

What's Up: Fostering Intergenerational Social Interactions

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Abstract. Among the many factors that affect wellbeing, social relationships are undoubtedly one of the most important ones. As we grow old, however, our ability to maintain and nurture them is challenged by a wide range of age-related changes that hinder our perceptual, cognitive and psychomotor capabilities. In this paper, we present a mobile communication platform specifically designed to foster social interactions between elderly users and their friends and family. To validate our solution and gain further understanding of the needs of elderly from a design perspective, a "think aloud" study was conducted, investigating the usability and applicability of our solution. This study and its results are described in this paper, showing how a simple, almost featureless, interface is suitable for the oldest group of users and informing our design about different interaction issues to take into account for the future development of our platform.

1 Introduction

It is a fact of life that as we grow old, our capabilities are reduced in numerous ways including, among others, the decline of vision, hearing and of psychomotor abilities (Drolet et. al. 2010, Fozard & Salant 2001). Because of these changes, elders' interactions with relatives and friends tend to be reduced, often restricted to sporadic phone calls and face to face meeting that are usually initiated by the elders. Most grandparents talk to their grandchildren less than once a fortnight, phone-calls seldom last more than five minutes and grandparents (or parents) initiate the great majority of the calls (Evjemo 2004).

Information and communication technologies can help to tackle this problem by considering better both elderly especial capabilities and youngsters modes of communication. Following this overall requirement, we have developed a communication platform that fosters intergenerational communication through the means of a mobile application with different views and complexity levels.

To validate our approach and gain knowledge to further improve it, we have given a prototype version of our solution to a group of 28 elders and asked them to “think aloud” while they were using it. The experience gave us invaluable information about the difficulties of using current mobile technologies and touch interfaces for the older adults, besides the fact of helping us to improve our overall platform. In the following sections, we briefly explore related work and introduce our solution, we describe the methods we have used for our preliminary study, and finally discuss the results and future work.

2 Related Work

Among the many technologies that address the issue of intergenerational social interactions we can find the PACE Project¹ and their experience with tele-mentoring using videoconferences between older adults and youngsters (Bernard et. al. 2011). StoryVisit.org is another application aimed to connect families (Raffle et. al. 2011), particularly children with their parents living far away by providing a web interface for video conferencing and synchronized story telling. Also inline, but aiming more at the overall social connectedness without stressing the intergenerational aspect we can mention Bettie², a touch device to send and receive messages, similar to our solution and to setup at home. Epigraph is another available tool that provides a screen divided into a number of channels, each representing each family member. Channels can be updated via email, text or picture message (Lindley et. al. 2009). In the same line, Meza-Kubo introduces a TableTop device that provides social networking features for family members and caregivers to connect, motivate, and monitor elders' activities (Meza-Kubo et. al. 2009).

Another related line of work is that of simplified interfaces for elderly users. Eldy³ is a system that simplifies the user interface of a PC, providing quick access to the most important functions. InTouchLink⁴ is another example of the same type, aimed at senior living communities, providing simplified access to email, internet, photos, calendar, news, among other things.

¹ <http://www.pace2000.org/>

² <http://www.bett.ie/>

³ <http://www.eldy.eu/>

⁴ <http://www.intouchlink.com/>

3 What's Up Intergenerational Communication

What's Up is a mobile communication platform developed within the Lifeparticipation project¹ of the University of Trento, with the goal of supporting intergenerational social interactions. It is composed of two main mobile applications that provide simple communication through a common infrastructure. At one side, the younger use *What's Up LifeShare*, a full featured messaging application developed for the most common communication device of youngsters: smartphones (both iPhone² and Android³). On the other side, elders use the *What's Up Display*, and iPad oriented application that works as a display of all received messages and pictures. Figure 1 shows the communication model we propose.



Fig. 1. What's Up's one way communication

In the first iteration, *What's Up Display* worked only in a photo-frame mode, receiving text and pictures⁴. Later on, three more levels of complexity were added, as shown in Figure 2, to enable simple two-way communication allowing the elder to ask for news (level 1, “What’s UP”), reply with like/unlike messages (level 2, “Feedback”) and reply with a text message (level 3, “Complete”).

¹ <http://www.lifeparticipation.org/>

² <http://itunes.apple.com/it/app/lifeshare/id466402571?mt=8>

³ <https://play.google.com/store/apps/details?id=it.trento.casagranda.simone.ysharee>

⁴ Demonstration/promotion video available: <http://www.youtube.com/watch?v=U-B-gfgjuz0>



Fig. 2. What's Up Interfaces for the Think Aloud Study

A prototype with all these levels of complexity was implemented for the study we describe in the following section, with the goal of understanding how much of the usability of the application is affected by the increasing complexity.

4 Prototype Evaluation: Think Aloud Study

In order to assess the usability and applicability of our solution, we have introduced the iPad to 28 elder users and then installed our application with a complexity level different from the last testing (to ensure heterogeneous opinions on different levels). Basic functionalities were explained to users, asking them to navigate between resources and explain what they felt, their thoughts and concerns. Usability and applicability were then evaluated using the following means:

- Each participant answered a questionnaire about the ease of use and comfort after using the first complexity level.
- Continuing the test, each participant tested the remaining levels of complexity.
- Each participant was then asked to produce a ranking of UIs by the level of enjoyment in using each of them.

Through all the session, each participant was video recorded while interacting with the application (“think aloud” method), with the goals of eliciting the way each UI is perceived and extracting mental models of the users while solving problems (Lewis and Rieman 1994). For the first evaluation, the formal mental model extraction was left for future work, doing only and empirical evaluation.

