

The design adaptation of the virtual assistant Anne for moderated dementia patients and their formal caregivers in protected environment tests

Vera Stara¹, Michiel de Jong², Elisa Felici¹, Daniel Bolliger³, Edith Birrer³, Viviane von Döllen⁴, Lorena Rossi¹, Marcel Heerink², Vanessa Evers²

1 IRCCS INRCA - National Institute of Health & Science on Ageing, Ancona, Italy

2 University of Twente, The Netherlands

3 iHomeLab Lucerne University of Applied Sciences & Arts Switzerland

4 Développement organisationnel, Stéftung Hëllef Doheem Luxembourg

Background. Dementia has become a major health problem with an equally important economic impact on our society: approximately 47 million people have dementia worldwide and this is expected to almost triple by 2050. The cost associated with this disease is estimated to be at 818 billion dollars, and by 2030, this cost is expected to exceed one trillion dollars [1]. Enabling patients with dementia and their carers to improve their quality of life and dignity is a great challenge.

The Living Well project. In the light of this background, the Living Well with Anne project (<http://livingwellwithanne.eu/>) aims to develop a computerised system to help and support older adults and their caregivers who are living independently in their own home and are dealing with memory and other cognitive issues. The system includes an avatar for interaction which is even able to show emotions to make the interaction more natural. An easy to learn command set enables the end-user to operate with the device. Local and collaborative algorithms allow the system to recognize the individual user's behavior and enable the system to adapt to the specific individual needs. Anne works on a Surface Pro under the Microsoft Windows 10 operating system.

The Method. A great challenge of the Living Well project is to provide a human-centred perspective that can be integrated in the main development cycles of the system [2]. The active involvement of users and a clear understanding of context of use are the key strengths to overcome the main barriers in applying technology for seniors in general and in particular for people who suffer of dementia. Within this challenge, an important phase is to adapt Anne to the different stages of dementia. This adaptation has been approached using the specific method of protected environment tests: Anne is experienced by patients with moderate dementia within a controlled setting and under the supervision of their formal caregivers. Each user experience is observed by formal caregivers and researchers. Formal caregivers are interviewed at the end of each session of test using a semi-structured list of questions.

The Results. In Italy, 5 patients with moderate dementia, 2 formal caregivers and 2 researchers has been involved in different iterations. In Luxembourg 1 person with dementia, 2 formal caregivers and 1 researcher were involved in the requirements session. Additional patients will be involved in the testing of the consequent iteration of the protected environment tests. The observations show that: 1) the observant did not detect facial expressions of anxiety; 2) Anne can be a very interesting tool for the daily activity of the formal caregivers.; 3) the current Anne is too complex to be used in an autonomously way by the users, because these participants are not able to touch the screen and do not understand that Anne is here to listen or serve them.

Conclusion. The results confirm a virtual assistant can be a good tool to help formal caregivers in supporting people with moderate dementia. Moreover, further research is needed to understand the impact of this kind of systems with regards to the progressive nature of dementia [3].

References

1 Magklara, E., Stephan, B. C., & Robinson, L. (2019). Current approaches to dementia screening and case finding in low-and middle-income countries: Research update and recommendations. *International journal of geriatric psychiatry*, 34(1), 3-7.

2 de Jong, M., Stara, V., von Döllen, V., Bolliger, D., Heerink, M., & Evers, V. (2018, November). Users requirements in the design of a virtual agent for patients with dementia and their caregivers. In *Proceedings of the 4th EAI International Conference on Smart Objects and Technologies for Social Good* (pp. 136-141). ACM.

3 Lorenz, K., Freddolino, P. P., Comas-Herrera, A., Knapp, M., & Damant, J. (2017). Technology-based tools and services for people with dementia and carers: Mapping technology onto the dementia care pathway. *Dementia*, 1471301217691617.