A DYNAMIC WAY OF LIVING THROUGHOUT THE SEASONS, AS AN ALTERNATIVE DESIGN APPROACH FOR CURRENT ENERGY-EFFICIENT HOUSING CONCEPTS: A CONCEPTUAL FRAMEWORK

Keywords
User-centered design approach, dynamic resident, efficient occupant behavior, user interaction, actual energy consumption, energy-efficient housing concepts

Introduction / Context
Strong focus on energy-efficiency leads to an object-centred design approach where the resident is considered as passive:

High influence of user practices on actual energy demand due to inefficient occupant behaviour and lack of user interaction

Goal
Overview of the current design challenges in traditional energy-efficient housing concepts in view of user practices and proposition of design criteria by means of a user-centred design approach

Development of a conceptual framework to promote more dynamic, efficient use in the living environment as an incentive for further development of an alternative dwelling concept

Methodology
By means of a literature study:
1. Dynamic architecture: clarify complex user interaction between static building, dynamic resident and seasonal changes
2. Studies on occupant behaviour and comfort: investigation of lack of user interaction in current object-centred design approach (design challenges)
3. User-centred design methodology: promoting effective user interaction (design criteria)

Results
1. Complex interaction between resident, building and climate (Fig. 1)
   An intrinsically static built environment needs to respond to a dynamic resident and seasonal changes
2. An object-centred design approach: design challenges (Fig. 2)
   Controlling the resident, keeping a constant indoor climate and a static built environment due to high quantities of materials and complex systems
   In conflict with a dynamic resident and seasonal changes leading to a lack of user interaction and inefficient occupant behaviour
3. A user-centred design approach: design criteria (Fig. 2)
   Guiding and supporting the resident, accommodating varying climatic conditions and promoting and adaptable space plan and flexible structure
   Taking into account the seasonal user pattern and diversified occupation pattern of the dynamic resident throughout the seasons

Conclusion
Enabling a dynamic way of living throughout the seasons
Responding to seasonal comfort and spatial needs of a dynamic resident for more user interaction and efficient use of the indoor living environment as an alternative design approach

Contact
Dra. Ann Boserez
ann.boserez@uhasselt.be
T +32(0)11 29 21 69

Universiteit Hasselt | Campus Diepenbeek
Agoralaan Gebouw E | B-3590 Diepenbeek
Kantoor E - A04

Focus on literature review (PhD-track)

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1: Knowledge development</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conceptual framework for a dynamic way of living</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase 2: Development and evaluation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource-efficient housing concepts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case study research (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Critical overview of innovative sustainable housing concepts in practice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research by design</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development of resource-efficient housing concepts by enabling a dynamic way of living (workshops, with architects, quantitative tools and focus groups for evaluation and user-tests)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research by design Life projects with residents from case studies for development of renovation model (design phase, quantitative tools and interviews for evaluation, user-tests)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Synthesis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dwelling concept</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fig. 1: Dynamic way of living throughout the seasons

Fig. 2: Conceptual framework