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Enabling Community Participation of Senior Citizens through Participatory Design and ICT

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Abstract: In this paper, we summarize our experience in organizing a laboratory of ICT for senior citizens using a participatory design approach and with the goal of better understanding their relationship with technology. The starting research question was how could we engage elderly into an activity that is both enriching for them and for our ICT research, design and development efforts, all at the same time. Our goal was to avoid dealing with them as "research subjects", rather inviting them to become "research collaborators" within an approach to research that is both inclusive and respectful. The first of such experiences is a "Laboratory of Technologies for Elderly", designed and developed in a participatory manner and with the motivation of enabling them to reach out and share their experiences through the use of ICT, in particular, through the use of a Blog, which was chosen by the participants as one of the topics to learn during the lab. The Laboratory and subsequent Blog, still actively updated, have both served as means for enabling community participation and have provided us with important insights that will shape our future work in the field.

Keywords: social informatics, elderly, ICT for elderly, participatory learning and research, blogging

1. Introduction and Motivation

Along with the advent of the Internet and the boom of information and communication technologies (ICT) of the last two decades, another cultural shift was undergoing around one of the most important topics our times: *the challenges of ageing.* All around the world, and especially in developed countries, the old "needs-approach" to ageing, thinking of elderly as the people who just need care due to their limitations, has been left behind and replaced by a more positive "rights-approach" (WHO 2002) that emphasizes the fact that life does not end at that imaginary line between young and older adults, and there can still be lot to it beyond the natural limitations imposed by age.

This is a global cultural change that comes along in a world whose population is rapidly ageing and living everyday longer lives, with an expected elderly population of two billion before 2050 (where elderly means 60 years old at least)[1] most of them living in developed countries (Bloom 2011). And while such increasing brings economical and societal challenges to many social systems (Fuchs1998), it also opens new opportunities to seize. In this context, ICT has a role to play and it cannot be only that of supporting care and compensation, but should be also oriented to the enhancement of people's life (Bornswijk 2002).

The aforementioned scenario had motivated the creation of the Lifeparticipation Group[2], a research and design group that works within the emerging field of social informatics with the general goal of building solutions that improve people's well-being, with an initial focus on helping elderly to participate in life. We aim at identifying technology and user interaction paradigms that will help older adults in sharing and experience their life and that of their loved ones, providing technologies that are socially accepted and making use of commercially available hardware and low-cost solutions.

[1] http://www.who.int/ageing/en/
[2] http://www.lifeparticipation.org/

To reach these goals, our approach contemplates a great deal of learning by doing (i.e. build quickly applications, evaluate and improve). However, beyond this practical approach we also need to venture into their world and get as close as we can to their view of life.

With this motivation in mind and seeking to get some first hand experiences with them, we started out a project that took us on a wonderful journey of discovery and learning. Our original goal was a simple one: to go out in the field and talk directly with elders so that we can learn how do they engage with technology and how can ICT add positively to their lives.

How do we do this while offering something of value for them, so that they are motivated to participate? How do we engage them into an activity that is both enriching for them and for us all at the same time? That was the challenge: to avoid dealing with them as our "research subjects" but rather as people with whom to share a common path, although coming from a different history and going to different places.

Led by these questions, we have chosen a *Participatory Design* (PD) approach. The origins of PD have a strong political connotation, rooted in Scandinavian unions' projects for workers inclusion in innovation projects, but the approach has been subsequently adopted according to a rather broad spectrum of perspectives. A common distinction between different approaches to PD underlines the difference between the *political* and the *technical* aspects of PD (Ehn, 1992) or between the "pragmatic, theoretical, and political" approaches (Greenbaum, 1993). The difference lies in the focus on power relationship rather than on the improved quality of the expected outcome of the design process. A different classification underlines the roles of the users, differentiating between design done "for, with, and by the users" (Briefs et. al. 1983; Bergvall-Kåreborn and Ståhlbrost, 2008). These roles summarize the balance of power between the designer and the user, where PD aims to including the users as peers in the design activities.

The relevance of PD in community development has been explored since several years (O'Day et al, 1996). With (Carrol and Rosson, 2007), we contend that PD can support the *inclusion* of community members in process related to technology and that this aspect has a central relevance in building a community. With this conception of PD in mind, we headed off to a local Elderly Service Center for building a participatory experience with them. After some months of exploration, we started a "Laboratory of Technologies" with the goal of helping older adults to learn about computers and where they themselves were going to decide the topics and the program to follow on the go.

