

Designing a Comprehensive Navigation Device for Older Adults Living with Early- and Middle-Stage Dementia in Care Homes

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As the global population ages, there is a growing need for developing technologies that support the specific needs of older adults, especially those who live with degenerative conditions, such as dementia. My project focuses on the design of a comprehensive navigation device, specially adapted to the needs of older adults living with early- and middle-stage dementia in care homes. The aim was to create a user-friendly, intuitive device that encourages physical activity and promotes independence, thus enhancing mobility and improving the well being of its users.

Dementia presents various challenges that hinder the daily lives of the people living with it. These challenges include memory loss, disorientation of time and place and lack of initiation among other such things. For older adults living in care homes, these challenges can significantly hinder their mobility and independence. Traditional navigation aids such as maps or apps on our phones, are often too complex or overwhelming for individuals in cognitive decline to understand. Because of this, it is crucial for a device to be designed that is specifically tailored to meet the needs and limitations of the user group.

A user-centred design approach was used to develop an effective solution by focusing on understanding the needs, wishes and challenges of the target group. The process began by conducting extensive research on the topic as a whole zoning into the important aspects as the assignment progressed. An expert interview complemented this by giving a more direct insight into the perspective of the target group. To conclude the research conducted, a list of requirements was established that gave a basis for the design phase that followed. This list focused on the simplicity and ease of use of the device to maximise the ease of use for the users.

The design phase was characterised by the development of three ideas that came from an extensive round of idea generation. These explored different forms of sensory feedback for the provision of directions, namely visual, auditory and tactile cues. With the development of the concepts, abiding by the list of requirements, a choice had to be made for which one to develop further. For this, the expert that was previously interviewed was sought out again to get their opinion about the choice. This led to the election of a simplified digital compass that mixes elements of a handheld GPS device with those of a compass. The device gives both

visual and auditory instructions, accommodating different levels of sensory perception and ensuring that the device can be used properly in various scenarios. With the use of buttons, extra functions can be activated that further enhance the usability of the device. The final design can be seen in Figure 1.

Figure 1: Final design of the device



With the finalisation of the device, the elements were prototyped to verify their functionality and see if any changes had to be made. This was done by modelling the device on SolidWorks and 3D-printing it. This gave a physical representation of the device to be able to test its ergonomics and the layout of the features. The prototype of the device can be seen in Figure 2. To use the device, it is connected to the user's phone, which covers the biggest part of the functionality, letting the device be as simple as possible. The app was also visualised in this phase to get an idea of the features and functionality present in it.

Figure 2: 3D-printed prototype of device and mount



While the design shows promise, there are several opportunities for further research and development. This could be done by adding other elements to increase the motivation of the users or by extending the functionality of the product to allow for a more complete solution that can further assist older adults in their daily lives. By integrating the users in the form of testing, the possibilities for expansion can be fully seen and there will be a clearer picture of the elements that could further benefit the device.

In conclusion, as a result of this project, a comprehensive navigation device personalised to the needs of older adults living with dementia in care homes was successfully designed, providing a valuable tool for the promotion of independence and quality of life. With further expansion, this device shows promise to make a positive impact on the lives of older adults and their caregivers, creating a more inclusive and supportive approach to digital health technology.