Barriers to domestic retrofit – learning from past home improvement experiences

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Barriers to domestic retrofit – learning from past home improvement experiences

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Abstract
If the UK is to meet its carbon reduction targets, it will be necessary to retrofit energy saving measures into the majority of homes. With approximately three quarters of the houses that will exist in 2050 already built, this presents an enormous task. Whilst retrofit of social housing can be undertaken at scale, encouraging people who are owner occupiers to make changes to their homes presents more of a challenge. Within this owner occupier group there are 4.5million homes that are also hard to treat, having solid walls, and so many of the retrofit measures available will not be suitable. This paper reports case study research based on 20 UK owner occupier households. It presents the results of a thematic analysis based on semi–structured interviews with the 34 adult members of the households that explored the home improvement experiences of the participants from when they brought the house. The barriers that deter people from making improvements to their homes and therefore implementing energy efficiency measures are presented. The findings highlight a range of interrelated and sometimes rather intangible barriers to making home improvements to older, hard to treat properties. It is essential for these sometimes subtle issues to be understood in order for policy makers to suitably engage home owners in taking up energy saving measures and to inform the requirements for skilled professionals and their involvement in the process.

Keywords: home improvement, retrofit, barriers, energy efficiency, user centred design

1 Introduction
The UK Government has set targets of zero-carbon homes for all new builds by 2016; however a significant problem in carbon reduction lies in the houses that already exist, with approximately 75% of the houses that will exist in 2050 already built (Wright 2008). There are many changes, both physical and behavioural that can make a house more efficient. Changes in a household’s behaviour and habits can play a big part, as can decarbonising the grid by using renewable energy. However, the introduction of energy saving measures and technologies in the home will form a significant part of a suite of measures aimed at reaching the UK’s carbon reduction targets. With 15.5 million homes in England being owner-occupied and 29% of these homes (4.5 million) having solid walls (DEFRA, 2008a), to make retrofit appealing and engaging, it must be ensured that the needs of home owners are met by the technologies on offer, as in many
cases home owners will be funding such measures. It is therefore imperative that understanding the requirements of householders is gained in order to maximise the uptake of retrofitted energy saving measures.

2 Home Improvement and Domestic Retrofit

Currently, retrofit is only carried out in owner occupied homes when the owner is motivated to make changes to the home as there are no standards or legislation that force people to make improvements to their home. The energy efficiency of a house may be improved as an additional advantage of home improvement, but rarely seems to be the main incentive for change. As energy saving measures are not yet being retrofitted into UK homes in large numbers, focusing on why and how people undertake home improvements can provide understanding of the context within which the retrofitting of energy fitting measures will take place. With a view to identifying ‘trigger points’ (defined as the times in the lifecycle of a home where energy saving measures could be fitted as part of a wider home improvement project), the Energy Saving Trust (2011) highlighted three primary barriers to home improvement: Information & Awareness, Hassle and Cost.

Many of the existing schemes and initiatives for retrofit (CERT, CESP etc) are not aimed at owner occupied houses, have limited funds, or are only available for those on low income levels or benefits. This means there is a large sector of the market that is unable to benefit from or make use of these schemes. In addition, many of the schemes only provide ‘main stream’ retrofitting options, such as cavity wall and loft insulation, which means the owner occupied, solid walled houses at the core of this research are largely not catered for. The UK Government’s ‘Green Deal’ policy being introduced in 2012 is designed to provide, through loans, the funding necessary to carry out whole-house energy efficiency refurbishments, but these still require the homeowner to want to carry out the improvements.

