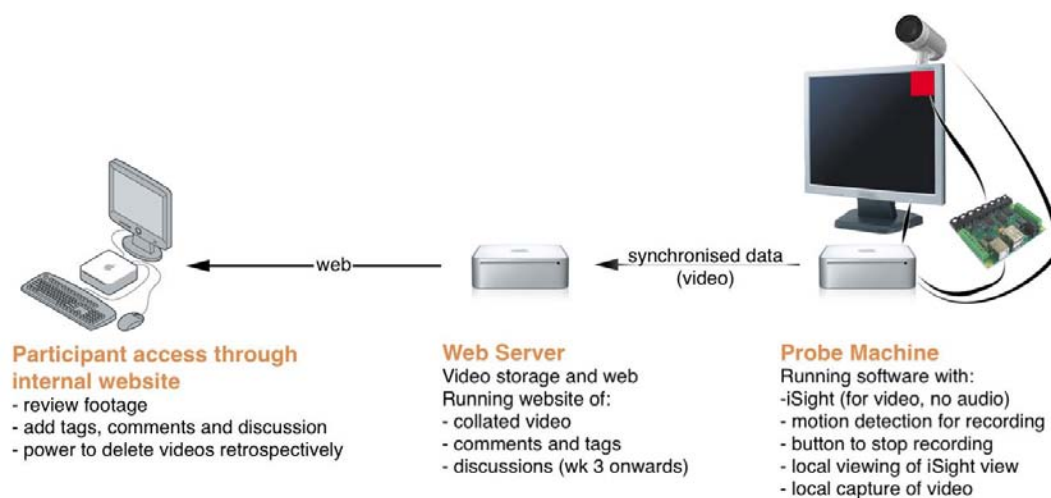
Figure 7.5: Outline of the Zebra components and interaction points

Figure 7.5 provides an overview of the Zebra probe's architecture. The capture side, labeled *Probe Machine* and the feedback side, labeled *Web Server* run on an Apple Mac Mini using the Mac OS X 10.4 operating system. The Probe Machine is fitted with an Apple iSight camera to collect images. A custom-made program, developed using the núcleo toolkit [Roussel, 2006] and the openCV library [Intel Research] provides motion detection and video clip recordings of the images captured by the camera. A standard 17 inches LCD screen serves to display the Probe Machine's feedback: what the camera is capturing and a feedback showing whether the system is recording images (Figure 7.1b) or not (Figure 7.1a). A physical touch-sensitive button is connected to the computer and interfaced to the software using Phidgets[1] [Greenberg and Fitchett, 2001]. It provides a privacy-enforcing feature that disables recording for a period of five minutes. Feedback that recording has been disabled and the remaining time before it restarts is provided on the screen (Figure 7.1c). The Mac Mini uses a Web Server using PHP and MySQL to organize the video clips chronologically on a webpage accessible to participants where they can review and comment on the clips (Figure 7.3). The website was available to participants throughout the study, with some additional functionalities changed or released during its course.

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[1]More on Phidgets at `http://www.phidgets.com/`

7.3.6 Procedure

Zebra was deployed in the coffee room of our lab (See Figure 7.6), where people engage in coffee chats, lunch get-togethers and, on occasion, meetings (for example, between Ph.D. students and their advisers). The camera was directed toward the door to capture people going in and out while also capturing activities around the table and beside the sink. The deployment lasted one month, during which minor changes were made to the Zebra probe, mostly with respect to camera position and the usability of the feedback website. The coffee room was particularly suitable. As a public space, it was shared amongst the whole group and was visited regularly by most of the lab members. Moreover, people usually left their work to go to the coffee room, being potentially more available to examine and interact with the Zebra probe.
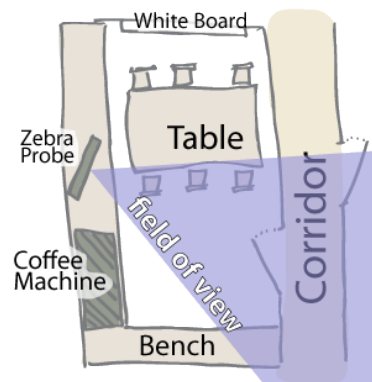
Figure 7.6: Positioning of Zebra in the coffee room

A pilot study in a seldom-used room preceded the deployment, enabling some participants to preview the Zebra probe and test the system. We announced the deployment via email, three weeks before starting the study, to prepare participants and address potential initial concerns. We also sent email when the Zebra Probe was activated, including additional details about the study. Prior to the deployment, we obtained ethical review and informed consent from both lab managers and participants. Signs were also posted in the coffee room to inform passers-by and visitors about the experiment. Additional information sheets and informed consent forms were made available outside and within the coffee room.

In the initial workshop and emails, we asked participants to engage with Zebra when they wanted. We encouraged them to give feedback as they reviewed the posted data. The feedback interface was available at all times, using computers within the local network. We organized a second workshop two weeks after the beginning of the deployment to engage participants in consultation over the project direction and gain feedback and participants' perceptions about the Zebra probe. This enabled to reiterate the aims of the study and to discuss any concerns and questions the participants had about the study (on both a deployment and an interaction level). After the workshop, we enabled discussions on the feedback website and revised how participants interacted with the Zebra probe based on the workshop discussion. New features were implemented, including a tag cloud and the ability to search and view videos based on tags to enable faster tagging and discussion (Figure 7.3). The final workshop held at the end of the study gave participants a preview of the results and included a discussion of the methodology with the participants as co-designers of the tool.

Participants' schedules strongly influenced participation in workshops and interviews. Typically, between 8 and 12 participants collaborated during workshop sessions and 8 key participants were interviewed toward the end of the study. Interviews lasted between 30 and 90 minutes.

7.3.7 Design Changes

Some design changes occurred to the feedback interface over the course of the study, to adapt to user needs and desires as observed or captured during workshops. In particular, the navigation through tags was enhanced in order for someone to be able to browse video where his/her name was tagged.

We also observed many occasions were the Zebra probe had captured people walking down the corridor, thus triggering the motion detection recording through the glass panel. In order to limit the number of irrelevant video clips in the list, video clips lasting less than 5 seconds were automatically hidden from users on the feedback interface.

Considering the important number of remaining video clips we decided to add two indicators to help participants navigate within them. The first indicator was relative to the length of the video clip. Events involving more than one person typically resulted in longer videos. As these videos were the most likely to generate discussions, we wanted them to stand out of the weekly video clips view (See figure 7.2). In order to achieve this, we added to each clip thumbnail a colored indicator, in

Figure 7.7: Details of the Zebra feedback interface thumbnail view. The orange square's saturation indicates clip length while the blue square's saturation indicates the number of user contributions.

which saturation varied depending on the length of the clip. The second indicator was relative to the number of user contributions to the clip. Each clip thumbnail was enhanced with a color indicator, in which saturation varied depending on the number of submissions made to this video (discussion and tags). This was expected to lead users to video clips that had been subjects of discussions. These indicators are shown in detail figure 7.7.

7.4 Results

7.4.1 Probed Data

Over the course of the study, participants entered 13 comments, 11 posts in discussions, and 27 tags. Tags were posted by participants only on the 27th and 39th days, dates of workshops. We, as investigators, posted five comments, 36 discussions, and 140 tags. A further two comments, three discussions and 477 tags were unidentified [2]. The data contained 51 unique tags. The most used tags were the names of the lab members visiting the coffee room regularly that we entered to help analyze the occupants of the coffee room and helped the participants review the videos concerning themselves. 351 unique videos were tagged, representing about 10% of the overall collection. Participants' tags included descriptions of the events such as *"walking past"*, *"coffee"*, and *"waiting"*. Figure 7.8 gives an example of participants' posts on one of the videos.

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[2]Investigators' estimated being responsible for about 75% of the unidentified tagging, which occurred when we started tagging the data for its analysis, precising names of participants and key actions, and forgot to precise our name.

```
P1:    Nice throw over the shoulder ;)
P2:    I like the non-distracted waiting for coffee time.
       It lets my ideas percolate.
P2:    (that last comment on ideas was me)
P3:    can someone tell me what the squares of different
       shades of red a blue mean? i have been wondering
       for somet time...
P4:    I think you look bored, we should introduce
       distractions so that people can do stuff while
       waiting for the coffee machine to heat up or
       produce the magic juice.
P5:    As the room is now, no wonder John looks like he
       can't wait to get out of there. The kitchen feels
       a bit like a sterile surgery, maybe a flowery
       tablecloth would do the trick ;-).
```

Figure 7.8: Example of Zebra users' discussion on a particular video.

3677 video clips were recorded for a total length of 49 hours (almost 130 times less than a 24/7 recording). 2149 of the clips were hidden because they were irrelevant to the study, *e.g.*, caused by a light flicker. This left 29 hours of video in 1528 clips (Figure 7.9). We estimate that we reviewed around 95% of the videos using a fast browsing interaction described later. Participants used tags more than other parts of the feedback interface. Workshops allowed gathering feedback on the presented tool, considering our HCI researchers as participants in an observational study using the tool.

7.4.2   Reactions to the Introduction of the Zebra Probe

Participants in this study were occasionally asked to react as researchers from the Zebra's perspective, but they were primarily observed by it. Therefore, they provided interesting reactions to the introduction of a video recording device in a space. One user suggested that we should remove the screen with the always-on feedback as it was thought to be too intrusive, or "in your face". In talks with participants, we realized that one sub-group, composed of four women, had decided to limit their use of the coffee room to avoid being recorded. Further investigation led to the understanding

Figure 7.9: Percentage of video recorded each day during the Zebra probe's deployment.

that the recording *per se* was not the main cause, but the fact that they were always re-

minded of the video capture made them too self conscious about their actions. The review of the videos allowed us to observe their gradual desertion of the coffee room. However, after the second workshop where we addressed some of their questions on the finality of the study, this sub-group returned to the room, though never as extensively as before the study. This suggests that removing the always-on screen feedback would probably lower the impact of the tool on the environment, and would prove to be less intrusive as a result.

Participants used the feedback side of the Zebra probe moderately. Most discussions concerned funny clips and some key aspects of a day, a particular meeting that had occurred in the coffee room or a lunch. After the second workshop, we modified the capture side feedback display to include a thumbnail of what was being recorded as well as the webpage of the feedback side, thus allowing participants to provide feedback on the site. However, overall the effort required for sending feedback proved to be high and only a limited number of contributions were made.

7.4.3 Analyzing Collected Data

Toward the end of the study, discussions with participants led to suggestions and critiques of the data review and analysis. The current web-based implementation of the system inspired many responses. The tagging capability was suggested as a way to sort the videos into categories and support qualitative analysis. As participants themselves created the tags, they could provide categories and a vocabulary that can be re-used by the designers in discussions with users or to "code" the data. The analysis of the tags generated by the participants themselves could reveal interesting insights into their perception of their environment.

Participants also suggested that they would like to easily retrieve every video in which they appear to help them comment on their actions. As a result, study researchers started to review data from the server regularly during the day in order to tag them with the names of the people appearing on them. At the same time, we implemented the tag cloud feature (Figure 7.4). Viewing the tag cloud allowed us to observe which users were using the coffee room more often as by doing so their name would be tagged more often and therefore appear larger in the cloud.

While reviewing videos, we observed that most participants glanced at the clips instead of playing them. They would hold the video marker and slide it to view an accelerated version of the video, efficient to recall memories and most interactions taking place. This fast browsing of videos was later suggested in the form of selected key frames allowing participants and researchers to highlight important moments in a video for later discussion, but also to create a summary of the video.

For further data analysis, participants suggested implementing an interface to compare interaction over different days. Using tags as filters, we could compare lunch times, types of informal interactions, etc. to observe and analyze temporal patterns. Key moments of an interaction sequence could be displayed as stills to provide a contextual overview for those not wishing to review all the video footage.

7.4.4 Workshop and Interview Outcomes

Using the interviews and the workshops, the study led participants to discuss different approaches to the observation tool tailored for different research and design audiences. We

also made a distinction between researchers' perception of the tool as *participants in an observational study* and their critique and review of the concepts Zebra incorporates as *experts in HCI*. We highlighted these points of distinction between roles played by participants during workshops and interview sessions by focusing questions on either aspect subsequently.

In interviews and workshops, participating researchers provided comments on how the data could be used, other deployment contexts, and aims for potential extension of the tool's capabilities. The following alternatives summarize the researchers' re-interpretations of the tool according to their domain of expertise. The two most interesting alternatives are presented here: a participatory design alternative, and a human study alternative.

Participatory Design Alternative

The low level of engagement with the feedback interface motivated the investigation of how the tool could be designed to encourage, motivate or provoke more engagement. Participants suggested two variations of the Zebra probe focused on enhancing the engagement of participants through maximizing exposure, stimulation and motivation. The first suggestion was to create an observation tool to engage people with it and confront them with the previously recorded videos. Instead of providing systematic recording and feedback, the device would randomly switch between two modes when motion was detected: playback of previously recorded video, upon which room occupants would then be given the opportunity to comment; and recording (as described previously). This system could still provide the systematic recording ability of the Zebra probe, and would significantly increase the provocation of participants and their access to the recorded data. This technique effectively addresses the issue of exposure (*i.e.* how user should be exposed to the collected data so that they could comment on it).

The second suggestion was to design a tool that maximizes exposure of participants to the collected material and lower the threshold necessary to take part in the data analysis. In this alternative, the feedback screen would be removed and replaced by printed keyframes from the videos that have been tagged by researchers and organized, then pinned on the wall of the coffee room. Participants would be free to write additional tags and comments on the prints and review particular videos by scanning a tag printed with the keyframe to identify. The corresponding video would then be played on the screen. Eventually, people would rearrange the printed keyframes any way they wanted. The resulting organization would be recorded every evening for record keeping and other videos placed on the wall. This technique is strongly related to the video card game [7], a technique for analyzing video in collaboration with participants in a study which uses raw clips of video from the design setting to identify interaction themes.

Human Studies Alternative: Augmented Diaries

Participants also suggested the use of the tool to conduct diary studies. Instead of pen and paper diaries, video would be automatically recorded by the device and serve as a prompt for the researchers to inquire about the details of a particular interaction It could also be a powerful medium to help users recall a specific instant. However, diaries involve the user making the entries and choosing what to report instead of relying on systematic data collection, making them susceptible to omissions and other misreporting of events. During

our interviews, an alternative was suggested in the form of a bookmark button, which would allow users to create diary entries in the recording. These entries would take the form of a marker to particular moments of the video. Researchers or participants would then review the clips for further discussions on particular scenes. Researchers would still have access to the full body of collected data, but could prompt users based on their own markers as well.

One suggested benefit would be the ability to run the study remotely, reviewing data and prompting users automatically. Bookmark entries would also be easier for the participants to make, and because the context of the marker would be recorded as a video, it would be rich in details to support remembering. This technique would also empower users, giving them the ability to highlight moments in their day that they consider important.

This alternative echoes previous work in the use of videos for research and fieldwork, such as the EVA system by Mackay [1989] system that permitted the use of meta-data to search, sort and explore video. However the proposed approach allows users to be actively involved in the collection of meta-data, making the process more oriented toward a PD approach. Brandt *et al.* [2007] also provides similar approaches where participants in a diary study use short messages or pictures while mobile to complete the entries online when they are at home and more available.

7.4.5 Informal Interaction and Social Networks

An informal analysis of videos showed many aspects of the space that could trigger ideas for designs. It provided both inspiration and information on how to use the space to enhance remote collaboration. For example, people waiting for the coffee to brew often look for something to occupy themselves, such as reading old newspapers. Once Zebra was installed, we observed that sometimes occupants of the coffee room would undergo considerable effort to create a funny video for the people watching it. This could encourage informal exchange between collaborators and encourage interaction.

Figure 7.10: A snapshot of informal interaction occurring in the coffee room: lunch between staff and students

On preliminary analysis of the data, patterns of social networks began to emerge. For example, many participants would take a coffee at regular times of the day, and sometimes coordinate their coffee breaks while some other times meeting in the coffee room by accident. Often, participants who wanted to discuss while in a coffee break would leave the otherwise locked door of the room open to facilitate informal interaction (Figure 7.10).

The use of tags as markers of participants' involvement in video files enabled an overview, which not only aided the participants in annotating their own experiences, but also revealed a rich relationship of groupings of people to activities in context. While revealing people's daily routines in the space, this interaction also gave participants insights into each other's activities, interactions and engagements. This situated social network was raised in the workshops as an insight into colleagues' activities and had helped people adapt their

own activities in response to their colleagues' routines. Revealing this previously hidden data had given participants new insights and opportunities to interact with their colleagues.

7.5 Discussion

7.5.1 Engaging Users in Fieldwork

I have been on [the website]. [. . .] *Usually to read the comments that other people make. They're quite funny sometimes.* A participant of the Zebra study

Despite our assumption that researchers would be more prone to accept and interact with the probe, the limited number of contributions through the feedback interface raises strong concerns about engaging users in fieldwork observations with such tools. In our study, we used provocation (*e.g.* funny videos) to observe if it would influence participants' willingness to participate in the study (to look at videos and write comments). Our results suggest that provocation motivated participants to access the interface and interact with it. We also encouraged discussion and use of the interface by making funny videos, which would introduce the system to participants and allow them to get familiar with the system. Through challenging or entertaining aspects of the Zebra probe, we were able to temporarily elicit participants' reaction to its deployment. These reactions served to fine tune the available interaction with the device and raise issues of navigation in the provided web interface. Provocation seems to be a particularly suitable motivator when engaging users in fieldwork and PD in general. However, the nature of provocation raises issues of data validity and usefulness. An example of suitable provocation for engaging user is given in the participatory design alternative described earlier. By feeding the video data back to the observees while they are available to interact with it, a system could prompt users to react on it and record reactions.

The low level of engagement of users with the feedback interface reveals that more could be done to ensure the capture of data, as suggested both in the participatory design and augmented diary alternatives given above. The mechanism of entering feedback should also be improved and tailored to ensure ease of use and input. Brandt *et al.* [2007] provide one possible alternative for facilitating users' implication in observations. The use of different media and feedback types could also be investigated. The use of different input points (dedicated website, on-site audio or video commenting, . . .) can support the participants when they wish to provide feedback on the available data. For example, a console could be provided just next to the capture device for the user to easily enter comments and tags, or possibly just mark this video as "of interest".

7.5.2 Engaging Users in Design Exercises

The nature of the participatory design process around the study deployment enabled participants to engage in a manner that was less intrusive to daily activities and routines. The background deployment of Zebra in a commonly-used public environment let participants become familiar with the presence of the device, interface and main system features. The extended period of the study deployment let participants engage in their own time, choosing when and how they wished to be involved with collating and analyzing data.

The gradual deployment of the Zebra features over time helped renew interest in the tool, while gradually building participants' knowledge of the possible interactions and in-

creasing the level of control they had over reflection of the captured moments. The formal sessions of researcher-participant engagement and feedback were short, considering the one-month deployment of Zebra. The three hours cumulated reflection on the device (during interviews or workshops), its usage and use outside of the deployed context, required a minimal investment from participants while efficiently maximizing the feedback and dialog to ensure participants felt both informed and engaged in the process. By using this process, most of the shared understanding about the design was built over time through participants' exposure to the Zebra probe and opportunistic discussions as well as the formal workshops.

Our belief is that using a technology probe as at the beginning of a design process allowed participants to fully engage in it without requiring lengthy introduction. By experimenting with the probe, they are challenged in their way of thinking and are given the opportunity to begin an informed reflection about the design space in which I designed. Conversely when the focus of the technology probe is narrow, the researcher would benefit from ensuring that what it gathers is data directly analyzable. Clearly, a compromise needs to be found between the *inspiring* and the *informing* aspects of the technology probe prior to its deployment.

7.6 Technology Probes and Communication Appliances

7.6.1 Analyzing Data

This study gave us the opportunity to handle the analysis of video data from a different perspective than the perspective of the mirrorSpace study (Chapter 4). First a technology probe generates very large amounts of data. Current approaches for handling vast amounts of data include descriptive statistics, which do not permit exploratory analysis and can be misleading [Tukey, 1977], and information visualization, which does not provide support for large amounts of video. Coding, using the Grounded Theory or another method remains the main approach for analyzing video and becomes quickly tedious for very vast amounts of automatically recorded data. The approach of the EVA [Mackay, 1989] and DIVA systems [Mackay and Beaudouin-Lafon, 1998] provide an initial way to explore video data, but neither system is available for use, and the data from the technology probe does not provide support for the use of contextual information supported by DIVA.

An important result of the Zebra study is the suggestion that participants can assist in data analysis. They are given the opportunity to highlight important moments in their interaction with the device through the device itself. As suggested in the augmented diary alternative, a technology probe could also be a means for collecting explicit feedback from users about the concepts being investigated. First it directs researchers' attention in the data on moments which are salient from the user's point of view. Second, it supports the design dialog and complements standard data analysis techniques by allowing researchers to pay more attention to important moments singled out by users, in complements to the data singled out by the researcher.

7.6.2 Design Process

Additionally, we believe technology probes are more efficient at facilitating the dialog between users and designers if they are used earlier in the design process. In our subsequent work using TP to study communication appliances, they will be introduced as an initial design exercise to provoke users' reaction and raise their motivation and engagement in the

project while capturing data. Moreover, the increased reliability of the probe (comparatively to the mirrorSpace probe) also partially accounts for the increased success of the Zebra study. To increase reliability, especially of communication over the Internet, we will focus on designing communication appliances based on media other than video that require less bandwidth to be used as a TP.

7.7 Conclusion

In this chapter, we have reported on a study that explored the role of technology probes in the participatory design process. This study outlined the role of technology probes in easing engagement from users in the process, while allowing them to provide important insight on the design. This reflection allowed us to better understand the benefits of technology probes in the process and make a better use of the technique.

This approach to technology probes is further illustrated in the context of this thesis in Chapter 6, page 154. In this section, we illustrate how we built upon participants' experience with the technology probe to conduct participatory design activities (*i.e.* brainstorming, ideas' critic) to iterate on the concept at hand (markerClock).

Exploring Technology Probes' Data: Mélange

Contents

Summary

This chapter describes the Mélange technique which allows users to browse large visual spaces while retaining awareness of intervening context by folding the 2D space into 3D. We designed this technique in collaboration with people in the INRIA Aviz team to support the exploration of large visual spaces, such as visual representations of time based data produced by the technology probes. To evaluate the impact of Mélange on supporting the exploration task, we conducted a controlled experiment comparing it to two state of the art techniques: single view port and split screen viewport. This experiment showed that Mélange significantly improves users' awareness of intervening context while retaining similar performances during the navigation.

The design and evaluation of Mélange was conducted in collaboration with Niklas Elmqvist, Nathalie Henry and Jean-Daniel Fekete. This thesis' author contributed to the design of the technique, as well as to the experiment design, conduct and data analysis. The Mélange study took place in the INRIA - Aviz team located at the Laboratoire de Recherche en Informatique. This work was also published as a long paper at the 2008 ACM Conference on Human Factors in Computer Systems (CHI 2008).

Niklas Elmqvist, Nathalie Henry, Yann Riche and Jean-Daniel Fekete, *Mélange: Space Folding for Multi-Focus Interaction*, in the Proceedings of CHI2008, The 2008 ACM SIGCHI Conference on Human Factors in Computer Systems , Florence, Italy (ACM Press).

8.1   Exploring Data from Technology Probes

As described in more detail in Chapter 7 related to our Zebra probe, technology probes [Hutchinson *et al.*, 2003] are tools designed to help researchers gather a variety of data from the field. Part of this data is gathered by logging users' interactions with the device and their use in longitudinal studies implies a collection vast amounts of time based data. The mirrorSpace, Zebra and markerClock studies (See respectively chapters 4, 7 and 5) are clear examples of such datasets, containing thousands of events, spread across weeks. For instance, the markerClock experiment generated 35 619 events, spread across more than 56 days.

This data is particularly helpful in understanding how people actually used the technology probe. Thus our attention is not on verifying hypothesis, for which we could use inferential statistics, but rather on exploring our data to observe phenomena not captured through other means. This particular aspect of data analysis is called Exploratory Data Analysis (EDA) [Tukey, 1977]. As Tuckey outlines, EDA is better conducted using a visual representation of data, rather than statistic summarizing it. Descriptive statistics provide a summary of data which can be helpful, but also misleading [Tukey, 1977]. Visualizing the data allows us to identify patterns of use and particular events. However, the granularity of events captured by the technology probes can be range from the millisecond to the hour, thus making it difficult to study its time-based visualization at an appropriate level of detail. On one side, a level of detail based on the seconds will very likely involve very large visual spaces many times the size of a standard screen for which interaction is tedious, potentially disorienting, and often ineffective [Furnas, 1986, 2006]. The visual representation of the data from the markerClock experiment, for instance, represented 4320 pixels per day in width, or $120,960$ for each deployment period of 4 weeks (See figure 8.1).
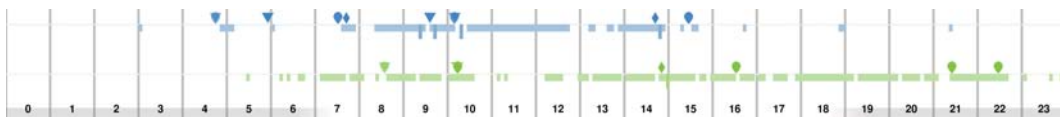
Figure 8.1: Precise visualization of markerClock data. Here a pixel is equivalent to 20 seconds of log.

On the other side, a level of detail based on the hour will involve aggregating fine details of the data and losing precision (See for instance figure 8.2 the representation of the same data as figure 8.1 but represented with a one minute per pixel level of detail). A solution

to this problem in other types of visual representations could be to use multiscale visual spaces, where the scale of the visualization can vary depending on the data being considered. However, this is misleading in a time based representation where distance between events is highly meaningful.
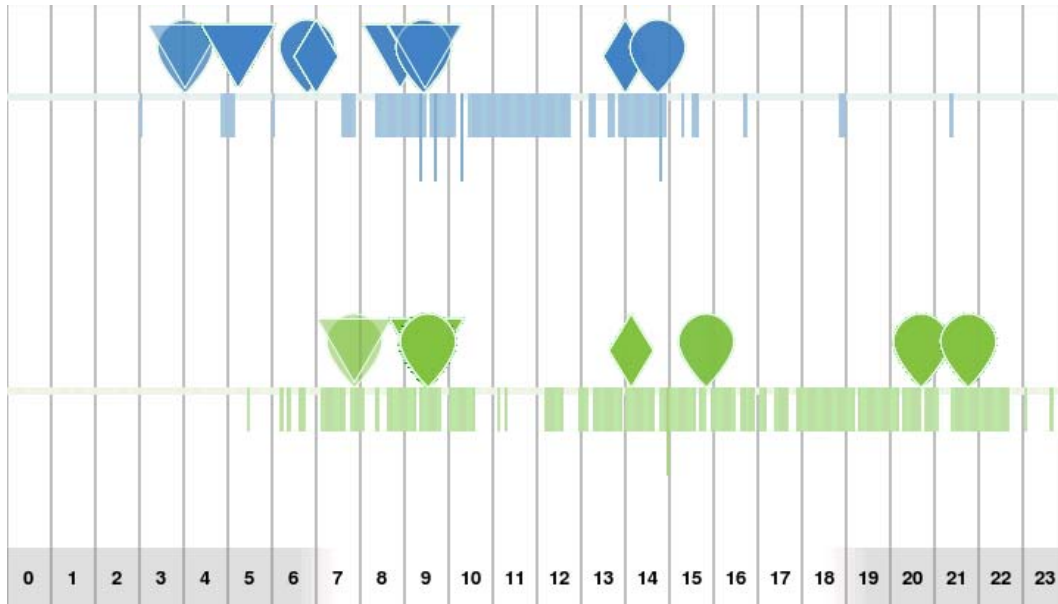
Figure 8.2: Rough visualization of markerClock data. Here a pixel is equivalent to 2 minutes of log.

As a result, visualization for time-based technology probes data need to be able to accommodate an exploration on the finer level, while allowing an analysis on an overview level. Moreover, we argue that the exploration task often involves comparing portions of the data at a fine level of detail in order to compare salient features while looking for visual patterns. Thus we argue that a navigation with such visual space would benefit from a multi-focus presentation, where multiple portions of the data remain visible during the exploration in order to be able to compare different portions.