The resulting experience became an active collaboration between senior citizens and ICT researchers, that helped us in learning about how to improve our own ICT solution ideas and products while at the same time enabled high level of participation between elderly through the engagement in the lab and the resulting blog that came out of it.

In this paper, we describe this activity and summarize what we have learnt from it. ICT has proven to be a powerful instrument to enable community participation, but even more so, the participatory approach we have followed has had a considerably positive impact in deepening the relationship between our group and the group of users we are aiming to support.

1.1. Context: applications for the Lifeparticipation of Elderly

The better understand the motivation of this study is important to briefly describe the work of the aforementioned Lifeparticipation group, where we are designing and developing mobile applications that seek to support elderly in achieving the goals of an active life.

The first of such applications is *What'sUp?*[3]*,* an intergenerational social interactions platform that allows young users in sharing pictures and short text messages with their elderly loved ones.

What'sUp implements a two-sided interaction model, where youngsters will use a smartphone application to share while elders will receive and respond using a tablet-based application. The elder side has and adaptable UI that goes from a simple portrait mode for one-way communication, up to a fourth level of interaction where there is also the possibility to reply back with text and predefined feedback (Dianti et. al. 2012).

[3] http://www.lifeparticipation.org/whatsup.html

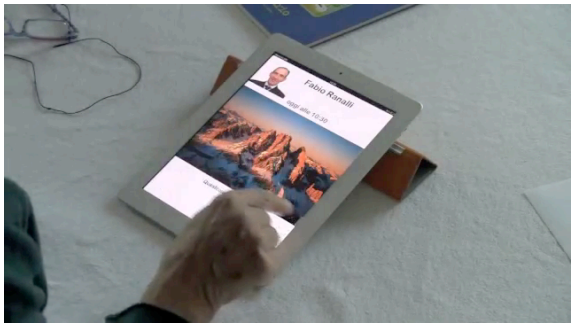

Figure 1: An elder using What's Up in a think aloud study

The second application is *ActiveLifestyle*[4], a platform and an iPad application dedicated to motivate elderly to follow strength and balance training plans. The platform allows physiotherapists to define a plan that elders can follow by using the application, which include video tutorials of the exercises, notifications about the plan, interaction features to share messages with other elders or family members (through What'sUp) and motivation components that will measure progress and engage elders to keep up with the plan (Silveira et. al 2012).

Figure 2: Zurich Users testing ActiveLifestyle

Finally, our third application is *ActiveBrain*[5], a cross-platform and simplified simulation of the Dance Dance Revolution[6] arcade game redesigned for the use of elderly with limitations and aimed to provide cognitive training in the future

Figure 3: One of the elders from the Lab testing ActiveBrain game

[4] http://www.lifeparticipation.org/active.html
[5] http://www.lifeparticipation.org/activeBrain.html
[6] http://www.konami.jp/bemani/ddr/jp/

2. Methodology: The Kaleidoscopio Laboratory of Technologies

To design new ICT for elderly and improve what we had already built, a participatory approach was needed to involve our end-users in the design process, not only to have them test our apps in the end of the design cycle, but to talk to them at the beginning of it in the look for a better understanding of their needs and desires. Particularly, we started the laboratory with two main research questions:

- What type of information and activities would elderly share with the world given the opportunities to do so through using ICT?
- What difficulties and challenges do elderly users encounter when interacting with current ICT?

Along with these, a third question was pushed forward regarding the method to use, to make it compliant with the principles of participatory design and the new and emergent design thinking approach (Brown 2008) that it is a core part of our group.

- How can we answer our questions using an approach that is as respectful as possible of the people involved, treating them as research collaborators instead of research subjects?

2.1. Methodological Principles

In general, we have used the principles of the following methodological approaches during this experience, in order to gain as much insight as possible from it.

