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A game to determine preferences and needs for an indoor environment

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Abstract. One of the challenges of designing buildings with a good indoor environment is to make it good for everyone. Ideas about requirements vary depending on who is asked; the designer, contractor, owner, investor, and occupant, might all have different ideas about what is the best indoor environment. Usually, the occupant is often the one who is not heard, and this may lead to a misfit. To make it easier to imagine how a building would function for the occupants, a game was designed in which events happen that require changes in the design. The game helps to explore the options and inform the stakeholders about their preferences and needs and how to be more responsive to changes, in a way that is visual, easy to understand, and fun.

1 Preferences of different stakeholders

One of the challenges of designing buildings with a good indoor environment is to make it acceptable for everyone. Depending on building function, climate, and the occupants, the needs and preferences vary [1]. Differences have been found in preferred indoor temperature ranges [2, 3], the amount of (control over) ventilation [4], or what sounds (noise levels) are acceptable [5]. These can also vary in time, and per context. Ideas about requirements also vary depending on who is asked; the designer, contractor, owner, investor, and occupant, might all have different ideas about what is the best indoor environment. Complaints usually come up after the building is being occupied and in-use, while knowing more about needs and preferences beforehand could prevent problems from occurring afterwards [6-9]. In order to stimulate the different stakeholders to discuss the requirements and come up with solutions that would work for everyone, it could be useful to have an interface to immediately show the effects of design decisions in an abstract way.

Out of the stakeholders, the occupant is usually the one who is not heard, and this may lead to a misfit [10, 11]. In general, occupants have some form of control over a number of indoor environmental parameters, such as temperature ventilation, light, and to a limited extent, noise, but only after the building is completed and they are already using it. The prevention of needing to make changes after completion to satisfy the occupants, could be achieved by getting the different stakeholders to talk together about the requirements in a different setting than usual.

1.2 Design of the game

To make it easier to imagine how a building would work over time, a game was designed. In this game events happen that might require changes in the design to fit the occupants' needs. The game can be used to create scenarios and explore what the consequences are of design choices for the occupants. The events and building can be made to fit the scenario, by changing the events, the starting position of the elements, and the cards, with events that are likely to happen. The content of the cards should be as such that it emphasizes the use aspect of the building. This way both new buildings as well as existing buildings can be used for the game

Flexible 3d elements like doors, walls, windows, and furniture, can be placed on a uniform base to recreate an existing building or a planned building (see the figure below).

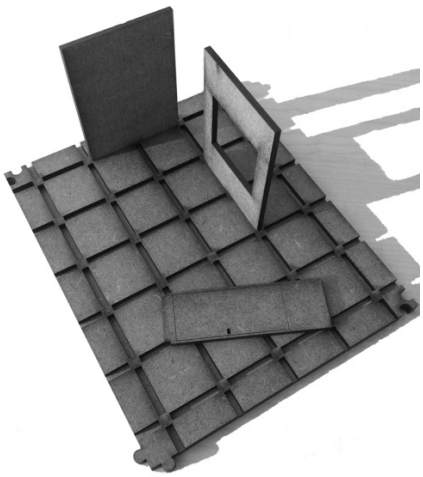

Fig. 1. The building elements of the game.

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The version that was tested considers vacant buildings for people in need of housing for a short period, and who have a low income. The cards therefore describe events with students, immigrants, and other people who need housing but do not have the means to acquire a place to live without assistance. In figure 2 two of the used cards are depicted. The events and residents on the cards can be adjusted to fit any situation.

Fig. 2. The cards with events and residents.

Depending on the residents and events, the different furniture is added or removed (see figure 3). The players need to decide where it fits in a space, and who is allowed to use it, when a card says so. This stimulates the players to think about flexibility.

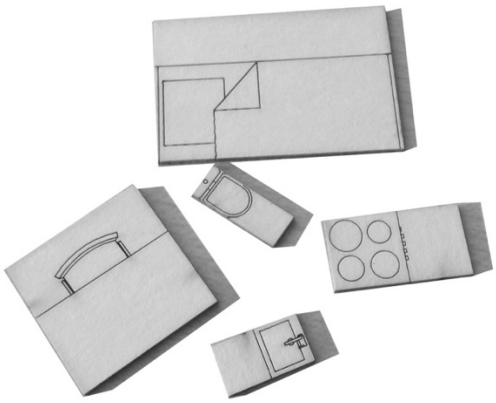

Fig. 3. The furniture in the game.

Special cubes are available to see what qualities emerge based on the design choices that are made. These qualities range from having a flexible space, options for personalisation, to having a nice view. The cubes are shown in figure 4. Which qualities are in the game can also be adjusted depending on the occupants in the target group. For these qualities it is important that they can be described spatially.

Fig. 4. The qualities that can be created.

2 Outcome of the game

Depending on the players, the game provides different information; future users, building owners, and designers, will use different perspectives and make different choices when an event takes place. The elements make it easier to imagine what the effects of the building design and use are on ventilation and light (through the placing of (operable) windows and doors), thermal aspects (a heating system, or orientation), and noise (the layout and occupants). What this looks like can be seen in figure 5.
Unlike a 'normal' discussion on occupants' needs, this game requires the players to think as an occupant or stakeholder. The role-play in the game may help the player better understand another person's needs, and as such make the discussion on needs more personal. The game helps to explore design options, inform the stakeholders about their own and the occupants' preferences and needs, and how to be more responsive to changes, in a way that is visual, easy to understand, and fun.

Fig. 5. People playing the game

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