In this chapter, we present Mélange, a presentation technique designed to support the exploration of large visual spaces. This chapter is dedicated to describing and evaluating Mélange, while outcomes of the exploratory process are given in our Chapter 5 on our markerClock technology probe.

Mélange uses the paradigm of paper-folding to allow users to explore their large visual spaces, enabling multi-focus interaction and intervening context awareness. Mélange provides this by folding the visual space between two focus points in the depth of the screen, using a 3D visual effect similar to the folding of paper (See figure 8.3).

8.2 Requirements

The situation described above is very similar when exploring social networks, which can be represented as matrices to avoid node overlap or edge crossings — particularly useful for dense and large networks [Ghoniem *et al.*, 2005]. Here, nodes are placed on the row and
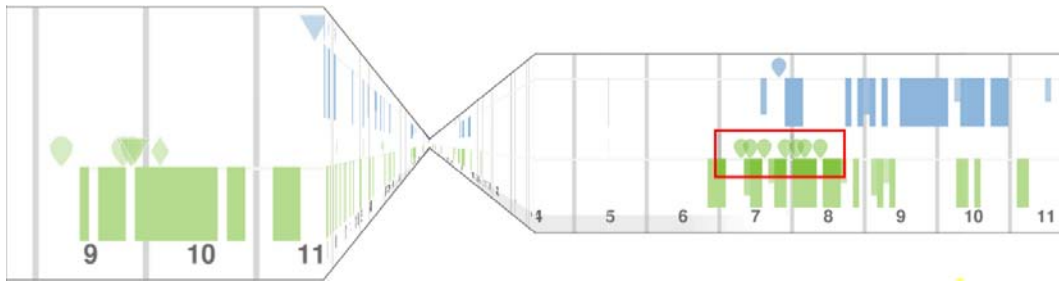
Figure 8.3: Exploration of markerClock's data using Mélange. Here we show Véronique's use of markers over two hours to send a happy 70th birthday message to Ursula (outlined in red).

column axes, and a filled cell in the matrix indicates an edge between nodes. Often, several different parts of the same matrix are interesting for a particular task, such as collaborating actors, as well as the intermediate context between them (the communities they belong to). However, no efficient interaction technique exists for exploring these matrices, leaving the user no option but to pan and zoom to navigate.

Matrices representing social networks, and large time-based data are two examples of multi-point interaction tasks [Shoemaker and Gutwin, 2007] that require several concurrently visible focus points. In our generalized *multi-focus interaction* model, we also stipulate that each focus must be independently zoomed so that the user can adapt the magnification to the task. Furthermore, as much display space as possible should be dedicated to each focus to show its surrounding context. Finally, our intended user tasks often require an awareness of the content and quantity of space that lies between the foci. For the world map example, context and distance helps the user quickly estimate flight time and stopovers on the way. For the social network, they give an indication of the global communities and collaboration patterns.

Based on these requirements, we formulate a number of design goals for our approach to exploring large visual spaces:

G1 *guaranteed focus visibility:* multiple foci at the desired zoom level should be visible simultaneously, regardless of their location on the space;

G2 *surrounding context visibility:* as much as possible of the area surrounding each focus region should be visible;

G3 *intervening context awareness:* the space between focus regions should be shown to give a frame of reference; and

G4 *distance awareness:* some notion of the distance between the focus regions should be available.

No existing interaction technique is known to fulfill all of the above design goals. Therefore, we present the *Mélange* technique which uses the paradigm of paper for the visual space to automatically fold intervening space between focus regions to guarantee their visibility.

The rest of this chapter is structured as follows: We begin with a review of the existing work on space deformation and similar techniques for exploring visual spaces. We then present the Mélange interaction technique. We describe our controlled experiment and present the results and a discussion of our findings.

8.3 Related Work

There are a number of existing techniques (or combinations of techniques) that partially fulfill the design goals outlined above. This section reviews the main approaches:

- *General navigation:* interaction techniques for navigating in large visual spaces;
- *Split-screen:* dividing the viewport into smaller subwindows, each showing a small region of the space;
- *Space distortion:* deforming geometric space; and
- *Semantic distortion:* deforming semantic space.

Table 8.1 gives a summary of these strategies and how they fulfill our design goals.

Solution strategy	G1	G2	G3	G4	Techniques
General navigation	–	–	–	–	[Appert and Fekete, 2006, Igarashi and Hinckley, 2000]
Split-screen	Y	Y	–	–	[Shoemaker and Gutwin, 2007]
Fisheye views	Y	P	Y	–	[Furnas, 1986, Shoemaker and Gutwin, 2007]
Rubber sheet	P	P	Y	–	[Munzner *et al.*, 2003, Sarkar *et al.*, 1993, Slack *et al.*, 2006]
Semantic distortion	Y	Y	Y	–	[Card and Nation, 2002, Plaisant *et al.*, 2002]

Table 8.1 : Design goals fulfilled by existing strategies (P = partially).

8.3.1 General Navigation

Zooming and panning are the standard actions for interacting with large visual spaces that exceed the size of the viewport. Furnas and Bederson present the space-scale diagram [Furnas and Bederson, 1995] as a comprehensive model for describing these actions as paths through scale-space. In general, using both zoom and pan in combination is both more efficient and more informative than using just panning [Bourgeois and Guiard, 2002, Furnas and Bederson, 1995, van Wijk and Nuij, 2003]. However, zooming and panning do not directly support any of our design goals.

A number of approaches have been developed to better support navigation in zoomable spaces. Speed-dependent automatic zooming [Igarashi and Hinckley, 2000] (SDAZ) seamlessly zooms out to maintain a fixed visual flow depending on the speed of scrolling governed by the user's cursor. Bourgeois and Guiard [Bourgeois and Guiard, 2002] show that

bimanual multi-scale navigation outperforms standard navigation. OrthoZoom [Appert and Fekete, 2006] allows for controlling both zoom and pan using the orthogonal axes of the mouse in a 1D scrolling task, and was recently shown to be the fastest one-dimensional scrolling technique.

For larger visual spaces, standard navigational aids include an overview window showing the position and general context of the viewport on the canvas [Plaisant *et al.*, 1995]. A recent trend integrates the overview in the detail view to provide off-screen target awareness; examples include Halo [Baudisch and Rosenholtz, 2003], where circles emanating from off-screen targets indicate their approximate distance and location, City Lights [Zellweger *et al.*, 2003] that show the "shadows" of off-screen targets on window borders, and the EdgeRadar [Gustafson and Irani, 2007] that provides a rectangular context region on window edges. Hopping [Irani *et al.*, 2006] extends the idea by also allowing for direct teleportation to any of the off-screen targets indicated on the viewport edge. However, again, these techniques do not provide multiple foci, and provide poor context awareness.

8.3.2 Split-Screen

Splitting the screen into several windows showing different parts of the visual space is a standard method employed by commercial applications such as Microsoft Excel and Adobe PhotoShop. However, there exists no evaluation on the performance of navigation in such split-screen setups.

Shoemaker and Gutwin [Shoemaker and Gutwin, 2007] present an interaction technique called split-scrolling that automatically divides the screen into two viewports when two interaction points move apart, but they do not empirically evaluate this technique.

For time-series data, it is useful to be able to summarize or condense periods of times into aggregated representations. An example is LifeLines [Plaisant *et al.*, 1996a], where the time navigation scrollbar can be split into several regions with multiple foci.

By definition, split-screen setups support the guaranteed visibility (G1) and surrounding context (G2) goals, but intervening context (G3) and distance (G4) is lost. Adding an overview helps to show the context, but overviews are typically small and placed in the periphery of the viewport, splitting the user's attention and consuming screen real estate.

8.3.3 Space Distortion

Instead of having the user travel through the visual space, space-distortion techniques deform the space non-linearly to optimize browsing. Fisheye views [Furnas, 1986, 2006] describe ways of doing this, both in geometric as well as information space. The Table Lens [Rao and Card, 1994] is an example of applying fisheye distortion to a tabular visualization. The Document Lens [Robertson and Mackinlay, 1993] visualizes a large document as a rectangular array of pages with a focused region in 3D. This use of 3D perspective foreshortening as a distortion technique is also used in the Perspective Wall [Mackinlay *et al.*, 1991]. However, most of these approaches have no direct support for our design goals, although they can be used as starting points for fulfilling them.

The rubber sheet stretching metaphor [Sarkar *et al.*, 1993] is one model for distorting 2D space. Accordion Drawing [Munzner *et al.*, 2003] (AD) is an extension of the rubber sheet with support for guaranteed visibility. Slack et al. [Slack *et al.*, 2006] present a general application framework for accordion drawing. The AD method supports all of our design

goals, but some of them only partially. Focus regions cannot be zoomed independently (G1), the model is not view-dependent so surrounding context is not automatically allocated a maximum amount of space (G2), and the compressed space gives no direct distance awareness (G4).

Instead of distorting the whole space, Shoemaker and Gutwin [Shoemaker and Gutwin, 2007] describe a multi-point interaction technique based on automatic creation of fisheye lenses for each interaction point. As for the AD method, this approach supports design goals G1 and G3, but there is no automatic space allocation given the available space (G2), and distance awareness (G4) is difficult to attain when the space is non-linearly deformed. For our exploration task, it would make more sense to deform the context regions and leave the focus unchanged and of maximum size, whereas fisheye lenses allocate space for the foci and leave the context unchanged.

8.3.4 Semantic Distortion

As stated earlier, fisheye views [Furnas, 1986] also allow for semantic zooming [Perlin and Fox, 1993]. In other words, we can distort semantic space instead of geometric space. DOITree [Card and Nation, 2002] and SpaceTree [Plaisant *et al.*, 2002] are examples of such techniques for hierarchical structures. However, while this approach can support design goals G1 through G3, it is again distance awareness (G4) that is lacking due to the scale-independent graphical representation.

8.4 Mélange: Folding 2D Space into 3D
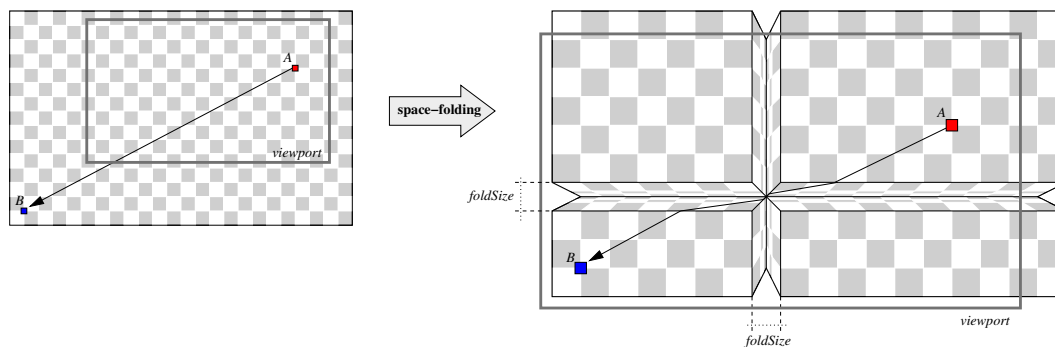
Figure 8.4: Folding a 2D space with two focus points *A* (main) and *B*. The space is folded to make best use of the available area in the viewport. Focus points can be independently zoomed by changing their 3D depths.

Mélange is a space deformation technique that folds 2D space into 3D in order to bring several focus regions of interest into view at the same time. Figure 8.3 shows a portion of markerClock's data visualization being folded using Mélange to bring both the morning of the first day and the morning of the 12th day into view at high magnification. This view clearly shows the particular use of markerClock's symbols on the latter, which represented a happy 70th birthday message (7 drops) from Véronique to Ursula. This resulted in Ursula calling Véronique to thank her for her.

8.4.1   Multiple Foci: Guaranteed Focus and Context Visibility

Given a set of focus points and the location and extents of the current viewport on the canvas, the objective of the Mélange technique is to combine different parts of the visual space so that the focus points and as much as possible of their surrounding context are visible on the user's screen. This fulfills the *guaranteed focus visibility* (G1) and *surrounding context visibility* (G2) design goals.

Focus points are specified as 2D positions on the visual space, and also have an associated depth factor that allows each point to be zoomed independently of the others. This supports interactions where different parts of the visual space must be viewed at different scales, such as a social scientist studying a particular actor in relation to a larger clique of actors on a matrix representation of a social network.

8.4.2   Folding Space: Intervening Context Awareness

A split-screen approach to multiple foci would remove space outside of the focus regions and show each region as small subwindows in the main viewport. Mélange instead *folds* the space into the negative depth dimension (*i.e.* into the screen, see Figure 8.3). If there is no extraneous space to fold away, the space is instead stretched, similar to the rubber sheet [Sarkar *et al.*, 1993] but with support for independent depths for each focus point.

The folds themselves are shown in 3D perspective as they stretch away into the depths of screen, and they also indicate the relative positioning of the focus points. Thus, this fulfills the *intervening context awareness* (G3) design goal. Furthermore, this mechanism gives a tangible and compelling metaphor for the user that is close to how real paper or fabric is folded. We believe that this metaphor is easier to understand than merely compressing the space, as in rubber sheet-inspired models.

Figure 8.4 shows a schematic overview of the folding process. The user's viewport (denoted by the smaller rectangle in the left part of the figure) is centered on the focus point *A* — the main focus — but the user has also designated a second focus point, *B*. Given the available space in the viewport, the Mélange technique folds away some of the intervening space below and to the left of *A* to also bring *B* onto the screen. All folds are rectilinear to simplify understanding of the deformed space. A certain amount of screen real estate (*foldSize*) is used to show the contents of the folded space in 3D perspective as it stretches away into the depths of screen. These regions serve as context between the focus regions.

The above method generalizes to any number of additional focus points. One of the foci is always designated as the main one and is used as a baseline for computing the size allocations for the others.

8.4.3   Interacting with Folds: Context and Distance Awareness

Deforming the space to bring several foci onto the screen may give the user a false sense of the size of the visual space. For example, folding a world map to bring London and New York into focus at high detail level will certainly convey a false sense of the distances between the two cities.

Mélange supports better distance awareness than compression-based techniques like the rubber sheet method [Sarkar *et al.*, 1993] since the 3D perspective of the folds gives an indication of the distance between the regions.
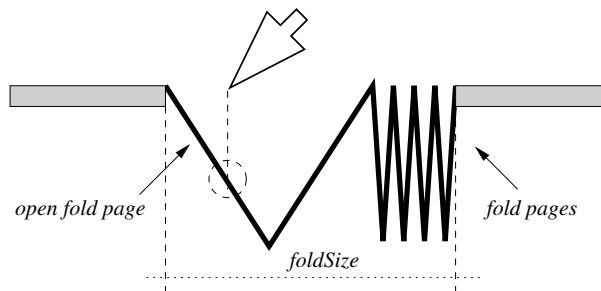
Figure 8.5: Fold pages for conveying a sense of distance between focus regions. Supports flipping and defining new focus points.

To further improve distance awareness, we introduce fold pages and interaction techniques for flipping between them. The folded space is split by a suitable and tangible unit, such as the size of the screen. Only one such unit is shown at full detail, and the rest are shown as thin fold pages (Figure 8.5). Each fold page represents one screen of compressed space. This helps fulfill the *distance awareness* (G4) design goal by allowing the user to quickly estimate the number of fold pages to find the distance between the focus points (like estimating a book's length from its thickness).

Another benefit is that context awareness is improved by allocating more screen estate to each individual fold page (although some overview is lost). Pages could potentially also show condensed context information on its one-pixel representation, akin to the compact contextual views of the City Lights [Zellweger *et al.*, 2003] technique.

Hovering with the mouse over the pages flips through them like leafing through a book. Furthermore, clicking on a fold adds a focus point on the designated location, and double-clicking removes all of the other focus points and creates a new primary focus point at the position. The effect is that the user stops folding space and travels to the new location.

8.4.4   Design Decisions

In this section we deal with some of the specific design decisions underlying Mélange. Note that the method does not stipulate how the user interacts with the focus points, allowing it to be combined with advanced multi-scale navigation techniques like OrthoZoom [Appert and Fekete, 2006] or SDAZ [Igarashi and Hinckley, 2000].

Fold Geometry

The Mélange space-folding mechanism is different to most focus+context techniques in that it compresses uninteresting space as opposed to expanding the focused space. The geometry of the actual folds is an interesting design issue; to fully support the metaphor of folding paper or fabric, the space should probably be folded in a smooth curve. However, this would cause most screen estate to be afforded to the middle region of the compressed space.

Most often, the space closer to a focus region is more important than the space halfway between regions. Therefore, in our realization, the folds are sharp and angular (more like

paper origami than fabric folding), similar to the Perspective Wall [Mackinlay *et al.*, 1991]. 3D perspective foreshortening gives a form of fisheye effect on the contents of the folds.

Perspective Correction

When rendering the visual canvas and the folds in 3D, we must correct for perspective to get a correct visual appearance for the folds. Otherwise, the perspective projection of the 2D space deformed into 3D causes uneven distribution of screen space. Carpendale [Carpendale and Montagnese, 2001] calls this *folding* a region over other regions, unrelated to our use of the term. We solve this by performing all layout in the 2D screen space, and then unprojecting to 3D world space.

8.5 User Study

We performed a controlled experiment to evaluate whether the Mélange technique assists users in exploring large visual spaces, by comparing it to single and split-screen viewports. We designed the experiment to test our design goals in the context of a matrix visualization of a large graph with MatLink [Henry and Fekete, 2007] arcs connecting relevant nodes in the graph.

8.5.1 Participants

We recruited 12 unpaid subjects (1 female, 11 male) for our study. The participants were from 20 to 35 years of age, had normal or corrected-to-normal vision, and were screened to not be color-blind. No specific skills were required other than basic computer experience.

8.5.2 Apparatus

The experimental apparatus consisted of an Apple iMac Core 2 Duo 2.33 GHz workstation with 2 GBs of memory and equipped with a standard two-button mouse (with wheel) and keyboard. The 21-inch display was fixed at 1680×1050 resolution and powered by an ATI Radeon X1600 with 256 MB of video memory.

8.5.3 Tasks

Participants were given a source node and its neighborhood on an adjacency matrix representation of a social network, and were then asked to perform three tasks in sequence:

T1 Find one destination node connected to the source node with the same neighborhood [G1 and G2]

T2 Estimate the distance between the source and destination nodes (in 1:1 screen units) [G4]

T3 Estimate the number of contextual targets between the source and destination nodes [G3]

This scenario was inspired by social network analysis, where a common task is to compare the local neighborhood of two actors to find similar patterns of collaboration.

Potential targets in our study were blue squares measuring 20 pixels (at 1:1 zoom level), surrounded by a neighborhood of four half-size (10 pixel) squares of different colors (Figure 8.6). We chose five colors for these neighborhood squares: white, magenta, orange, green, and blue (a selection that is preattentively perceptible [Healey, 1996]). Neighborhood nodes were placed in a 5×5 grid around the blue rectangle, and whole targets were placed in one line on the visual space, like columns in a matrix visualization.

Targets were identical if both the position and color of their neighborhood nodes are identical. Only one other target neighborhood matched the source target, others were distractors. Connections between the source node and the potential targets were visualized using MatLink arcs. Not all nodes on the visual space had a MatLink arc from the source node; those without were background nodes that also served as distractors, and participants were instructed to disregard them when looking for the destination target.
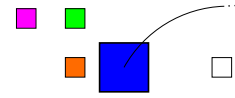
Figure 8.6: Example of a source target with its four-node neighborhood.

Contextual targets (T3) were red squares six times the size of primary targets (*i.e.* 120 pixels) and below the line of primary targets. The motivation for this was that being aware of intervening context is only applicable for large-scale features such as mountain ranges or large bodies of water on a map, or communities of actors in a social network.

All targets on the visual space — *i.e.* target nodes, neighborhood nodes, and contextual targets — were guaranteed to be rendered with at least a single pixel, forcing them to be visible even if the view was zoomed out or distorted.

The visual space itself was represented by a checkered gray rectangle that was 30 screens wide and one screen high. Each scenario had randomly-generated distractors. The source node was always located on the left edge of the rectangle, so the participant would always have to pan right to find the target. The view was initialized to center on the source node at 1:1 zoom level for every new scenario (started by T1), and was then left in its previous position for each consecutive task (T2 and T3).

Finally, to give users a frame of reference for distance, screen units were indicated on the visual space by black lines drawn on the checkered gray rectangle. Figure 8.7 shows a screenshot of our experiment application.

8.5.4 Experimental Conditions

The factors were presentation technique, off-screen distance, distractor density, and contextual target density.

Presentation Technique   The primary objective of our experiment was to study the performance of different presentations of the visual space for supporting our design goals. In addition to the Mélange technique, we included single and split-screen viewport conditions for comparison (See figure 8.8). While none of these two fulfill our design goals, they are commonly used in practice, suggesting that they are suitable competitors.

We considered comparing our technique against Accordion Drawing [Munzner *et al.*, 2003]. However, AD does not seem to support independently zoomed foci. Furthermore, Nekrasovski et al. [Nekrasovski *et al.*, 2006] have shown that pan and zoom for a large hierarchical dataset is more efficient than navigation in AD spaces, hence our choice of
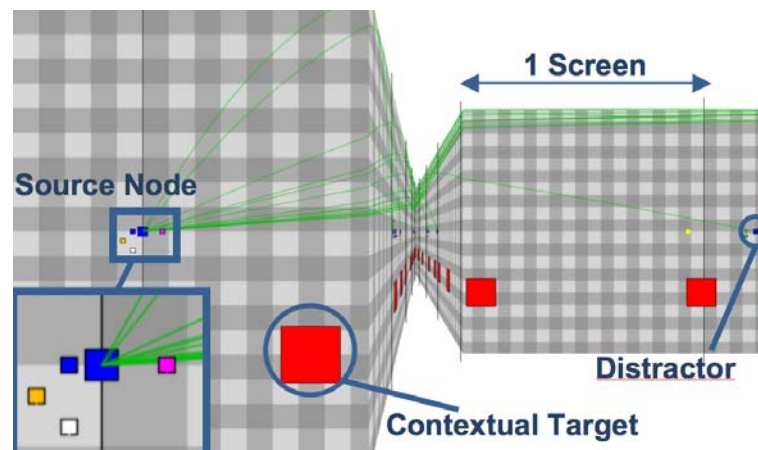
Figure 8.7: Screenshot from the user study application.
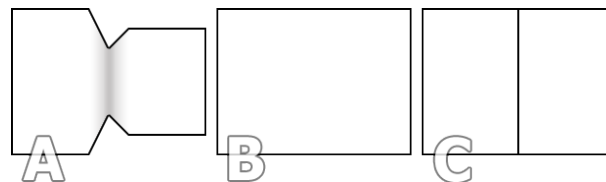
Figure 8.8: Presentation Techniques compared in our experiment: A. Mélange, B. Single Viewport, C. Split Screen Viewport

competing techniques.

- *Single viewport (SV).* The standard baseline consisting of a single window showing a view of the visual space. Has no direct support for any of our stated design goals, these must be achieved through interaction.
- *Split-screen viewport (SSV).* The main viewport is split vertically into two equal-sized subwindows, each showing a different view of the visual space. In our setup, the left subwindow was fixed to always show the source node at 1:1 zoom, while the user could interact with the view of the right subwindow.
- *Mélange (M).* Our space-folding technique with the primary focus point on the source node and the secondary point controlled by the user. Moving the focus point (in the horizontal and depth dimensions) will thus cause the visual space to be folded to accommodate both focus points in the viewport. Fold pages were disabled to not unfairly give a direct distance measure to the participants (*i.e.* only the 3D perspective foreshortening of the folds indicated distance).

All three techniques were controlled using standard zoom and pan operations. Dragging the mouse while clicking the left mouse button caused horizontal movement of the focus point (the camera for single viewport, the right subwindow for split-screen, and the folding focus point for Mélange). The focus could be zoomed in and out by dragging with the right mouse button, or by spinning the mouse wheel.

Off-Screen Distance   We wanted to see whether performance varied with the distance to traverse on the visual space, so we tested three different distances: 4, 8, and 16 screen widths of distance (in our experimental setup, the screen width was 1680 pixels). In a matrix representation, this corresponds roughly to networks containing 400, 800, and 1600 actors.

Distractor Density   The number of false targets (*i.e.* distractors) between the source and destination nodes will clearly affect the time spent finding the destination node (T1). Thus, we included two different densities: *low* or *high*. This corresponded to one or two potential targets per screen (half of them background nodes with no MatLink arcs to them).

Contextual Target Density   We studied two levels of density for the contextual targets between the source and destination nodes: *few* (less than or equal to five) or *many* (more than five).

8.5.5 Experimental Design

We used a $3 \times 3 \times 2 \times 2$ within-subjects factorial design. The factors (described above) were:

- Presentation technique: single (SV), split (SSV), and Mélange (M)
- Off-screen distance: 4, 8, or 16 screens
- Distractor density: 1 or 2 per screen (average)
- Contextual target density: few (≤ 5) or many (> 5)

The order of the techniques was counterbalanced: two participants were assigned to each order. Participants were asked to complete 3 blocks of 24 trials (3 distances $\times$ 2 distractor densities $\times$ 2 contextual target densities $\times$ 2 trials) in randomized order. With 12 participants, the study software collected 864 trials in total.

8.5.6 Procedure

Participants were introduced to the study and randomly assigned to one of the six order groups for the presentation technique. They then performed three blocks of trials, one per technique, in succession. Before each block, the test administrator explained how to use the technique and then let the participant practice on six training trials. Participants were not allowed to proceed past each training trial without answering correctly to all three tasks.

Each trial consisted of performing the three tasks T1 to T3 in sequence. A screen with instructions was given prior to each task, and the participant proceeded to the task by clicking a button or pressing the space bar. Task T1 ended when the participant clicked the right target (which then turned from blue to yellow); for the other tasks, the participant pressed the space bar to end the task. After task T2 and T3, participants were presented with a multiple-choice question asking about their answer to the task.

Participants were instructed to work as quickly as possible. For every trial, the software silently collected the time and correctness measures for the three tasks (only time for T1). Participants were instructed to pause between each block to avoid fatigue affecting the results. At the end of the test, they were given a preference questionnaire to complete.

Task	Factors	F	p
T1	Distance	38.740	**
	Distractors	55.155	**
T2	Technique	8.695	*
	Distance	6.560	*
	Technique*Distance	6.658	**
	Distance*Distractors*Context	4.216	*
T3	Distance*Context	5.335	*
	Technique*Distance*Context	2.660	*

$ = p \leq 0.05$, ** $= p \leq 0.001$.

Table 8.2 : Significant effects of completion time on the factors.

8.5.7 Predictions

P1: Mélange is as fast as single or split-screen viewport   We believe that the space-folding technique will not introduce significantly slower completion times for standard visual search (task T1). In other words, we think that the added visual complexity and space allocations of the fold region and the additional focus point will not cause slow-downs for a user trying to locate a specific target on the canvas.

P2: Mélange provides more efficient context awareness   None of the two techniques we compare Mélange to support contextual views explicitly, but participants are nonetheless exposed to this context when navigating over the visual space. We submit that the intervening context shown in the fold regions of the technique will cause significantly lower completion times for tasks T2 and T3.

P3: Mélange provides more accurate context awareness   Analogously to P2, we also believe that participants will be more accurate when answering contextual tasks (T2 and T3) with Mélange than the other two presentation techniques. Mélange provides an integrated overview of the context, whereas the other two require the user to manually pan and zoom around in the space to discover this information.

8.6   Results

We analyzed the measurements collected from the study for efficiency (completion time) and correctness (error rate).

8.6.1   Completion Time

Table 8.2 summarizes the main effects for time. Figure 8.9 shows mean time to completion for all tasks.

