

3D interactive smart home : a new research tool for user studies of smart homes

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E. ALLAMEH, M. HEIDARI, B. DE VRIES, H.J.P. TIMMERMANS, **3D interactive smart home: A new research tool for user studies of smart homes.** *Gerontechnology* 2016;15(suppl):70s; doi:10.4017/gt.2016.15.s.016.00 **Purpose** Smart homes are increasingly considered as a new type of housing in future aging societies. In order to engineer successful smart homes, not only technical aspects but also users' attitude and preferences need to be addressed. For a variety of reasons, researchers are sometimes not able to do research in living labs¹. The appropriate settings may not be available, the logistics of doing real prototyping may be too great, sufficient control may not be attainable or user studies may be too challenging in living labs. Virtual Reality (VR) methods can ameliorate, if not solve, many of the challenges in experimental methodologies² such as time, space, and technique. VR enable accurate comparison of different design options by the development of more efficient and cost-effective solutions. A growing literature tested for compatibility of the stated preferences in VR and revealed preferences obtained through real experience. These tests report that the stated preferences can provide a reasonable account of people's real choices^{3,4}. Hence, we advocate the promise of VR as a user research tool in smart home research. **Method** We developed a tool, which simulates an interactive smart home with multiple embedded smart technologies, namely, smart kitchen table, smart wall, smart private zone, smart furniture, and smart flexible boundaries (Figure 1). Through multiple tasks, users can explore the simulated smart home, arrange their activities around the smart technologies and report their daily life. An activity schedule is designed, which lets users specify the types, the locations and the durations of their activities and report if they have any interactions or conflicts during those activities. Furthermore, they can change the spatial characteristics of the smart home and configure their final preferred layout. The outputs give information on not only what people say about a smart home, but also on what people do in a smart home and what they make and create as their own smart home. **Results & Discussion** While living labs are the most common in using facilities, VR can be another assessment research tool in smart home research. Using the presented tool, researchers can first improve the experience of users (especially on the elderly) from the smart homes and then elicit their preferences through tasks before the construction phase. Outputs are categorized in: (i) living preferences, and (ii) spatial preferences of users in smart homes.

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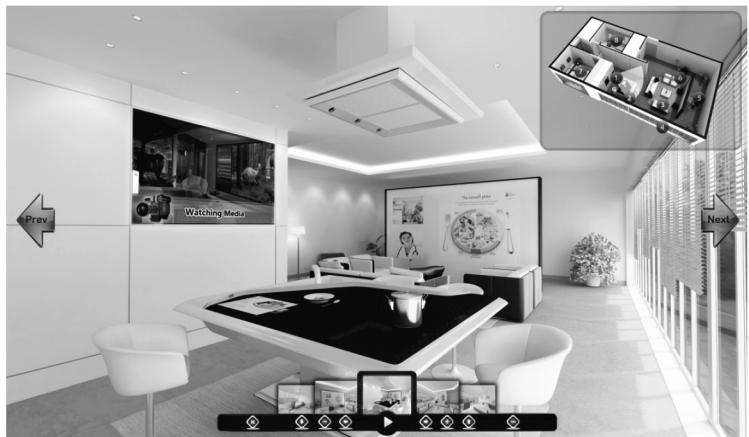


Figure 1. A screenshot from the 3D interactive smart home