World Academy of Science, Engineering and Technology
International Journal of Computer and Information Engineering
Vol:11, No:05, 2017

Embodied Empowerment: A Design Framework for Augmenting Human Agency in Assistive Technologies

Authors : Melina Kopke, Jelle Van Dijk

Abstract : Persons with cognitive disabilities, such as Autism Spectrum Disorder (ASD) are often dependent on some form of professional support. Recent transformations in Dutch healthcare have spurred institutions to apply new, empowering methods and tools to enable their clients to cope (more) independently in daily life. Assistive Technologies (ATs) seem promising as empowering tools. While ATs can, functionally speaking, help people to perform certain activities without human assistance, we hold that, from a design-theoretical perspective, such technologies often fail to empower in a deeper sense. Most technologies serve either to prescribe or to monitor users' actions, which in some sense objectifies them, rather than strengthening their agency. This paper proposes that theories of embodied interaction could help formulating a design vision in which interactive assistive devices augment, rather than replace, human agency and thereby add to a persons' empowerment in daily life settings. It aims to close the gap between empowerment theory and the opportunities provided by assistive technologies, by showing how embodiment and empowerment theory can be applied in practice in the design of new, interactive assistive devices. Taking a Research-through-Design approach, we conducted a case study of designing to support independently living people with ASD with structuring daily activities. In three iterations we interlaced design action, active involvement and prototype evaluations with future end-users and healthcare professionals, and theoretical reflection. Our co-design sessions revealed the issue of handling daily activities being multidimensional. Not having the ability to self-manage one's daily life has immense consequences on one's self-image, and also has major effects on the relationship with professional caregivers. Over the course of the project relevant theoretical principles of both embodiment and empowerment theory together with user-insights, informed our design decisions. This resulted in a system of wireless light units that users can program as a reminder for tasks, but also to record and reflect on their actions. The iterative process helped to gradually refine and reframe our growing understanding of what it concretely means for a technology to empower a person in daily life. Drawing on the case study insights we propose a set of concrete design principles that together form what we call the embodied empowerment design framework. The framework includes four main principles: Enabling 'reflection-in-action'; making information 'publicly available' in order to enable co-reflection and social coupling; enabling the implementation of shared reflections into an 'endurable-external feedback loop' embedded in the persons familiar 'lifeworld'; and nudging situated actions with self-created action-affordances. In essence, the framework aims for the self-development of a suitable routine, or 'situated practice', by building on a growing shared insight of what works for the person. The framework, we propose, may serve as a starting point for AT designers to create truly empowering interactive products. In a set of follow-up projects involving the participation of persons with ASD, Intellectual Disabilities, Dementia and Acquired Brain Injury, the framework will be applied, evaluated and further refined.

Keywords : assistive technology, design, embodiment, empowerment
Conference Title : ICHCI 2017 : International Conference on Human-Computer Interaction
Conference Location : Amsterdam, Netherlands
Conference Dates : May 14-15, 2017