For task T1, the average completion time was 18.05 (s.d. 1.42) seconds for SV, 16.98 (s.d. 0.85) seconds for SSV, and 19.18 (s.d. 0.99) seconds for M (SSV < M < SV). A
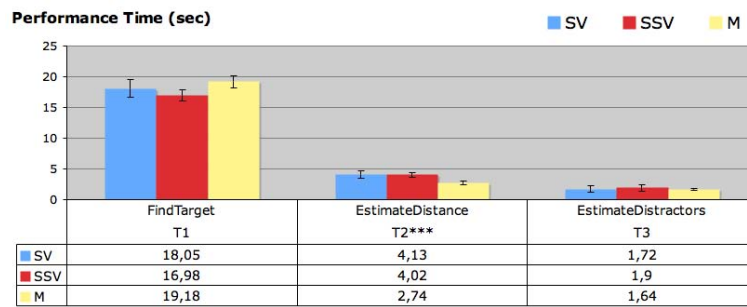
Figure 8.9: Average completion times for presentation technique across T1, T2, and T3.

repeated-measures analysis of variance (ANOVA) showed no significant main effect of Presentation technique.

For task T2, the average time was 4.13 (s.d. 0.64) seconds for SV, 4.02 (s.d. 0.43) seconds for SSV, and 2.74 (s.d. 0.35) seconds for M (M < SSV < SV). ANOVA yielded a significant main effect for Presentation technique ($F_{2,22} = 9.203, p = .001$).

For T3, the average time was 1.72 (s.d. 0.57) seconds for SV, 1.90 (s.d. 0.50) seconds for SSV, and 1.64 (s.d. 0.19) seconds for M (SV < M < SSV). ANOVA yielded no significant main effect for Presentation technique.

For task T2, the average correctness was 0.986 (s.d. 0.007) for SV, 0.948 (s.d. 0.013) for SSV, and 0.983 (s.d. 0.008) for M (SV > M > SSV). This is a significant difference (Friedman test, $p = .008$). A Wilcoxon test for paired comparison shows that M and SV have higher correctness than SSV (M vs SSV: $p < .025$, SV vs SSV: $p < .012$). Figure 8.10 shows the mean correctness for T2.

For task T3, the average correctness was 0.983 (s.d. 0.008) for single viewport, 0.965 (s.d. 0.011) for split-screen, and 0.983 (s.d. 0.008) for Mélange. This is a non-significant difference (Friedman test, $p = .189$).

8.6.2 Subjective Preference

When asked about their preference on the presentation technique, 5 out of 12 participants ranked the Mélange technique first (5 for split-screen and 2 for single viewport). Comments from the participants were favorable for our new technique, particularly for contextual tasks.

8.7 Discussion

Summarizing the previous section, our user study yields the following results:

- Our experiment shows no significant differences between the three techniques for visual search (T1) so we cannot conclude about our prediction P1. With 12 participants, the techniques seemed comparable in performance.
- Mélange is significantly faster for the contextual task T2 than both single and split-screen viewport, confirming prediction P2. The difference is almost one-third of the completion time for the competing techniques.

- Mélange promoted significantly better correctness than split-screen viewport. This partially confirms prediction P3. There was no difference for Mélange in comparison to single viewport, but this may be due to single viewport simply not supporting quick contextual assessment.

In the following sections, we try to explain and generalize these results, and see how our work can be used in practice.

8.7.1 Explaining the Results

These results confirm that the Mélange space-folding technique provides extra benefit beyond the standard split-screen method. More specifically, the results show that providing an awareness of intervening context and distance between focus points helps for contextual tasks, while clearly not consuming too much screen space or cognitive effort to cause poorer performance than split-screen viewports.

Looking at the completion times for task T1, we note that there is no large difference between single-focus (single viewport) and the two double-focus (split-screen and Mélange) presentation techniques. The reason for this is that T1 is a relatively simple visual search task where the target appearance can be memorized, so two foci are not strictly necessary. We designed the study this way to avoid punishing the participants with very long completion times — instead, the objective of task T1 (rather than strictly confirming G1 and G2) is to show that space-folding does not introduce slow-downs in navigation compared to single or split-screen viewports (prediction P1).

It is also worth noting that Mélange is a novel and relatively complex presentation technique, whereas our participants had all encountered single and split-screen viewport presentations before. This may account for the long completion times for task T1 using Mélange, but we believe that this measure will decrease as a user becomes more comfortable using the technique.

We found no significant difference in completion time for the T3 task, so our prediction P2 only holds for contextual task T2. However, we observed that participants in the user study tended to solve both T2 and T3 simultaneously during the T2 time. This was possible because distance indicators and contextual targets were visible for both tasks. If we combine the completion times for both tasks, the average time was 5.74 seconds for SV, 5.79 seconds for SSV, and 4.17 (s.d.) seconds for M ($M < SV < SSV$). Removing outliers, this is a significant difference ($F_{2,22} = 4.289, p = .027$).

While Mélange was significantly more correct than split-screen, there was no difference in comparison to single viewport. We believe this is due to single viewport simply not supporting quick assessment of context. With Mélange, users can easily retrieve the contextual information, whereas split-screen and single viewport require users to invest considerable time to reach the same accuracy.

8.7.2 Generalizing the Results

Our results show that the Mélange technique fulfills most of our predictions for the chosen scenario and tasks. The question is naturally whether these results generalize to the whole class of large visual spaces discussed in the introduction.

The answer to this question is two-fold: We believe that the tasks and the scenario used

in the study are realistic enough to be ecologically valid, yet general enough to allow us to extend the results to other domains. For the first point, the tasks selected are based on typical user tasks for network analysis [Lee *et al.*, 2006]. For the second, the study scenario is sufficiently abstract so that there is nothing in the tasks or the scenario that limits the results.

One specific threat to generalizing the results is that we only tested one-dimensional navigation (horizontal) in one direction (left to right). Two-dimensional tasks may exhibit differences depending on the relative positions of the foci.

For larger distances (more than the 16 screens tested in our study), the performance may degrade since the folds become very small and dense. This would happen when navigating a DNA sequence, for example. Supporting this situation is left for future work.

Correcness (%)		SV	SSV	M
	EstimateDistance T2**		EstimateDistractors T3	
SV	98,6		98,3	
SSV	94,8		96,5	
M	98,3		98,3	
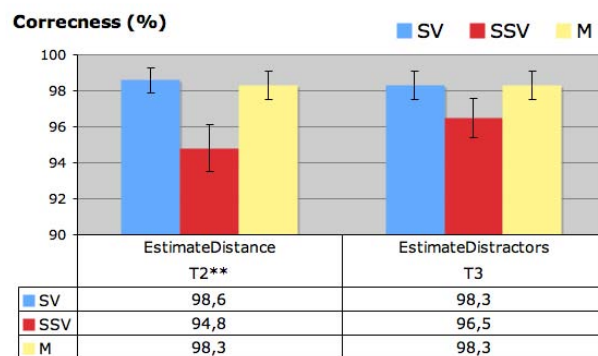
Figure 8.10: Correctness for presentation technique for T2.

8.7.3   Multi-Focus Interaction in Practice

One important issue with all multiple-foci techniques, including split-screen and space-folding as well as overview windows, is that they divide the user's attention between several different viewports and consume valuable screen estate. Even for a focus+context technique like Mélange, there is a non-trivial cognitive effort associated with comparing the different focus regions. As for screen space, users typically interact with only one area of the visual space at a time, so multiple-foci techniques reduce the amount of screen space available for this interaction. Mélange is slightly worse than split-screen due to the fold regions also
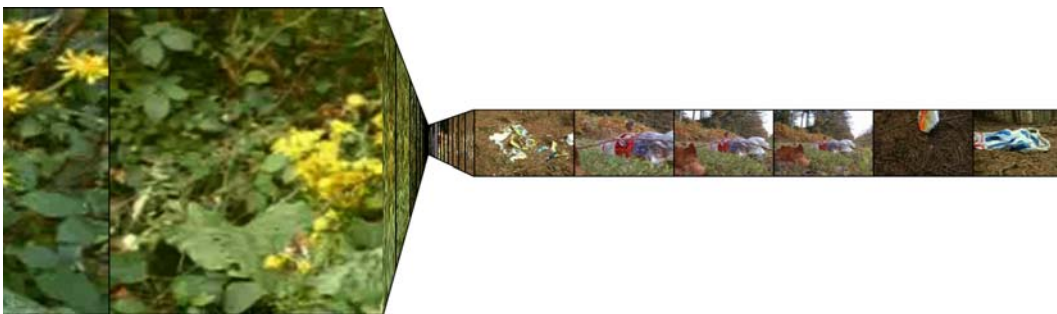
Figure 8.11: Folding a 1D video editing timeline using the Mélange technique.

consuming screen space. Having just a single viewport sidesteps both of these concerns. However, this loss of screen space is balanced by improved context awareness.

As has been shown in this paper, split-screen is perhaps the primary competitor to space-folding. One of its major advantages is its simplicity, both for interaction and implementation. Mélange is unquestionably more complex in both aspects, but we believe that its advantages outweigh this fact. Not only does space-folding better show contextual information, as has been demonstrated in this paper, but it also integrates several foci into the same continuous view, and directly gives the relative positioning of the foci. By the same token, split-screen viewports are fully independent of each other, so they give no intrinsic indication of what part of the space they are showing in relation to the others. In fact, both subviewports may be showing the same target, causing the user to mistake the source node for the destination node, as happened to one of our study participants.

We can anticipate many additional applications for Mélange beyond those discussed in this paper *i.e.* logged data from longitudinal field deployments and large matrices. Figure 8.11 shows an example of a video editing timeline — essentially a 1D visual structure — being folded using our technique. This may be useful for an editor who is synchronizing shots in different parts of a video, or looking to perform color correction between different clips on the timeline. Other potential applications include maps, blueprints, large images, documents, and even user interface components.

8.8 Conclusion

In this chapter, we have introduced a presentation technique called Mélange and designed to help explore large visual spaces such as visualizations of time-based log data issued from technology probes. Mélange allows users to navigate through large visual space while keeping several focus of interest in focus, and keeping an awareness of intervening context. This is particularly interesting to support the task of analyzing log data in a visual form without having to aggregate the data and lose details of the regions of interest. Thus this technique supported our need for various levels of details in the exploration of our log data.

We have illustrated the use of Mélange in our exploration of the log data issued from our markerClock technology probe study (See Chapter 5). In this exploration, Mélange allowed us to observe unusual pattrens like a birthday message using markerClock's symbolic codes, and also to present them as we used it to outline the differences between a normal morning and the morning of the participants' birthday (See figure 8.3).

However, Mélange is implemented as a prototype, and our interaction with it outline the need for a more sophisticated tool, including multiscale navigation techniques and pattern matching functionalities. While these issues fall outside the immediate scope of this thesis, collaborators on this work are exploring them further.

Finally, we believe Mélange technique can be generalized to many different visual spaces such as adjacency matrices of large social networks [Henry, 2008].

Conclusion and Research Directions

Chapter 9

This thesis contributed to the domain of Human Computer Interaction, with a particular focus on Computer Mediated Communication and Technology for the Aging Population. This multi-disciplinary thesis provides new perspective for the design of Communication Appliances to support aging in place. It is justified by the increasing proportion of older adults willing to age longer and independently at home. In this chapter, we discuss the limits of this research and describe the various contributions we made. We conclude with a description of various aspects of this thesis which could lead to further research.

9.1   Limits of This Research

When conducting scientific work, one must keep in mind the various aspects which validate the outcomes of research work. In our case, we discuss the validity of our samples of participants, the data we collected, the repeatability of our studies, and the generalization of their results.

The validity of studies are limited by the number of participants involved and the short period of time during which they were conducted, in particular for our technology probe studies. However, we need to acknowledge the difficulty in recruiting participants for such study and the limited resources available to us to conduct field deployments. In the context of a Ph.D. thesis which involved 3 years of work, we chose to use a triangulation approach to study our research problem from various perspectives, using in particular technology probes.

The data we collected is largely qualitative, which can be considered as unusual in the field of computer science traditionally focused on quantitative metrics such as time or error rate. The exploratory nature of this work did not allow us to conduct hypothesis testing experiments. We rather chose to let properties emerge from our active interaction with the design space and to describe these emerging properties for designers and researchers to reuse. However, we paid a particular attention to using controlled experiments, which offer a strict quantitative approach to test hypothesis, when such study were appropriate.

Because of its large qualitative nature, a large part of this thesis is difficult to replicate. However, a great attention has been paid to the methodology we used (Grounded Theory) to allow researchers to conduct concurrent observations and seek the emergence of phenomena which come to confirm or infirm our analysis. In Chapter 3, we have paid a particular attention to describing the context in which our observations took place, and the user population involved. We believe that similar results would be obtained by conducting studies in similar contexts. However, like in any qualitative study, this cannot be guaranteed.

Finally, we acknowledge that our methodology limits the generalizability of our results. This is frequently the case in HCI where only a limited portion of the population can be studied. However, we believe that the data we collected and our analysis and discussion will provide a different perspective on the use of communication to support aging in place. While we limited our observation and analysis to the elderly population, we believe that some phenomena we report could be applicable to a larger population. This thesis could therefore trigger explorations within the larger community of computer mediated communication researchers.

9.2   Contributions

During our research, we identified key aspects of the elders' exchanges with their social networks which could be supported by communication appliances to support their independence. These aspects include the role of peer support which we call *PeerCare*, the desire to *communicate with families without intrusion*, and the role of *rhythms and routines* in establishing and maintaining shared awareness. In particular, we have highlighted the role of *personal cues, environmental cues, and communication routines* in establishing and maintaining routines' awareness and PeerCare relations amongst elders. We have further explored these concepts using the technology probe methodology, and employing various design concepts: the *mirrorSpace*, re-implemented from Roussel *et al.* [2004a] and *markerClock*, which we designed specifically for this exploration. We have then explored the role of direct communication in allowing elders to keep in touch with their social networks. Finally, we extended our understanding of the use of the technology probes methodology regarding participatory design, and suggested various methods for supporting the exploration and analysis of the data they collect.

Figure 9.1: Contribution: Opportunities for the Design of Communication Appliances: PeerCare and Communication with Families Without Intrusion

9.2.1   PeerCare and Family Intrusions

The first major contribution of this thesis is the identification of various opportunities for using communication appliances to support aging in place: PeerCare and respectful communication with elders' families. This contribution allows designers to explore alternatives to monitoring which are socially acceptable and grounded in current, natural behaviors.

PeerCare describes the peer support network formed by elders in their community. It emphasizes the role of exchanges with peers to establish this support network and identifies various aspects of this peer support: neighborhood, friendship and club membership. PeerCare is rarely an explicit agreement, but more an implicit understanding between elders and their social network that one must look after each other. Elderly peers are particularly inclined to function as a group of peers as they share similar concerns (*i.e.* declining motor and sensorial skills, isolation) and want to remain active in the community. Our investigation of the concept using various perspectives (user study, participatory design) lead us to establishing PeerCare as a key approach in designing communication appliances for aging in place. By designing communication appliances for these relationships, designers can provide a socially acceptable alternative to monitoring.

Our user study with elders also uncovered their concerns regarding their intrusion in their adult children's family life. Many participants reported limiting their exchanges with their adult children in order not to be a burden for them. We suggest that innovative commu-

nication systems could help elderly parents and adult children keep in touch while limiting the feeling of intrusivity. Our subsequent participatory design study suggests that asynchronous lightweight exchanges could provide an interesting approach for supporting this.

9.2.2 Rhythms and Routines Awareness

The second major contribution of this thesis is our approach developed in chapter 3 and further studied in chapters 4 and 5, which establishes that an important awareness component is the awareness of routines, build upon the perception of rhythms in the elder's behavior. Building upon our studies, we suggest two types of information which contribute to rhythm perception and routines awareness: personal and environmental cues. This descriptions served as a basis first for re-implementing a mirrorSpace device, based on the concept by Roussel *et al.* [2004a], and second for designing and implementing markerClock, an augmented clock allowing users to exchange rhythms and support routines' awareness.

9.2.3 MirrorSpace Study

Figure 9.2: Contribution: Study of use of always-on video communication for shared awareness.

Our third contribution is the re-implementation of the mirrorSpace concept for its use as a technology probe with elders. Building upon the findings of our user study, we used this technology probe to explore the use of a video-based always-on communication system to mediate personal cues and shared awareness. Our workshops and field deployment both highlighted the challenge in using video for ambient communication in the home, including issues of privacy and transparency. Furthermore, our discussions with elders on the concept of mirrorSpace highlighted that augmenting existing devices in the home could lead to a better acceptance of communication appliances in the aging in place context. This aspect was further explored in the design, implementation and deployment of markerClock.

9.2.4 MarkerClock

Our fourth contribution is the design and implementation of markerClock, an augmented communicating clock allowing elders to exchange an awareness of rhythms with either peers or relatives, and to establish lightweight communication routines. MarkerClock works as a standalone communication device allowing users to exchange simple ambiguous cues about their home environment, and simple asynchronous messages using symbolic codes.

In additional, we deployed markerClock as a technology probe for a period of one month in two pairs of households, first in a PeerCare context, and second in an elderly parent /
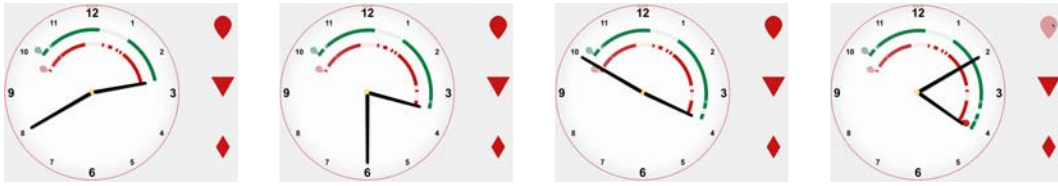
Figure 9.3: Contribution: markerClock, sharing life rhythms for routines awareness.

adult child context. Building upon this study, we illustrated markerClock's ability to raise an awareness of routines, and its role in establishing new communication routines. We also illustrated the role of device augmentation, and placement in integrating communication appliances in the home. Users' reaction to the markerClock probe suggested that an increase in the amount of awareness information available to them did not necessarily imply an increase in the feeling of closeness, as suggested in the literature. Finally, this study highlighted the need for empathy and expressiveness in home communication.

9.2.5 Participatory Design With Seniors

Figure 9.4: Contribution: Participatory Design with Elders

Our fifth major contribution is the participatory design study which explored the role of communication in aging in place. We conducted a series of participatory design workshops with elders investigating roles and recipients of communication. In particular, we highlighted the role of perceived value in communication related to concepts such as effort, importance, sensuality and empathy. This exploration further validated the findings from our initial user study (Chapter 3) regarding the two main opportunities for the design of communication devices : PeerCare and adult child / elderly parent relationships. Finally, this study confirmed the role of shared activities in supporting aging in place by creating opportunities for establishing and maintaining communication routines, helping build and maintain communities, and avoid loneliness.

9.2.6 Technology Probes: Engagement and Data Exploration

Additionally, we contributed to the methodological aspects of our work both from a methodological and technical point of view. We first explored the role of technology probes in easing user engagement in participatory design. We subsequently designed and evaluated a presentation technique to support the exploration of large visual representations of technology probes data.

Based on our experience using technology probes with elders (cha. 4 and 5), we con-
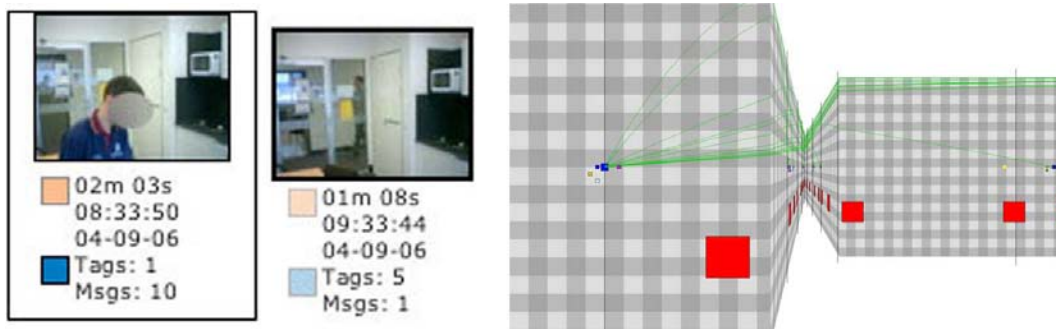
Figure 9.5: Contribution: Engagement and Data Exploration with technology Probes

ducted a field study, in collaboration with Matthew Simpson and Stephen Viller, exploring the role of the technology probe methodology in easing users' engagement in the design process. For this study, we investigated the design of a field observation tool with fellow HCI researchers. In this context, we designed and implemented an automated video capture device called the Zebra probe, which we deployed in a public space of our lab. The results of this study suggest that the technology probe methodology supports users' easy engagement by exposing participants in their daily activities to a provocative design concept. Participants were subsequently knowledgeable about the concept at hand, and shared opinions and design suggestions to be incorporated in the design process. This work was conducted in collaboration with Matthew Simpson at the University of Queensland, Australia. Our role in this collaboration included the design of the study, as well as the implementation of the technology probe and its iterations. We also conducted the field study in collaboration with Matthew Simpson, including the use of interviews and workshops to collect user data and, we carried out its analysis.

Furthermore, our experience with the technology probe highlighted issues regarding the exploration and analysis of data collected during long term deployments. In particular, our mirrorSpace study (cha. 4) collected more than 9,000 videos totalizing more than 29 hours over one two-week deployment, and our markerClock study (cha. 5) collected more than 35,000 events (motion value or symbol exchanged). This amount of data implies that exploration is a tedious process. For exploring and analyzing large amounts of digital video, we have suggested the use of participants' annotations using a website presenting the data to both researchers and participants with visual cues indicating salient videos which might be of particular interest. This approach suggested several perspectives on the exploration of automatically collected video data, including a participatory approach where participants can annotate and tag the videos.

Additionally, for exploring vast amounts of log data, we designed and evaluated the use of a presentation technique called Mélange. Mélange was designed to support the exploration of large visual spaces while keeping many points of interest in focus, and keeping an awareness of the intervening context between the focus points. Our controlled experiment comparing Mélange to other state of the art presentation techniques showed that Mélange was significantly more efficient in retaining awareness of intervening context while not showing any significant difference in the navigation. This work was conducted in collaboration with Niklas Elmqvist, Nathalie Henry and Jean-Daniel Fekete. Our role in this col-

laboration essentially consisted of co-designing the Mélange technique and the controlled experiment for its evaluation. We were also in charge of conducting the experiment and co-analyzed the results using the R[1] software package.

9.3   Research Directions

Building upon our work, we suggest four main directions for future work: Value in communication, multiscale communication, supporting rhythms and routines awareness, and tools for exploring and analyzing technology probes' quantitative data.

9.3.1   Value in Communication

While many projects are exploring the use of communication in the domestic realm, very little attention has been paid to the concept of **value in communication** from a user's point of view. As outlined in our participatory design exploration, we suggest that taking value in consideration when designing digital communication would support users' acceptance and improve the overall experience. We suggest four starting points for studying value in communication: effort, importance, sensuality and empathy. This aspect emerges also from various recent work in Computer Mediated Communication for the Home, including the Intimate Virtual Object [Kaye *et al.*, 2005], in which the creativity and involvement are necessary in maintaining an active communication between intimate people, using a very simple, constrained medium. Similarly, the Whereabout Clock from Brown *et al.* [2007], Sellen *et al.* [2006] explores the concept of family values and the role of communication and awareness technologies to support these values. The work of Aoki and Woodruff [2005] also provides an interesting perspective regarding the role of ambiguity in the interpretation of a message for resolving social difficulties. However, it remains unclear what aspects of communication add value to the relationship, and how systems can be designed to sustain or enhance this value.

9.3.2   Multiscale Communication

The concept of multiscale communication, introduced by Roussel and Gueddana [2007], brings interesting framework for analyzing and studying computer mediated communication. In particular, we suggest that exploring **multiscale communication** devices are a key aspect in developing rich yet efficient **ubiquitous communication** devices. The markerClock experience emphasizes the use of augmented domestic objects as a proxy for ubiquitous computing, by using simple and ambiguous information and relying on existing shared knowledge amongst social networks. However, users' experiences suggest that richer, more nuanced and expressive media could also support relationships by helping build shared experiences and narratives. In particular, we identified in this thesis the elders' desire for peripheral communication, shared activities, informal communications and in-depth exchanges. These roles of communication can be considered as conflicting when attempting to support all these aspects of communication in one specific design; however, we believe multiscale communication can provide a framework for thinking about managing attention for diverging communication needs. In particular, the use of interactive surfaces such as interactive tabletops [Apted *et al.*, 2006] provide an interesting paradigm for enabling multiscale communication in the home. These systems might be especially appropriate for

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[1]More on the R software package at `http://www.r-project.org/`

people like elders who are not necessarily at ease with typical desktop computing paradigms and hardware, i.e. the pointer/mouse pair. Leveraging various levels of engagement through a given system is also an underlying principle guiding the design of the mirrorSpace [Roussel *et al.*, 2004a] and the Pêle-Mêle Gueddana and Roussel [2006]. Both allow users to shift from peripheral communication to a more direct communication using either proximity [Roussel *et al.*, 2004a] or a measure of the users' attention [Gueddana and Roussel, 2006]. The solution might lie in the cooperation of multiple communication systems, each allowing various levels of engagement, possibly complementarily, to cover the whole spectrum of communication needs. To this effect, the effort of the Casablanca and the Interliving projects [Beaudouin-Lafon *et al.*, 2001, Hindus *et al.*, 2001] investigating communication systems for the home have produced various designs which can complement each other to cover many communication needs, from shared activities to storytelling.

9.3.3 Supporting Awareness of Rhythms and Routines

In the past few years, there has been an increasing interest in understanding the role of awareness of routines in people's interactions with one another, and with their environment. The studies of the Whereabouts clock by Brown *et al.* [2007] and of motion awareness by Bentley and Metcalf [2007] showed that awareness information helped families keeping track of routines, thus allowing them to maintain peace of mind, and to feel connected. Palen and Aaløkke [2006] described how routines helped elderly people organize their medication intake, and also helped caregivers being aware of their patient's state according to whether the routines had been followed. Crabtree and Rodden [2004] also described how routines in the home are meaningful and should be taken into account in the design of ubiquitous computing systems. Tolmie *et al.* [2002] described how people relied on their intrinseque knowledge of each other, and in particular each other's routines, to interact. Nagel [2006] and Begole *et al.* [2002] highlighted the role of awareness of routines in coordinating communication in the home and in the workplace. Our user study as well as our experience with markerClock highlighted the role of **rhythm and routine awareness** for elders. We could explore this concept further by studying what environmental cues that can and should be captured for establishing awareness of routines, and how they should be represented to allow users to perceive patterns while staying transparent in the home and respecting privacy. In particular, we suggest that users should be given the opportunity to place sensors capturing their environment, giving them more control over their privacy, and also allowing them to decide which information is most meaningful to share, and with whom.

Additionally, we have described the how **communication routines** also supported the establishment of PeerCare behaviors and group cohesion. It is clear to us that the role of rhythms and routines, and in particular communication routines, extends beyond the concept of PeerCare and the elderly population. Further work could be done to explore these aspects in other contexts, such as work context or other personal communications. Many work done in the field of computer mediated communication could be analyzed in terms of how designed system support the establishment and maintenance of communication routines.

Finally, the role of awareness of routines and rhythms, and their visual representations, is interesting beyond the field of computer mediated communication. There is an increasing body of work focusing on helping people adopt a more conservative and sustainable approach regarding their energy and water consumption as well as their carbon emissions as demonstrated by the recent workshops held in international conferences [Foth *et al.*, 2008, Paulos *et al.*, 2008]. We suggest that rhythmic representations for the home could support a

persuasive approach to helping people adopt more sustainable behavior.

9.3.4 Exploring and Analyzing Technology Probes' Data

Our experience with technology probes highlighted many difficulties the **exploration of the log data**. New tools are needed to facilitate exploration and analysis of time related data, based on events and for longitudinal studies, as highlighted by the emerging interest in Information Visualization expressed during the BELIV workshop series[2]. Through our studies and exploration, we emphasize the importance of granularity, often underestimated in existing systems. In particular, we suggest that such system should allow users to manipulate time at different levels of granularity (*i.e.* millisecond, hour, day, week) and allow different, flexible forms of aggregation.

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[2]More on BELIV on `http://www.dis.uniroma1.it/~beliv08`

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Appendices

10.1   Probes

10.1.1   The Kit

Quelque chose d'irritant.

L'objet préféré de quelqu'un d'autre.

Quelque chose qui vous gêne.

Quelque chose qui vous fait rêver.