- *Participatory Design:* specific computing programs and tasks to learn plus topics used to motivate discussion during the laboratory were all based on participant's initial feedback and later interaction and observations during the laboratory, with the close collaboration of the elderly service centre coordinator. Moreover, all the observations that were gathered during the laboratory were constantly reviewed during our group's design and development meetings, serving ultimately as one of the main inputs for our design. To further stress the design aspect, a *Design Workshop* followed up the laboratory, where the participants of it tested and brainstormed with us about our applications. This workshop only resulted in almost the same amount of qualitative output as the Laboratory, which will be covered on a future analysis.
- *Participant Observations:* during each session, the authors have participated with the elders in the learning process with the role of facilitators. Along the duration of a session, each author recorded field notes of anything we thought important, from ICT usage and learning difficulties to interaction and behavioural highlights. A debriefing meeting was held at the end of each session to further extend our observations.
- *Personal tutoring:* during each session, one of the facilitators acted as the teacher, guiding the tutorial on the particular task selected for that day, while the remaining facilitators will go around the room offering personal tutoring to each as they stumbled upon difficulties or were stuck behind with the activity. Moreover, on a non-regular basis, some of the authors visited the centre to provide further personalized support.
- *Background-based disposition:* in each session the disposition of the participants in the Laboratory was set in pairs, coupling the ones with more experience with technology with those whose progress was set to a lower pace. In addition, participants who had the less confidence with the use of ICT would be sitting in locations easily accessible by facilitators.
- *Grounded Theory:* we analysed our data (field notes, brainstorming ideas, interviews and videos) using this approach from social science, in which we start by gathering data for them arriving a conclusion without a previous hypothesis.

2.2. Program and Development of the Laboratory

The answer to the last question is the activity itself: a *"Laboratory of Technologies for Elderly"*, designed and conducted using a participatory approach with the goal of giving elderly the knowledge and a tool for sharing their wisdom and interests with world. The whole experience was divided in five moments.

2.2.1. Exploration

Having in mind the brief of planning a participatory experience that would benefit both participants and researchers at the same time, we contacted an Elderly Service Center oriented to self-sufficient older adults and managed by a local cooperative[7]. The exploration consisted of involving first the people in charge of the center, in the figure of its manager, with whom we organize different encounter along three months of *exploring the different possibilities* for a joint collaboration. Finally, the winning idea was that of the laboratory, which would be framed with the motivation of helping elders in learning about the use of computers, ultimately giving them a concrete tool for reaching out and share their experiences.

2.2.2. Brainstorming

Once the activity was selected, and after promoting the laboratory for a month, a *brainstorming session* with the subscribed participants was organized as the first day of the laboratory. In this session, participants were motivated to imagine themselves as being in charge of the communications magazine of the center and they were assigned with the task of answering the following two questions in a brainstorming session:

- What are the activities of your magazine?
- Who is going to be the reader of your magazine?

The goal of the first two questions was to identify how they visualized the idea of becoming communicators of the center in order to layout a set of topics of interest we could later use during the lab. Two more were drawn with the goal of identifying in general terms what was their background and what expectations they had about learning during the laboratory. This would later support the scheduling of each session around one specific task to perform with the computer and one tool to use for that task:

- What I know?
- What I would like to learn?

The brainstorming resulted in a list of 157 post-its, which included the replies of 30 participants who attended the first day.

2.2.3. Laboratory Sessions

Following the debriefing of the answers obtained in the brainstorming, we organized laboratory to have weekly sessions during 3 months, resulting in 10 sessions, each of which was focused on learning one of the *tasks* that came out from the brainstorming, using a tool selected by us and motivated around a *topic* that it could be of interest to them.

The task to learn on each session was planned on the go, during a debriefing meeting between the researchers after each day of the laboratory, where we would use our observations to decide the next iteration. The intention was not to cover all the topics, but rather to give enough time of practice for them to learn and us to observe the most.

Of 10 sessions, scattered along three months and held once a week, 5 were focused on writing documents (using open office), 2 on browsing the Internet (using Internet Explorer) and 3 on writing and commenting on a blog (Wordpress). These were the three main subjects that came out from the first session. Other topics of interest to them, which were covered within the others, were the handling of pictures and the use of an USB drive. Using the camera and taking pictures was one that could not be included because of a lack of time.

Each session was held in a computer lab of the Faculty of Sociology of the University of Trento. This physical environment had some important consequences on the mind setting of the participants, which we will further analyze later. Moreover, the computers in the lab were all equipped with Windows 7 as the operating system, and the user account policies of the university restricted the access for our lab to a very strict limited time.

