"Smart furniture 'listening' to your body!" – Designing an assistive 'hub' to support independent ageing

D. Yang & L. Moody

Yang & Moody (2020). Gerontechnology 19(suppl); https://doi.org/10.4017/gt.2020.19.s.69672

Purpose An aging population and increased longevity leads to accompanying economic and healthcare challenges (Bloom et al., 2015). According to WHO, appropriate and timely measures can minimize health care expenditure by supported self-care and home-care services (Rechel, Doyle, Grundy & McKee, 2009). Technology-driven interventions integrated in the physical environment can play a key role to measure and detect health problems at an earlier stage, decrease the costs of caring and reduce the physical and emotional burden on family members and caregivers (WHO, 2015). Effective smart home technology will have increasing significance to health and social care, whilst offering the ability to monitor daily living as well as detect and predict changes in daily routines (Ding, Cooper, Pasquina & Fici-Pasquina, 2011; Martin, Kelly, Kernohan, McCreight & Nugent, 2009). Whilst the potential of such technologies to enable older adults to remain living independently for longer is broadly recognised, there are still questions around acceptability and sustainability (Peek et al., 2014). We argue that to improve adoption and acceptance by the end-user, further investigation is required of the wants, needs, and attitudes of older adults towards smart assistive technologies. Findings should then inform development from the design concept stage through the development and evaluation process. This paper will describe the user research undertaken as part of the large-scale and multi-disciplinary EU funded project MATUROLIFE. We will outline the process involved in developing smart furniture that seeks to capture and make use of health and well-being data to enable ageing in place. **Method** Thirty-seven older adults aged 65 and above were interviewed to understand their needs, preferences and views on independence, health concerns and determine design requirements. Six co-creation workshops were then undertaken with older adults to prioritize design requirements and develop smart design concept. The project is highly multidisciplinary bringing together older adult participants with product and furniture designers, human factor and material scientists, and also sensor and electronics technologists to share knowledge, and enable open innovation and collaboration. **Results and Discussion** The interviews and co-design activities indicated that older adults would prioritise issues associated with poor sleep patterns, remaining physically active, fear of falling, being unsteady on their feet, and fear of not reaching help if needed, when seeking to design new technology. In order to address these priorities, the design of a smart sofa with an assistive 'hub' to support the sit-stand movement and enable old adults remaining active and mobile was scoped out during the workshops. It would detect and record physical presence in conjunction with vital signs (i.e. breathing) with alerting support network, as well as encouraging a positive sleep routine. It was identified that, as well as smart functionality, the sofa should offer stylish and comfortable addition to the home. The concept prototype is currently under development and will combine smart textiles with sensor technologies to provide valuable information and services to the user and those that care for and support them.

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Keywords: smart furniture, ageing independence, assistive technology, co-design
Address: Centre for Arts, Memory and Communities, Coventry University, UK
Email: danying.yang@coventry.ac.uk

Figure 1. Smart sofa design

Figure 2. Smart sofa prototype