CE QUE VOUS AIMERIEZ CHANGER.

Un objet qui change Etape 1.
Un objet qui change Etape 2.
Un objet qui change Etape 3.

La première personne que vous rencontrez aujourd'hui.
(Date: ___ / ___ / ___).

Un endroit où vous aimeriez parler avec quelqu'un mais ne pouvez pas.

Quelque chose d'intriguant.

Quelque chose alors que vous vous ennuyez.

Photographiez ce que vous voyez par la fenêtre.

Un objet que vous aimez bien montrer.

Qui compte sur toi en cas d'ennuis?

Sur qui comptez-vous en cas de problème?

S'il-te-plaît, raconte-moi une histoire avec tes voisins

Quel est le dernier cadeau que tu as reçu?

Qui inviterais-tu à prendre le thé?

Décrivez la pièce où vous êtes le plus à l'aise.

Activité 1 : Photos

A l'aide le l'appareil photo fourni dans le paquet, prenez des photos cenrées sur votre maison et ses environs proches (jardin, pas de porte, etc.). Nous vous fournissons une série de 16 sujets à photographier dans votre maison. Vous n'avez pas à les faire dans l'ordre, mais essayer tant que possible d'en faire le maximum. Pour chaque photo, écrivez quelques mots pour nous l'expliquer :

Une photo de vous.

Quelque chose d'irritant.

Votre appareil préféré.

Un objet que vous aimez bien montrer.

Votre appareil le plus difficile à utiliser.

La première personne que vous rencontrez aujourd'hui (Date: /   /   ).

Quelque chose qui vous gène.

Quelque chose d'intriguant.

Quelque chose qui vous fait rêver.

Un objet qui change Etape 1.

L'objet préféré de quelqu'un d'autre.

Un objet qui change Etape 2.

Ce que vous aimeriez changer.

Un objet qui change Etape 3.

Un endroit où vous aimeriez parler avec quelqu'un mais ne pouvez pas.

Ce que vous montrez aux autres.

Ce que vous voyez par la fenêtre.

Ce que vous aimeriez montrer.

Quelque chose alors que vous vous ennuyez.

Ce que vous n'aimez pas montrer.

Pour les photos restantes, prenez chez vous les objets, lieux, situations, personnes dont vous aimeriez nous parler.

Activité 2 : Cartes Postales

Sur chaque carte postale se trouve une question à laquelle nous vous demandons de répondre en quelques phrases, en nous racontant l'histoire associée en une trentaine de mots.

Activité 3 : Placez vos contacts

Sur la cible page suivante, veuillez lister vos connaissances en les plaçant selon le schéma suivant: au plus près du centre les personnes qui vous voyez souvent, les personnes que vous voyez moins souvent sur le cercle suivant, les personnes que vous voyez encore moins souvent sur le suivant, etc.

Pour ce faire, dessinez un rond sur le cercle et notez-y le nom de la personne, puis sur la liste page qui suit, notez les détails sur la personne que vous venez de placer.

Pour être aussi exhaustif que possible, essayez les techniques suivantes:

Hier
Qui ai-je rencontré?
A qui ai-je téléphoné, de qui ai-je reçu des appels?
Qui m'a écrit?

La semaine dernière
Qui ai-je rencontré?
A qui ai-je téléphoné, de qui ai-je reçu des appels?
Qui m'a écrit?

Le mois dernier
Qui ai-je rencontré?
A qui ai-je téléphoné, de qui ai-je reçu des appels?
Qui m'a écrit?

Quels amis ou connaissances habitent:
*   - Près de chez moi, à portée de marche?*
*   - Un peu plus loin, à porté de voiture, je peux aller chez eux dans l'heure?*
*   - Plus loin encore, il me faut longtemps pour m'y rendre.*

Ai-je bien placé mes amis proches?
Ai-je bien placé les voisins avec qui j'entretiens un relation de confiance?
Ai-je bien placé les membres de ma famille à qui je pense souvent? Avec qui je communique souvent?

Tous les
Jours

Tous
les ans
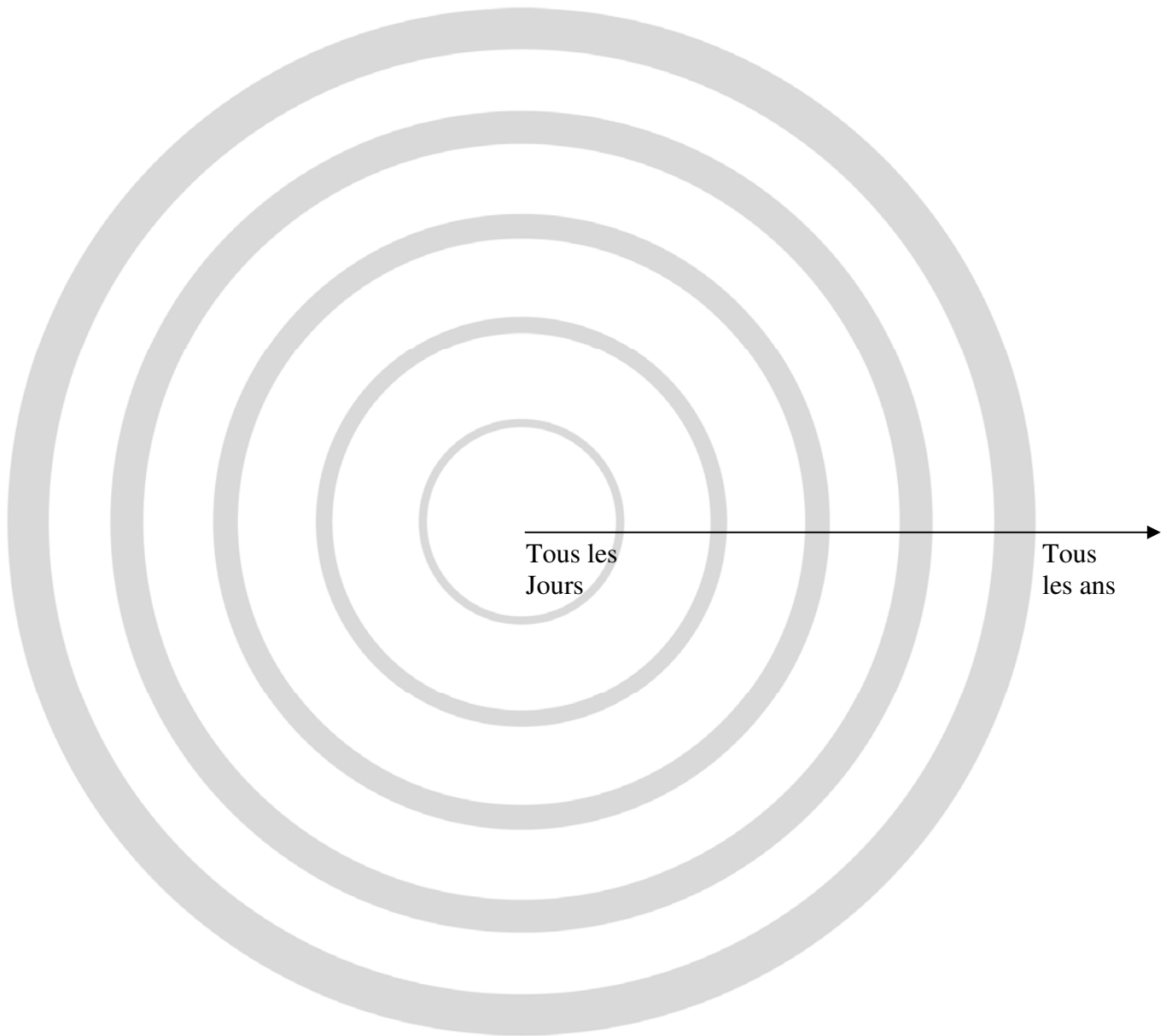
Nom : _____ Prénom : _____

Age approximatif : _____ ans

A quelle catégorie pensez vous que cette personne appartient ?
  ❑ Ami   ❑ Famille   ❑ Voisin   ❑ Connaissance   ❑ Autre : _____

Comment pourriez-vous vous rendre chez cette personne ?
  ❑ à pied   ❑ à vélo   ❑ en voiture   ❑ en train   ❑ en avion

A quel moment l'avez vous rencontré ? _____

Comment communiquez vous ? _____

En quelques mots décrivez nous votre relation : _____

_____

_____

10.2　Interviews

10.2.1　The Gang of Four

Béatrice

73 ans (13/06/1932)

Ancienne commerçante (confiserie et épicerie de choix)

Niveau d'études: Brevet élémentaire

Technologie: Pas d'ordinateur, elle a une chaine hifi neuve qu'elle en peut configurer et qui donc ne sert à rien pour le moment, un vieux poste de radio et un téléphone. Elle avait un autre téléphone plus récent mais elle ne le trouvait pas plus pratique et trop dur à utiliser donc elle est revenue à son ancien modèle (photos disponibles).

Santé: Elle souffre d'arthrite rhumatode ainsi que des conséquences d'une congestion cérébrale (voir wendy ou enregistrement) qui l'handicapent du côté gauche essentiellement (voir wendy ou enregistrement).

Logement: Son appartement est près de la gare et du centre ville, au second étage. Il y a un ascenceur dans l'immeuble. Il est assez vaste. Elle y vit depuis deux ans. Il n'y a pas de photos dans le séjour et quelques objets personnels et bibelots.

Récit de sa journée précédente (jeudi)

Elle s'est levée puis est partie au kiné, elle y va une fois par semaine.

Elle s'est ensuite rendue au marché pour faire des courses (elle y va le jeudi et le dimanche).

Elle a mangé chez elle (elle a cuisiné) puis est allé au Centre Communal d'Action Sociale (CCAS) en bus. Là bas elle a joué à la belote et au scrabble. Elle va là bas pour rencontrer des partenaires de jeux. Il y a peu d'habitués et c'est un cercle moins intime que celui de l'association évasion dont elle fait partie.

Elle est ensuite rentrée pour dner, puis elle a lu, regardé la tv et s'est couchée.

Elle utilise essentiellemnt le téléphone, elle ne peut pas facilement écrire à cause de son handicap.

Elle n'a pas d'enfants, mais une soeur et un frère en Normandie avec qui elle communique 1fois tous les 15 jours environ.

Elle a une aide ménagère d'origine maghrebine qui vient tous les lundis. Elle a fait sa connaissance via l'association Relais Emplois Services de Brétigny qui met en relation les personnes souhaitant faire des petits travaux et des personnes qui en ont besoin. Cette association avait avant une personne qui s'occupait des petits travaux (changer ampoules, accrocher un cadre, monter une lampe, etc.) Mais il n'y a plus personne à l'heure actuelle. (mari de christine, ancien ingénieur de l'armée de l'air et membre bénvole d'Evasion) s'occupe néanmoins de ce genre d'activités de temps en temps.

Elle va également régulièrement au supermarché ou il lui arroive d'avoir des altercations avec des jeunes qui sont irrespectueux. Elle ne connait pas le personnel du supermarché, à part le directeur qu'elle connait un peu.

L'association EVasion est bien pour elle car il y a non seulmement le fait de passer du

temps et de rencontrer des gens, mais aussi une réelle amitié qui se crée entre les membres. Elle échange d'ailleurs pas mal de coups de fil avec ces personnes.

Elle échange néanmoins peu de coups de fils avec les membres du CCAS (le club de l'amitié) avec qui elle n'a des contacts qu'occasionnels. Christine l'appelle regulierement, toutes les semaines.

Au CCAS il y a des gens jusqu'à 89 ans. Elle est jalouse des gens plus mobiles qu'elle (même plus vieux).

Evènements de la semaine: Nouveau Lit articulé et nouvelle chaine hifi mais celle ci n'est pas rêglée car elle ne sait pas le faire.

Fait très intéressant: LA BANDE DES QUATRE *12'30"*

On est toujours au moins deux ou trois

Tous les jours on prend pratiquement des nouvelles des unes des autres.

13'10"

Tous les matins depuis que j'ai eu cette congestion cerebrale, on a un code avec la voisine. D'ailleurs ce matin elle m'a sonne vers 10h30 et elle me dit "Bah j'ai pas entendu votre coup de fil ce matin". Je l'avais appelee mais elle a pas du entendre. Je sonne trois fois et elle repond pas. Alors comme ca elle sait que je suis levee et que ca va bien. Sinon si ca allait pas bien elle saurait. D'ailleurs elle est programmee sur le telephone et j'ai juste a appuyer sur la touche. Tous les jours, moi de mon cote si je la vois pas, c'est pareil, on s'inquiete l'une de l'autre.

Elle a des amies qui vivent près de chez elle: la voisine d'en face et deux dames habitant l'immeuble en face. Toutes sont gées et à la retraite. Tous les jours elles se donnent des nouvelles via l'interphone, en montant se voir ou en téléphonant. D'habitude Béatrice téléphone tous les matins pour bavarder deux minutes avec une voisine de l'immeuble en face, mais ce matin par exemple elle a oublié de le faire alors la dame est passée alors que nous faisions l'interview pour discuter cinq minute par l'interphone et vérifier que tout va bien.

Cette communauté, cette proximité les rassure moralement. Elles sont solidaires. Comme il n'y a pas de gardien dans l'immeuble elles s'occupent les unes de autres. Par exemple lorsque Béatrice a eu sa congestion cérébrale, elle avait beaucoup de mal à monter ses stores (stores déroulants) et ce sont donc ses amies qui le faisaient pour elle. Elle envisage maintenant de faire installer des stores électriques.

Les rencontres avec ces dames se sont faites de façon opportune: une fois en allant au CCAS elle a "pris en charge" une dame qui venait d'arriver et ne connaissait pas. Lui a offert un thé et en rentrant elles se sont rendues compte qu'elles vivaient très près. L'autre dame c'est en revenant de la messe qu'elle a fait la même découverte.

Elle a découvert Evasion lorsqu'lle est arrivée à Brétigny, elle est allé se renseigner auprès de l'office du tourisme, puis du CCAS. Elle semble pleine d'initiatives.

Béatrice nous avoue qu'il est toujours difficile de faire rentrer quelqu'un chez soi. Elle prend ses précautions, comme elle nous connait via Mamie qui fait mes éloges, il est plus simple pour elle de nous laisser rentrer.

Elle échange parfois quelques mots avec un couple de personnes gées qui se trouve au 1er étage.

Béatrice a perdu son mari à la suite d'une rupture d'anévrisme (???) de façon très soudaine il y a quelques années. Elle habitait Lardi (10km de Brétigny, leur ancienne résidence de weekend) et avant de Meudon o ils tenaient leur commerce. Elle a voulu quitter sa maison à la mort de son mari et se rapprocher de brétigny.

Depuis sa congestion cérébrale elle a des problèmes de mobilité. Cela l'empêche par exemple de conduire.

LA MAISON DE RETRAITE

C'est très cher, elle préfère rester chez elle tant qu'elle en a la possibilité. Les résidences services sont aussi très chères, et de plus elles sont souvent situées loin du centre ville, des commerces et des commodités, ce qui rend leur accès difficile. La tante de son Beau Frère a essayé les résidences service mais elle en est partie car c'était trop loin des commerces et de tout et elle n'était pas assez dépendant, trop [active (cité)] pour avoir besoin de ce service.

PB AVEC LA TECHNOLOGIE:

Les téléphones portables ont des touches trop petites, surtout avec ses pb d'arthrite etd e mobilité. De plus l'écran est brillant et difficile à lire pour elle. Il est d'ailleurs bloqué. Ils l'avaient acheté elle et son mair pour quand ils avaient le camping car, en acs de pb.

Elle aime son téléphone fixe car elle peut manipuler les commandes en ayant le combiné à l'oreille. Les touches sont larges et les fonctionnalités évidentes.

Elle n'aime pas lire les notices et ne prend pas la peine de le faire. Elle évoque le pb de régulateur de vitesse et du pb de faire confiance à un fabriquant (la voiture a été vue par les experts de renault avant d'être vue par des epxerts des tribunaux civils).

Béatrice a un problème avec les codes qu'il faut partout et les clefs aussi: code pour le téléphone portable, code pour la porte, code de carte blue... clef pour la porte en bas, clefs pour la porte en haut, etc... ELle n'a pas la mémoire des chiffres et ça l'agace. Elle trouve que les gens sont des numéros maintenant.

Elle bénéficie d'une carte de tarifs réduits pour les transports. Cependant les tarifs lui semblent prohibitifs, elle a des problèmes pour comprendre les zones du train et l'inflexibilité des gens de la RATP. (informatique = moins de fléxibilité).

Manque de transports "à la carte". Elle n'aime pas prendre le train toute seule.

Gertrude

Son fils ne veut pas qu'elle soit toute seule

Ca fait 40 qu'elle était à Lille, 4 voisins qui avaient sa clef là bas.

Quand on arrive on ne connat personne.

Ne dort pas beaucoup, a subi des traumatismes (perte de son mari)

Aide ménagère 4H / week - 1h30, 1h30, 1h. Connue via une association

Elle va dans un club ou elle parle

Elle fait ses courses au marché et à Intermarché

Le fils veut qu'elle garde son indépendance aussi.

Elle fait sa lessive.

TV, mots croisés avant de se coucher

Ne vient pas de là mais du nord, mais son fils habitait ici

Ne pas rester toute seul dans le nord, son fils lui a demandé de venir à Brétigny

Il lui a demandé de venir vivre par ici, sans vivre ensemble.

Ce sont aux enfants de s'occuper de leurs parents lorsqu'ils sont malades.

> *J'avais de bons voisins, c'est agreable. Il y avait quatres personnes qui avaient ma clef.*

Venue il y a trois ans.

Retour a la journee d'hier

Elle a fait sa lessive.

Aide ménagère 4H/Semaine 3 fois par semaine.

Par une association, bien car qd on arrive on ne connait personne.

Connait ses voisins 85 et 82 ans, originaire de Paris mais revenus de la côte d'azur o ils ont habité. Ils vieillissent et leur fille leur demande de revenir car si il y a quelque chose ils seront la.

Part vers l'histoire des ses voisins. Raconte son histoire en racontant l'histoire de ses voisins.

Elle passe par une association, elle ne peut pas choisir son planning.

Après la lessive, l'AM aide à pendre le linge.

En vieillissant, tout viellit, les muscles, l'arthrose, parlé de l'opérer du canal carpien.

Elle zappe les programmes TV.

Reviens vers la vie de tous les jours, plus général

un peu de ménage, ranger la chambre, les affaires.

Marché puis coup de tel de l'aide ménagère, vers 11H.

Elle a téléphoné et reu des coups de fils du nord. Elle faisait partie de clubs, des fidèles de là bas qui échangent leur vie avec elle. Une cousine lui a téléphoné.

Une amie du nord qu'elle a connu au club de la MGEN juste à sa retraite. Elle a appelé du mobil home dans le midi. Elle était là bas avec son mari et sa fille handicapée mentale. Elle l'appelle quand elle a un pb. Là le CAT allait fermer elle savait pas trop o aller.

On doit s'estimer heureux de ne pas avoir eu ses pépins là.

Elle viens de faire un petit voyage, mais pb de genoux, elle ne voyagera plus toute seule. Elle a l'impression qu'elle ne tient plus sur ses jambes. PB: RER + METRO + TRAIN + changements + bagages. Mais là son fils n'avait pas cours donc il l'a conduite en gare du nord. Elel y a retrouvé sa cousine en gare du nord pour aller dans la région d'origine de ses parents o elle a gardé des liens très forts. En relation avec les filles de son cousin germain. Elle a été à la communion du petit fils de ... La cousine l'a ramené, avec qq'un a va.

12'30"

mauvaise vue, doit etre opérée de la cataracte.

Amie proche, principale d'un collège à Brétigny.

J'essaye de la remettre sur le coup de fil à sa cousine mais elle repart sur une histoire.

Elle a appelé pdt que gertrude était partie, elle a donc rappelé.

Elle a le droit à 50% de la retraite sécu de son mari (il était fonctionnnaire) car sinon elle n'aurait rien.

Elle a fait de la paperasse car il faut suivre qt meme. Elle a reu sa facture d'aide ménagère. Elle est méticuleuse et son mari s'occupait de tous les papiers, mais à sa mort elle a été désemparée. Elle demande à son fil s de vérifier.

18'50"

Elle a reu une lettre de Marseille, une cousine du coté de son père qu'elle a découverte en faisant de la généalogie. Tous les ans la cousine venait près de Lille. Elle lui donne des nouvelles de la femme de son frère qui a un cancer. Elle s'occupe encore de charité (elle était nonne).

Ca fait du bien d'avoir cette lettre de temps en temps passk'en sommes maintenant les jeunes n'écrivent plus, y'a l'ordinateur. y'a deux personnes qui lui écrivent. Sa cousine et un ancien élève qui a le même ge que son fils et, si elle ne répond pas dans les 15 jours croit qu'elle est malade et renvoie une lettre pour dire toujours les même choses qu'il n'a pas de boulot, qu'il est malade, heureusement qu'il a sa femme.

[Histoire du passé]

Elle a gardé son père chez elle lorsque sa mère est morte (après son mariage).

Elle a regardé la télé. Elle zappe bcp. Par exemple la ferme. Elle veut etre au courant n peu de tout.

Elle est descendue au troisième chez un ménage qui a 10 ans de moins qu'elle. Qd elle est arrivée elle ne connaissait absolument personne sauf les voisins de chez son fils. Elle a été désemparée car pdt les vacances son fils est parti et elle a eu peur d'avoir un pépin. 27'

Si y'a un pépin, "vous faites le 15" "mais à qui je donne ma clef?". mais y'avait un monsieur qui avait vu le déménagement, qui lui a témoigné souvent de l'intéret. Il a le sens du social. Il s'occupe de la fête des voisins. Ce monsieur prenait des nouvelles dans l'ascenceur. Elle lui a demandé si elle pouvait lui confier les coordonnées de son fils. Elle se promène toujours avec une carte avec le numéro de son fils et des copines et elle a toujours

sous la main les coordonnées de son docteur.

le monsieur l'a invité à prendre le thé, elle va le voir de temps en temps

29'

la bande des quatre. Qd elle est arrivée elle a été à la mairie pour des démarches administratives et elle y a apprit l'existence du club de l'amitié du CCAS.

Mais toutes le meme cas : veuve, personnes ayant vendu une maison individuelle pour reprendre un appartement parce que c'est quand meme la qu'il y a moins de travail.

Vous trouvez des vieilles grand mere comme moi, 88 meme 90 ans. Y'a une difference bientôt, y'a une generation. IL pourrait y avoir les meres et les filles. Plus de 60 ans c'est les excursions, les sejours.

Au club de l'amitie, toutes les apres midi vous pouvez y aller et vous trouver quelqu'un avec qui causer. Y'a meme des dames qui y vont pour coudre un petit peu. Elle cousent a la main et elles trouvent d'autres personnes qui cousent aussi.

Les gens y jouent au cartes et au scrabble, et elle n'aime pas les cartes mais joue au scrabble dans ce type de club depuis qu'elle est en retraite. Plusieurs fois elle y est allé sans jamais trouver de joueur de carte. Elle allait donc à la bibliothèque ou elle ne voyait personne mais elle a insisté. De temps en temps le club faisait une conférence. un jour elle y est allée. Comme il n'y a plus de bus après 9h30 elle a été dans un mini bus o quartier par quartier elles sont ramenées chez elles, et elles se sont rendu compte qu'elle habitaient près les unes des autres.

Elle sont toutes ds le même cas, toutes veuves ayant auparavant habitée une maison individuelle, ayant déménagé dans un appartement et ayant vendu la maison individuelle pour reprendre un petit appartement car il y a moins de travail.

A amené Hélène au scrabble. Elle avait fait connaissance en allant à la bibliothèque du CCAS de la principale. Elle a reformé le club de scrabble. On peut facilement former deux tables de scrabble. Elle se donnent rendez vous pour faire un scrabble.

Autre association, Alizée. créé par des jeunes retraités car différences d'âges ds le club de l'amitié. Elles ne font pas de jeux les après midis. Y'a quelqu'un à qui causer. Certaines vont au CCAS pour aller coudre, c'est un remède contre la solitude. Elle ne pourra pas faire de séjour avec Alizée. Car elle ne veux embeter. Visite du sénat organisée bientot mais elle y était allé avec le club de Lille et elle a peur que les escaliers la fatiguent et qu'elle retarde tout le monde.

Vous vous voyez souvent avec la bande des quatre?

Oui tous les lundis après midis pour le scrabble avec Helene. Béatrice joue surtout aux cartes et va chez evasion le mardi. Comme elles sont 4 et ne peuvent pas aller chez les enfants tous les weekends, elles se rencontrent, soit vont faire un tour ou vont les unes chez les autres. Vont jouer au scrabble "pour etre ensemble" après.

Vous avez les petites cartes de ces personnes là de la bande des quatre?

Nicole est la quatrième, elle est encore très occupée, s'occupe de ses petits enfants le mercredi. Elle a trois enfants. elle a toujours quelqu'un qui vient. Béatrice n'a pas d'enfants

et Hélène en a trois. Elle même va assez souvent chez les enfants mais c'est en fonction de leurs enfants à eux. Elle est allée déjeuner chez ses petits fils.

[Raconte une histoire de ses petits enfants]

Changement du régime de retraite pour les institutrices.

A pris sa retraite à 55 ans. Elle n'a pas le maximum car pas normalienne donc titularisée assez tard.

[Raconte l'histoire de la carrière de son fils]

Utilise ses mains pour appuyer ses propos.

Regarde souvent par la fenêtre.

Vous utilisez beaucoup les moyens de communication? téléphone ?

Oui! (très direct) parce que j'avais déjà l'habitude dans le nord et puis on téléphone aussi.. C'est une lutte ne quelque sorte contre la solitude, un lien. Les enfants là, les jeunes, sont entre eux mais il n'y a plus ce lien là de la famille. On vit plutôt génération... Je pense que la vie a tellement changé en quelques années qu'on a plus les mêmes raisons pour se parler, pour communiquer. D'abord le vocabulaire qui a bien évolué aussi. Quelques fois j'entends les petites enfants parler entre eux, je comprends pas ce qu'il s disent. Passke bon vous avez qq mots d'argot et puis vous avez aussi tous les mots techniques et tous les mots empruntés de l'anglais et tout a qui sont passés dans le domaine courant. on m'a acheté le dictionnaire de Scrabble, c'est fou ce qu'on trouve là dedans, par exemple [...].

Est ce que vous partagez vos contacts de docteurs en cas d'urgence, est ce que vous vous reposez sur elle?

Oui la première fois qu'elles se sont rencontrées, elles ont échangé leurs numéros, de docteurs et autres (son fils par exemple).

Y'a pas si longtemps, appel d'Hélène pour lui dire que Béatrice venait d'arriver chez elle, dans un état "épouvantable" à moitié habillé et qu'elle n'arrivait pas à comprendre ce qu'elle disait. Elle est allée chez Hélène, elle a trouvé Béatrice sur le divan, la bouche tordue, congestion cérébrale. Là Hélène lui a dit que Béatrice ne voulait pas qu'elles appellent le SAMU. Ger a dit si et quelques minutes plus tard c'est son médecin (à ger) qui est arrivé. Il l'a envoyé à l'hôpital d'Arpajon. Ca lui avait pris, il y a quelques heures que ca n'allait pas bien, elle avait vomi, elle avait voulu préparer ses affaires pour aller qqpart et elle en est sortie. Hélène a voulu allez avec elle pour etre solidaire. Elles sont allé toutes les trois à Arpajon.

Dernièrement elle (B) s'est faite attraper, soi disant sur un passage clouté, avec sa poussette. Elle a cette habitude de ne pas traverser sur les passage cloutés. Elle a été prise en charge par les pompier ste est allée à l'hopital d'Arpajon. Elle les a appelées et elles sont allé lui rendre visite pour lui amener des affaires que Helene a récupéré grace à son double de chez B. G a un double de Nicole aussi et G a un portable que pour la nuit si elle a qqch. Programmé (2- nicole, 3- fils chez lui, 5-fils sur portable) est ce qu'elle va se débrouiller avec a? Elle voulait prendre une téléalarme amis son fils a dit non c'est pas la peine. Ici c'est peut etre pas au point comme maintenant fallait faire toute une installation dans la maison, a cote 15000FR. Ici je crois que... Elle a laissé tomber, "je peux pas non plus vivre dans la crainte" elle a toujours la hantise de se casser qqch en tombant avec son arthrose. Elle a donné les numéros aux voisins. En face de chez elle une institutrice qui a la trentaine.

