# Tablet apps for the elderly

Ivo Fonseca
Aveiro University / ICPD
Campus Universitário de Santiago
3810-193 Aveiro
+351 936 422 079
ivodaniel@ua.pt

Ana Veloso
Aveiro University / CETAC.MEDIA
Campus Universitário de Santiago
3810-193 Aveiro
+351 961 907 419
aiv@ua.pt

Nuno Dias
Aveiro University / ID+
Campus Universitário de Santiago
3810-193 Aveiro
+351 927 992 256
ndias@ua.pt

## ABSTRACT

In the past decades, life expectancy for the average 65-year-old senior citizens has increased. It would be expected to have a proportional growth as quality of life, instead these variables don't necessarily have a direct correspondence. This age group remains particularly vulnerable to situations of loneliness, depression and social isolation. Furthermore, a social support network (family and friends) seems to be a solution for the eradication of these barriers [1]. The Internet is a possible choice for overcoming the physical and social barriers that seniors have between them and their social group, but several social, cognitive and ergonomic factors hinder the realization of this potential. In the context of interface design, it is necessary to understand senior citizens' specific needs and conceive a more user-friendly and inclusive design [2]. Research areas focused on Tangible User Interfaces as well as ubiquitous computing can contribute to solving this problem with an appropriate interaction paradigm that reduces the level of abstraction between user intentions and devices functions [3]. It is therefore, urgent to understand how the TUI's (Tangible User Interfaces) can be used to create a new type of interface that promotes the use of ICT (Information and Communication Technologies) for senior citizens.

The present research work was undertaken to study the problem of senior citizens' digital exclusion by designing and evaluating a service of asynchronous communication - email - with the involvement of senior citizens during the design process. The proposed service uses a multitouch interaction paradigm through a multitouch tablet device (Apple iPad).

The methodology used for the creation of the interface was based on User Centered Design (UCD) approach. UCD simplifies the execution of user's tasks and ensure that users are able to make use of the product as intended by easing the process of learning [4]. It also fosters new insights in the development of a product and allows the questioning of assumptions and practices pre-established, facilitating the creation of innovative and useful interfaces [5]. Several methods were used for conducting this participatory research design, such as the technique PICTIVE [6] in order to allow users acting as participants in the whole process and improve their acquisition of knowledge in design [7] as well as making the design process more fun due to the users' involvement [8].

Moreover, the emotional and user's experience design has been subject of great importance to the area of interaction design [9]. It is increasingly important to develop systems that are satisfying, enjoyable, fun, interesting, motivating, meaningful, aesthetically significant and creative; in other words, it is crucial to define what the user will experience when using the interface – the user experience – and these goals are fundamentally different from those related to usability: whereas usability goals are objective, the nature of experience is essentially subjective [7]. One of the models arising from psychology, which is relevant to this context, is the theory of flow (optimal experience). It describes the mental state of optimal experience as a result of the realization of something whose reward is its own action, held in a state of total involvement, concentration, enjoyment, and loss of track of time, in balance between extrinsic and intrinsic capacity challenges [10]. Another emerging concept – hedonomics – is defined as the branch of science and design dedicated to the promotion of optimal relationship between man and technology [11]. Through this term, it seeks to counter the focus of HCI on the mere adequacy between user and equipment – ergonomics – promoting instead the dimensions of pleasure.

The multitouch interfaces – interfaces that make use of free actions allowed by the simultaneous use of fingers and limbs of the user – are an emerging technology. They turned out to be popular in the mid-first decade of this century, and constituted a promising approach to learning systems, by reducing the cognitive load resulting from the direct manipulation of objects. The appeal of direct manipulation of multitouch interfaces comes through the experience they provide: by manipulating objects in a predictable and realistic way and it is given the illusion of a

real grasp. The direct manipulation provides an intuitive relationship between points in the local and screen space, without requiring any explicit gesture processing [12]. The real focus of this study is to know what are the benefits of these devices for senior citizens.

To sum up, the main focus of this research was the creation of a multitouch email app for senior citizen users. In order to achieve this the research team had the collaboration of two groups from two Private Social Institutions in the region of Aveiro. The experimental group collaborated in the creation of the interface through a collaborative design technique (PICTIVE), which enabled the construction of a multitouch system in an equal opportunity context between the user and the designer; the control group helped to evaluate the quality of the prototype, considering its usability and the user experience. All seniors involved had previous contact, albeit limited, with computers, and none had used multitouch devices before. As such, the experimental group went through several weeks of a set of multitouch activities and games that allowed them to gain familiarity with the device and increase the quality of their contribution during the participatory design process.

Finally, the findings indicate that using a multitouch device provides an advantage in approaching seniors citizens to ICT, by reducing the physical effort required to use computer interfaces. However, significant advantage in the reduction of existing cognitive barriers was not observed. The participatory design seemed to be a promising technique for this age group, as it was possible to obtain valid information for the construction of the conceptual model of an e-mail service and the seniors understood well the “make-believe” nature of the exercise. Finally, the results of the analysis of the flow states were consistent with the prototype’s qualitative results as well as the qualitative observation of its procedures. We can, therefore, conclude that the construction of gestural interfaces tailored to senior citizens provide a good user experience and may provide a way to approach this target audience to the use of ICT.

## REFERENCES


[1] Dean, A., Kolody, B. and Wood, P. Effects of Social Support from Various Sources on Depression in Elderly Persons. Journal of Health and Social Behavior, 31, 2 1990), 148-161.

[2] Basdekis, I., Klironomos, I., Antona, M. and Stephanidis, C. Online Communities for All: The Role of Design for All in the Formation and Support of Inclusive Online Communities. In Proceedings of the International Design for All Conference (Rovaniemi, Finland 2006).

[3] Hollinworth, N. Improving computer interaction for older adults. ACM SIGACCESS Accessibility and Computing, 93 2009), 11-17.

[4] Abras, C., Maloney-Krichmar, D. and Preece, J. User-Centered Design. Sage Publications, City, 2004.

[5] Black, A. User-centered design. City, 2008.

[6] Muller, M. J. PICTIVE - An Exploration in Participatory Design. City, 1991.

[7] Preece, Rogers, Y. and Sharp, H. Design de interacção: além da interação homem-computador. Bookman, Porto Alegre, 2005.

[8] Shneiderman Designing the User Interface: Strategies for Effective Human-Computer Interaction Addison Wesley Longman, Reading, 1998.

[9] Shneiderman Designing for fun: how can we design user interfaces to be more fun? interactions, 11, 5 2004), 48-50.

[10] Csíkszentmihályi, M. Beyond boredom and anxiety: the experience of play in work and games. Jossey-Bass, 1975.

[11] Hancock, P., Pepe, A. and Murphy, L. Hedonomics: The power of positive and pleasurable ergonomics. Ergonomics in design: The quarterly of human factors applications, 13, 1 2005), 8-14.

[12] Reisman, J. L., Davidson, P. L. and Han, J. Y. Generalizing Multi-Touch Direct Manipulation. In Proceedings of the SIGGRAPH 2009 (New Orleans, Louisiana, 2009).