Of the 28 users, 16 belong to a young-old group (aging 65 to 74), 6 to a middle-old group (aging 75 to 84), and 6 to the old-old group (aging 85 or more)¹.

¹ The groups segmentation follows that of Drolet, Schwartz and Yoon (Drolet et. al. 2010)

5 Results

Most users responded positively when asked about the ease of use and comfort of the application, as seen in Figure 3.

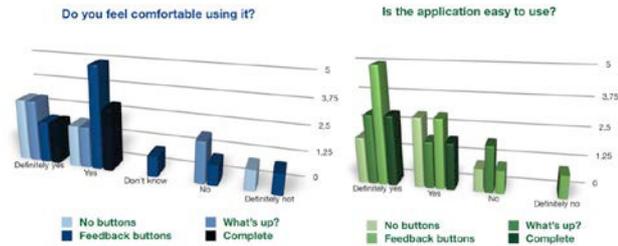


Fig. 3. Ease of use and comfort of the application.

Moreover, following other answers to the questionnaires, overall evaluation of the design is positive. Buttons meaning was clear and readability was 100% positive. Almost all feedback about aesthetics was positive.

When asked 'would you use the application?' most elders that would not use the application are those that do not use computers either, while others are more in touch with technology. Furthermore, most elders answered that they would use the application alone (provided that they have been taught how to turned on/off the iPad). On the frequency of communication between elders and youngsters, our results show that people that are not willing to use the application are in general less willing to communicate also with other technologies.

The final question on the questionnaires was about the preferred interface level. Figure 4 shows that young-old elders prefer the most complex application, while the old-old users are more willing to use a simple interface, with no buttons and where they just have to use the finger to navigate the resources. When not considering age groups, however, no interface was particularly preferred, which means that applications should be customizable in this aspect.

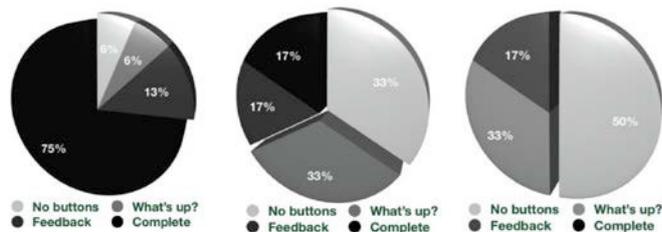


Fig. 4. Preference of interface levels by age group in ascending order.

Finally, from the empirical evaluation of the think aloud videos, the most important results are as follow:

- For the simple, no buttons interface, most users did not have problems, even with shaking hands.
- The ‘unlike’ button might not have a clear meaning in occasions.
- Shaking hands is a problem when using a keyboard or buttons making them involuntary press the device, which later disorientates the elders for the unexpected application behaviour.
- Sometimes, users were touching button images in the wrong place, indicating some difficulties for understanding icons.
- Some users tried to scroll buttons, indicating that multiple interaction patterns can be confusing for some elders
- Faster users pressed buttons over and over again during delays.

A summarized video of the think aloud protocols is available online with further conclusions of our analysis¹.

6 Conclusions and Future Work

In this paper, we have introduced a communication platform that enables intergenerational social interactions through the means of mobile applications that run on smartphones for youngsters and on tablet devices for older adults.

With a first prototype of our platform, we have collected think aloud protocols and answers to a questionnaire about its usability and applicability, preliminary demonstrating that a platform of this type has a real potential for filling the communication gap between elders and their younger social connections.

Our results showed that the number of provided features changes the levels of experienced usability and applicability in the elders. Adaptability of complexity seems to be an important design requirement given that no interface is the most preferred by all age groups. For the oldest users (aged 85 or more), however, the most simple seems to be clearly preferred. The applications initially should be presented to the elders with the most simple interface and limited classes of features, adding a new class of features only after the user gets confident.

We have also collected important information about the use of this technology and the willingness of older adults to use it for communication, which can be very useful for application designers working for this type of users.

Future work include the formal evaluation of the think aloud protocols to extract mental models, running an usage study to understand the when and why youngsters would share a message with the elders, and the overall improvement of

¹ Think aloud videos summary: <http://www.youtube.com/watch?v=pouFfeR0n0A>

the application capabilities including the support for sharing videos, synchronized viewing of resources, cleaned UI design, among other things.

7 References

- Bernard, M-M., Fruhwirth, M., Brooks, M., Oakley, K. et. al. (2011): Intergenerational telementoring for the promotion of social relationships. *Gerontechnology*.
- Drolet, A., Norbert S. and Yoon C. (2010): *The Aging Consumer: Perspectives from Psychology and Economics*, Taylor & Francis.
- Evjemo, B., Svendsen, G. B., Rinde, E. and Johnsen, J-A. K. (2004): Supporting the distributed family: The need for a conversational context. *Proceedings of NordiCHI 2004*.
- Fozard, J. L. and Gordon-Salant, S. (2001): Changes in vision and hearing with aging. In Birren, J. E. & Warner, K. *Handbook of the psychology of aging*. New York: Academic Press
- Lewis, C. and Rieman, J. (1993). *Task-Centered User Interface Design. A Practical Introduction*.
- Lindley, S.E., Harper R. and Sellen A. (2009): Desiring to be in touch in a changing communications landscape: attitudes of older adults. *Human factors in computing systems*. ACM.
- Meza-Kubo, V., Moran, A.L. and Rodriguez, M. (2009): Intergenerational Communication Systems in Support for Elder Adults with Cognitive Decline. *IEEE Proc. Of TCCD Workshop, Pervasive Health*.
- Raffle H, Revelle G, Mori K, et al. (2011): Hello, is Grandma there? Let's Read! StoryVisit: Family Video Chat and Connected E-Books. *Human Factors*.