
LIFE-BASED DESIGN OF DIGITAL SERVICES SUPPORTING THE SENSE OF SECURITY FOR HOME-DWELLING PEOPLE LIVING WITH MEMORY DISORDER

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Abstract

Memory disorder impairs people's independent functioning in daily life and thus threatens their safe living at home. Living at home safely requires the diversification of in-home services and forms of assistance for those living with memory disorder. The aim of this paper is to describe the life-based design process of the ongoing TuTunKo-project (2016-2017) and provide ideas for a practical operational model based on the experiences gained during the project. The goal of the project is to design a platform for digital services that support the sense of security and quality of everyday life of home-dwelling people living with memory disorder. In addition, instruments will be developed to evaluate the sense of security and life management of those with the condition and their family members.

Keywords: digital services; Finland; home-dwelling; life-based design; memory disorder; sense of security

Introduction

A key goal in Finnish social and health policy is to promote elderly people's possibilities for accessible and safe living at home for as long as possible.¹ The average age of the population in Finland is increasing faster than in several other countries.² Due to that, the prevalence of memory disorders is increasing.³ Although age is a risk factor, memory disorder also touches younger people with age-appropriate service-needs.⁴ Memory disorder impairs people's independent functioning in daily life and thus threatens their safe living at home.⁵ Living at home safely requires the diversification of in-home services and forms of assistance for people living with memory disorder.³ Technology can help create a barrier-free home environment which increases the sense of security,

enhances a person's daily functioning, supports informal caregivers and enables safe living at home for as long as possible.^{6,7}

The aim of this paper is to describe the life-based design (LBD) process of service concepts in the ongoing TuTunKo-project (2016-2017) and provide ideas for a practical operational model based on the experiences gained during the project.

Objectives of the project

The TuTunKo-project aims to increase the sense of security of home-dwelling people living with early-stage memory disorder (PMD) and support their self-care and independent living by means of digital services. The goal is to design a platform for digital services that enables the tailored selection of products and services from different manufacturers for the users' individual needs. Digital services will be designed to support the sense of security and quality of everyday life for PMD. In addition, instruments will be developed to evaluate the sense of security and life management of those living with the condition and their family members.

Implementation of the project

The development process was premised on the basis of LBD, a multidimensional and holistic understanding of human life as the foundation of the design.^{8,9} The starting point was to understand users' way of life, needs and accurate problems in daily life before designing technical solutions that could support their sense of security at home. We also aimed to involve the users in the design process. User needs were identified by performing a relevant literature search and conducting qualitative interviews. The literature search focused on the risk factors that predict PMD's transition to long-term care, factors that promote their sense of security at home and their experiences of technology regarding safe living at home. Qualitative interviews provided complementary understanding of the factors that create sense of security from the

viewpoints of PMD, their family members and nurses. Furthermore, more detailed views of the users' needs and wants towards digital technology were gained from the clients and staff of the Memory Association of Oulu Region, an expert and support centre for PMD and their family members.

Based on the understanding of users' needs and wants, the relevant literature concerning self-care behaviour styles of older people living at home, adult learning theory, and elderly persons' safety needs, four different user profiles with possible useful technology were formulated.^{10,11,12} These profiles as well as discussions between research institutes, municipalities' service providers and collaborative companies formed a background for new service models aiming to increase the users' sense of security and quality of life. During the project the collaborative companies will pilot their devices, such as entry management, activity monitoring, GPS-tracking and automatic medicine dispensing, with participating municipalities' home care services. Users' and home care nurses' experiences of the feasibility and usefulness of piloted technology as well as the cost effectiveness of the technology will be evaluated. Self-administered questionnaires to measure the sense of security and life management of PMDs and their family members will be developed during the project. Our objective is to develop valid and reliable easy-to-use instruments which can be integrated into a digital platform, and which recognises critical changes in a person's situation, helps to target nursing interventions according to individual needs, and guides and motivates users to self-care.

Elements of the operational model

Based on experiences gained during the project, the elements of the operational model for the design and introduction of a digital platform for supporting the sense of security of PMD at their homes is presented in the Figure 1.

