

Warm Technology: A Design Perspective on Dementia Research in HCI

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Abstract

The number of people with dementia is increasing and there is still no cure. HCI research has been addressing the role of technology in supporting the quality of life of people with dementia. We foreground the concept of *Warm Technology*, as an approach to technology design that addresses the social and emotional needs of people with dementia through empowering technologies. In this poster submission, we first elaborate on the relevance of Warm Technology for health research in HCI. Next, we provide two concrete examples of Warm Technologies to support people with dementia at home and in residential care settings. Lastly, we outline directions for future research on dementia in HCI to design for 1) *Transitions*, 2) *Impact*, and 3) *Emergent Technologies*.

CCS Concepts

• **Human-centered computing** → **Human computer interaction (HCI)**; *HCI theory, concepts and models*.

Keywords

Care, Dementia, Design, HCI, Health, Warm Technology

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1 INTRODUCTION

Dementia is a general term for neurodegenerative conditions causing cognitive changes that negatively affect memory, language, orientation, and judgment [10]. Dementia is an ongoing global societal phenomenon as the number of people diagnosed increases rapidly and adds pressure to overburdened care systems and increased workload for individual care professionals [1]. Researchers in Human-Computer Interaction (HCI) are investigating how technology and design can contribute to the well-being of people with dementia and their caregivers [11]. This work on design and dementia in HCI has shifted the social and critical perspectives of people with dementia from addressing them as a homogeneous group of

patients based on cognitive and physical disabilities to acknowledging them as individuals with their own unique lived experiences [9]. This approach aims to promote empowerment and agency in social encounters [2, 6], and support people with dementia in exploring their sense of self and expressing identity [12].

In line with this work, we foreground the concept of *Warm Technology*, which is defined as an approach to technology design that addresses the social and emotional needs of people with dementia through multisensory and empowering technologies that focus on the abilities and potential of the person with dementia [7]. In this poster submission, we 1) elaborate on the relevance of Warm Technology for health research in HCI, 2) provide concrete examples of Warm Technology based on previous CHI publications, and 3) set avenues for future dementia research in HCI.

2 Warm Technology

The concept of Warm Technology [7] was introduced by IJsselsteijn et al. to design technology that supports a ‘warm care’ approach [14]. ‘Warm’ refers to warmth from human contact and presence, as well as feelings of comfort, coziness, and human affection. The concept of ‘warm care’ builds further on person-centered approaches by providing warmth and affection in the care delivery process [15]. This sensitive approach is often in contrast to functional technologies perceived as instrumental and depriving care residents of the closeness, social connection, and human affection that a caregiver provides [14]. For example, while medicine dispensers can quickly complete the care task of administering medicines, a caregiver providing medicines in person is associated with compassionate care delivery, as this gives room for a social encounter and personal touch [13].

Warm Technology aims to support the needs of people with dementia and facilitate their engagement in social and affective relations [7]. It offers an approach to technology design that embraces the individual experience and potential of people with dementia to be user-friendly, empowering, aesthetically pleasing, and non-stigmatizing [7]. In addition, it is not only an inherent quality of the technology but also how it is deployed in care practice and used by professional caregivers. Warm Technology aims to fit within complex everyday care environments and address the health environment as the ‘home’ of people with dementia through comfortable and meaningful experiences.

3 EXAMPLE CASES OF WARM TECHNOLOGY

In this section, we provide two examples of Warm Technology in a home and residential care setting.

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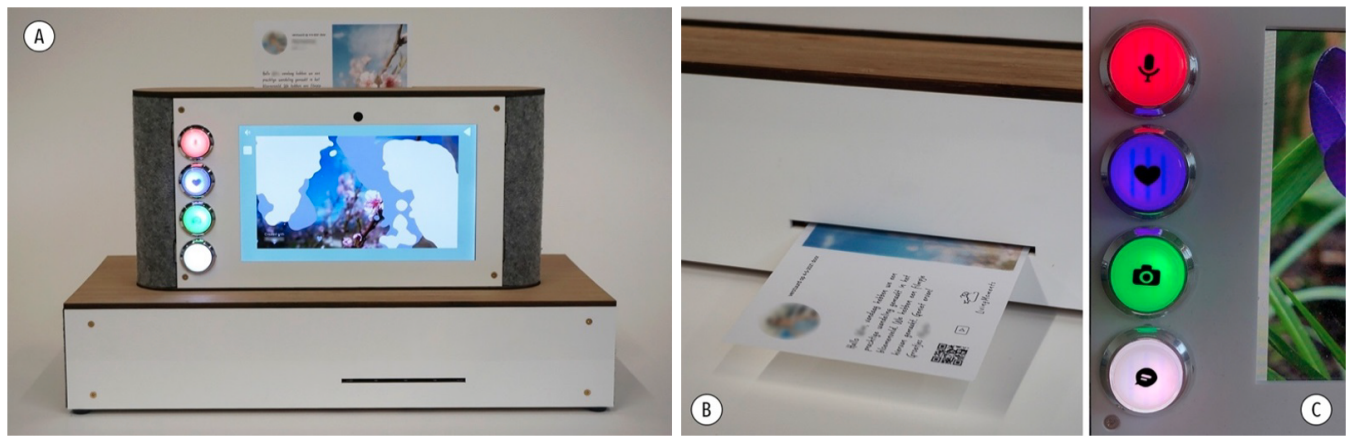


Figure 1: LivingMoments supports communication between people with dementia and their relatives by printing physical postcards of messages sent by loved ones (b) that can activate media content, e.g., photo, video or audio files (a), and providing different modalities to respond (c) [16].