Vous vous appuyez bcp sur les gens qui sont autour de vous en cas de pb?

Oui c'est une sécurité je trouve. Et je vois que Nicole en dessous a aussi la clef de B car elle n'a pas d'enfant et quand on a un pépin c'est aux enfants de prendre la décision. Fo pas trop peser sur leur ménage car ils ont leur pépins, leur enfants qui leur causent des pb. Sa nièce prend son mercredi pour prendre en charge des enfants si y'a besoin. Habituellement elle prend son petit fils le mercredi. Les personnes dans la soixantaines sont bcp à s'occuper du jeune ménage pour les enfants.

Elle n'est pas trop habile avec tout ce qui est appareil, c'était son mari qui ...

Ds la bande des 4 elles se fêtent les anniversaires. Elles s'offrent des petits cadeaux, ne mettent pas de bougie. Le mieux, l'histoire du dimanche, lorsqu'on sait que l'une d'entre nous va être toute seule, on sort ensemble. Elle a trouvé a formidable. Chez mon fils des fois le samedi soir je ne sais encore rien, mais des fois il appelle pour venir la chercher au dernier moment pour venir dner. Mais c'est pas de leur faute non plus, ce sont leurs enfants. C'est au dernier moment. Avec le congélateur et le micro onde, c'est plus comme avant. On passe plus des heures à faire la cuisine. On ne sait pas toujours d'avance donc on dit untel qu'est ce qu'elle fait, etc. On a pas toujours les mêmes gots mais j'estime qu'à notre âge on a assez d'expérience pour être tolérants.

Le mois de juillet, le club va être fermé donc elle pourront venir.

Des fois la femme de ménage arrive à des heures pas possibles.

Hélène

· Radio ds la salle à manger.

· Grand mirroir

· Des cadres photos.

· Chaine hifi

Hier, elle est allée à la clinique des charmilles pour un examen ophtalmo chez un spécialiste. Au mois de mars, elle a été voir un ophtalmo à l'hopital d'arpajon. Elle souffre d'un glocaume sur chaque oeil. A pratiquement perdu la vue sur un oeil. Ils vont essayer de maintenir le peu de vue qui lui reste par un traitement à vie pour réduire la tension occulaire.

Elle n'avait pas lu l'ordonnance et il y avait plusieurs examens à réaliser que le médecin ne pouvait pas faire tous ds la journée. Elle a du y retourner le lendemain.
Elle s'est levée vers 7h30-8h. Petit déjeuner, douche, ménage.
Courses, attendu tranquillement 15h45 que le VSL vienne la chercher. Déjeuné et regardé la TV en attendant. Elle est rentrée vers 17h30 et a regardé les pubs dans la boite. Béatrice est venue prendre des nouvelles de son problème.

Sa fille l'a appelé pour avoir les resultats des examens et sa fille aussi. Elle a un autre fils plus vieux que le précédent. Les coups de fil ont duré 15-20 minutes.
Ils appellent souvent. Son fils passe la voir tous les vendredi après son travail. Sa fille l'appelle moins souvent. une fois tous les 7-15 jours.
Avec Ger elle va le lundi et le jeudi au scrabble. Le dimanche elles vont faire un petit tour si emlle ne sont pas prises au parc carouge ou autour du paté de maison.
Bien souvent son fils passe la chercher pour aller au cimetière pour voir son défunt mari. Elle reste avec eux ensuite, aparfois meme pour diner.
Elle n'échange pas trop de coups de fil avec la bande des 4 mais elle leur parle par l'interphone.

On se voit souvent, on se voit tous les jours. Toutes tous les jours.

Tous les jours Béat fait sonner son téléphone pour lui dire que tout va bien.
Hier elles ont toutes pris des nouvelles. Elle n'a pas vu Gertrude ni hier ni ce matin car elle était prise avec sa femme de ménage.
Elles se voient moins avec Nicole et Gertrude car elles habitent l'immeuble à côté mais elle parlent souvent le matin par l'interphone.

Elle vient souvent le matin me faire un petit coucou à l'interphone.

Elles se voient dans la journée quelques fois, intermarché par exemple. Elle et Bé sont plus proches.

Enfin on est plus proches toutes les deux, c'est obligé.

10'

Son fils le plus jeune habite savigny elle le voit tous les vendredis. Sa fille habitait savigny aussi et est partie vers La Porte Dorée

Tout a maintenant on est un peu... (séparés).

Le fils le plus agé passe souvent. Il habite a Saintrie (pas loin non plus vers evry corbeille). Il travaille à Elancourt. Il aide sa fille dans le pavillon mais sinon passe la voir.
Elle a des contacts avec ses petits enfants qui viennent de temps en temps.
Elle a des contacts avec d'autres personnes âgées, notamment grace aux excursions à la journée organisées.
Elle prend du temps pour s'occuper de Béa et réciproquement.

Histoire de l'AVC de Béa:

D'habitude Hélène va avec Béa mettre les poubelles en bas. Mais ce matin là Béa avait RDV chez le rhumato. Elle ne s'est donc pas méfiée. Vers 15h30 Nicole l'a appelé (à l'interphone) pour savoir si elle allait faire de l'aquagym. Béa avait eu une crise au matin alors qu'elle essayait de s'habiller pour aller chez le kiné.

Personne ne s'est aperu de rien bien entendu.

Lorsque l'interphone a sonné, Béa a du se secouer car elle a réagi et est allé voir Hélène. Elle était incohérente. Elle n'arrivait pas à la comprendre à cause de sa paralysie du visage. H a suggéré d'appeler le SAMu mais B a refusé. Après avoir essayé ss succès de joindre un médecin de Brétigny, ils ont fait appel à un qui a fini par venir (recouper avec Ger).

Elle a du rester de 9h30 à 15h30 sur le sol.
[…]
Il ya eu un concours de circonstance qui a fait que...
[…]
Moi j'étais contente de rencontrer une personne de mon âge, parce que autrement que ce que j'aurais fait là toute seule comme a. Tandis que là ,bon bah, on se voit de temps en temps, en principe tous les jours. On discute un petit peu, et puis "vous faites quoi tantot, moi je vais là". Voilà.

Elle a eu un lymphome. maladie du sang. Sans traitement, un examen tous les 6 mois. Ca n'évolue pas. Ca ne lui restreint pas son indépendance.

TECHNOLOGIE

Elle a un lecteur DVD et un Magnéto neuf avec lequel elle n'arrive pas à enregistrer. Elle arrivait avec l'ancien qui était "plus perfectionné". Hier elle a mis une cassette qu'elle a enregistré et voilà que la pub arrive au milieu du film. Après elle n'a pas pu arrêter l'accéléré. Elle a ré-éteind et elle a relancé le film. Elle ne se fait pas au magnétoscope.

Oh oui c'est certainement moi.

Elle a du mal pour le faire marcher et se demande si il n'est pas cassé.

Ca va bien c'est pas vital, ma foi tant pis si j'arrive pas, c'est pas grave.

Sinon elle a une chaine hifi sur laquelle sa petite fille a mis des étiquette pour que son défunt mari ne se trompe pas en l'utilisant.
Elle n'a pas de téléphone portable, mais elle a une téléphone sans fil. Elle a un micro onde, un four. Pas de pb pour la machine à laver.

Habitait Savigny avant de venir ici.

En cas d'urgence, elle s'adresse au samu en premier.

H était rédacteur ds une compagnie d'assurance à Paris, ds le 9ème. Retraite depuis 23 ans.

Elle va avoir 79 ans.

> *M'enfin j'ai ma tête c'est le principal.*

Elle a laissé l'appartement dans l'état, a refait faire sa cuisine.

Elle a une soeur avec qui elle communique de temps en temps.

Elle a un appareil photo.

Ses enfants prennent des photos, car elle ne voit pas.

Dans la rue elle a du mal à se déplacer et voir autour d'elle. Elle ne vois pas bien les contrastes. Elle est tombée en voyant.

> *Une canne? Je devrais (en prendre une), mais bah...*

Son petit fils est ingénieur à l'Ed Nationale.

> *C'est compliqué l'informatique, hein? On sait pas toujours très bien...*

Plus motivée pour en faire une réunion de groupe avec les autres dames.

10.2.2 The Club Members

Summary

Situations

For this study, eight of our participants were recruited primarily as members of senior clubs in the Parisian suburb. They are grouped for our analysis to identify key aspects of club membership which are of interest to us. Two clubs were investigated, situated in two different towns and each including between 60 and 200 members, with weekly activities and occasional excursions and trips.

These participants are all women aged between 66 and 88. Annabelle, Dorothee, Françoise and Kathy live in apartments, while Christine, Émilie, Irène and Josiane lives in houses not too far from the center of town. All homes are situated near the shops and close to public transport in a dense urban area. All participants are members of senior clubs in their town.

Club 1

Annabelle is rather active and does not suffer from major physical impairment and despite a pacemaker. She is very mobile and goes to Paris every week. She has been divorced for 33 years and has five children, one of which lives in the same town, while another lives in Paris. Annabelle owns a computer which is not connected to the Internet, but rarely uses it. Her living room is fitted with framed photographs of children and grandchildren, and various bibelots. When introducing us in her apartment, she apologizes about *"the mess"*, explaining that she prefers to spend time out than to spend hours cleaning and tidying her apartment.

Christine is a 66 years old woman, who has an active role in the local seniors club. She recently lost her daughter from cancer and now regularly welcomes . She has another daughter with whom she gets along really well. She spends a lot of time with her grandchildren who lost their mother and has many framed pictures of them in her living room. She is very involved in the seniors club, which organizes activities and solidarity amongst elderly and disabled people. Her living room is fitted with many photos of her family, and bibelots. She is rather mobile and still drives her car.

Dorothée is a 73 years old woman living on her own in her apartment. Her daughter lives near her apartment (within walking distance) while her son lives lives further away (more than 300km). She regularly participates in club activities, being an active member of two local clubs including a choir. She often looks after the son of her daughter, but rarely contacts her other grandson, because she and her son are not getting along. She often goes out for walks in the nearby park to keep in shape and be outside. She often watches TV, especially in the evening. She also listens to the radio and reads daily. She also owns a video recorder but rarely uses it because she has troubles manipulating it.

Emilie is an 88 years old woman and has been living in a house in the center of town for more than 60 years. Her house is adjacent to what used to be her shop. She has no children of her own but her husband had children from his previous marriage, with whom she stays in contact. She walks regularly to visit her friends and to go shopping and is quite active, but she avoids using the stairs in her home because she is afraid of falling and with no one around to provide assistance. Therefore she does not use her full house, but a part of it, which makes it easier to maintain. Her house is also fitted with a backyard in which she

grows plants and flowers. Many framed picture sit in her living room, representing children and grand children of her husband. Bibelots lay on top of the wooden furniture and a few paintings are on the walls. The room next to her living hosts the TV which is linked to an old VCR that she uses regularly to record and replay shows. She regularly listens to the radio while she is in the house.

At 83, Françoise[1] lives in an apartment in the same town as Emilie, near the town center. Before her husband passed away, she used to do some cleaning and services and raised her children. At the death of her husband, she started working part time for Emilie, helping her to keep the shop, until Emilie herself stopped working. Françoise still helps Emilie to maintain her home and does some house cleaning[2]. Françoise has three sons who all live in the same town as her. They all live within walking distance of her. For the past few years, she has been saving money for a retirement home, because she does not want to be a charge for her sons and age in their home. She hopes to remain mobile and independent as long as possible.

Club 2

Irène is a 68 years woman who is quite independent and still drives. She is the president of the local seniors club, a role which keeps her busy. With the club, she organizes excursions and visits, as well as a yearly trip to a foreign country. Whenever an event occur that requires transportation, she tries to organize for people with cars to pick up people without cars. She has a daughter living in Paris with her granddaughter, and a son who recently moved from a town close to her (less than 20km) to a more distant region (more than 300km). Irène owns a VCR, which she has no difficulty using, and a computer which she uses to write letters for the association, but has no Internet connection.

Josiane is 75 years old. She is Irène's neighbor, a member of the club Irène presides and also the secretary of a second local senior club. She lives with her dog in a little house surrounded by a garden and still drives her car. Josiane reports never feeling lonely or bored, always keeping herself busy with the garden, the club or her dog. While she has had some experience with computers, and considered buying one, she has decided that her home was too small to fit it and did not purchase one. However, she takes photographs everytime she goes on a trip with teh various clubs with her friends. Josiane is single and has little family. She keeps in contact with a niece living in another part of France (more than 300 km away). Recently, one of her friends passed away of cancer. She had accompagned her with a few her friends and still regularly meets with a few of them.

Kathy is a 82 years old active woman. She lives alone with her dog in her apartment since her husband passed away. They lived in a house situated an hour far from here for 20 years, but moved closer to her three children who now all live within 15 kilometers. She is *"enslaved"* by her dog which she has to walk everyday, but enjoys its company. She participates in many club activities and also in church activities, helping mourning people and advising them with funeral ceremonies. She also has a large number of plants, that she keeps on her balcony. Her apartment is small enough for her to maintain on her own.

Exchanges

Club

The Club 1 organizes weekly meetings on Tuesday and game afternoons on Thursday. It

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[1]Françoise was interviewed in Emilie's home.
[2]She recently retired entirely.

also sometimes organizes day-trips in the Paris area, and a dinner at least once a year. Club 2 also organizes game afternoons and day-trips, but also a trip once a year to a different country for holidays.

Annabelle is a regular member of the club, but rarely has contacts with its member outisde the club activities. On the other hand, Christine spends a lot of time for the club and its members, listening to elderly people who call her for help and often helping them, with shopping for example. SHe otherwise organizes for volunteers of the association (mainly elderly people) to provide a more regular help for other members in need. She also makes sure that people are not left on their own and calls people who are sometimes hospitalised to tell others how they are going.Christine is happy to see that club members build friendship over time and meet each other outside the club's activities for games and even sometimes for holidays.

Dorothée, like Emilie and Francoise, are all members of the Club 1. They attend both weekly meetings and participate in club activities like daily trips. Dorothee in particular reports attending to every trip she is offered. All three are also volunteers for the association. Dorothée visits a woman with heavy sight impairments every Wednesday. On this occasion, she either reads for her or they go out for a walk. Emilie and Francoise visit an elderly woman who has difficulties walking once a week, where they play Scrabble during the whole afternoon. Dorothee is also member of a choir, in which she has made friends. After the weekly rehearsals, it is not rare for her to linger along and have lunch with them.

Irène stays in contact with former members of the seniors club which have moved through occasional phone calls or letters. She also participates in most activities, being present many times a week to welcome the club members, usually for at least an hour. She is also regulalry in contact with the other members of the club's board. She has befriended with few members from the club because she rather wants to be available for her daughter who lives in Paris. Josiane also attends weekly meetings of her club, and frequently exchanges with its members for club business.

Kathy is busy with many clubs and church activities. During our interview, she recognized having made a lot of friends through the clubs, people she feels close to. In particular she met a woman she now considers as s sister and leaves in the building next door to hers.

Families

Annabelle has regular contacts with her daughter that lives in Paris. She visits her at least once a week and at her request regularly babysits her daughter's baby. They also exchange phone calls, that Annabelle usually initiates. She only rarely communicates with her other children and tries not to call to often, not to oppress them. Annabelle also communicates by phone with her sister who lives in a medicalised institute, and visits her on occasions. Dorothée regularly exchanges with her daughter who lives close to her (within walking distance). She receives a phonecall from her daughter at least once a day, and visits her regularly, especially on weekends. She also babysit her daughter's son who is 10.

Emilie has regular contacts with the children and grandchildren of her husband. They live far away but exchange phone calls, especially with one of them who calls about every two weeks. They also occasionaly visit her and spend some time in Paris. She also occasionaly receives phone calls from her niece who lives in Paris, and which she visits about once every month, when she attends to a medical appointment.

Françoise's sons all live in the same town as her, so they have very regular exchanges.

She oftens visit them for lunch and then spend the afternoon with them. She tries not to intrude on her sons' life so she does not ask for help, but they provide it anyway. If she loses her indpendence, she would rather be in an institution than to have to be a charge for them. She also contacts her sibblings who live far away (more than 300km), every week and by phone. She visits them once a year for end of the year celebrations.

Irène occasionally exchanges phone calls with distant family members to exchange news. And regrets not more often seeing her son, who moved away with his family in a different city (more than 300km away). They used to be closer when they still lived in the region (less than 20km away), and she would babysit her grandson. Their departure has left her with a void, which she partially filled with her club activities. Her daughter lives in Paris, and they exchange regularly, in particular when she needs babysitting or requires help. However, Irène is quite concerned about making sure that she does not intrude on her children's life. She does not want to intrude but rather be present in case of need.

Kathy has three chlidren living in the same town as her. Every two weeks, she visits her daughter and at least regularly spends the day with one of her sons. She also keeps regular contacts with he rgrandchildren to know what they are up to.

Neighbors

Dorothée does not really know her neighbors well, but reports finding them nice and cordial. They mostly exchange greetings when they see each other. Emilie communicates daily with a woman who lives close to her house. They meet every evening for a chat if they have not already met during the day. They are good friends and have each others' key so that she could help her in case of emergency.

Irène likes caring for her garden, which gives her the opportunity to talk with Josiane, her next door neighbor. They have been good friends for 20 years and probably see each other every day. When one is sick, the other systematically checks to see if everything is fine and help the other if necessary. On occasions, they meet with other friends to have tea. Irène also regularly chats with her close neighbors and invites the children to play in the garden. She has regular exchanges with her neighbors accross the street with whom she exchanges keys when either of them goes on holidays. She also reports that she inconsciously learnt some of their routines, when their sutter are shut or open. They have also developed a code with her neighbors, so that they do not worry if they do not see her coming back at night. When she has something planned for the evening, she only closes half of her shutters to signal to them that she will be coming back late. Otherwise, she has cordial relations with all her other neighbors and trusts they know they can count on her in case of need. She reports that she does not want to intrude in their privacy, especially since they are not retired and still work during the day.

Kathy's close friend live next door. They have met through the club and now see each other everyday, more than once a day. This friend often comes to walk the dog, and regularly drives Kathy for a walk in the nearby park.

Friends

Emilie visits friends in town twice a week. She usually walks there and they play games and chat. One of them she visits on Wednesday but at the time of our interview, she had been hospitalised, she then visited her instead. Françoise also has a few friends, some of whom now live far away (more than 300km) and who she calls every week for at least 15 minutes. Another friend lives closer by and they exchange at least one phone call a week,

and every Monday, she visits a friend who lives in town. She would like to visit her friends more often but rather uses the phone which is cheaper and more convenient.

Josiane has made friends with a few woman, who used to be friends of a friend of her, who passed away recently. Since then, they meet regularly, usually at Josiane's home, and exchange phone calls. Through the club, Josiane has made many friends, who she meets regulalry either during club activities, or events like a show. They sometimes meet for tea or coffee, or event dinners and special occasions like birthdays. Withou having regular exchanges, they remain aware of each others' whereabouts.

Kathy has made many firends through her club activities. She is also still in contact with neighbors she used to have before she moved, and who are now renting her house. Living in the center of town, it is not rare for her to meet with acquaintances during her walks with her dog, or when going to the market. She also has closer friends who she travels with regularly. They have a strong solidarity so when of them is sick and cannot attend weekly club events, they visit them more often and call to have a chat and make sure everything is fine.

Others

When she walks in Paris, Annabelle likes impromptu conversations with strangers or people she regularly meets at the places she regularly visits. She finds difficult to talk with younger people and thinks more should be done to help intergenerational relations.

Dorothée likes to go to the market, during which she usually meets other members of the club and talks with the shopkeeper to whom she is a regular customer. Françoise also has regular shops she attends to at the market and who know her. Emilie shops every second day at the bakery next to her house, and who she knows well.

Josiane has a particular acquaintance that calls her for help when her children are away on holidays. While she does consider her as a friend, she still help her and check on her regularly to make sure she is alright.

Artifacts

In this case as in the previous case, picture frames are often found in the living of our participants. They usually represent relatives, children and grandchildren. Also, some participants reported using photo album to remind them of close relatives while they are not visiting, and that those also like to see the albums when they come for a visit.

Josiane, Irène and their neighbors also sometimes drop a message in the mailbox, when they need to exchange a message or documents. Sharing a fence, Irène and Josiane also sometimes leave messages in plastic bags on the fence when the other is away. This way, the urgent message will be notcied as soon as the person gets back and dealt with. Eventually, many participants reported exchanging their keys with friends living close or neighbors. This is intended to allow them to access their home should it be required.

Annabelle

Lieu : dans son appartement.

Description : Appartement comprenant plusieurs pièces dans un petit immeuble au 1er étage. L'entretien se déroule dans le salon. Divers bibelots dans le salon sur des étagères. En particulier diverses théières.

Situation sociale et familiale : Divorcée depuis 33ans, 5 enfants, 1 fille à Paris XVème à qui elle rend visite régulièrement et qu'elle appelle aussi. 1 fille en Angleterre avec qui elle a peu de contacts (1 par mois p-), mais qui sont généralement prolongés (1h) à cause de leur rareté. 1 autre fille et 1 fils. 1 fils à Brétigny-sur-Orges avec qui elle a peu de contacts.

Licence de droit

Mère au foyer puis secrétaire d'assistante sociale après son divorce

Santé :

Dépression pathologique sous traitement médicamenteux. Pile cardiaque. Bonne mobilité. Lunettes nécessaires pour lire.

Technologies : Annabelle possède un ordinateur mais sans connexion Internet. Elle affirme ne pas communiquer par lettre, mais utiliser exclusivement le téléphone.

Fait surprenant : Annabelle n'aime pas rester chez elle, elle n'aime pas Brétigny-sur-Orges. Son indépendance et sa mobilité lui sont chères. Elle va à Paris au moins 2 à 3 fois par semaine. Elle aime aller à Notre-Dame et faire des rencontres fortuites et inopinées.

En brut :

Possède une licence de droit, elle est femme au foyer [Vie à domicile] et élève ses 5 enfants [Maternité] jusqu'à 45 ans, puis divorcée [Divorce] et devient secrétaire d'assistante sociale [Activité salariale], a eu beaucoup de contacts avec des handicapés [Travail d'intért commun, social]. Ses ennuis de santé se résument à une dépression pathologique sous traitement médicamenteux [Handicap psychologique] et une pile cardiaque [Pb physiologique mineur]. Elle est très mobile [Mobilité] et semble très active. Elle porte des lunettes [Léger handicap sensoriel], mais pas pour parler.

L'entretien se déroule dans son appartement [Appartement] qui se trouve au premier étage d'un petit immeuble. Elle monte l'escalier à pied. On prend le thé dans son salon. Elle s'excuse du bazar qui règne chez elle en expliquant que contrairement aux autres grand-mères elle préfère sortir que passer sa vie à nettoyer.

Son salon est bien rangé, assez hétéroclite. Une porte-fentre donne sur le derrière de l'immeuble. Il y a un grand canapé et une petite table o elle sert le thé, nous nous asseyons autour de la table. Elle semble un peu honteuse de la façon dont elle me reçoit et j'essaye de la rassurer. Elle commence à me parler d'un coup de fil qu'elle a eu avec sa fille alors je m'assieds et commence l'interview.

Cette dame se lève généralement tard, elle explique qu'elle s'est levée tôt toute sa vie et n'a plus d'intért à le faire maintenant.

Hier après s'tre levé, elle est allée au Bon Marché à Paris, puis à Notre Dame de Paris pour prier pour sa fille qui a un cancer du sein. Elle aime lorsque des personnes dans la rue l'approchent pour lui demander leur chemin. Elle s'arrte aussi souvent à la brioche dorée pour prendre une gourmandise et elle aime alors tre approché par d'autres personnes âgées

pour parler de façon informelle. Comme elle y va régulièrement, elle rencontre d'autres habitués là-bas.

Elle n'aime pas Brétigny sur Orges

Dans son salon, deux cadres avec photos dont un cadre avec une jeune femme, un homme et un bébé. Il s'agit de sa plus jeune fille qu'elle a eue à 41ans. Incapable d'avoir un enfant, elle a adopté un bébé colombien.

Elle a une fille en Angleterre, un fils à Brétigny qu'elle ne voit pas souvent, +une fille et un garçon. Et sa plus jeune fille à Paris XVème. Elle communique régulièrement avec elle mais la plupart du temps c'est elle qui appelle. Sinon sa fille l'appelle quand elle a besoin d'elle, par exemple pour garder le bébé (qui a un an).

Elle essaye de na pas trop téléphoner pour ne pas trop étouffer ses enfants.

Elle utilise essentiellement le téléphone pour communiquer, et non pas ni le courrier ni les emails. Elle un ordinateur mais pas de connexion Internet.

Elle sort souvent toute seule, pour aller au ciné ou sortir. Elle va régulièrement à Paris (3 fois par semaine environ) chez sa fille notamment.

Elle considère son profil comme très atypique, en cela qu'elle sort beaucoup, n'aime pas rester dans son appartement et n'aime pas Brétigny sur Orges. Elle part tous les ans dans les " vacances bleues " (???) dans le Sud pour prendre des vacances. Souvent, elle y va seule. Elle est étonnée de la ghettosation des personnes âgées qui n'ont que peu de contacts avec les plus jeunes générations.

Elle avoue mal accepter de vieillir. Cependant elle trouve que beaucoup de jeunes sont charmants et lui laissent la place dans le métro, ce qui lui montre qu'elle parat vieille mais ce dont elle profite allègrement. Elle joue un peu de son image de l'âge.

Elle dit n'avoir envie de rien, et ne pas tre très manuelle et ne pas d'avoir d'activités à la maison. Elle a peur de s'ennuyer et c'est pour ça qu'elle sort. Elle n'a pas d'animaux de compagnie car elle a peur que ça l'empche de sortir.

Elle a envisagé l'institut, mais elle a peur de ceux-ci. Elle communique par téléphone avec sa sur qui habite dans un institut médicalisé et la visite parfois aussi. Elle est pratiquement paralysée. Elle craint cet environnement qu'elle perçoit comme apathique ou les gens s'ennuient ou souffrent. Elle envisagera sérieusement les instituts quand elle ne pourras plus vivre toute seule. Elle n'a pas envisagé les résidences pour personnes âgées, malgré le fait qu'elle ait rencontré des gens qui les côtoient et semblent épanouis et profitent de leur liberté de mouvements.

Christine

66 ans

Contrôleur du trésor, mari diplomate

BAC, concours de l'administration

Elle est dans l'asso depuis 1996 suite à la perte de sa fille. L'asso se sont des personnes qui ont besoin les unes des autres. Se rendre utile, s'accrocher à a.

2 cancers + pb de coeur

1 mari, 2 petits fils orphelins de mère, une autre fille

Secrétaire d'[Club 1] depuis 1996

Elle a appelé une femme hier soir pour savoir ce que l'association peut faire pour elle.Demain elle va rendre visite à ce monsieur de 61 qui est aveugle depuis 61. Elle va lui faire la lecture et le sortir.

Difficile de trouver des gens à cette époque car la pluspart partent en voyage à cette époque. La pluspart des volontaires sont des retraités.

Lorsqu'elle part en retraite d'été en Loire Atlantique elle appelle qt meme courament les autres personnes.

Elle organise les personnes pour le bénévolat dans l'asso. Puis elle leur envoie le planning de leur activitiés.

PB la semaine dernière: jeune de 36 ans avec une tumeur au cerveau, paralysé à moitié. Autre jeune de 24 ans qui passe son BAFA (SDF). Il est venu aider le jeune de 36 ans pour ses corvée etc. Le pb c'est que la personne paralysée a eu une cris d'épilépsie et est partie à l'hopital. EN revenant il a retrouvé son appart tout sens dessus dessous. Le paralysé menace de se suicider.Charlotte est revenue troublée et le jeune est returné à l'hopital.

Une de ses activités est d'accompagner les personnes âgées faire leurs courses.

Réunion le Mardi avec [Club 1]

Jeudi y'a ludothèque

Des gens l'appellent réguilèrement pour lui demander de l'aide qu'elle donne, même si elle ne connait pas les gens.