[7] http://kaleidoscopio.coop/

At the end of the laboratory, a Blog[8] was created with the goal of providing them with a concrete ICT artifact that would continue to enable participation in their community. The blog was chosen for two reasons: i) was one of the common topics that were mentioned in the brainstorming, and ii) it was the easiest to deploy and to learn of considered options (which included a full-featured website and creation of social networking profiles)

2.2.4. Final Brainstorming

After the final session of the laboratory, an extra session was organized in which the initial brainstorming was repeated, using the same questions, with the goal of comparing answers and verifying the evolution of both their knowledge and their expectations for the future.

2.2.5. Follow Up

To follow up of this laboratory, participants were invited to visit us in our faculty, for engaging directly with researchers, designers and developers in what we have called the *Design with Elderly Workshop.* During this workshop, the participants played with our applications in small focus groups and brainstormed about how to improve them, helping us to detect 16 concrete design mistakes plus other 21 usability notes to take care of.

The workshop itself, where we conducted both pure and participant observations, plus some concrete interaction analysis, produced a whole other set of qualitative data, which will be analyzed in a future work.

During this workshop, a final questionnaire was also given to them, where we have asked them to answer to open questions about their satisfaction with the laboratory and their intention to continue the contribution to the blog.

Finally, the blog itself is a mean for interaction and follow up. Having been actively updated after the laboratory, it has allowed us and other members of our group to keep in touch with the participants, enabling continuous community participation.

2.3. Participation and Results:

A total of 30 people registered to participate of the experience, of which 26 attended to the initial brainstorming session, and 15 continued up to the last session. Almost all the participants were women (only 3 were men) and the average of age was 68, placing the whole group in the young-old age segment (age 65 to 74)[9]. Figure 4 shows the age distribution, although the most important characteristic about the group is that they are all self-sufficient and independent.

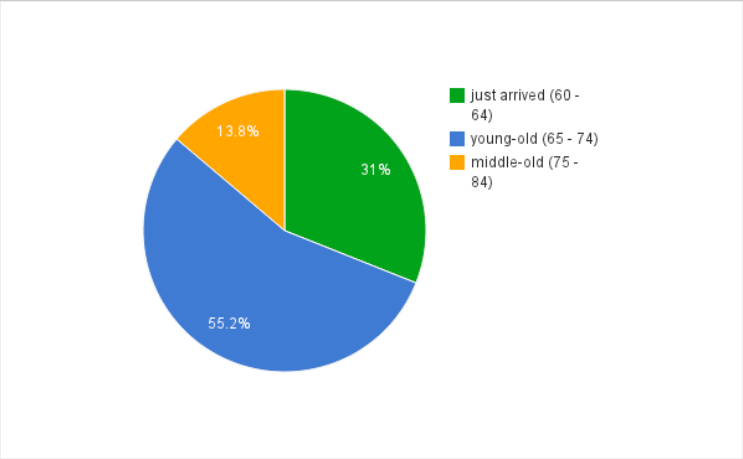

Figure 4: Age Distribution of the Participants

The resulting data is qualitative in its full nature and rendered a total 308 textual items including 196 brainstorming notes and 112 observations. Furthermore, we have recorded 5 full lab session videos and 6 video interviews asking facilitators, the centre's manager and 6 of the participants to summarize the most important aspects of the laboratory experience and

[8] http://test.lifeparticipation.org/kaleidoscopio/

[9] Age groups based on the segmentation (Drolet et. al. 2010)

its follow up workshop (which is not included in this paper). A final questionnaire was also completed by 15 participants rendering an additional set of 100 textual open answers about their satisfaction, learning outcomes, future expectations and their intentions to use and topics to address on the blog.

2.3.1. The Blog

One of our goals, besides answering our research questions, was that of helping elderly users in reaching out to share their experiences through the use of ICT, enabling a continuous community participation and engagement. Following this goal we have analyzed several alternatives during the course, ranging from a full featured website to social network profiles in facebook for each participant and a virtual community within. Eventually, based on the interests for writing and reporting about the activities of the centre (as stated in the brainstorming session), we selected the idea of a *blog* as the best matching ICT artefact to empower participation in this community. The Blog was both easy to deploy and not too much complex to learn, while it would provide the basis for sharing their thoughts and experiences with a greater audience and not only themselves.

