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A tool to include different occupants' comfort needs in design

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As occupants spend about 90% of their time indoors, it is important to develop design strategies on building scale that contribute to comfort. Due to strong interactions between indoor air, thermal comfort, daylight, acoustics, it is logic to study these factors comprehensively. One of the complexities is that occupants with diverse preferences use buildings at the same time, particularly large buildings such as hospitals. Furthermore, needs can change over time, e.g. because of changing outdoor conditions due to climate change.

Therefore, nor custom made design for specific occupants' needs, neither generic design for average needs seems optimal in building design. While consultation of actual users during the design process to better understand their specific needs is useful, a tool that provides in-depth insights into needs of a representative group of occupants can enhance customization.

Segmentation studies, grouping representative groups of occupants with similar comfort preferences, provide insights into diverse occupants' preferences. A segmentation study in six hospitals showed that health and building characteristics varied between groups of occupants, diversified by their preferences for comfort. To support architects and engineers during the design process, the differences between the diversified groups were visualized into a tool, i.e. a paper cube.

We evaluated the paper cube (Figure 1) in a workshop with four groups of each four to five architects. Using layout drawings, the architects specified which rooms were suitable, considering the diverse preferences for comfort. The workshop showed that such a tool can support design decisions; e.g., the architects agreed about the suitability of rooms for specific preferences. Further study including also other disciplines, such as facility managers, healthcare workers, and building engineers, is required to develop a tool that enables to include different occupants' needs effectively and efficiently into design.

Figure 1