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USING DIGITAL INTERVENTIONS FOR BEHAVIOUR CHANGE TOWARDS ENERGY EFFICIENT BEHAVIOUR

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1. INTRODUCTION

Energy is consumed by people rather than by buildings. However, most of the strategies to achieve energy efficiency in buildings focus on technical mitigation measures. The EU Interreg Alpine Space project 'THE4BEES' aims at reducing greenhouse gas (GHG) emissions and energy consumption in buildings through more efficient behaviour. Having the extended model of normative decision making by Klöckner and Matthies [1] in mind, there are various pathways to influence people's behaviour. According to the model, awareness raising is the first step towards behavioural change. Together with users, energy managers, technical experts and scientists, ICT tools have been developed and are currently tested. Four specified target groups are part of seven pilots: alpine huts, schools, work places and private households. In the end it is the behaviour of students, workers, tourists and residents that will create the impact. The ICT tools should support soft approaches to raise awareness and change energy relevant behaviour. For this purpose, a mix of intervention strategies has been discussed and implemented within the project.

2. IMPLEMENTED INTERVENTION STRATEGIES AND FIRST RESULTS

An intervention is a measure that e.g. aims at changing behaviour. Several interventions such as feedback, tips and advice, additional information, story-telling, unusual usage alerts, comparison and competition, gamification and incentives are discussed in the context of digital intervention strategies. Research strongly recommends to use a mix of several intervention types in order to overcome barriers of changing behaviour and to repeat interventions several times in order to achieve long-term impact [2]. In the course of the project it was decided to use the following intervention methods:

1. Feedback: users and energy managers are informed on an ICT tool about their energy consumption and other measures such as room temperature or air quality via sensors. The sensors were programmed in co-creation processes with the pilots using the open-source electronic prototyping platform Arduino. First results show that Wi-Fi access can be a relevant barrier to this approach. Nevertheless, especially students, but also all other pilot site users are very interested in feedback about their consumption behaviour.
2. Comparison: consumption patterns can be compared within a pilot by the energy manager and based on one user's weekly consumption. Due to complexity of inter-group comparison it was decided to use only intra-user or so-called normative comparison with historical data.

3. Hints and tips: users get hints and tips for taking action depending on the season, target group and consumption pattern. These were developed together with the target group and strongly approved.
4. Unusual usage alerts: on the ICT tool users not only get feedback about the average measurement but also an indicator for “best practice” and “worst practice”. This is still under discussion, as it can also lead to converse effects.
5. Additional information: energy consumption is calculated in carbon footprint (kg of CO₂). This is only used in work place pilots as a reference frame and is still under discussion.
6. Storytelling: in two school pilots, storytelling maps are used to involve students directly in the process. They are used to illustrate co-creation processes and measurements with interactive maps, text, images and other multimedia files. So far, this is a very successful method in the project and students are very motivated to be part of the process and track their behavioural impact.

The above depicted intervention methods are integrated in two digital ICT tools (figure 1): 1) For energy managers, a dashboard was created that is fed by sensors in all rooms of the building. The monitored measurements are, for example, power consumption, room temperature, room luminosity, window opening time. 2) An app has been developed, especially for students, with elements like consumption overview, comparison with last week, hints and tips and an option to rate the current comfort level (happy-neutral-not happy).



Figure 1: Dashboard for energy managers (left) and app for students (right).

When information and communication technologies (ICT) are used to trigger behaviour change a few basic considerations have to be made about channel, design and usability of the tool [3]. The tools are currently tested and continuously developed together with the users within the seven project pilots.

4. CONCLUSIONS

First results provide information on what has to be considered when aiming at changing energy related behaviour [3]. The co-creation process demonstrated the high relevance of participation in terms of involving the target group of a specific intervention to foster positive effects. It also shows that changing processes take a long period of time and interventions should be repeated in order to stabilise the desired effects. It is also important to tailor the interventions to different groups of people according to the strength of their habits, knowledge background, intention and environmental constraints [2].

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