3.1 LivingMoments: Communication Between People with Dementia and Their Relatives

People with dementia living at home have difficulty communicating and connecting with family and friends. In addition, existing communication technologies are often inaccessible and are not adjusted to the specific abilities of people with dementia. To address this challenge, Thoolen et al. developed LivingMoments, which is a communication platform that enables people with dementia to communicate with their relatives remotely [16]. The system provides a combination of digital and physical interaction that can be customized to the specific and changing abilities of people with dementia (see Figure 1). LivingMoments was evaluated in a six-week field evaluation with six participants living at home with different levels of dementia. The results highlighted the importance of tailoring communication to individual abilities by reducing barriers through content adjustment and fostering habits for ongoing use. This work offers design insights for technologies that promote ongoing engagement among people with dementia, accommodating their diverse and evolving needs. LivingMoments is a concrete example of Warm Technology to support social connectedness between people in the early stages of dementia living at home and their social network.

3.2 Vita: Everyday Sounds in Advanced Dementia Care

People with advanced dementia often experience a lack of social experiences and meaningful activities in care homes. Music and sound can evoke personal associations, memories, emotions, and social responses, yet sound-based technologies are often inaccessible for people with advanced dementia. Houben et al. presented Vita (see Figure 2): an interactive pillow that offers a dementia-friendly interface for direct access to music or other forms of audio content [3]. Sound fragments can be played by touching one of the six textile touchpads of Vita. Vita was evaluated in a field study in two care homes for four weeks [3]. The everyday sounds facilitated by

Vita stimulated meaningful conversations based on memories or associations evoked by the sounds. Similarly, exploring the sounds on Vita could trigger non-verbal connections between caregivers and residents by mimicking the sounds, making eye contact, smiling and laughing together. Furthermore, the sessions with Vita offered playfulness and discovery by exploring and playing everyday sounds in an informal and social setting. Vita is a concrete example of how Warm Technology can facilitate meaningful connections in care home settings.

4 DIRECTIONS FOR FUTURE WORK

In this section, we further outline three potential future directions for dementia research in HCI, to design for 1) *Transitions in Care*, 2) *Impact and Implementation*, and 3) *Emergent Technologies*.

4.1 Designing for Transitions in Care

Moving from home to formal residential care is often a stressful and emotionally challenging experience for both people with dementia and their informal caregivers. Although HCI research has explored how technology supports individuals with dementia either at home or within formal care settings, there remains a gap in understanding how technology can assist during the transition between these environments. In a recent paper [5], we interviewed 42 informal caregivers of people with dementia to uncover their experiences before, during, and after the transition from home to residential care. Our findings revealed how informal caregivers were: 1) navigating hurdles of information on care transitions, 2) caught up in the evolving challenges of informal caregiving, and 3) shifting from uncertainty in decision-making to acceptance of admission. As dementia covers many different phases, perspectives, and stakeholders over time, we see a **role for HCI in supporting these complex transitions through technology**. We highlight the need to adopt practice-based approaches in health and HCI research to support redesigning policies, improve care systems, and increase care standards and quality of life for people with dementia.



Figure 2: VITA is a cushion equipped with conductive textile sensors that offer a touch-based input for playing audio content [3, 4].

4.2 Designing for Impact and Implementation

Research on technology adoption in care practice has consistently highlighted how technologies that seem promising and successful at first are often abandoned over time. For example, the lack of time and high workloads of care staff are recurring barriers to implementing novel technologies in everyday care routines [8]. Therefore, there is a strong need to bridge this technology implementation gap to ensure the long-term benefits of technology in healthcare practice. The successful adoption of technology in care practice comes with many challenges, such as aligning different stakeholder perspectives while addressing contextual social and cultural factors that also come into play. We identify a second direction for HCI research in health to expand beyond evaluating artifacts in context to **address longitudinal effects and successful implementation in care practice.**

4.3 Designing for Emergent Technologies

Emergent technologies such as AI present novel opportunities to support people with dementia and their caregivers by providing personal and tailored support. Building on our Warm Technology approach, we see novel opportunities for AI to go beyond accessibility features and adaptable UX design to supporting social connectedness in home and care settings. For example, generative AI can generate meaningful media content, e.g., stories, images, or music, based on personal prompts to support reminiscence or communication with relatives or caregivers. However, people with dementia are rarely involved in the design or conceptualization of AI-based applications. We highlight a third direction for HCI research to further investigate how **people with dementia can be involved in the co-creation of AI to support their social and emotional needs.**

5 Conclusion

We outline our Warm Technology approach through examples of previous works and provide potential directions for future research

on dementia in HCI. With this poster submission, we aim to contribute to discussions, challenges, and opportunities relevant to the *HCI and Health* community.

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