ID + EE = Comfort?

Merging Inclusive Design and Energy Efficiency as a disruptive approach to housing renovation

Ermal Kapedani | Shana Bonneux | Jasmien Herssens | Griet Verbeeck

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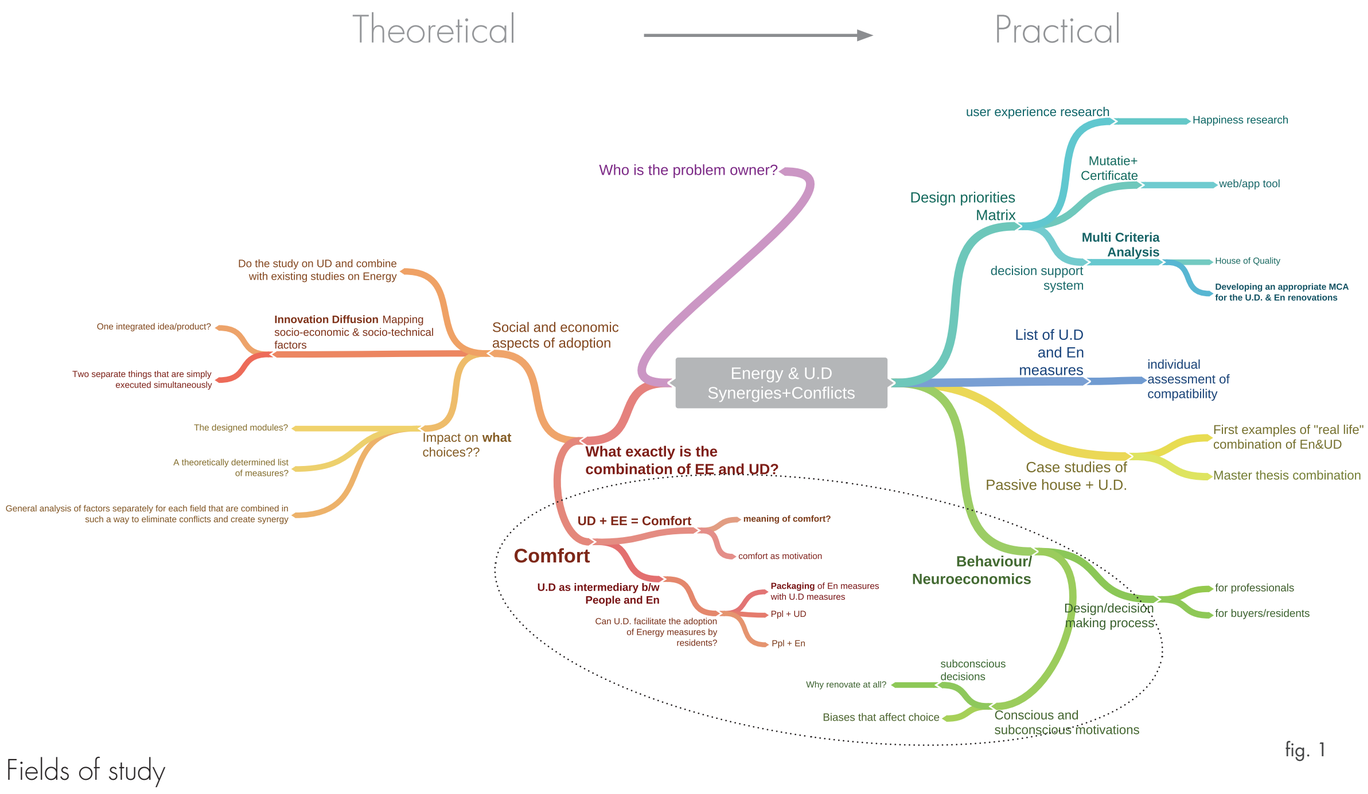

