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QUALITATIVE CLASSIFICATION OF ENERGY CONSUMING HABITS OF YOUNG HOME OCCUPANTS.

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1. INTRODUCTION

Two main strategies have generally been used for tackling energy reduction: one dealing with the design and development of building systems and appliances that are engineered to be as efficient as possible while meeting standards, the other addressing the user, usually through campaigns, advertisements, or physical interventions, with the expectation of changing behaviours into more sustainable ones [1]. Nevertheless, behavioural change and energy savings through such approaches has not been decisively achieved, presumably due to the intangibility of both the end results, which are health, comfort, and energy savings, and to the fact that generally, the home environment and the energy consuming products within are not designed to support the occupants' cognitions and behaviours [2, 3]. In recent years, it has been shown that occupants' "habits" are the main culprit behind inflated home energy usage [4]. Habits are particular types of behaviour that due to their unconsciousness and automaticity, have been understudied. Habits are particular types of behavior that due to their unconsciousness and automaticity, have been understudied [5, 6]. Based on psychological and behavioral research, habits are cue and context dependent behaviors, which happen automatically and unconsciously, that are learned through the obtention of a reward, achieved by the habit itself [7]. Therefore, habits are forged by the need of controlling and obtaining rewards, achieved through a behavior –the habit itself- and that is triggered by an environmental cue. As the behavior becomes more frequent, and automatic, it becomes a habit.

2. MATERIALS AND METHODS

A workshop was carried out as a pilot to classify the habits of master students. The objective of the study was to find types of energy consuming habits by a young population. Architecture master students of the Delft Technical University, were invited to participate in the workshop. This was done by sending them a link to fill out a specially developed survey. The workshop had six steps: first, identifying general home expenditure behaviours at home. Secondly, identifying an energy consuming behaviour repetitive in nature. Third, identifying the reward that the behaviour brings. Forth, identifying the cue that triggers the behaviour. Fifth, deliberating whether one of the elements of the habit could be changed. Sixth, brainstorming systems that would allow for the same reward, while allowing for a behaviour that is less wasteful. After the workshop, the forms filled out by the participants were analysed, and the routines were grouped by type.

3. RESULTS

85 people filled out the initial survey, from which 66 participated in the workshop. The mean age was 23.9 (21-30). 91% of them were renters, and 60% lived with housemates, 9% with their families, and the rest alone. 70% of them had been living in their current house for less than 3 months, since this was a newly started semester, mainly with freshly arrived international students. 57% of them resided in an apartment, of which 90% was situated in the Hague-Rotterdam region. Of the 66 participants who finished the workshop, 48 unique habits were specified by the students. The habits were written into sticky notes and categorized into groups. After several iterations of this clustering procedure, a final number of routine groups was found.

Eight types of habits were found: forgetfulness, water use, thermal habits, cleaning habits, cooking habits, personal care habits, relaxation habits, and hobbies. The eight types of habits are presented in Table 1 with examples of their comprising behaviours.

Routine Groups	Example of behaviors	Number of people
forgetfulness habits	Leaving lights on; forgetting laptop on, forgetting other appliances on, etc.	10
water use habits	Long hot showers, using washer at low capacity, dishwasher at low capacity, etc.	10
thermal habits	Turning on a/c in any season. Having heating on all year. Opening windows when HVAC on.	5
cleaning habits	Using vacuum cleaner for smaller tasks.	3
cooking habits	Boiling water, microwave use, oven usage,	10
personal care habits	Air purification, AC use for dryer air, etc. Several sequential routines in the mornings.	6
relaxation habits	Social media use all day on laptop, music on all day to avoid loneliness, radio on for background noise, binge watching TV for avoiding boredom, game console, etc.	11
hobbies	Playing instruments, watching one movie every evening, skypeing with people, etc	4

4. DISCUSSION

The strength and limitations of this study are varied. Firstly, this workshop shows promising results to apply it as a small-scale focus group, whose results should be supportive of the results of a survey carried out with 900 respondents. It also shows that the habits of this particular population are ultimately simple to categorize into heterogeneous groups, due to the habits distinctness. The advantage of having knowledge about these habits, specifically when combined with the results of a survey can help for the design and development of home products that will better support the users' needs and motivations, so that energy savings are achieved in a more successful manner. However, focus groups in small groups have to be carried out for this, while also combining the results of such a qualitative study with that of a quantitative one.

5. CONCLUSION

This workshop enabled the finding of eight distinct types of energy consuming habits by students of architecture in the Netherlands. The study served as a pilot for carrying out focus groups with a similar goal. Thus, the study will serve to cross-verify the results from a previous, quantitative study. The objective of this is to classify occupants based on their behavioural patterns, which in its turn is a requirement for the development of tailor-made energy consuming products and systems, which, though their characteristics, support the users' needs and behaviours.

6. ACKNOWLEDGEMENTS

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