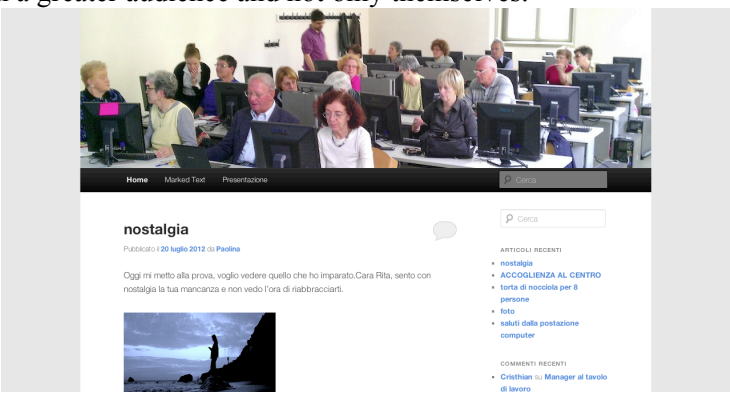

Figure 5: Home Screen of the Blog

When we asked the participants if they would use the blog to share their activities, more than half replied positively. Figure 5 shows the summary of this user intention in number of people (of a total of 15).

Beyond this quantitative data, which is based on a low number of replies, what is really significative is that the user intention is reflected by the real usage of the blog afterwards, having a number of contributors almost equal to the number of people who had a positive intention when answering the questionnaire. Of the 15 participants, 6 have continued to contribute with blog posts. Half of them did so on a weekly basis (just as Figure 5) and the other half contributed at least once per month, contributing a total of 99 new articles in 84 days (from the end of the Laboratory in June 1st till August 23rd of 2012). The contribution was higher in August, with a growth of 200% in productivity with respect to the previous month.

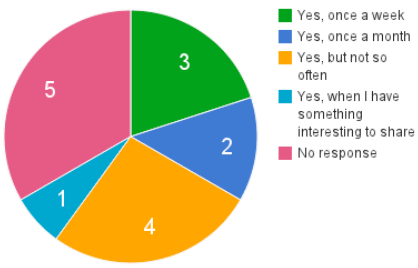

Figure 6: Blog use Intention of the participants

While the participation has been good and sustained so far, the interaction through commenting has not followed the same path. Only 38% of the articles were commented, and mostly by the same group of authors plus facilitators, although this will probably change if the blog is better promoted.

3. Analysis and Discussion

The whole experience of this laboratory has provided us with highly rich dataset of qualitative information. A preliminary analysis of this information is discussed in this section, which will be later on extended on a future work including more formal methods of analysis. The analysis follow the two research questions expressed at the beginning of the paper.

3.1. Sharing Interests and Interaction Patterns

The first research question that motivated this experience was what type of information and activities would elderly share with the world given the opportunities to do so using ICT? All of the observation notes taken during the laboratory, text items resulting from brainstorming sessions, questionnaire answers and blog posts written by participants make in its whole a highly rich well of qualitative data we have just started to dig into.

From the point of view of our research, there are two things we would like to learn: which topics of interest are more common between elderly and how do they interact when sharing what interest them most. Although there is much more room for further analysis, this section briefly reports the insights we have gained along these goals.

3.1.1. Sharing Interests

By analysing what they write on the blog, we can find information about what type of activities should ICT for sharing support if it aims to help older adults to reach out and share their lives with the world, enhancing their social interactions.

With its 3 months of independent activity, the blog is still young, but by reading the articles posted so far, the three most important subjects they have shared are *recipes, excursions* and *poems.* A new trend, started on the last month of activity, is that of sharing wisdom pieces like *phrases* and *short stories* with an underlying message. We can think of this as a set of initial insights to guide the design of early prototypes for applications that support sharing of elderly life experiences.

Some interviews with people that often visit the centre have been also posted, making it seem as if the "journalist" role can have a very positive impact on them. Reporting interviews was one of the most commonly mentioned "activities" for the imagined magazine of both brainstorming sessions.

Also from the brainstorming sessions, the three main topics of interests (regarding learning ICT) were *writing, making and sharing pictures* and *documenting interviews and activities of the centre.*

Moreover, in the initial brainstorming, one of the most common answers to the question *what would you like to learn* was related in some way or another to blogging (e.g. some answers were "enter a blog and a social network", "set things up with a blog", "to tag and to blog").

And finally, even if many did not have computers at home or knew very little about them, most were familiar with terms like "twitter", "Skype" or "social network".

3.1.2. Interaction Patterns

The second set of insights to discuss have to do with how was the interaction both during the laboratory and when sharing things through the blog.