fig. 1

Fields of study

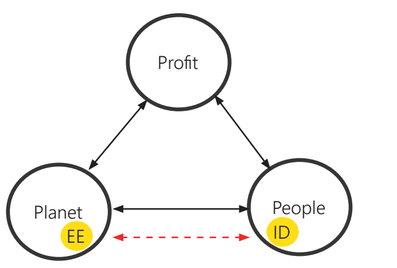

fig 2. Sustainability context

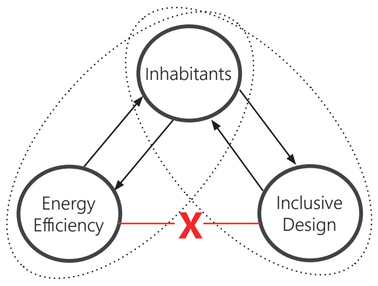

fig 3. Current relations

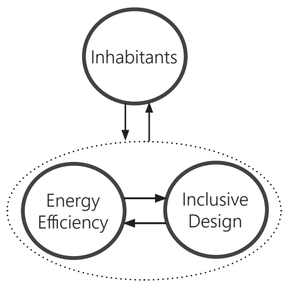

fig 4. Proposed relations as a unified concept

Theoretical context

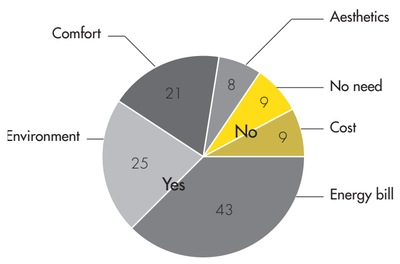

fig 5. Would you include EE in your house and why (not)?

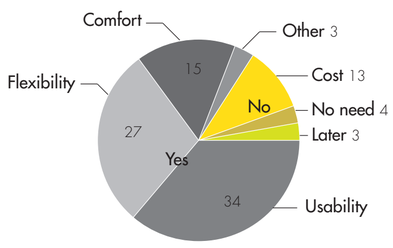

fig 6. Would you include ID in your house and why (not)?

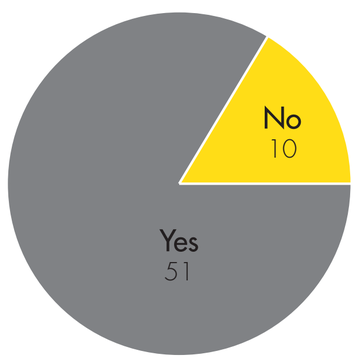

fig 7. Would you include a combination of ID and EE in your house?