Conclusions

Although this is a preliminary project, it points out the importance of developing new technology that can secure safe living at home for those with memory disorder. Furthermore, the project indicates the necessity for a life-based approach when designing and introducing new technology for users with impairment in daily functioning. With the help of LBD, safe living can be achieved through the analysis

of people's forms of life and life settings as a starting point to technology design, and the efficient use of these data in design processes. This project provides the background for a for a larger project to validate the operational

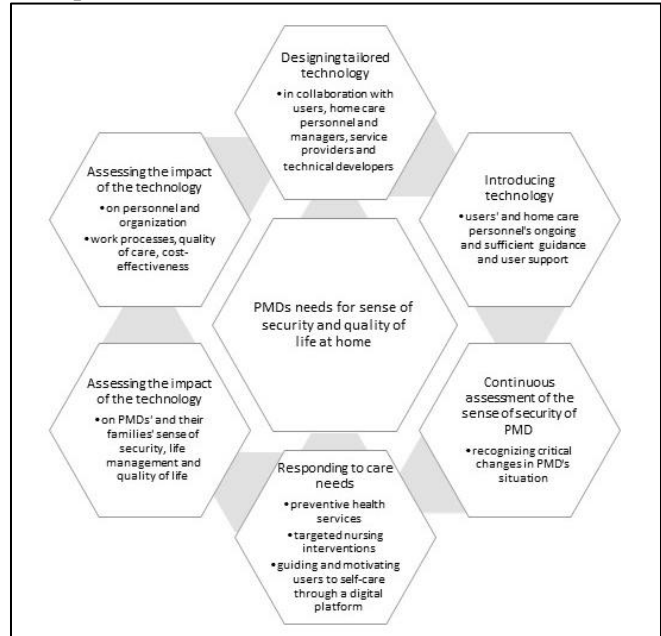


Figure 1. Elements of the operational model for the design and introduction of technology for supporting the sense of security of PMD at their homes.

model. A platform for digital services will be developed as a continuation to this project.

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References

1. Ministry of Social Affairs and Health. *Quality recommendation to guarantee a good quality of life and improved services for older persons*. Publications of the Ministry of Social Affairs and Health 2013:19. Available at: <http://urn.fi/URN:ISBN:978-952-00-3443-6> accessed 2 January 2017.
2. United Nations, Department of Economic and Social Affairs, Population Division (2015). *World Population Ageing 2015*, ST/ESA/SER.A/390. Available at: http://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2015_Report.pdf accessed 2 January 2017.
3. Ministry of Social Affairs and Health. *National Memory Programme 2012–2020. Creating a "memory-friendly" Finland*. Reports and Memorandums of the Finnish Ministry of Social Affairs and Health 2013:9. Available at: <http://urn.fi/URN:ISBN:978-952-00-3286-9> accessed 2 January 2017.
4. Johannessen A, Möller A. Experiences of persons with early-onset dementia in everyday life: a qualitative study. *Dementia* 2011;12(4):410–424. Available at: <http://journals.sagepub.com/doi/pdf/10.1177/1471301211430647> accessed 2 January 2017.
5. Black BS, Johnston D, Rabins PV, et al. Unmet needs of community-residing persons with dementia and their informal caregivers: findings from the Maximising Independence at Home Study. *J Am Geriatr Soc* 2013;61(12):2087-2095. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4001885/pdf/nihms565158.pdf> accessed 2 January 2017.
6. Van Hoof J, Kort HSM. Supportive living environments: a first concept of a dwelling designed for older adults with dementia. *Dementia* 2009;8(2):293-316. Available at: <http://journals.sagepub.com/doi/pdf/10.1177/1471301209103276> accessed 2 January 2017.
7. Olsson A, Engström M, Skovdahl K, Lampic C. My, your and our needs for safety and security: relatives' reflections on using information and communication technology in dementia care. *Scand J Caring Sci* 2012;26(1):104-112. Available at: <http://onlinelibrary.wiley.com/doi/10.1111/j.1471-6712.2011.00916.x/epdf> accessed 2 January 2017.
8. Leikas J. Life-Based Design. *A holistic approach to designing human-technology interaction*. VTT Technical Research Centre of Finland, VTT Publications 726, 2009. Available at: http://www.vtt.fi/Documents/2010_P726.pdf accessed 2 January 2017.
9. Saariluoma P, Cañas JJ, Leikas J. *Designing for Life - A human perspective on technology development*. London: Palgrave MacMillan, 2016.
10. Räsänen PM, Kanste O, Elo S, Kyngäs H. Factors associated with the self-care of home-dwelling older people. *J Nurs Educ Pract* 2014;4(8):90-96. Available at: <http://dx.doi.org/10.5430/jnep.v4n8p90> accessed 2 January 2017.
11. Jarvis P. *Paradoxes of Learning. On Becoming an Individual in Society*. San Francisco, CA, Jossey-Bass Inc. Publishers, 1992.
12. Lanne M. Käsityksiä kotona asuvan ikäihmisen turvallisuuteen liittyvistä tarpeista ja palveluista [In Finnish]. *Gerontologia* 2013;27(3):262–276.