From this experience, the main conclusion we can draw is that elderly love to *work in pairs*. Or more generally, they are highly collaborative. Even though each person had a computer of its own during the laboratory, many times we had found him or her working together on the same computer. And more so, several articles (around 30%) were actually signed by more than one person, or at least mentioned by name several others.

This means that thinking on multiple-authors collaborative blogging platforms has a great potential of use within older adults. And even more so, it also gives an idea of the level of engagement produced in this type of experiences and the potential of social ICT for these target users.

While they enjoy very much collaboration, they also like to express their individuality and ownership on the posts, which means that there is a need for having a way for each author to claim what it is his or her contribution, by enabling multiple author signatures so that they can see these articles as one of their owns and not only on the profile the user whose accounts was used to write it. This is something that came up on visits that we have realized to the centre after the laboratory.

We have seen how elderly have shown to be highly interactive and social when they have the opportunity. However, the little degree of commenting in the blog poses a challenge to the sustainability of this participation in the future, leading to the question of how much will this participation go on without an engaging audience that provides feedback and support.

One possible reason of the low amount of comments interaction is that the blog has not yet been officially promoted outside the centre. One of the authors also claimed not understanding how the comments work.

Moreover, according to both the coordinator of the centre and one volunteer, the blog has become one of the most important activities and even "the passion" of the authors, who are regularly coming only to write something in the blog. More importantly two out of the six regular authors have only started to frequent the centre because of the Blog. Friendship has also been triggered after blogging several times in pairs.

The Blog had also given new roles to some of the participants by enabling those who are more experts to become guides of the others. One of them in particular, who was always mentioning during the laboratory how difficult and how bad she was with the computer, have become one of the leading authors of the blog with 20% of the articles under her authorship.

While participation is certainly enabled, conflicts have also appeared when one of the authors posted too many articles on the same day, overshadowing other contributions.

3.2. Difficulties and Challenges when using ICT

The second of our research questions was *what difficulties and challenges do elderly users encounter when interacting with current ICT?* Analyzing the observations taken during the laboratory, and given the nature of our activity, we have found two main types of difficulties: those related to the *usability of the technology* and those related to the problems when trying to *learn ICT*. Following, we discuss our findings along these two main categories.

3.2.1. Usability Difficulties

One of the most common difficulties we have seen our participants to tackle once and again, is the complexity of having to engage with an user interface (UI) that has *multiple applications running all at the same time*. It was often confusing to them how to go from one application to another, and instead of simply switching contexts (e.g. using ALT+Tab in Windows), the usual approach for most was to open the program again from the menu. This seems to indicate that most elderly users will benefit more from an UI that is organized to be wizard-guided or sequential.

A second very common problem had to do with the *use of the mouse*. Moving, clicking, positioning and dragging are considered difficult tasks for elderly (Taveira 2009) and this experience was no exception. Very often, they would find themselves moving text around when all they wanted to do was to select a piece of text, and these situation take us to the next important complication: *undoing*.

In the many cases where something unexpected happened (e.g. moving text instead of just selecting it with the mouse), it was unclear for most how to go back to the previous state, even after having explained several times the use of the undo option. This generated great anxiety and many times we heard the participants loosing confidence and saying *"I am just never going to good for this"* or *"Forgive me, but I am just very bad at this"*.

Other problems were more connected to the *incorrect mental models* they had about computer and its different parts. One recurrent example was that many elders thought that

once the USB was connected to the PC, everything should automatically be stored there. Understanding that the USB drive was different than the hard drive required us to use real life examples of real documents being move from one box to another. And this led to another problem in the use of files: *understanding the notion of copies.*

During practices of writing in open office, they were using the laboratory PC and then we were asking them to save the files in their USB drives so to take them home. However, once multiple copies of the same file were created, they were often loosing track of which was the latest version.

Regarding the blog, the most important complication had to do with the fact that Wordpress' interface is overloaded with options, which in most of the times they won't use nor need. Before explaining, some people thought that saving in the blog meant also that the file was saved in their computer. There is a need for a simpler version of a blog with emphasis on the writing and content production experience rather than on organizing, tagging and categorizing the content.