La maladie la plus grave de notre temps c'est la solitude

Des fois elle peut passer une heure au tel avec des gens qui ont besoin de parler. Ca ne la dérange pas trop car elle aime bien parler. Elle est très prise par le téléphone et les visites. Qd une personnes la contacte, elle va la voir et puis après avoir défini le besoin de la personne, elle lui prévoit un programme de bénévoles et les lui présente. Si il y a affinités, elles se rencontrent.

Bcp de gens réclament des sorties

L'asso roganise 2ou3 fois par an de sorties récréatives. Plus deux repas au restaurant par an + galette des rois + sortie au cinéma.

Elle se partage le travail avec la présidente. Elles essayent d'être toujours présente aux réunions, soit l'une soit l'autre.

Ca leur apporte pas mal

Si qq'un est hospitalisé, elle va leur rendre visite et donne des nouvelles au reste du groupe et adapte le planning.

En se réunissant les personnes deviennent plus affables.

Les personnes âgées doivent être occupées.

Lorsqu'une personne risque de se suicider elle est surveillée.

Il manque des hommes pour aller aider et faire du bricolage.

les personnes âgées deviennent proactives

on essaye de les rendre utile "Je sers à qqch".

Il y a un manque de bénévoles, 81 membres mais seulement 30 bénévoles dont la plupart sont des personnes âgées.

C'est très important de leur donner qqch à faireé.

C'est très intéressant de s'occuper des autres

Un petit fils de 6 ans va faire un concert pour les personnes âgées la semaine prochaine.

Elle utilise le courrier pour l'asso, pour envoyer les planning, etc, ou pour envoyer une carte.

Avec sa fille, elle s'entendent bien, elle lui prete ses appartements sur la cote pour les personnes qui en ont besoin si c'est la basse saison.

Elle n'a pas encore internet mais elle va le commander, néanmoins peu de p a l'ont. Ca peut aider pour la logistique

Les personnes âgées sortent souvent ensemble en dehors de l'association.

Dorothée

Qu'avez-vous fait hier (lundi de pâques) ?

Réveil, toilette, déjeuner (elle vit toute seule), ménage chez elle. Elle lit un peu, écoute la radio, regarde la télé l'après-midi, une balade à pied [elle dit ce qu'elle fait généralement l'après-midi]. Ele n'a vu personne de la journée, un coup de fil à une personne qui n'était pas là...Elle a rencrontré une connaissance du quartier qui promenait son chien. "Y'avait personne, y'avait pas marché".

Et vendredi ?

Petit déjeuner comme d'habitude (céréale, fruit, boisson). Vers 9h30, elle est allé au CCAS (Centre Communal d'Action Social) où elle participe à une choral (de 10h à 11h45). Elle y a rencontré pleins d'amis, ils sont environ 25 personnes et ils se réunissent tous les vendredi. Elle a déjeuner là-bas, avec les membres de la choral et d'autres qui arrivent...parfois elle y reste un peu l'après-midi. Elle est allé chez sa fille, qui habite à côté...elle l'a attendu car elle était absente et a vu son petit-fils vers 17h. Ses autres grands-parents sont arrivé pour venir le chercher et le garder pendant le week-end de pâques. Dner vers 19h30...avant elle s'occupe, regarde la télé...un coup de fils de sa fille...elle se téléphone beaucoup... "Elle m'a déjà téléphoner ce matin".

Evènement spécial cette semaine ?

Pas trop...le mercredi et jeudi, elle voit une membre de l'association. Le week-end, elle est souvent seule ou sort avec sa fille. Une fois par mois, elle fait une sortie avec le syndicat d'initiative ou l'association. Dimanche elles vont à XXX [elle regarde son agenda]. "A chaque fois que je peux sortir, je sors...en groupe, c'est des sortie de groupe".

Un coup de fils de sa fille par jour (au moins) "souvent le soir" un autre petit-fils et des amis qu'elle appelle de temps en temps mais qu'elle ne voit pas souvent car "ils n'habitent pas à Bretigny" 1 fois par semaine pour certain, 1 fois par an (à Tours)...selon les peronnes, ça varie...

Des personnes qu'elle voit régulièrement ?

Mercredi, son contact de l'association. Si sciatique, elle n'y va pas. Une dame plus agée, pour discutter et pour la sortir car elle est mal voyante (+ de 80 ans), elle reste 2h, 2h30, et elles discuttent quand elle ne veut pas sortir...Elle s'appellent uniquement quand l'une d'elle doit annuler.

D'autres activités que la chorale ?

Non...Ils font une fte à la fin de l'année. Ils chantent des chants populaire "pas une choral où il faut savoir chanter", "on se déguise...pour s'amuser en mme temps", "Je participe mas je ne suis pas une grande artiste".

Un petit fils de 16 ans, donc elle ne le garde plus "il se garde tout seul".

"Je n'ai pas beaucoup d'activité". Avant faisait de la gymnastique, mais depuis sa ciatique (il y a 2 ans) a arrté. "Je vais marcher de moi-mme "... " je ne fais pas grand chose"

Elle n'est plus en contact avec son fils, mais un peu avec son petit fils de 10 ans. Ils ont eu un conflit familial "essayé de se réconcilier mais..." Ils habitent à Strasbourg, je ne le vois qu'une fois par an, mon petit-fils...peut-tre qu'il viendra pendant les grandes vacances, il n'est venu qu'une fois. Elle lui a envoyé une carte pour pâques, il l'a appelé pour remercier

(environ un coup de fils par an).

Equipement

Elle a un téléphone portable qu'elle utilise peu, pour avoir des nouvelles, pour appeler son petit-fils. Radio, télé, magnétoscope. "Le magnétoscope, c'est pas mon fort...il est difficile, je n'enregistre pas, la programmation, j'ai du mal".

[elle a une conversation de cinq minutes avec une membre de l'association qui n'arrive pas à joindre Chrsitine.]

Elle voit les membres de l'association 2 fois par semaine, les croisent au marché, mais ne les a pas souvent au téléphone. Pas de contact avec les voisins mais ils sont sympas "Dans mon escalier, ça va".

Le marché, deux fois par semaine (jeudi et dimanche), c'est la balade, elle y croise ses connaissances et discutte avec elles et les marchands, toujours les mmes.

Evènements inattendus ?

Non...quand ça arrive, c'est plutôt des problèmes et en cascade...

Elle n'a pas d'ordinateur. "J'ai essayé, mais finalement non...j'ai pas voulu m'en préoccuper"

Vous écrivez ?

Très peu..."quand je pars en vacances oui" donc uniquement des cartes postales.

Émilie

Racontez moi votre journe d'hier

Lessive en route, pas tour dans le jardin car il pleuvait, pousses sur les amaryllis. Ensuite a regardé la fin d'une émission enregistrée la veille. Une messe à Notre Dame avec de la musique des religieuses dont elle est friande. Puis petit déjeuner.

Le lundi, c'est régulier, elle monte rue XXX faire du Scrabble chez une amie, une dame qui l'accueille toutes les semaines faire deux trois parties de Scrabble. Elle va à pied.

Après le scrabble vous etes rentrée?

Rentrée à 17H30. Ele a l'habitude d'aller voir tous les soirs une amie sur la place. Une amie très sure, très gentille qui l'accueille tous les soirs. Elles se remémorent les évènements de la journée. Tous les soir sauf quand l'une s'absente ou qu'elles se sont vues dans l'après midi. par exemple quand elles vont jouer au scrabble ensemble chez ma grand mère.

la semaine dernière il faisait un temps magnifique, elles sont allé au parc [XXX] pour faire un tour. (F) y a fait un foot avec un enfant d'une dizaine d'année, (E) aussi.

Mardi - XXX, Merc chez des amis mais en ce moment la dame est hospitalisée. jeudi XXX, vendredi Scrabble avec Germaine.

Est ce que la journée hier est typique, rien d'extraordinaire?

Non

Est-ce qu'il s'est passé quelque chose d'extraordinaire la semaine dernière? (E)

Coup de fil Dimanche de sa nièce de Paris qui lui annonçait le décès de sa soeur anée. Une dame de 95 ans. C'est pas un événement heureux, enfin. Elle a eu un coup de fil de sa petite fille par alliance qui lui annonçait sa visite dans les châteaux de la Loire. Elle a visité les châteaux de la Loire plus jeune.

Coup de fil réguliers? (E)

A (F) pour qu'elle apporte des courses en passant (F travaille à domicile chez E).

Enfants de son mari qui sont loin (elle n'en a pas). Un qui habite Nemours, un à Marseille et St Paul de Vence. Avec celui de Nemours, un coup de fil tous les quinze jours. Il vient rendre visite régulièrement. Est passé Samedi. Il est resté 45 minutes environ. Ils sont en train de divorcer avec sa femme depuis presque un an. Celui de St Paul de Vence vient très rarement en région parisienne. Celui de Marseille aime bien se faire héberger. Il a 62 ans. Il est à Marseille depuis 20 ans. Il vit seul depuis 20 et qq années.

Des amis? (E)

Mme XXX, mais de la place dont le mari est mort à 44 ans. Elle vit seule depuis. Elle a mes clefs, j'ai les siennes, elle pourrait venir me secourir.

Elle ne téléphone pas, elle passe la voir.

D'autres personnes? (E)

Sa propre nièce avec qui elle entretient des rapports téléphoniques. Quand elle va à Paris elle en profite pour aller déjeuner avec eux.

Elle va à Paris pour des RDV de dentiste, chirurgien. Une visite par mois environ, sauf quand il fait trop froid ou trop chaud.

Ensuite elle rentre chez elle et fait son petiot dner. Quand il fait beau elle fait un tour de jardin. Elle ira retirer trois brins d'herbe.

Commerçants réguliers? (E)

Le boulanger à côté o elle va tous les deux jours. (F) lui ramène des courses tous les jours si elle a besoin, sinon elle va à InterMarché le Samedi.

Sinon elle fréquente le cinéma. Elle a vu le Dernier Trappeur, Les Choristes.

Elle a gagné un abonnement pour deux personnes tout l'année. Elle a donc emmené Léa voir un dessin animé. Elle a un bon souvenir de Philadelphia.

Samedi a proposé d'aller voir Bob l'éponge, Léa a dit non. Elle ne veut pas rentrer trop tard non plus. Elle voulait aller voir De Battre Mon Coeur s'est Arrté.

Pourriez vous me parler des gens sur les photos là? (E)

Ses petits enfant, les enfants de son mari et son petit fils de 18 mois qui vit à Nemours.

Issue d'une famille nombreuse de 6 enfants. De ces 6 enfants il en reste 2. A la mort de son pere en 1966 elle s'est fachée avec plusieurs frères et soeur. N'est restée en contact qu'avec sa défunte soeur ainée et sa fille.

Françoise

Décrivez moi votre journée d'hier.

Levée à 7H30 7H45. A fait du repassage car invitée chez son dernier fils. A déjeuné chez elle. Ils sont tous à XXX. Elle a trois garçons. 50-56-58 ans. Elle a passé l'après midi chez lui. Allé en voiture mais revenu à pied.

Ils sont monté, ont pris un verre puis sont partis. Elle a diné. puis télévision jusqu'à 23h.

Samedi pareil mais elle a fait tout son ménage. Astiqué ses meubles.

Elle est malade du téléphone.

Soeur à Menton et Amis à Gap, chaque semaine, au moins un quart d'heure. Elle a une amie à Arcueil avec qui elle discute par tel au moins une fois par semaine. Télévison si il y a qqch d'intéressant, sinon lecture au lit.

Le samedi au marché à 9h30 puis rentrée à 12H. Commerçant réguliers au marché depuis 15 ans au moins.

A perdu son mari y'a 20 ans.

Elle a fait un peu de tout, aidé au commerce de (E) puis a continué après. Elle vient Merc, Jeudi, Vendredi depuis 26 ans. Elle va aussi à Chateaudun o elle va 8 jours à Chateaudun, 8 jours à Gap, trois semaines à Menton pour les ftes de fin d'année. Elle va avoir 83 ans. Elle vient ici, elle vient faire le ménage et l'après midi elles sortent toutes les deux.

Elle va tous les vendredi chez ma grand mere, elle marque la date et les points mais ne joue pas elle mme. Elle a une vie qui est bien rglée. Le lundi elle va voir une amie qui a 83 ans et qui a deux fils qu'elle ne voit pas souvent. Elle voit ses autres fils régulièrement. Des coups de fil réguliers. Elle ne dit jamais rien, ne pose jamais de question.

J'avoue que j'ai beaucoup de chance.

D'autres personnes avec qui vous parlez régulièrement?

ma famille est toute dans la Nievre. Son frère, sa cousine, sa nièce de Paris. Toutes les semaines elle leur téléphone. Elle a un téléphone fixe et un sans fil que ses fils lui ont acheté pour éviter de se casser la figure. Elle a un portable pour quand elle est dehors. Depuis que son mari est parti, elle "dégringole".

Elle voit ses petits enfants souvent. A chaque anniversaire, un chèque.

Il y a des amies qu'elle aimerait passer voir plus souvent, comme Mme Martin, 89ans qui quand elle est contente téléphone et quand elle est pas contente téléphone aussi.

Rien d'extraordinaire la semaine dernière?

Non absolument rien. Elle a une vie bien rglée.

Une lettre, du courrier?

Non elle n'aime pas écrire.

Est ce qu'il y a un pb particulier de tous les jours que vous aimeriez résoudre?

Non, bonne santé. Opérée du dos y'a dix ans, pas de pb depuis.

Son mari est contre les femmes qui travaillent. Elle travaillait sans que ça impacte sur

la vie de tous les jours, il fallait que la maison soit nickel. Les enfants allaient à l'école et restaient à l'étude. Elle travaillait tout d'abord chez un médecin. Elle faisait du ménage.

Elle a dépanné en ménage. Quand son mari est parti, ça a été une catastrophe. Il a eu un caner et est parti en quatre mois. Cancer des poumons, il fumait. Le soutien après a été les garçons. Elle était trop sollicité par les garçons. Elle est indépendante, elle a horreur de demander au 4e.

Elle a tout ce qui faut. Elle a peu de retraite mais elle a de l'argent de son mari et ce qu'elle gagne ici. Elle n'a pas le droit de se plaindre.

Elle a déjà envisagé la maison de retraite?

Elle a mis de l'argent de côté, car elle en veut pas vieillir chez ses enfants. Elle ne se voit pas non plus vieillir dans un lit, dans un fauteuil. Si elle perd de la mobilité, elle ira peut-tre en maison de retraite, mais n'en aura plus pour longtemps. Elle a de la chance pour son âge.

"Je suis assez indépendante il faut le reconnaitre. J'ai horreur de demander."

Elle est organisé ici aussi, chez (E). Elles s'entendent bien. Elle est assez souple de caractère (F).

Elle est ds les gens gâtés. Ses fils ont tous une situation. Tous un appartement ou un pavillon.

(E) a un téléphone sans fil. Elle n'est pas trop téléphone comme (F). Elle (F) écoute beaucoup quand elle appelle.

Irène

Présidente du club 1
Habite XXX près des commerces.
Très souvent dans le jardin
Fais du courrier
Levée à 7h, petit déjeuner, douche
A pris contact avec la permanence du centre car elle devait les rejoindre vers 9h et 11h30 (maison des assos au centre d'XXX). Pour savoir si ils étaient au complet ou s'ils avaient besoin d'elle pour assurer la permanence.
A passé un coup de fil à une agence pour le voyage au Canada pour l'asso en 2006.
A fait son lit, s'est habillée puis a rassemblé du courrier qu'elle devait porter à la poste pour l'association.
Descendue vers 10h à XXX Centre. Restée 1h à la permanence. Ont mis sur pied la prochaine sortie du mois de juillet (Grandes Eaux Nocturnes à Versailles). Organisation des deux autocars. Elle a remis du courrier à la mairie concernant la réservation des salles. Renouvellement des contrats des alles octroyées tout au long de l'année et réservation de salle pour le 15 décembre.

Elle a salué Mme le Maire.
Elle est partie de là faire des courses à Carrefour. Elle a flâné. Pas concluant malgré quelques essais.

"La mode actuelle n'est vraiment pas faite pour les personnes âgées."

Revenue bredouille, déjeuner.
Courrier d'une agence de voyage. Proposition de sortie pour le mois de Novembre.
Ils essayent de ne pas partir trop loin (¡200) et vers le sud pour éviter les embouteillages
Regarder les infos, la TV.

A eu un appel téléphonique de sa belle-maman qui a 82 ans. Elle voulait avoir des nouvelles. Elle habite en couple en Seine-et-Marne,a proximité de sa fille et de ses petits-enfants.
Elle a contacté la secrétaire de l'asso, pour une confirmation d'un courrier.
Elle est repartie à XXX pour effectuer un achat, mais a été déçue et est rentrée chez elle.
Elle a arrosé son jardin. Principalement des fleurs, mais aussi un petit potager.
Diner tardif puis a regardé la TV et notes pour le voyage ARO au Canada.
l'Association prend bcp de temps en été car des gens actifs sont partis en vacances. Bcp de courrier, des propositions de sorties par exemple.
Pb de dépose des gens en bus, mais entraide entres voisins. Ils arrivent à savoir si telle ou telle voisine y va de façon à ne pas faire le trajet de retour tout seul (quand c'est trop tard). Elle rencontre environ une vingtaine de personnes au centre.

Il y a-t-il bcp de gens avec qui vous avez sympatisé en dehors de l'association?

Non car elle essaye de de garder un max de temps à elle pour aller voir sa fille. Sa voisine qu'elle connait depuis trente ans. Sinon des anciennes personnes de l'asso avec lesquelles elle a gardé un très bon contacts. Ponctuellement un coup de fil ou une lettre. Possède un tel portable.

Possédez vous un tel portable?

Elle possède un tel portable. Elle s'en sert beaucoup pour l'association, pour la co-

ordination des sorties, guider les chauffeurs de cars, etc. Surtout le jour des sorties. A l'association elle l'utilise car il n'y a pas de tel à la permanence.

Elle l'a en permanence avec elle en cas de panne de voiture.

Vous avez mentionné votre fille qui vit à Paris

Oui et une petite fille aussi.

Et vous avez aussi d'autre famille?

Elle a aussi un fils qui habite dans le bassin d'Arcachon.

Vous les voyez souvent?

De moins en moins car ils viennent de faire construire et sont limités par les moyens. Elle a peu de temps pour se libérer pour aller les voir.

Vous communiquez par téléphone?

Oui, bcp par téléphone. Comme tous les grands parents il ne faut pas oublier les fetes, les anniversaires. Ils ont été très proches à la naissance d'Alexandre, le dernier qui a 15 mois, alors qu'ils habitaient du coté de XXX. Depuis que les petits ont été petits, elle s'en ai bcp occupée et à l'époque elle travaillait encore. Après ça a fait un grand vide mais ils ont eu une mutation et ensuite 2 ans aux US. Elle a eu un vide et puis elle s'est habituée. Elle a comblé (temps) par l'asso et pas l'affectif.

Et votre fille?

Elle y va très régulièrement. C'est souvent elle qui y va car elle travaille énormément. C'est une nounou qui la garde depuis la naissance à domicile donc il n'y a pas eu de présence obligatoire de sa part.

Quelle fréquence?

Au max tous les 15 jours.

Régulièrement au tel?

2 fois par semaine environ.? Elle essaye de ne pas empiéter trop sur leur vie privée.

"J'essaye de ne pas empieter trop car je sais qu'ils sont tres occupes. [...] Je privilegie leur vie privee. [...] Je m'en mele le moins possible. S'ils ont un souci ils savent que je suis la."

C'est un pb pour vous de ne pas trop empiéter sur leur vie?

Oui je privilégie leur vie privée.

25'

Et des fois vous vous retenez pour la respecter?

Non passke sa fille le sait et son fils l'invite toujours. Mais par principe ou par son éducation elle essaye de ne pas trop se méler, mais d'tre là en cas de soucis.

Vous avez des amis dans le quartier?

Vit ici depuis 30 ans. Elle ne les fréquente pas vraiment mais il y a un très bon voisinage.

Les voisins d'à côté étaient de très bons amis et c'est leur soeur qui est venue habiter à leur mort. Elle s'entends très bien avec elle, se sont de vrais amis.

Puis le couple en face qu'elle connait depuis qu'elle est arrivée. l'amitié est venue tout

de suite, invitée (avec son mari) à son arrivée pour l'apéro, puis un baptème, un repas chez l'un chez l'autre.

Tous les autres voisins qui ont permuté depuis. Coucou de la main avec les nouveaux voisins mais ils travaillent tous et elle essaye de respecter leur vie privée. Au nouvel an ils se présentent leurs voeux.

Sans se fréquenter bcp, ils savent qu'[ils peuvent compter sur moi]. Propose aux enfants de venir jouer dans le jardin et aux parents de cueillir des cerises.

Avez vous des contacts avec des anciens voisins qui ont déménagé?

Les anciens voisins d'a coté qui habitent dans l'Isère qu'elle a appelé y'a pas très longtemps. C'est plus par téléphone avec les distances. Elles se tiennent au courant des enfants, eptits enfants... conversations de grand mère. Elle ne se contactent pas régulièrement mais occasionnellement.

Les anciens collègues de travail elle ne les fréquente plus très régulièrement comme elle le faisait avant à cause de l'asso et c'est un service public dont ils ne côtoyaient pas trop en dehors du travail. En passant au centre elle passe leur dire bonjour (travaillait au centre sécu d'Orsay).

Est ce que parmi les voisins que vous avez, certains vous ont laissé des clefs pour relever le courrier ou autre?

Oui Oui, la voisine (Josiane) et occasionnellement avec les anciens voisins pour relever le courrier de la boite au lettre et les gens en face pour relever le courrier quand ils attendent un truc spécial (réultats d'examen et autres).

Est ce que avec votre voisine vous veillez l'une sur l'autre.

Oui hier nous avons parlé au moins à trois reprises. Systématiquement vérifie les volets de sa voisine et aussi ceux des voisins d'en face pour savoir si ils sont là ou pas, ils sont des couche tard et des leve tard. Les autres voisins d'en face aussi, des fois ils ont les volets ouverts vers 11H. "C'est un signe mais ce n'est pas réfléchi."

"Systematiquement le matin lorsque je me reveille, si j'ouvre ma porte, je vois si ses volets son fermes ou ouverts déjà. Et je fais pareil, bien que je ne m'en apercoive pas, je fais pas de facon volontaire, je surveille aussi les voisins d'en face. Si les voles ne sont pas ouverts je me demande s'ils sont la ou s'ils sont partis. Et comme je sais que ce sont des couche tard et des leves tard je ne m'inquiete pas."

Est ce que vous vous voyez pour prendre le thé régulièrement avec votre voisine ou autre? 32"

Non c'est plus occasionnel. On se voit tous les jeudis à l'association et ça se passe aussi bcp par tel, par exemple dimanche elle a reçu un coup de fil pour aller prendre un pot avec sa voisine et des voisines qui étaient venues cueillir des cerises. Elles ont discuté pdt 1 heure ensemble. Quand elle a sa fille, elle l'invite. Elles se retrouvent pour les fetes de fin d'année avec d'autres amis pour aller manger au restaurant et finir l'année comme ça.

Pour l'association, vous faites bcp de communication, sûrement par courrier...

Elle communique bcp par courrier pour l'asso mais aussi par téléphone. Les offices de tourisme c'est mieux par téléphone pour le premier contact.

Est ce que vous utilisez l'ordinateur?

Elle fait tous ses courriers dessus. Elle en cherche pas trop les détails.

Est ce que vous avez internet?

Non

Et vos enfants?

Oui

Et est ce que ça vous a déjà intrigué?

Oui, mais j'ai peur de me perdre dans les recherches. Elle a peur d'tre trop curieuse et de perdre du temps.

Avez vous déjà manipulé?

Non mais elle a suivi des manipulations. Avec le trésorier ou sa fille qui regardent pour elle des infos. Tous les gens lui disent autour de prendre Internet, mais pour l'instant elle n'a pas cédé.

Des gens qui vous poussent ou votre famille?

Des gens de son age, un couple d'amis au XXX qui lui disent de prendre Internet. Quand ils se voient cette question revient souvent.

Avez vous avez des objets technologiques dans votre maison?

Téléphone portable, ordinateur, chaine hifi, magnéto, caméscope, canal+.

Vous etes à l'aise? avec tout ça?

Oui oui je suis assez à l'aise.

Et le magnétoscope?

Des fois il faut revenir à la notice mais ça va.

Vous privilégiez quel moyen de communication?

Bcp de téléphone mais elle aime bien le contact direct. la recnontre.

Tous les jours vous essayez de communiquer avec le voisinage, etc? 38'45

"Oui, ce n'est pas tjs le cas car ce n'est pas tjs passke l'on est sur le pas de sa porte que l'on va rencontrer des tas de voisins."

ce matin elle est partie car soirée d'une trentaine de voisins et elle a récupéré ses plats et le plat d'une autre dame plus des photos à aller mettre à développer et elle est partie mettre les photos tout de suite hier soir et les a récupéré ce matin et est allé ramener le plateau pour rememorer la soirée.

Elle a vu sa voisine donc ce matin (contrairement à ce qu'elle a dit) et un autre voisin sr le pas de sa porte. "Ca fait partie tellement des banalités que..."

La dame chez qui nous étions convié (soirée entre amies) habite un peu plus loin ds la mme rue et déménage aux XXX. Elles se voient à l'asso et tout.

Je vais demander votre age si ça ne vous dérange pas.

68 ans

Est ce que vous avez eu des pb médicaux importants?

Oui, je me suis fait mon petit cancer en 84, comme bcp de personnes.

Il n'y a pas eu de rechute ou de pb lié?

On a craint que ça ne se réveille un peu mais ça s'est stabilisé, il n'y a pas eu trop de dégats.

Est ce que vous prenez des dispositions particulières liées à cette maladie?

Elle est toujours suivie une fois par an.

Ce soir elle a provoqué un examen de controle ce soir car elle ne se sent pas très bien (fatiguée).

Vous faites attention à la santé des gens autour de vous?

voisine, "C'est systématique, si il y en a une qui va chez le docteur, l'autre le sait. C'est grave ou ça ne l'est pas. Bon si je sais qu'elle a consulté [. . .] elle demande oú ça en est. Pareillement si elle demande est ce que c'était grave."

Est ce que vous avez des questions?

Elle n'a pas l'impression de nous avoir dit quelque chose d'intéressant.

Ca vous dérange si on prend quelques photographies?

pas du tout

Elle a démarché quelques personnes mais sans succès. Ils partent en vacances.

Elle me raconte comment elle a démarché des gens et les réponses qu'elle a eu.

Photo de la petite fille.

Nous montre son bureau.

Dans le bureau photo des petits fils.

Elle est issue d'une grande famille. La communication c'est innée dans une grande famille car on se doit de s'entraider. 48'

Elle va au mariage de sa petite soeur en juillet.

Josiane

Elles n'ont pas compris, elles ont pensé à leurs problèmes uniquement, pas aux autres.

Donnez moi le détail de votre vie quotidienne, décrivez moi votre journée d'hier.

Elle n'est pas sortie du tout. Elle ne s'ennuie jamais, fait pleins de choses. Elle s'occupe du jardin, fais de la broderie, de la peinture, des travaux manuels. Elle regarde le tour de France.

Pour tre un peu plus spécifique, vous vous tes réveillé vers quelle heure

Réveillée vers 5H30 6H, mais pas levée de suite. Est allée regarder la TV. Elle regarde les voyages, les animaux. Elle regarde aussi "ce qui se passe".

Regarde Euronews et ensuite regarde la deux. Si elle s'ennuie, elle zappe sur les animaux, les voyages.

Petit déjeuner léger. Jus de fruits, café, yahourt vers 7H45. Donne à manger à la chienne avant le petit dej. Ensuite elle sort regarder les fleurs, el jardin. Ravie quand ça pousse. SI ça manque d'eau elle le note pour e soir.

Elle a fait une lessive, puis a rangeotté dans le garage.

"Toute la journée j'ai été occupé, mais occupé à quoi je sais pas vous dire"

Vers 10H30 elle regarde le courrier, va faire sa toilette. Elle a coupé les lavandes en fleur pour les mettre à scher. Elle n'a pas eu de coups de téléphone.