Survey results

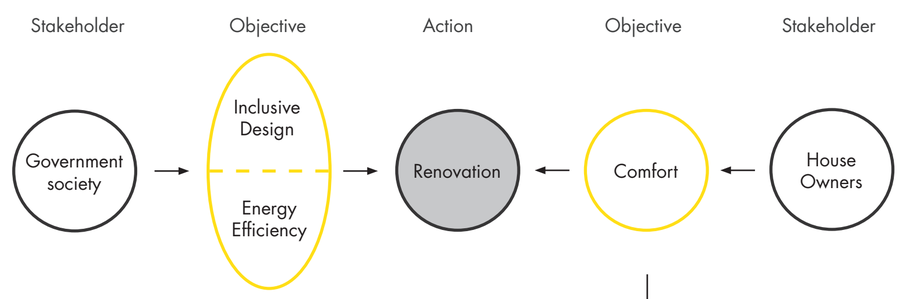

fig. 8

A mismatch of objectives

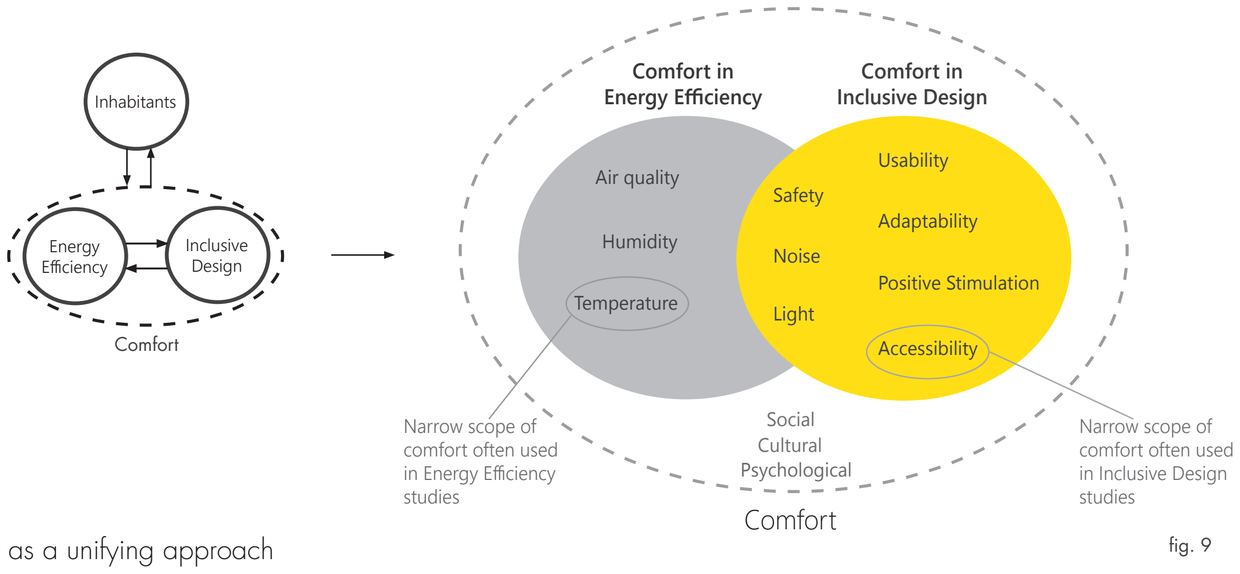

fig. 9

Comfort as a unifying approach

Abstract

There is a pressing need for housing renovations that both **accommodate lifelong living and significantly increase energy efficiency.** Much research has been done on both Inclusive design (ID) and energy efficiency (EE). However, they are **treated independently** and faced with limited adoption. A simultaneous renovation for ID and EE might lead to renovation concepts that better fulfil the residents' desire for comfort in addition to savings in money and time.

Comfort is an important driver for both types of renovations. **Our hypothesis** is that when the concept of comfort is expanded to include wider physiological, social, cognitive and cultural aspects, the merging of ID and EE can offer residents a more complete sense of comfort, thereby increasing the adoption of both ID and EE.

Introduction

Context

As part of the drive for greater sustainability in the building stock, public policy and societal objectives aim for higher numbers of housing renovations that accommodate lifelong living and significantly increase energy efficiency (Figure 2).

Research problem

Despite much research on both UD and EE, these two fields are treated separately in literature and practice. However, this is a missed opportunity to create synergies and offer more complete and attractive renovation concepts (Figure 3).

Research question:

How can ID and EE measures in housing renovations be synergetically merged in order to increase the adoption of both?

The research presented in this poster attempts to answer the 1st part of this question which concerns itself with the meaning of merging of ID and EE: "How can the combination of these two fields of knowledge be approached from a theoretical perspective?" One hypothesis we want to test is that a focus on comfort is a good approach for increasing the addoption of both ID and EE.

Methodology

Literature Review

A literature review was undertaken searching for studies on the combination of ID and EE measures and incentives and barriers to their adoption. There were no studies found that analyse the two concepts in tandem, so they were individually considered with over 60 publications reviewed on adoption of EE measures, with particular focus on housing renovation and behaviour, and over 35 publications on ID.

Survey

The questionnaire was designed and administered at the Universal Design Living Lab in Hasselt, Belgium in May-June 2015. The purpose was to get a feeling of people's attitude towards EE, ID and combination of the two. When selecting motivators multiple answers were possible.

