

## HealSit : encourage active sitting behaviour through an interactive seat cushion

***Citation for published version (APA):***

Ren, X., Visser, V. J. J., Lu, Y., Brankaert, R. G. A., Offermans, S. A. M., & Nagtzaam, H. A. H. (2016). HealSit : encourage active sitting behaviour through an interactive seat cushion. In *10th World Conference of Gerontechnology, 28-30 September 2016, Nice, France* Article 23S (Gerontechnology; Vol. 11, supplement). International Society for Gerontechnology.

***Document status and date:***

Published: 28/09/2016

***Document Version:***

Publisher's PDF, also known as Version of Record (includes final page, issue and volume numbers)

***Please check the document version of this publication:***

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

***General rights***

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

[www.tue.nl/taverne](http://www.tue.nl/taverne)

***Take down policy***

If you believe that this document breaches copyright please contact us at:

[openaccess@tue.nl](mailto:openaccess@tue.nl)

providing details and we will investigate your claim.

X. REN, V. VISSER, Y. LU, R. BRANKAERT, S. OFFERMANS, H. NAGTZAAM. **HealSit: Encourage active sitting behaviour through an interactive seat cushion.** *Gerontechnology* 2016;15(suppl):23s; doi:10.4017/gt.2016.15.s.815.00 **Purpose** As identified by Schutzer et al.<sup>1</sup>, the deterioration of health plays a major role among the barriers to prevent seniors from doing exercise. Adversely, inadequate physical activity negatively affects their health and in turn leads to more sedentary lifestyles. Evidence has suggested that providing moderate physical exercises in repeated session are beneficial in aiding sedentary behaviours. For example, the frequent changes of sitting postures from one to another can help to decrease the health risk from excessive sedentary time<sup>2</sup>, which is applicable for elderly people with deficient mobility. In this paper, we approach this opportunity through a formative study of the novel design of HealSit. Our prototype aims at providing active sitting experiences for elderly people to prevent sedentary lifestyles. **Method** We explored design opportunities based on the Research through Design approach<sup>3</sup>. Three iterations were carried out, consisting technology design, interaction design, and user experience design. **Results & Discussion** In the 1<sup>st</sup> iteration, we designed a portable system, a Force Resistor Sensor-based pad that can be placed on every normal seat, to track and archive sitting behaviours by applying Artificial Neuron Network. In the 2<sup>nd</sup> iteration, we came up with the concept of utilizing interactive music to provide a more engaging and adherent exercise. We aimed to let the elderly influence the volume of the music by changing their postures and doing sitting exercises. Based on Forlizzi and Battarbee<sup>4</sup>, we extended the user experience into three modes in the 3<sup>rd</sup> iteration, including lifestyle mode, exercise mode, and co-exercise mode. For future work, we plan to conduct a control study with three groups of participants to evaluate: (i) if the interactive music improves the exercise experience, (ii) if the co-exercise experience has the intended effect to motivate active behaviour. In the long run, we aim to conduct a long-term study to verify to what extent HealSit can be used to support active ageing

**References**

1. Schutzer KA, Graves BS. Barriers and motivations to exercise in older adults. *Preventive Medicine*. 2004;39(5):1056-1061; doi:10.1016/j.ypmed.2004.04.003
2. Owen N, Healy GN, Matthews CE, Dunstan DW. Too much sitting: the population-health science of sedentary behavior. *Exercise and Sport Sciences Reviews* 2010;38(3):105; doi:10.1097/JES.0b013e3181e373a2
3. Zimmerman J, Forlizzi J, Evenson S. Research through design as a method for interaction design research in HCI. In: Proceedings of the SIGCHI conference on Human factors in computing systems 2007; pp 493-502; doi:10.1145/1240624.1240704
4. Forlizzi J, Battarbee K. Understanding experience in interactive systems. In: Proceedings of the 5<sup>th</sup> conference on Designing interactive systems: processes, practices, methods, and techniques 2004; pp 261-268; doi:10.1145/1013115.1013152

**Keywords:** Innovation opportunities in Gerontechnology, active ageing, sitting exercise, music

**Address:** Eindhoven University of Technology, Eindhoven, Netherlands;  
E: x.ren@tue.nl

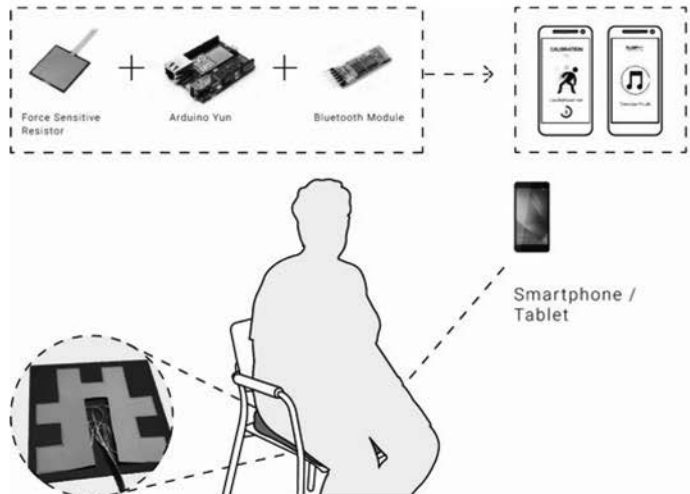


Figure 1. An impression of ShuttleKickers, the interactive physical object and the platform that keeps track of progress