Personne n'est passé?

C'est un petit peu exceptionnel (que quelqu'un passe). Elle est un peu sauvage, les gens autour d'elle sont en couple n'ont pas bcp besoin d'elle. Elle a salué les voisins.

On se voit bcp comme ça (avec Irène). On se voyait plus avant qu'elle prenne la présidence d'ARO. C'est très amical. Elle lui cueille des cerises.

Est ce que c'est une journée typique?

Oui

QQch de spécial s'est passé cette semaine?

Permanence à ARO, puis courses à Carrefour ou chez Truffault pour le jardin.

Une journée spéciale?

Vendredi les grandes eaux à Versailles. Organisé par ARO. Deux cars, il a fait beau.

Retour à la journée d'hier

Elle ne se rappelle pas ce qu'elle a fait la veille. "Je ne m'ennuie jamais." Elle a du faire des petites choses habituelles. Elle est allé faire un tour pour voir les framboises, il n'y en a pas bcp, ça sera la fin. C'est évident que quand c'est pas l'été ca bouge plus, il y a plus de choses à faire avec l'asso.

Pense que ce soir elle ira voir le feu d'artifice aux ULIS avec quelques femmes seules (5 ou 6) du coin. Y'a une personne qui est aux ULIS, les autres habitent ORSAY ou Montdétour. Des amies avec qui elle voyage avec ARO.

Vous les voyez en dehors des sorties

Oui, occasinnelement. Y'en a une qui s'occupe de la bibliothèque.

Vous échanger des coups de tel?

Qd elle ont besoin de qqch elles appellent, souvent à propos de l'asso (les mais de montdétour). Y'a un monsieur qui est venu aujourd'hui amener un cheque.

Quand on se téléphone, ça peut durer un moment.

Appelle quand l'une ou l'autre sont malades.

Par exemple, j'ai une voisine dont les enfants sont pas là qui lui a demandé si elle pouvait l'emmener chez le dentiste. Elle prévient toujours en retard. Elle pense qu'on lui doit tout. On a qq problèmes : elle, irène et les voisins d'en face. Qd y'a la canicule, on regarde quant mme si ses volets sont ouverts, etc. Mais on a pas de rapports d'amitié. Elle échange avec elle uniquement des nouvelles, pas d'amitié.

Retour à la journée d'hier

Après le repas, a du s'endormir devant la télévision.

Vers 14h30 elle a regardé le tour de France. Amstrong a été très élégant. Il a gagné, mais a laissé gagner l'étape par son partenaire d'échappée.

à 17H la chienne réclame son diner. Elle ressort à ce moment là, il fait moins chaud, elle reprofite du jardin.

QQch de particulier hier?

Non

Autre chose, un autre jour?

Non

Avez vous de la famille, des connaissances dans la région?

Non pas d'enfant, plus de parents, pas de mari. Contacts avec une nièce dans l'Eure. A des contacts surtout par téléphone. De temps en temps passe un WE chez eux. Quand y'a la foire à tout elle leur réserve un stand et ils viennent ici.

Vous l'avez regulièrement au tel?

C'est pa srégulier, mais ça nous arrive de rester une ou deux heures au tél. Je n'ai jamais eu besoin de personne donc elles ne pensent pas que j'ai besoin de ui que ce soit. 'ai cette réputation dans la famille.

Est ce que vous avez des visites régulières dans la semaine?

C'est pas mon genre. J'ai une personne qui passe de temps en temps. Une de ces amies est décédé en Décembre. Son fils adoptif c'est noyé accidentellement et c'était très dur. Elle avait sans le savoir une tumeur au cerveau. On s'en est rendu compte au début du mois de Nov et elle est morte mi dec. On a essayé de l'accompagner. Avec un de ses amies plus jeune qu'elle, on continue à se voir. On s'occupe du courrier, on le descend chez le notaire. Elle (la dmae) passe régulièrement tous les deux jours, on se téléphone, elle passe avec sa mère. Elle garde le chien. Elle a appelé pour l'inviter à prendre un gâteau avec elles demain. J'ai dit oui biensur, mais je n'aime pas les gateaux et je n'aime pas le sucre.

Donc vous la voyez régulièrement?

Oui vraiment, elle vient deux ou trois fois par semaine. Elle va chez elle aussi, mais pas au mme rhythme, elle vient plutot ici.

Etes vous abonné à des revues?

Elle est abonnée à Elle Géo et Grands Reportages, Rustica et un magazine pour personnes âgées: Pleine Vie.

Elle s'occupe aussi avec la mairie, notamment elle distribue les journaux. Quand il y a des élections elle travaille avec eux. Elle a candidaté pour faire la révision des listes éléctorales.

Avec Irène ça se passe comment?

Avec Irène, ca se passe très bien, on se connait depuis vingt ans. Si j'ai besoin de quoi que ce soit j'appelle Irène, y'a pas de pb. Quand je ne suis pas bien elle me téléphone pour savoir si ça va bien. Je connais bien ses enfants, voyez... Je fréquentais aussi cette dame qui est décédée au mois de dec. Elle a eu qq mois difficiles. La doctoresse l'avait prévenue que l'accompagner serait dur et c'est vrai mais elle ne pouvait pas la laisser seule. Mais elle a mis qq mois avant de récupérer.

Avec Irène, parfois au desus de la cloture?

On a parfois de grandes conversations ensembles. On se voit moins depuis qu'elle est à la tte de l'association.

Et avant vous habitiez?

Avant elle habitait Asnières dans le 92. Elle a travaillé jusqu'à 68 ans là bas. A eu une période de chômage mais s'est adaptée. Puis on l'a obligée à prendre sa retraite, mais une amie a repris un magasin et elle l'a aidé avec l'informatique, la caisse, etc. Elle a demandé un report de retraite. Ca l'a beaucoup intéressé. Dans des magasins de lingerie féminie. 4 magasins Neuilly Boulogne 14e 17e. Elle enregistrait les commandes, faisait les stocks, sortait les étiquettes.

Donc vous avez déjà manipulé un ordinateur?

Oui oui

Avec aisance?

Oui

Elle ne travaillait qu'avec la souris, ne faisait pas de courrier.

Avez vous envisagé d'acheter un ordinateur?

Au début oui, ça l'a tenté puis elle a décidé qu'elle n'avait pas la place pour le mettre, Elle n'a que 55m2.

Date de naissance 22 01 1930

Avant de prendre votre retraite, quelle activité exerciez vous?

A appris steno dactylo, certif d'étude. Deux ans de commerciale. Entrée ds une compagnie d'assurance à 16 ans. Ensuite est allée vers le commercial. Elle est devenue secrétaire. Est devenue PDG. Elle importait du café d'Italie. Avant avec une amie elle importait des machines à repasser, etc... et elles faisait les foires expo. Elle dressait le stand et son associée vendait pendant qu'elle rentrait à Pairs pour récupérer et aller livrer le matériel, puis de démonter le stand.

Des pb de santé au quotidien?

Non, du cholestérol.

Technologies?

Télé, magnéto, Sattellite (Elle ne se souvient pas facilement des noms techniques).

Est ce que vous pouvez me raconter qqch surprenant qui soit arrivé ces derniers temps?

Non il se passe jamais grand chose. QQ fois on me raconte pas des choses très banales. Les gens lui parlent bcp. "Souvent on se confie." y'a des gens à qui il faut pas demander des choses, comment ca va. Mais parfois les gens se confient, explosent, notamment une dame du centre d'Orsay, plus agée. Qui était asez sévère. Un jour s'est confiée, a eu un pb avec son fils. a 57 il a eu une méningite aigue. Elle a du avoir besoin de le dire. "C'est souvent comme ça."

Avez vous des problèmes particuliers avec la techno? Non

Avez vous un tel portable?

Non, mes neveux voudraient que j'en ai un. Personne ne peut m'expliquer de quel appareil qui ne me faut. Les gens ne savent pas m'expliquer simplement ce dont j'ai besoin.

Je fais de la photo. Avec un Olympus. Photos de fleur, d'animaux, de portrait, etc. Me montre un album de photo. Elle est allée en Russie faire une croisière de St Petersbourg à Moscou. Aveec les amis de Montdétour. Vraiment enchantée de ce voyage.

Elle était avec des amis proches que pour la plupart elle connait depuis 20 ans.

Décrit ses photos.

Sur le bateau toujours occupée à un tas de choses. Elle a fait du chant, 4 airs avec une chorale sur le bateau. Enregistrée sur un CD. Ils étaient ravis.

Est ce que vous avez déjà utilisé Internet?

Non

Ca vous a déjà intéressé?

Oui oui, je suis curieuse.

D'accord pour continuer à travailler avec nous.

Facinée par la facilité des hommes politiques à parler.

Je prends quelques photos.

Collectionne les chouettes.

Kathy

N'aime pas tre photographiée

Suggère un dictaphone

Je ne vois pas ce que je peux vous apporter

J'essaie de comprendre ce qui se passe ans votre vie de tous les jours. Pourriez vous me raconter votre journée d'hier en détail.

Toilette petit déjeuner, sortir la chienne pdt 1/2h, elle est esclave. Elle peut lacher sa chienne dans le petit pré à côté. Elle est allé faire les courses, à Franprix, chez le photographe, au marché. A rencontré deux ou trois connaissances.

Vous vous rappelez qui?

Des amis

Sur le chemin

Oui

Après rentrée déjeuner, puis a regardé la télévision. A téléphoné à 1-2 amies qui étaient malades. Elle a gardé des contacts. Elle habitait dans le Loiret avant la mort de son mari. Est ici depuis 3 ans et demi. Elle a gardé des contacts avec des amis là bas. Puis est partie en voiture avec une amie promener la chienne dans les jardins de la faculté.

Rentrée pour dîner et puis a regardé la tv en tricotant, elle tricote pour le tiers monde. Elle n'aime pas perdre son temps. Elle peut regarder la télé en tricotant. Si elle ne fait rien, la chienne s'inquiète (?).

Est-ce une journée typique?

Oui, encore là il n'y avait pas de réunion, dans le courant de l'année elle fait partie d'un tas d'associations alors elle a des runions. S'occupe de choses à la paroisse

Quelles asso?

Club 2

Mouvement des chrétiens retraités

Travail à la paroisse, accompagnement des familles en deuil, la cérémonie

C'est très prenant, accueillir les familles, choix et organisation de la cérémonie, rencontre avec le prtre. Avec le club 2 des sorties une fois par mois et les voyages.

Alors là vous partez en grèce?

Oui au mois de sept.

J'étais partie en Alsace dernièrement avec la mairie. Avant c'était dans les Vosges avec le club 2. Elle est aussi partie en Bretagne car elle y a une maison. Elle a 82 ans.

Quelque chose d'extraordinaire cette semaine

Elle est allé voir une amie qui est malade depuis bien longtemps. Elle a qqch aux poumons. Elle est plus qu'asthmatique. Elle ne peut pas supporter la moindre poussière. En plus elle a une otite.

Samedi elle va chez sa fille. Elle a trois enfants, qui vivent dans la région. Elle a vécu 20 ans dans le Loiret où elle et son mari avaient fait construire. A la mort de son mari elle

ne pouvait pas rester toute seule, elle a donc décidé de venir près de ses enfants. Sa fille est éducatrice à la creche d'XXX. Elle habite à Briis-Sous-Forges. Ses deux fils habitent le Plessis Robinson, un est médecin. Elle est à égale distance des trois.

Tous les 15 jours elle passe la journée chez sa fille avec la chienne. Samedi dernier elle est allé diner chez l'un de ces fils. Elle était cadre à la Banque de France à Paris. Elle a pris sa retraite ne 81. Elle en profite de sa retraite, elle a de la chance.

Donc hier, vous avez rencontré trois ou 4 personnes?

Je suis assez liante alors elle s'est tout de suite fait des amis.

Des amis proches?

Oui oui. Comme je fais partie d'un tas d'asso...

Est ce qu'il y a des amis proches que vous tes pratiquement sure de la rencontrer, ou d'avoir un coup de fil.

Elle a une amie qui habite au 10 (voisine) c'est comme une soeur, c'est elle qui l'emmène au parc de la fac.

Elle a une autre amie qui habite près du XXX, elle est très très intime avec elle. C'est avec elle qu'elle a fait le voyage ds les Vosges avec le club 2. mais elle (son amie) est tombée malade là bas et elle (K) est restée à ses côtés pour s'occuper d'elle. Elle était allée pour le carnaval des jonquilles. Elle est allé au carnaval de nice avec l'Club 2 l'année dernière.

15'30"

Avec le club 2 deux voyages par an et avec la Mairie elle en fait un. Cette année elle va en Grèce. Elle y est déjà allé car avec son mari, les 10 dernières années, elle allait en croisière. Dans les pays froids essentiellement.

A la fete des jonquilles elle a pas pu voir le defile car une amie est tombee malade donc elle a du la faire hospitaliser et s'occuper d'elle. Elle a beaucoup de bonnes amies sur lesquelles elle peut compter.

La dame du 10 c'est comme une sur, elle la voit tous les jours, meme des fois deux fois par jour. Chaque fois que sa voisine peut emmener la chienne se promener, elle l'emmène. Elle laisse sa chienne en nourrice quand elle part en voyage.

Vous partez en vacances avec la dame du 10 ?

Pas encore, des fois des sorties mais la prochaine fois peut-etre.

Quel age ?

Elle vient d'avoir 80 ans mais elle est tres alerte, elle conduit encore. Elle est tres tres gentille.

Elle n'a pas d'ordinateur. Tous ses petits enfants en ont un, 7 petits enfants, six garcons et 1 fille, aine a 32 ans et le plus jeune 19.

Vous les voyez regulierement ?

Oui, un aux Etats Unis en ecole d'inge. Un autre en alternance. Trois de son fils aine qui travaille. Deux de sa fille et qui fait une ecole d'inge mais est en annee sabatique pour faire des langues. Un autre qui fait 5e annee de pharmacie, il veut faire de la recherche ou etre en hopital.

Contacts reguliers ?

Oui des contacts, pas chaque semaine mais regulier. Contact par telephone ou elle els voit. Des fois quand elle va chez sa fille. Elle a été voir l'appt d'un de ces petits fils qui s'installait avec sa camarade.

Ecrire ?

Un carte en voyage. Certains en envoient aussi quand ils sont en voyage. Ils sont gentils.

Une histoire originale sur les relations avec la dame du 10? Votre recontre ? Rencontree a une soiree du Club 2 a Honfleur. Elles ont pris un petit train et elle s'asseoit a cote d'une dame qui avait l'air seule. En discutant elle se rendent compte qu'elles sont voisines.

Vue la derniere fois ?

Hier soir quand elles sont alle promener la chienne. Elle la promene 4 fois par jour. La voisine promene la chienne une fois par jour, pas meme tous les jours car elle rend service a beaucoup de gens. Elle-mme sort la chienne le matin, a une heure et demie, a 5 heures et le soir apres le film. Au moins 4 fois.

A part cette dame que vous voyez, d'autres personnes que vous voyez tous les jours?

Elle en voit tous les jours. Pas les memes mais tous les jours. Quand l'amie qui habite pres du XXX était malade, elle y allait plus souvent. Elle connait pas mal de monde avec la paroisse et l'association. Elle rencontre bcp de monde mais pas les meme.

Diplôme

Bac+2 en sciences

Ennuis de sante

Jamais

Telephone sans fil et portable

Pas de pb avec ?

Non

Magnetoscope et chaine hifi, pas de pb pour enregistrer.

Quels gens avez-vous rencontre ou eu au telephone hier ?

Amie qu'elle va aller voir vendredi. Son fils qui est en Bretagne en vacances, il a une maison la bas. Téléphone car elle a aussi une maison la bas et elle a des pb avec la mairie qui a abimée sa haie en faisant des travaux. Elle y est allée entre deux voyages. Le fils lui a dit que les arbres étaient vraiment fichus. Elle a une autre maison dans le Loiret qu'elle loue. Elle la loue aux enfants de son voisin. Pendant ce temps la ils l'entretiennent.

Autres personnes au telephone ? . . .

Des gens qui viennent rendre visite au quotidien ? Viennent chez vous ?

En contact avec beaucoup de gens mais peu qui viennent ici a cause de la chienne, les allergiques.

Elle est très prise mais la contacter en cas de besoin pour participer a d'autres études.

Va proposer à son amie qu'elle va voir vendredi, une scientifique qui a pleins de diplomes.

10.2.3 The Sheltered Housing Resdients

Summary

Situations

Alll three women live in a similar apartment, in a residence fitted with lifts accessible to disabled people. They are tenants of their apartments and own their own furniture and personal items. While there is a restaurant in which they can have breakfast and lunch, they also have their own kitchen in which they can cook meals. Each flat is constituated at least of a living room, a kitchen, a bathroom and a bedroom. All apartments are smaller than the ones from the Gang of Four. Picture frames lay on funiture and hang on walls and usually represent family members, especially children and grandchildren. Bibelots are present on furniture tops.

the residence in which they live provides services to the residents including a person available in case of problem 24 hours a day, social and cognitive activities such as a memory workshop, conferences and games, and gymnastics lessons.

Lucienne is a 79 years old woman who has been living in the sheltered housing residence for the past 14 years. She lived in a larger house in another part of town before moving into the institution. She originally decided to move to the residence because it had become expensive and tedious for her to pay rent and maintain her house and its garden. It was a difficult decision, but she does not regret it, she feels safer and has less chores to take care of. Lucienne is also member of the Club 2 and goes on daily trips when possible.

Marie has only recently moved in the residence. While she is 82, she is still independent, but after two years of reflection, she had decided that she was to lonely and needed to be more in contact with other people. Marie owns a computer connected to the Internet through a dialup connection. Every day, she reads emails, surfs on the Internet and uses her computer to handle digital photographs taken with her digital camera. Before moving in, she had lived 30 years in a big flat with her husband, then had moved to a smaller apartment shortly after he deceased.

Exchanges

Family

Friends

Other Residents

Staff

Lucienne

En résidence pour personnes âgées. Chez elle. Petit logement, salon et chambre, cuisine et salle de bain. Objets et bibelots sur les meubles, cadres photo.

Est-ce que vous pourriez me raconter votre journee d'hier un petit peu end etail, en commencant par votre lever. Avec plus de details possibles.

C'est assez monotone.

Je me suis levée de bonne heure comme je recevais du monde. Vers 7h. J'ai fait les courses puis commence a préparer le repas. Y'a eu pleins de choses qui n'allaient pas et qui l'ont donc demoralise, des trucs idiots qui faisaient qu'elle n'arrivait pas a tre a l'heure pour midi. Elle est pas allee au marche car il n'y en avait pas. Elle est allée a Franprix.

Elle a fait sa patisserie puis son repas. Puis ils sont restee apres le repas a bavarder avec ses enfants. Sont venus sa fille et ses deux enfants et son mari et son fils. L'apres midi les enfants de son fils sont venus pour le dessert. Il était déjà 17 heures. La premiere chose qu'elle fait le matin c'est donner a manger aux chats. Y'en a un deux, un a elle et une qu'elle a adopte et qui couche la. Comme il n'y a pas de restaurant le samedi dimanche elle court donner a manger aux autres dehors. Elle est la mere chat, enfin on l'appelle la mere chat.

Recu un coup de fil hier ?

Se souvient pas. Si son fils l'a appele pour lui dire que ses enfants ne viendraient pas manger. Sinon elle a des coups de fil tous les jours.

Et des contacts avec d'autres gens de la residence ?

Oui [hesite] elle dit bonjour bonsoir aux gens qui restent dans l'entree. Par contre elle a deux trois personnes qu'elle aime beaucoup avec qui elle parle beaucoup et avec qui elle parle plus facilement. Toutes sont dans le meme batiment. Il y a aussi une dame dans l'autre batiment mais elle la voit surtout lors de reunions et elle est tres sympatique.

Un evenement marquant la semaine derniere ?

Des mauvaises nouvelles qui me donnent un mauvais moral a la television : la grippe aviaire, le chicungougna.

Qui sont les personnes avec qui vous communiquez le plus ?

Je ne suis pas tres telephone. Je suis tres intimide par le telephone. Sa belle sur deux fois par semaine car elles s'aiment bien quand elle ne vient pas. Les enfants aussi ca c'est sur. Son fils deux fois par semaine pour savoir quand il vient dans la semaine. Sa fille une fois par semaine. Son fils habite chez sa sur car il est au chomage. Ils habitent Bris sous forges. Elle habitait rue (XXX pdt 33 ans).

Donc la semaine derniere vous avez vu vos enfants plus que le weekend ?

Oui son fils et petit fils sont venus jeudi. Ils viennent une fois par semaine pour manger.

Des coups de fils des enfants ou petit enfants?

Les petits enfants oui, surtout quand ils veulent venir manger. Ma petite fille non car elle suit des cours pour devenir assistante sociale donc elle a pas bcp de temps. Mais elle vient le dimanche.

D'autres personnes ?

Mon filleul, un neveu, me telephone regulierement, presque toutes les semaines. Mes petites cousines, une est ma filleule, les deux me telephonent souvent aussi.

Regulierement ?

Non pas regulier, ca peut etre deux fois par semaine comme ca peut etre un mois sans se parler. Y'en a une c'est plus regulier, au moins une fois par mois. Puis l'autre ma fieulle c'est moins souvent car elle a 5 enfants et un travail elle a moins le temps.

Et elles habitent ou ?

Je ne sais plus. Plus ca va plus je perds la mémoire.

Et c'est loin ?

Non pas tres loin, dans la banlieue, dans le 95 ou 93.

Ca fait longtemps que vous habitez a XXX ?

Restee 33 ans dans une maison au XXX puis depuis 4 ans ici. Avant a XXX pdt une quinzaine d'annees. Son fils aine est ne a XXX et il vient d'avoir 50 ans.

Vous habitiez dans un pavillon a XXX?

Oui.

Vous aviez des voisins ?

A cote c'était un champ qui s'est construit depuis. De l'autre cote c'était des gens qui ne venaient que le weekend. Je les frequentais pas bcp. En face aussi il y avait des gens que nous ne frequentions pas mais avec qui nous etions en tres bons termes. C'etait pareil une maison de vacances.

Plus au XXX ?

Oui parce qu'il y avaient les beaux parents de mon fils qui etaient charmant et quand j'ai perdu mon mari, ils sont venus, ils m'ont aide et ils m'ont soutenu. Les gens a cote aussi. Dans la rue. Les gens au marche aussi, quand ils ne l'ont pas vu depuis longtemps "ah on s'est demande ce qui se passait". Meme les voisins de derriere lui ont dit " qu'est ce qu'on vous regrette ". Ca fait chaud au cur une certaine sympathie. Ca se passait en bons termes.

Autour de chez vous c'était des voisins direct ?

Oui meme plus bas dans la rue, des voisins que maintenant elle ne voit plus et qui sont content de la voir, qui s'inquietent.

Des personnes de votre generation ?

Non plus jeunes. J'ai garde la petite jeune fille qui a maintenant plus de 20 ans. Je l'ai gardee. Elle aimait pas rester toute seule faire ses devoirs. On est reste en bons termes, elle m'envoie des cartes quand elle part en vacances. On est vraiemtn en tres tres bon termes, c'est tres sympatique.

Il y a des personnes dans votre voisinage dont vous aviez la clef ?

Oui les beaux parents ca arrivait, pour aller nourrir le chien. Ca arrivait. Pas les autres.

A l'inverse ?

Ou ca m'est arrive, pour nourrir les chats et le chien.

Pb de sante ?

Oui, lies a l'age. L'usure. Pour mon age j'ai pas a me plaindre. 79 ans bientôt. Rien de bien grave pour le moment.

Qu'est qui vous a decide de passer de votre pavillon a ici ?

C'est surtout financierement car elle était en location. Puis entretenir le jardin et le fuel c'était trop cher, plus elle pouvait pas trop entretenir le jardin car elle est devenue trop vieille et elle aimait pas trop ca. Elle s'était renseignee puis un jour elle a decide de prendre le taureau par les cornes et de venir la. Ca a été tres tres tres dur de venir la. Il lui a fallu du temps pour s'adapter.

Avantages et inconvenients ?

Plus besoin de s'occuper de rien. Plus de fuel, plus de jardin, plus a tailler la haie. Par contre elle a regrette les voisins. Ici on se sent plus aidee. On sent que si il y a qqch il y a la directrice, la secretaire, la gardienne, elle est en bons termes avec la gardienne. Je me sens plus en securite. S'il m'arrive qqch je sais qu'il y aura qq'un.

Dans le batiment y a-t-il des gens que vous rencontrez regulierement ? Prendre el the ensemble par exemple.

Ah non je frequente pas trop. Si l'aperitif une fois. Il m'avait offert du muguet mais sinon c'est tout. Je vais qq fois chez les gens mais pour leur faire des courses des choses comme ca. Meme avec les voisins on se frequentait pas de trop. On était en bons termes, bonjour bonsoir, mais pas les uns chez les autres. " C'est un peu dangereux ca. Je prefere comme ca. A l'occasion ca peut se faire mais pas systematiquement. "

18'45 "

Est-ce que vous allez a des activites ici ?

Oui a la gymnastique. Elle reste a la gym du XXX, Pas trop en hiver car il fait froid et noir. Ici aussi. Activite mémoire toutes les semaines ici. Aussi des actviites comme le loto, des anniversaires.

Des jeux ?

Loto en bas ou le scrabble quand il y en a des fois. Des qu'il y a qqch j'y vais ca m'occupe. Sinon l'été elle se promene.

Est-ce que le fait d'etre passe du pavillon a un endroit ou il y a plus de monde vous rassure ?

Oui ca me rassure. Avec les voisins ca se passait bien aussi mais ici c'est encore plus proche. Y'a la gardienne que je peux appeler la nuit. Ca la derangera pas parce que c'est son boulot, elle viendra. (pas de sentiment de demander un service a qq'un, c'est son boulot)

Vous faites les courses pour les gens des fois ?

Ici ? oh oui oh lala ! Je suis meme trop lancee. Ca devenait une obligation et ca m'amusait bcp moins. " Mais bon ca me fait l'occasion de les voir, discuter, quand ils ne peuvent pas manger c'est qu'ils ne sont pas en bonne sante. "

20'46"

Oh oui que ce que j'ai pu faire comme course.

Et a l'inverse est ce que qq'un viendrait faire les courses pour vous si vous etiez malade ?

Oui je pense y'a pas de raison. Comme moi je le fais. J'espere que qq'un Il y a bcp de gens handicapes ici qui marchent qui vont viennent mais quand il faut faire des courses c'est autre chose, c'est plus difficile.

Si vous aviez un souci de sante ou autre, qui contacteriez vous en premier ?

Sur le coup j'appelerais ici, celle qui est de garde. Ca m'est arrive d'appeler pour les autres. Un monsieur qui avait l'air de s'etouffer. Elle était completement affolee et ne savait pas quoi faire et elle a appele la gardienne qui est venue et s'est fachee car c'était une manie qu'il avait de s'affoler quand il avait du mal a respirer.

Il était venu vous rendre visite ?

Il est venu taper a ma porte. Elle lui faisait les courses. Il est venu car il etouffait. En meme temps il est mort comme ca aussi, un matin on l'a retrouve dans sa chambre. Je me disais dans le fond c'était peut etre pas si benin que ca.

Y'a des gens dont vous prenez les nouvelles dans la residence ?

Oui, peut etre pas tous les jours. Mais quand je les vois pas pdt qq temps je demande a la personne qui [la personne qui sait ?][la personne en question ?]. D'ailleurs les personnes qui restent dans le couloir toute la journee ils savent pas mal de choses.

Par contre y'a une dame pour qui elle faisait les courses est partie de la residence car elle tombait tout le temps. Elle la voyait faire des choses toutes seule et elle était pas tranquille. Et elle est tombee plusieurs fois. Elle voyait sa fille et donc pouvait avoir des nouvelles, mais comme elle est plus la elle a moins de nouvelles. (elle demandait pas a la personne elle-mme mais a sa fille quand elle passait).

Y'a une dame aussi pour qui elle faisait des courses qui est partie. Elle était en larme car triste de la quitter. Elle l'a appele pour lui dire que c'était pas facile.

Elle est en maison de retraite ?

