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Publication date
2017

Published in
Proceedings of the international scientific conference Healthy Buildings 2017-Europe

Citation (APA)
Wisse, R., Ortiz Sanchez, M., Kurvers, S., Boerstra, A., & Bluysen, P. M. (2017). Aspects influencing the usability of operable façade elements (OFE's) in Dutch offices: Preferences and expectations. In *Proceedings of the international scientific conference Healthy Buildings 2017-Europe* Article 0077

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Healthy Buildings 2017 Europe July 2-5, 2017, Lublin, Poland

Paper ID 0077 ISBN: 978-83-7947-232-1

Aspects influencing the usability of operable façade elements (OFE's) in Dutch offices: Preferences and expectations

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Keywords: Operable windows, thermal environment, indoor air quality, personal control, fine-tuning capability, context mapping

1 Introduction

Dutch office workers cannot always open their windows when needed. As a result, Operable Façade Elements (OFE's) cannot always be used for personal control over thermal environment and indoor air quality. The assumption is that technological characteristics of OFE's and environmental aspects influence whether and how people can use them. Therefore, a study was conducted to determine what people prefer and expect from an OFE.

2 Materials/Methods

This study builds on explicit and observable knowledge about aspects influencing the usability of OFE's. To gain deeper knowledge context mapping was applied. Context mapping is used for mapping the context of people's interaction with products to get to know the tacit knowledge and latent needs of end users and to understand what people know, feel and dream (Kistemaker 2012; Visser et al. 2005).

The study comprised two parts to collect user insights: 1) a preparation sensitizing phase (at home) with the use of 'sensitizing booklets' followed by 2) a group session.

Four female and five male students between 18-24 years old participated in both phases.

Participants were asked to make "homework" by answering questions such as "Imagine you walk into a room without operable windows or shutters, can you explain how you would feel?". For the group session the multisense, perceptual intelligence Lab in the faculty of Industrial Design at the Delft University of Technology was used. This room is especially designed for group sessions and is equipped with an audio installation and two cameras. During the session questions like, "What do you imagine as an ideal window?" were asked. Also, three generative tools based on IDEO's methods (2003) were applied: expressing tacit knowledge about OFE's through collages, ranking 6 OFE designs on preference and prioritizing 18 OFE related aspects by sorting cards.



Figure 1. Participants' discussion during group session.

3 Results and Discussion

Some results from the sensitizing booklet analysis describe the presence of an operable window in a room as giving a safer, open, nice, free and happy feeling compared to a room without operable windows. Also, some mentioned to appreciate the option of influencing the air quality and temperature with OFE (when necessary).

The participants mainly described and illustrated an ideal window as easily operable and adjustable (can provide both small and large amounts of air) by a controllable opening area and/or multiple windows.

During the group session, the preference for windowsills with room for stuff was mentioned and widely confirmed. The preference for an operable frame that does not bother because of taking away indoor space is mentioned as well, just like the preference for an OFE design with low noise nuisance.

In the first group question ‘If and why participants would like to have an OFE’, six of the nine participants responded that they want an OFE. Reasons for positive reply were: sense of control, secureness that you can work pleasantly, personal control over temperature, indoor air quality and air movement. It was also mentioned that moving air feels fresh and outdoor air has added value, feels better and enhances performance. Generally, large operable parts for the summer and small operable parts for the winter were preferred by those participants.

Reasons why the three other participants don’t necessarily want an OFE were: “As long as temperature can be regulated or as long as the indoor climate is good no OFE is needed” and “If the indoor climate is not properly managed (e.g. resulting in stale air) it is pleasant that something can be opened and it is nice to have control, but it is not by definition necessary”. Another reason for negative reply was that the temperature of air supply through a window cannot be regulated/ can cause cold.

In the ‘collage’ exercise the participants illustrated and explained what they find important and prefer in OFE’s and why they do so. They generally preferred much light and view to the outside in combination with operable windows.

Mentioned pros related to the OFE’s were: ease of control, options to vary the amount of air, enough fresh air possible/large enough, operable

in upper part of façade (operable while less cold and distracted), functional and basic.

Mentioned cons related to the OFE’s were: too small part of façade is glazed, too small OFE, too OFE, too many options (too difficult and causes discussion),

ugly and difficult to clean.

The OFE related aspects were prioritized by the participants as indicated in Figure 2.

Highest priority	Effort to control
	Fine-tunable
	Avoid ingress of water (wind driven rain)
	Adjustable
	Avoid ingress of pollution
Lowest priority	Avoid ingress of thieves
	Avoid ingress of noise
	Robust
	Ability to cross-ventilate
	Avoid ingress of wind
	Ability for night ventilation
	Avoid ingress of insects

Figure 2. Average results card sort exercise.

4 Conclusions

The objective was to find out what people prefer and expect from operable windows and why they do so. Low effort to control, fine-tuning capability and ease of use are important aspects of operable windows. These aspects seem to enhance perceived control and can improve satisfaction (interpretation based on Hellwig, 2015). Setting these aspects as requirements for OFE designs can improve usability in the future. Thereby the preferred fine-tuning capability seems to mean preference for a controllable opening area and/or multiple OFE’s.

Note that three of the nine participants preferred thermal regulation rather only by HVAC.

5 References

- Hellwig, R. T. 2015. Perceived control in indoor environments: a conceptual approach. *Building Research & Information*, 43(3), 302-315.
- IDEO, I. 2003. IDEO Method Cards: 51 ways to inspire design. *Palo Alto*. Accessed on October 10, 2016. Retrieved from <https://www.ideo.com/eu/post/method-cards>.
- Kistemaker, S. 2010. Contextmapping, the basics!. *Rich Insights*, 8-9.
- Visser, F. S., Stappers, P. J., Van der Lugt, R., & Sanders, E. B. 2005. Contextmapping: experiences from practice. *CoDesign*, 1(2), 119-149.