From this brief discussion, it becomes clear that *direct manipulation* (Dreier 1983) and *natural user interfaces* (Mann 2001), leaving behind the mouse and getting closer to things as they are in real life, are in fact the key for developing user interfaces that fit the needs of elderly, or at least, of elders who fit the characteristics of this group: self-sufficient, independent, highly active and mostly part of the young-old cohort (aged 65 to 74).

3.2.2. Learning Difficulties

The most important learning difficulty we have observed has to do with the *different paces* for learning that each participant had. These differences seem to become even more important, resulting in a very heterogeneous group with some people advancing very fast and practically self-learning, while other need of constant assistance to keep up with the laboratory. We have come to learn that *slow information presentation* and *multiple repetitions,* as noted by (McCort 2000), along with *annotated step-by-step guides* can be very useful tools to overcome barriers of learning in older adults. Many needed to write down everything step by step in order to follow these guides back when needed.

In particular, one problem for many had to do with the *difficulty of doing two different things at the same time*: following the explanation in the front of the laboratory while at the same time trying to do what it is shown in the main screen of presentation. One method we tested during the lab was to start by having an explanation session without any computer nearby and then got to practice in the laboratory. This has shown to be effective as a technique to get their attention.

The rapid pace that we sometimes had was a source of *anxiety* for some of the participants, and there were a couple of them who left the course for this reason. For this reason, it is fundamental to constantly follow them closely and reassure them when they feel stressed for not keeping with the pace.

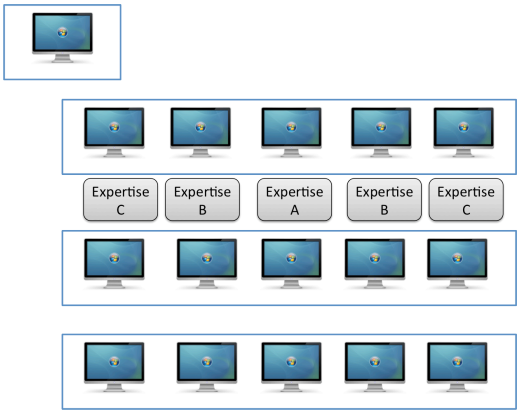

Figure 7. Laboratory disposition of participants according to expertise

The physical environment we had chosen posed also some important challenges on the mind setting of the participants. Originally, it was our intention to have sessions of mostly

practice and not too much of teaching, but the disposition of the laboratory made people feel like in classroom and then everyone was taking more an attitude of student than that of someone who has come to practice and proactively ask question about things it does not know.

This disposition made it difficult also to us to personally follow to the people who were sitting in he middle of the tables, because there was no central corridor. Figure 6 shows this disposition, that later became an opportunity for more collaboration when we had realized the high degree of diversity in expertise and in pace. Dividing people in three categories of expertise, we have placed people who knew more about computer at the centre, where they could help with the activity of personal tutoring while we concentrated on those that needed the most assistance. This collaboration, in the spirit of participatory design, was also one of the key factors enabling the participation in this community.

4. Conclusions and Future Work

In this paper, we have presented an overview of a Laboratory of Technologies for elderly planned and executed following a participatory approach. We have seen the potential of such approach not only for gathering valuable research feedback, but also to enable highly interactive community participation. We have realized with this experience and what we have learnt from it that ICT mixed with a motivating participatory environment, can both empower participation of elderly.

We have described in detail our approach, heavily based on grounded theory and participatory design. A preliminary analysis of the qualitative information we have gathered is presented, showing the learning potential of this type of research in the many field of ICT, and especially to produce requirements input for design processes.

The information we have gathered helped us to produce preliminary answers for our initial research questions about the most common topics of interest, interaction patterns and the difficulties that older adults might have when dealing with ICT. More analysis, however, can still be done, however we have seen how a simple ICT artefact (the blog) in a participatory context can enable community participation and engagement by creating close links between elderly who share stories together.

In particular, we have left most of the analysis for future work, where apart from the qualitative data gathered in this experience, we will include the information that resulted from the follow up *design workshop*. This analysis will seek to formalize the results from our preliminary analysis, with an orientation to the Human Computer Interactions community.

Moreover, other threads for future research include investigating on how to keep engagement in the long run, what is the impact of the blog in their lives and measuring how the interest in using the blog varies over time.

The most challenging part of a participatory experience is the post-experience. During such experiences, not only do you learn important lessons for your design or research, but you also deepen your relationship with the participants. And this of course has both a positive and a negative side. On the negative side, your analysis could be later on biased. On the positive side, you have built enough trust as to bring these participants back for future collaborations.