Oui, elle est contente, elle dit qu'on s'occupe de tout. Pourtant elle est alerte a 92 ans. Mais elle est tres exigeante. Sa fille la trouvait tres fatigante donc quand elle a demenage elle a essaye de trouver qqchose plus pres. Mais bon elle s'occupe de rien c'est ce qu'il lui fallait.

La dame qui tombait vous avez des nouvelles ?

Non car je vois sa fille moins souvent. Il faudrait que je me renseigne.

Des personnes dans d'autres institutions ?

Non. D'autres qui sont partis mais dont je n'ai pas de nouvelles. On ne communique pas avec tous, on ne peut pas. Si il y a une personne qui est partie, c'est toute une histoire, c'est drole. Non c'est pas drole. Pour elle tout le monde était voleur et elle lui a demande de faire des courses. Donc elle y a été et elle s'était bagarree avec une autre dame. C'était marque dans le journal et donc elle est parti. Un peu cocasse une femme agee qui se bagarre avec une autre. Arrive a nos ages se bagarrer c'est bizarre. Apres je regrettais car elle va dire que je la vole.

C'est pareil la dame partie a chevry elle avait accuse sa femme de menage de vol, qui alors avait fait une depression. Ca la met mal a l'aise.

Bcp de personnes agees ont tendance a etre tres suspiscieuses. Sa grand mere quand elle l'a garde, voyait du vol partout. Je suis peut etre un peu trop confiance. J'ai confiance

en tout le monde. Meme si je fais un peu plus attention.

Si un jour j'allais rentrer dans ma douche et la porte s'ouvre tout doucement. C'etiat un jeune qui passe la tete et quand il m'a vu il a sursaute et il a demande l'heure. La directrice lui a alors dit de fermer sa porte et il aurait fallu lui dire tout de suite. Il avait pas l'air bien feroce.

Quels appareils electriques ?

Plaques, four, four micro-onde, grille pain, gaufrier, pierrade, la TV, les postes de radio elle en a un ds chaque piece. Dans la piece principale elle en a deux, plus un ds la salle de bain et un ds la cuisine. Un magnetoscope, un lecteur CD et d'un lecteur cassette. Mais le VCR marche plus, il enregistre plus. Elle voudrait surtout enregistrer. Elle est incapable de s'en servir. Elle sait plus comment ca marche.

P[as de difficulte avec les autres appareils ?

Non

Pour le telephone vous aimez pas etre appelee ou appeler ?

Plutôt appeler, je sais pas pourquoi. Pareil avec le telephone portable ils vous rappellent tout le temps. Ils vous demarchent tout le temps c'est casse pied.

32'29"

Bruit d'horloge en fond.

Elel a un portable, mais elle s'en sert pas, elle l'oublie. Elle l'a depuis 3 ou 4 mois. Elle paye les deux donc elle s'en sert pour vider le forfait.

Est-ce que vous ecrivez ?

Plus avant mais plus parresseuse maintenant. Son amie d'enfance dans les Ardennes, toutes les semaines, au pire tous les 15 jours. Quand on a pas de nouvelles on s'inquiete. Mais pas tellement au telephone. Elle va la voir tous les ans ds les ardennes. Ca lui rappelle des souvenirs d'enfance car elle allait en vacances dans les ardennes chez les parents de son amie. Son père était prisonnier evade pdt la guerre et il était alle se cacher chez eux. Elles sont restees liees. Elle aime y aller mais il n'aime pas trop le climat.

D'autres gens ?

Les vux oui toutes les personnes plus agees qu'elle. Ca fait une quinzaine de personnes. Surtout de la famille, des cousins eloignes. Sinon par telephone, c'est eux qui appellent.

Profession ?

Commerce, puis quand mariee ne travaillait pas, puis dans un kioske de gare et ensuite employee chez Hachette. Est restee en relation avec les personnes la bas. Tous les ans au jour de l'an ils font un reveillon. Comme elle a plus de voiture maintenant elle peut plus aller les voir. Souvent des coups de tel des uns des autres. Comme j'etais deleguee du personnel, elle est restee en relation avec les gens.

Questions sur le questionnaire, qui l'a fait ?

Elle a pas de mémoire donc elle note tous, tous les numeros, toutes les sorties avec le club 2 et grand calendrier en carton.

Marie

A cause d'un probleme de fonctionnement du caméscope numérique, ces notes sont des notes "de mémoire".

Marie a 82 ans, elle vit à la RPA depuis quelques mois (je crois quelque chose comme 1 ou 2 ans). Elle a habité sceaux pendant 40 ans (voire plus) dans un immeuble qui appartenait à la famille de son mari. 1 an après la mort de celui ci, elle a voulu déménager car elle trouvait difficile de s'occuper du grand appartement seul. Elle a commencé à travailler comme employée de bureau puis a aidé son mari dans son travail (organisation de séjours, voyages, etc. Notamment pour des personnes âgées).

Elle a ensuite vécu dix ans dans un grand appartement à Orsay, près de l'Yvette.

Elle s'est ensuite rendue compte qu'elle avait du mal à l'entretenir et surtout qu'elle se sentait seule.

La fin de l'après-midi

Elle a observé que pour elle, la fin de l'après midi est un instant critique pour la solitude, car il tout le reste de la journée il y a des choses à faire, le marché, la promenade, le repas. Mais souvent quand vient la fin de l'après midi il n'y a plus rien à faire. Elle en a parlé avec d'autres résidents qui corroborent ses observations.

Marie a un ordinateur de type PC de bureau avec Internet bas débit et un appareil photo numérique (depuis 6 ans environ). Elle communique par email avec ses enfants, petits enfants, amis (un à Sainte Geneviève des bois, un autre à Chalons sur Saône). Elle a une amie dans les Ardennes qui va peut tre s'y mettre aussi. C'est sa belle fille (?) qui lui a installé, lui a appris à s'en servir. Elle est formatrice pour personnes âgées.

Elle a spécifiquement précisé tre partie de son appartement à Orsay pour avoir plus de monde autour d'elle, pouvoir parler. Elle fait le plus d'activités possibles: gymnastique, jeux, ... mais ne fait plus de voyage, mme si elle fait encore les excursions à la journée.

Elle me raconte comment son voisin épicier (à Sceaux), à la mort de son mari, avait l'habitude de regarder ses volets pour vérifier que tout allait bien et sinon s'inquiétait.

A Orsay, elle avait des voisins jeunes, qui travaillaient, donc peu de compagnie. Cependant elle arrosait les plantes de sa jeune voisine du dessous, etc.

Elle reoit beaucoup de coups de fils de ses enfants, sa famille est très importante pour elle. Elle se déplace encore souvent pour aller voir ses amies à la Haye aux Roses, Ste Geneviève des bois.

Elle prend pas mal de photos, surtout d'évènements, occasionnellement. Elle les imprime chez elle sur son imprimante. Elle en envoie également à ses correspondants.

Elle est enthousiaste pour les designs que je lui propose, mais ne semble pas tre très critique.

Elle va marcher une ou deux heures pratiquement chaque jour. Elle est indépendante et tient beaucoup à cette indépendance.

Ca a été dur de passer le cap d'aller de son appartement à la RPA mais elle pense qu'elle n'a fait qu'y gagner. Elle a de la compagnie, des activités (atelier mémoire, jeux, conférences, ...) Elle a ses amies avec qui elle mange et joue à la belote, parfois au scrabble.

Je la mets devant le scénario avec Berte (85 ans) et Josiane (78 ans). Le scénario est le

suivant:

Berte et Josiane sont amies. Elles habitaient avant toutes les deux dans un pavillon à Ste Geneviève des Bois, mais Josiane, à la suite d'un problème de genou, a décidé de se rapprocher du centre ville et de prendre un appartement plus près des magasins, plus facile d'accès et plus facile à entretenir. Cependant Berte et Josiane se retrouvent toutes deux privées de leur proximité respective. Comment faire pour les aider?

J'utilise pour le scénario des visuels d'INTERLIVING, pour donner du corps à l'histoire.

Peu de collaboration, il faut je pense commencer "moins vite". Faire une activité presque triviale, puis graduellement challenger les gens.

RETOUR

Démonstration sur l'ordinateur

Ordinateur DELL connexion dial up

Utilise les emails

Email de Doreco, un neveu par alliance anglais et des amis de Sainte Geneviève

Les emails de ses neveux et nièces. Emails de sa nièce par crise, quand elle a un problème, quand elle change de petit ami. Elle l'a eu beaucoup enfant donc elles ont un contact assez libre. Elle a une amie du mme âge (Monique) dans l'Eure et avec qui elle échange des emails. C'est une amie de lycée (Marie Curie). Ceux de St Geneviève, sa femme a été à Marie Curie aussi. Connues au lycée et restées en contact. Le mari était à l'Ecole d'optique avec le mari de Marie. Mais son mari n'a pas fait d'optique mais a organise des voyages.

Vous lui envoyez des emails à quelle régularité?

A Monique une ou deux fois par moi et puis elles se réunissent pour se voir tous les 4 une fois par mois. Des fois ils vont au restaurant et des fois ils viennent les uns chez les autres.

Elle fait des lettres avec MS WORD. Elle fait des retouches avec Photoshop Element, sa belle fille lui a montre comment faire mais elle a du mal. Sa belle fille fait des photomontages et vieillit des photos.

Combien de photos par jour?

Surtout pour les événements, c'est par période.

Vous avez un poste de radio?

Oui

Elle me montre les photos de paysage qu'elle a fait.

Elle a une TV.

Y'en a qui sont bien et d'autres qui sont moins bien. Elle les a elle mme développées.

Elle fait de l'ordinateur depuis 6 ans et de la photo numérique en mme temps. Elle a des photos de couchers de soleil, et quelques photos des alentours (fleurs, buissons, etc.) photos de famille dans un autre album. Elle a dedans des photos de son ancien appartement.

8'23" exercice de design avec scenario et images

13'

Lorsqu'une personne âgée doit déménager car elle ne peut plus rester dans son pavillon,

si elle déménage dans une résidence normale elle est seule. Alors que dans une résidence comme celle ou Marie est, elle n'est jamais seule. Elle a un homme a tout faire, qui peut les emmener faire des emplettes si nécessaire. Tous les lundis il y a un car qui les emmène dans les grandes surfaces.

Qu'avez-vous perdu en déménageant ici?

Rien. D'ailleurs, j'ai réfléchi pendant 2 ans avant de me décider. Les autres résidences coutent plus cher et donc elle a choisi ici. Elle ne pense pas que le contact entre les gens y soit aussi bon aussi. Elle en a parle à son fils. "La bas, au lieu de louer on achète le logement très cher et ensuite il y a des commodités comme une laverie, un bar, etc. Mais ce n'est pas cela qui est important, ce sont les activités comme on a ici. "

Aucun regret mais ici depuis octobre. Avant d'tre mal voyant ou quelque chose comme ca il faut venir ici.

"On a un problème de solitude. C'est ce que j'ai moins ici. Le fait de descendre déjeuner. On va toujours à la mme table donc je retrouve des personnes avec qui je parle pendant que je déjeune."

17′

Quand on vieillit, qu'on ait travaille ou qu'on ait élevé ses enfants, la différence c'est on a plus d'emploi du temps, plus besoin de se dire il faut que je fasse ci. [..] Le jour où on est vieux on a plus besoin de penser. Et c'est la qu'on se sclérose si on a rien à penser.

Vous jouez beaucoup?

Surtout la belote, Scrabble, amie a Etampes chez qui elle va passer quelques jours. Elle était au lycée mais ne connait pas les autres.

19′

Vous avez vos amies de lycée au téléphone?

Oui. Le mari de son amie (st Geneviève des bois) l'appelle régulièrement comme elle, elle perd un peu la tete. Il l'a appelé ce matin pour lui dire que son ordinateur avait été en panne et il n'avait pas d'email.

Au téléphone deux trois fois par semaine.

Des choses que vous aimiez bien partager avec ces gens la et que vous ne pouvez plus partager?

Non car elle a vécu 10 ans dans un immeuble (le long de l'Yvette). "Au dessus c'était un couple de retraites. J'avais de bons rapports avec tout le monde. J'avais une jeune personne qui est ingénieur au rez-de-chaussée. Alors elle j'allais arroser ses plantes chez elle, des choses comme ca. Et elle venait bavarder avec moi de temps en temps. Mais c'est tout il n'y avait pas de contact vraiment."

Est-ce qu'il y a avait des gens qui avaient vos clefs?

Non c'est mon fils qui avait les clefs.

Et a Sceaux?

"Oui à Sceaux déjà les gens me connaissaient. Je dois avouer que je n'avais pas... des clefs? Non. Il faut dire que j'avais des amis. L'épicier d'en face si je n'ouvrais pas mes volets il

faisait attention, comme j'ai été seule. [. . .] Il connaissait beaucoup la famille. [. . .] Il me disait si vous avez le moindre problème, vous pouvez m'appeler mme la nuit. Il n'y avait aucun problème. [. . .] Mais l'immeuble était dur a entretenir et j'ai préfère venir ici pour tre prt de mon fils."

Chose typique: les volets les gens s'en aperoivent

"Ca donne une sécurité."

Le plus important c'est les réunions avec les enfants, la famille.

<div align="center">

27′

</div>

"Quand je me suis retrouve seule, le moment le plus difficile c'est la fin de l'après-midi, quand on rentre de la promenade en attendant le diner. [. . .] C'est le moment ou il faut qu'on trouve quelque chose à faire. [. . .] Je crois que c'est le moment le plus dur."

<div align="center">

34′

</div>

"Mes amis de Sainte-Geneviève-des-Bois, des fois, ils prennent des photos dans le jardin et ils me l'envoient avec l'email. Ils me disent "un petit coucou du jardin: les fleurs, le jardin qui change.""

"Il est quand meme pas chez moi. Il sait comment je vis et tout et que si c'est autrement c'est qu'il y a une probleme." en parlant de l'epicier.

On a besoin d'etre seule quand meme. Meme quand j'avais ma famille, mon mari, mes enfants. J'avais besoin de me retrouver.

Noémie

Elle allait partir pour une activité car elle s'est trompée entre 14h et 16h. Elle ne serait remontée qu'à 16h30. (retour rythme, prédictif)

Photos encadrées au mur et sur un dessus de commode, une horloge et une caricature. De la famille. Une plante et telecommande TV sur la table.

Journée d'hier

Mercredi: Atelier Mémoire avec une dame qui vient tous les mercredis pour faire l'atelier. Puis après midi jeux de cartes avec l'ARO. Tous les mercredis on joue au scrabble, cartes, etc. Moins de personnes qu'avant car les anciens sont trop vieux pour venir et les jeunes ne viennent pas.

Vous faites les sorties avec l'ARO?

Oui les sorties d'une journée ou une demie journée, dans le coin. Une fois par mois. Une fois par an le repas surprise dans un endroit inconnu. Nombreux, 200 personnes.

Est-ce que vous pouvez me dire ce que vous avez fait hier entre votre lever et votre depart pour l'atelier? Est-ce que vous avez passe ou recu des coups de fil?

Elle a appelé une amie qui habitait ici est partie autre part, a Vendôme. Elle est dans une maison médicalisée, alors qu'ici c'est un foyer logement. Elle paye son loyer. Mais ils ont tout de fourni, alors qu'ici ils ont leurs meubles, c'est leur appartement.

"Elle est vraiment dans maison médicalisée. Alors qu'ici c'est un foyer logement, ce n'est pas du tout pareil. Nous on paye notre loyer, alors que les autres c'est une somme d'argent par mois. Ce n'est pas du tout pareil. Mais enfin ils ont tout aussi. Nous on a nos meubles, on a tout, on est chez nous comme si on était en appartement dans une autre résidence. C'est un studio quoi. Et on paye notre loyer tous les mois."

<div align="center">7′</div>

Autres coups de fil?

Non, ca arrive qu'il y ait des demarcheurs et c'est tres ennuyeux.

Dans l'apres midi?

Non, c'est rare. Des fois les gens appellent mais c'est rare. Les enfants vivent a cote. 3 enfants 5 petits enfants et 3 arriere petits enfants. Un fils sur Orsay et un fils et une fille aux Ulis. Elle a de la chance. Les petits enfants sont a cote aussi. 2 aux Ulis et 2 a Montdetour et une a Sartrouville.

Quelque chose d'inhabituel?

Non c'est rare, c'est une residence tranquille. Ca arrive que des personnes aillent a l'hopital. Y'en a qui tombent malade. Peu d'accidents. Orsay on est bien.

Est-ce que vous parlez avec les gens de la residence? un groupe d'ami(e)s…

Oui beaucoup. "On rencontre les gens de la rue, tout ca, on discute avec eux. Moi je connais bcp bcp de gens. Déjà on fait la gymnastique ici, le lundi et le jeudi. Donc on a des personnes qui viennent de l'exterieur ce qui nous permet de parler avec eux. Et moi je vais a la piscine le samedi c'est pareil. On voit les gens on discute avec eux et comme on sort avec l'ARO on voit d'autres personnes. On voit bcp de personnes, je connais enormement

de personnes. Je sais pas leur nom mais on les connait comme ca. On s'appelle bcp par les prenoms donc je connais les prenoms mais les noms de famille je connais pas.

Noyau dur, des amis régulier, des compagnons de jeu.

La dame d'a cote (voisine de palier). On est toujours toutes les deux, on travaille bcp toutes les deux on sort bcp toutes les deux, mais de l'exterieur non.

Et dans la résidence?

Dans la résidence y'en a d'autres. Maintenant y'en a bcp moins qui sortent aussi. Il y a deux repas de la Mairie.

A quelle réunion deviez vous aller cette pares midi?

Conférence Maroc. Des fois c'est d'autres pour nous faire voir d'autres choses. Un monsieur qui venait avec des diapos parler des endroits ou il est alle. C'était bien il expliquait bien c'était interessant. "On fete beaucoup les anniversaires aussi, tous les trois mois il y a un anniversaire."

Moi j'ai parle avec Marie. . . avec qui vous jouez aux cartes

"Oui il n'y a pas longtemps qu'elle est la. Un an. Je sais meme pas si il y a un an qu'elle est la."

Ca fait combien de temps que vous etes ici?

14 ans.

Et vous habitiez ou avant?

A Villebon.

Qu'est ce qui vous a . . .

Bah ma fille travaillait ici. Gardienne pdt 14 ans. Son fils travaille a la mairie. Y'en a 5-6 qui travaillent a la mairie. Son fils parti a la retraite travaillait a la mairie aussi.

Quel est le declencheur?

J'avais toujours dit que je viendrais ici. "Ce qui m'a decide de partir c'est-à-dire que j'avais a cote de chez moi un voisin depuis 40ans puis il est parti dans une maison de retraite a Villebon. et les personnes qui l'ont remplace etaient tres desagrable. A chaque moment ils cherchaient toujours des noises. Ca m'a degoutte alors j'ai dit allez hop je m'en vais. Moi j'avais jamais rien eu avec les voisins puis quand on a des voisins comme ca qui vous embetent comme ca j'ai prefere vendre et partir. Je regrette pas.

Je regrette pas parce que toute seule dans un pavillon ca revient cher.

<div align="center">15′</div>

Quel age avez-vous?

<div align="center">1921</div>

"Je vais arriver dans les plus longtemps qui sont ici. Je suis arrivee a 70 ans. Faut rentrer jeune dans les maisons comme ca. Parce que on est libre on s'en va on va on vient. En principe on reste jusqu'à la fin. Les gens qui s'en vont, ils restent pas longtemps. C'est ca qu'il y a de bien dans les maisons comme ca."

Quels avantages d'etre en residence par rapport au pavillon ou une maison de retraite?

"Etre chez soi, et qu'on est libre que dans les maisons de retraites vous etes pas libre. D'abord vous avez pas vos meubles ni rien, puis vous pouvez pas sortir et faire ce que vous voulez, alors que la on fait ce qu'on veut. On est exactement comme si on était dans une autre residence. Seulement ce qu'il y a c'est que quand on s'en va on le dit quand meme a la direction pour pas qu'ils s'inquietent. Alors on leur dit. Et ce qu'il y a de bien ici, si on a qqch [] il y a tjs quelqu'un vient. La gardienne vient se deplace et si la personne est malade on l'emmene a l'hopital. Sinon vous etes libres de faire ce que vous voulez."

Votre voisin de 40 ans, il est parti?

Il est a Palaiseau, ds une maison de retraite [medicalisee] car il a 95 ans.

Relation cordiale, amicale?

Des bons voisins

Vous vous invitiez a manger? des choses comme ca?

"Non. Si ca arrivait qu'avec une autre amie on aille manger au resto. Et dans la semaine on se reunissait tous les trois et on jouait aux carte ou on allait se ballader." Le voisin est parti en maison de retraite et l'amie est decedee. "On a été separes quoi. Sinon on serait peut etre reste plus longtemps dans le pavillon et on aurait continuer a rester ensemble." quoique eux aiment faire la java et pas elle. Aime pas inviter, manger, diner, boire du champagne, etc. Sa copine decedee pklus jeune qu'elle mais faisait pas attention a sa sante. Elle aime pas boire.

Est-ce que vous avez echange vos clefs?

Oui. Elle laissait son chien aussi. Un caniche. Je l'aimais mais maintenant elle est morte. Je la laissais dans la maison et lui s'en occupait, donner a manger, la promener. "Et si lui s'en allait dans sa famille, je m'occupais de son chat. Et quand sa femme était bien malade... et puis moi c'est pareil quand mon mari est decede il m'a beaucoup beaucoup aide. On s'entraidait bcp entre voisins, ce qui est normal."

$$19'50''$$

Est-ce que vous avez perdu une certaine securite quand il est parti?

"Oui je me suis retrouve toute seule. Vraiment on avait tellement l'habitude de... Je me suis retrouvee toute seule quoi. On allait le voir avec ma copine mais c'était pas pareil."

Vous avez encore des contacts avec ce monsieur?

Non plus de contacts. Il est la bas a Palaiseau. Il peut pas trop telephoner. Il parle pas il est assis dans un fauteuil. Faut peut etre pas demander l'impossible.

Si il vous arrivait un ennui, qui appelez vous en premier?

Les enfants. Enfin si c'était ici la gardienne.

Et qui viendrait vous rendre visite a l'hopital?

"Les gens viennent automatiquement. Je vous dirais que j'aime pas aller dans les hopitaux. Les enterrements et l'hopital c'est une corvee pour moi." Perdu mair a l'hopital et perdu un petit fils dans un accident de voiture a 18 ans. Elle y va que si elle a pas le choix. Voir qq'un a l'hopital elle aime pas mais elle y va. C'est pas qu'elle aime pas voir les gens, mais c'est les hopitaux.

Est-ce que vous avez des pb de sante grave?

Operee de la vesicule, apendicite, hepatite virale. Maintenant elle est plus malade. Tout est parti. C'est souvent entre 50 et 60 ans une femme a bcp de pb.

Y'a qd meme des pb de sante au jour le jour?

Non, je mange au resto tous les jours en bas.

Vous allez vous promener?

Oui mais pas quand il pleut. Des fois avec sa voisine, au marche, dans les bois, elles vont partout. Le long de l'Yvette. Elle aime pas marcher toute seule. Elle aime marcher a deux mais pas toute seule. Avant elle allait marcher avec sa fille tous les dimanches mais le fils de sa fille est revenu a la maison car séparé de sa copine. Elle peut plus aller marcher comme elle veut. Malheureusement. Les gens qui reviennent vivre a la maison c'est un pb, c'est dur, surtout quand il y a des enfants. Il a un enfant de 3 ans et son père c'est son dieu. Pb pour le gamin. Ils sont jeunes et ils comprennent pas.

<div align="center">25′50″</div>

Vous voyez votre famille regulierement?

Oui tres! Voit sa fille tous les matins. Son fils travaille a cote. "Ils viennent pas tous les jours. Mais des fois mon fils je suis deux mois sans le voir et il habite a cote. Non mais c'est bien comme ca. "Parce qu'il sait bien si je suis malade je les appelle ils viennent la tout de suite. Et ils ont leur vie aussi, il faut bien qu'ils vivent leur vie aussi."

<div align="center">26′34″</div>

D'autres amies en dehors?

Niece en province. Un neveux qui vit a cote. Elle le voit souvent, plus souvent que son fils. Il travaille pour la mairie en tant que plombier donc quand il intervient sur la residence il passe la voir. Son gendre aussi passe dans le coin. Elle a bcp de chance car elle voit sa famille tres tres souvent. Malheureusement, des fois les gens mettent les parents dans la residence et ne viennent pas les voir apres.

Des amis de quand vous etiez en pavillon ?

De collegues de travail avec qui elle echange des coups de fils et elles se voient de temps en temps. Ne se voient pas tous les mois car il y en a une qui est a Palaiseau, une autre a Bures. On se telephone. Se voient une fois par an. "Elles n'ont pas le temps moi non plus. C'est vrai que notre temps il est pris. Moi je suis prise tout le temps. Lundi matin j'ai la gym, le mardi je fais les courses, le mercredi j'ai mémoire, le jeudi c'est la gym le vendredi c'est le marche, le samedi c'est la piscine."

Quels appareils electriques?

Rien sinon le frigo, la cuisiniere, un poste radio. Pas de telephone ss fil. Pas de tel portable, car c'est casse pied. Utile pour celui qui travaille, mais pour nous c'est pas utile.

Voisins qu'elle voit toujours?

Voisine d'avant qui passe la voir souvent et elle lui telephone.

Regulierement?

Quand elle passe dans le coin, elle se telephonent.

De votre age?

Non elle est plus jeune, meme pas en retraite encore, elle a l'age de ses enfants.

D'autres?

C'est pareil, la bas les voisins les trois quarts sont partis il n'y en a plus. Les anciens que j'ai connu il n'y en a plus. Vous savez les gens vieillissent et puis s'en vont, on ne les revoit plus.

<div align="center">31'</div>

Est-ce que vous regrettez d'avoir perdu de vue des amis ou connaissance d'avant?

"Non moi je ne reviens jamais en arriere. [. . .] C'est vrai ceux qui reviennent en arriere sont malheureux. Moi je vois une dame qui est ici, elle revient toujours en arriere. Elle regarde toujours ses photos de il y a quarante ans et apres elle a le cafard."

Quels moyens de communication utilisez-vous? Lettre? Telephone? Visite?

Non je ne recois jamais a part mes enfants. Ils viennent me voir comme ca. Si je les recoit a manger je les invite au restaurant.

Commercant reguliers au marche?

Oui

Ils prennent de vos nouvelles?

Oui tous les vendredis je le vois. Je connais presque tous les commercants du marche. Mais je ne prends pas grand-chose comme je mange au restaurant en bas.

Des ennuis de sante recemment?

Non

<div align="center">33'</div>

Est-ce qu'il y a une personne malade recemment dans la residence ?

Voisine qui a eu une crise de nerfs. Voisine d'en face qui a eu quelques ennuis, mais elle est agee (93-94 ans) donc c'est dans l'ordre des choses.

Vous vous voyez bcp avec vos voisines?

"Oui on se voit tous les jours, mais comme ca. Surtout ici, dans les maison comme ca, attirer les gens a venir vous voir. Parce qu'il y a des gens qui sont tres entreprenants, qui vont venir vous embeter. Il faut etre bien avec tout le monde mais chacun chez soi. Sinon vous avez certains qui sont toujours la a venir vous voir vous embetter. J'en avais une j'avais du monde elle arrivait prenait une chaise et s'asseyait avec nous. C'est pas serieux."

<div align="center">34'22"</div>

Vous jouez avec des gens regulierement, vos voisines ?

Scrabble avec la voisine tous les jours. Le lundi, samedi et dimanche 2h. Elles descendent en bas pour jouer ensemble. Il n'y a pas beaucoup de monde qui joue au Scrabble. "Le

moins possible les uns chez les autres. Pourtant ma voisine je suis tres tres bien avec elle, ca doit faire 2 ans ou trois ans qu'elle est la. [. . .] Jamais on a pris un cafe l'une chez l'autre. La elel était malade la semaine derniere, j'allais la voir tous les matins savoir comment ca allait."

Au quotidien y'a des choses qui vous posent probleme?

Non, tout autour de la residence.

Qu'est ce qui vous motive de travailler avec moi?

Travailler avec les jeunes.