Results

Literature Review

In ID literature there was a tendency to focus discussion on definitions and benefits ("Making the case") of ID, with a distinct lack of field studies concerning adoption factors. The handful of studies that discussed barriers and incentives to adoption of ID measures (Goodman et al., 2006, Dong 2004) focused on the perspective of proffessionals involved in the process rather than the inhabitants' perspective.

In contrast, there is a wealth of studies on factors of adoption for EE measures. While many of these studies treat the inhabitant as a rational consumer (where financial and environmental factors are most important), a more recent trend has identified **non-energy motivatiors** for adoption through a socio-technical approach (Aune 2007 and 2012, Bartieu et al. 2006 and 2014, Gram-Hanssen 2014, Mills & Rosenfeld 1996) or behavioral sciences (Dugan & Connolly 2013, Wolve & Hedrick 2012).

Survey

In total there were 62 replies, 12 men and 50 women, 33 of which were visiting the Living Lab for professional interests while the rest were split between students and private interests. Comfort comes up as a significant, although not the most important, motivation for both EE and ID (Figure 5, 6). Here comfort was not defined explicitly, but is implicitly separated from usability and flexibility. If notion of comfort that includes both usability and flexibility is adopted, then comfort becomes the largest factor by far in motivating ID renovations. In addition, there was higher resistance to adoption of EE (18) and ID (17) measures individually than to adoption of their combination (10) (Figure 7). The survey results are treated with caution because of the selective sampling and location (visitors at the UD Living Lab, after going through a tour of the lab).

Discussion

"...in affluent societies, when individuals' income is beyond the level required for necessities, renovation can be elevated from the class of functional needs to discretionary expenditure in terms of **'lifestyle' pursuit."** (Peng 2013)

Comfort as a reason for action in renovations.

Comfort is an often recurring criterion or motivation for EE adoption in literature. Shove (2003), Lindén et al. (2006), and Aune et al. (2011) point out that policy instruments must be in direct conversation with cultural preferences, particularly with comfort and convenience. Both, the SEREC (Bartiau et al., 2006) and COHERENO (2014) research projects identify improvement in comfort as an important motivator for energy efficiency renovations in Belgium.

Despite the lack of adoption studies in ID literature, based on the very nature of ID measures which are designed to increase comfort and ease of use, it is reasonable to assume that comfort would be a significant factor in ID adoption as well. Survey responses mentioned above seem to point in this direction as well.

Redefinition of the problem - a mismatch

Governmental policy objectives related to environmental concerns, energy independence and demographic and lifestyle shifts are not aligned with the objectives of residents who consider comfort improvement as one of the main reasons for carrying out renovations (Figure 8)

A broader Comfort

Comfort can be generally interpreted as "self conscious satisfaction with the relationship between one's body and the immediate environment" (Crowley, 2001, p. 142). This definition encompasses the full physiological range of senses and is much wider than Within EE literature comfort is most often understood narrowly as the technically defined parameter of "thermal comfort", while in ID literature it is used in the context of accessibility or usability. However, Chappells and Shove (2005) argue that comfort covers a much wider range of physiological possibilities than currently contemplated by energy and environmental policy makers, and that the concept of comfort itself is malleable and in constant change. Shove (2003) represents it as a one directional ratchet-like path dependency. Cole et al. (2008) goes even further to include social, psychological, cultural and contextual aspects into comfort.

Comfort as a unifying concept

The already established topics within EE (such as thermal comfort, humidity and air quality etc.) and ID (accessibility, usability, adaptability etc.) fall neatly within the physiological aspects of comfort. In this sense comfort can be seen as an umbrella concept that includes both ID and EE and also happens to be a key motivator for people that undertake renovations. Thus, comfort can be used as framework that guides the integrated design and application of ID and EE technical measures. It can also serve as a communication framework which represents the objectives of both the inhabitants and the policy makers. (Figure 9).

Conclusion

When the concept of comfort is expanded to include the full range of physiological and cognitive aspects, the merging of ID and EE can offer inhabitants a more complete sense of comfort, and by doing so increasing adoption of both types of measures, in line with wider governmental and societal goals.

References

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