Furthermore, following the insights we have learnt about topic of interests, interaction patterns and difficulties in the use of ICT of elderly, the next logical step is to design new technologies that reduce or eliminate these difficulties maximizing sharing, henceforth closing this triangle with innovation. With this purpose, part of the future work is to design a system that will help elders to share, explore and rediscover their life experiences, find potentially old friends and other people with similar experiences, and, ultimately, increase their social interactions and foster exploration of their lives[10].

Finally, with this experience we have not only learnt important cues for our future research and development, but we had also successfully enabled high level of community participation using ICT.

[10] Early prototypes of this system are available at http://myhappystory.org/ and http://ow.ly/dbuV4

5. References

Bergvall-Kåreborn, B. and Ståhlbrost, A. (2008) Participatory design: one step back or two steps forward?. In *Proceedings of the Tenth Anniversary Conference on Participatory Design 2008 (PDC '08)*. Indiana University, Indianapolis, IN, USA

Bloom, D. E., Boersch-Supan, A., McGee, P., and Atsushi Seike. (2011) Population Aging: Facts, Challenges, and Responses. *Program on the Global Demography of Aging*.

Briefs, U., Ciborra C. and Schneider L. (1983) *Systems design for, with and by the users: Proceedings of the IFIP WG 9.1 Working Conference on Systems Design For, With and By the Users*. Riva del Sole, Italy, 20-24 September. Amsterdam, North-Holland

Brown, Tim. (2008) Design thinking. *Harvard business review*, 86(6), 84-92, 141.

Bronswijk, J. and Bouma, H. (2002) Technology for quality of life: an enriched taxonomy. Gerontechnology, 2(2):169-172

Carroll, J. M., and Rosson, M. B. (2007) Participatory design in community informatics. *Design Studies*, 28(3), 243-261.

Dianti M., Parra C., Casati F. and De Angelli, A. (2012) What's Up: Fostering Intergenerational Social Interactions. *FoSIBLE Workshop at COOP2012*, *May 2012*

Dreier, Matthias. (1983) Direct Manipulation. A Step Beyond Programming Languages. *IEEE Transactions on Computers* 16 (8): 57–69.

Drolet, A., Norbert S. and Yoon C. (2010) *The Aging Consumer: Perspectives from Psychology and Economics*. Taylor & Francis.

Ehn, Pelle (1992) Scandinavian design: on participation and skill. In *Usability*, Paul S. Adler and Terry A. Winograd (Eds.). Oxford University Press, Inc., New York, NY, USA

Fuchs, Victor. (1998) Health care for the elderly: How much? Who will pay for it?.

Greenbaum, J. (1993) PD a personal statement. *Commun. ACM* 36, 6 (June 1993)

Loureiro, B., and Rodrigues, R. (2011) Multi-touch as a Natural User Interface for elders: A survey. *Information Systems and Technologies, 2011 6th Iberian Conference. IEEE.*

Mccort, A., Telsavaara, T., Scipio, C. and Stanton, J. (2000) Issues in Teaching Older Adults How to Use Computers: The Skills Needed for Younger Adults to Use Computers. http://www.unc.edu/~jdumas/projects/aging.htm

Notess, M. and Lorenzen-Huber, L. (2007) Online learning for seniors: barriers and opportunities. *eLearn, 2007(5), 4. ACM.*

Silveira P., Daniel F., Casati F., Van Het Reve E., and de Bruin E. D. (2012). Active Lifestyle: an application to help elderly stay physically and socially active. *FoSIBLE Workshop at COOP2012, May 2012*

Mann, Steve. (2001). *Intelligent Image Processing*, John Wiley and Sons, 2001

Taveira, A. D. and Choi, S. D. (2009). Review Study of Computer Input Devices and Older Users. *International Journal of Human-Computer Interaction, 25(5), 455-474.*

Vicki L. O'Day, Daniel G. Bobrow, Billie Hughes, Kimberly Bobrow, Vijay Saraswat, Jo Talazus, Jim Walters and Cynde Welbes (1996) Community Designers. *In Proceedings of the 4th Biennial Participatory Design Conference 1996,* November 13 - November 16, 1996, Cambridge, Massachusetts, US.

WHO. (2002). *Active ageing: a policy framework.* World Organization of Health.