The variation in people’s attitude towards energy and the environment does pose significant challenges to those trying to engage householders in the development of measures and systems. Warm Front’s annual report (EAGA, 2009) recognises that each individual home will have different preferences and practices which will influence the installation of technologies and the way home improvement is carried out. It is therefore very important to ensure people are engaged in the process of retrofit, and to see how it can work individually for their household. It is therefore necessary to understand what would motivate householders to implement different measures and how the design and installation of technologies can be adapted to best appeal to the householder. It is commonly accepted that not all of the population will make an effort to increase the energy efficiency of their houses. This is not only through lack of resource, but lack of understanding, ability and will to act. DEFRA (2008b) identified 7 segments that can be used to classify the UK population, the most likely to take action being ‘Positive Greens’ and ‘Waste Watchers’. The combination of these segments makes up 30% of the population. The segments of the population who are most unlikely to act are ‘Stalled Starters’ and ‘Honestly Disengaged’ who have the lowest levels of will and ability to act, and make up a further 28% of the population (the remaining 42% lie in between the two extremes). When viewing the population divided into segments in this way, it becomes apparent that different groups will need to be approached in different ways.
A home improvement survey carried out by Halifax (2009) found that 55% of householders had undertaken some form of home improvement during the previous 12 months. They also found that the two main motivations behind these home improvements were to improve the look and design of the house (44%) and to update and modernise the house (38%). Another study found that 57% of homeowners described their motivation to make improvements as a desire to create a nicer living environment (AA, 2009). The UK recession, and the consequent fall in house prices, has impacted home owners’ decisions to sell and renovate. The high level of home improvement in 2009 and 2010 is likely to have been caused by a number of factors. One suggestion is that home owners have changed their attitude towards their property and are now seeing it more as a ‘home’ than an ‘investment’ and are therefore more likely to spend money on home improvements (Anon, 2009). The fall in interest rates for savings may also have impacted the trend, as homeowners realise that their savings not gaining any interest could provide better return when invested into improving their home. More competitive labour costs may also have an impact on the decision to improve.

3 Research Methodology
The main purpose of this study was to explore the past home improvement experiences of householders in order to inform the development and installation potential of future energy efficiency measures. The study took a user centred design approach, in conformance with ISO 9241-210: 2010 which states “Using a human-centred approach to design and development has substantial economic and social benefits for users, employers and suppliers. Highly usable systems and products tend to be more successful both technically and commercially”. The study formed part of a wider programme of work within the CALEBRE project, a four year multidisciplinary research project led by Loughborough University, aiming to establish a validated, comprehensive mechanism for reducing UK domestic carbon emissions within solid walled housing that is acceptable and appealing to users (Vadodaria, et al, 2010).

3.1 Participants
Participants were drawn from the East Midlands area of the UK who met the primary study criteria of owning and living in a solid walled house. Participants were selected using a purposive sampling approach so that they represented a wide range of family structures, incomes and social statuses, house and household types. While this was never intended to be a statistically representative sample, it allowed for a snapshot of different domestic situations to be explored, using a maximum variation sample (Marshall, 1996). A total of twenty households were selected to take part in the research. Wherever possible, all adult members of the household were interviewed to explore different viewpoints within a family and the dynamics of decision making in relation to home improvements. In total 16 males and 18 females took part in the interviews.

3.2 Data collection design
A case study approach was adopted with primary data collected through two semi-structured interviews, carried out on two separate occasions. Both open and closed questions were included; to engage the participants in conversation and exploration of
their behaviours and decision making. The interviews were carried out in the participants’ homes, in a room of their choice, for a comfortable environment and to allow visual cues that would prompt both the interviewees’ recollection and ensure that researchers could note contextual factors relating to participants’ responses. All interviews were audio recorded and later transcribed in full.

The aim of the first visit was to find out about the home improvements that had been previously carried out by participants. The first visit focused on exploring the motivations, barriers and enablers associated with the improvements made by the participants to their house. The first section of the interview was a timeline exercise that was designed to uncover the different home improvements that had been carried out in the house (described in more detail in Haines, et al., 2010). The householders were encouraged to openly discuss the changes and improvements they had made to their home. They were asked to give the rationale for purchasing the property and to discuss the changes that have been carried out from the point of purchase onwards. As conversation progressed, the home improvements were marked on the timeline, with the use of a set of magnetic schematic diagrams designed particularly for this study.

The conversation was initiated with a small number of direct questions, such as When did you buy the house? What improvements did you make first? The participants were then encouraged to talk about their homes, and were prompted when necessary with comments such as What did you do next? The participants were also asked to give an indication of the level of disruption that the home improvement caused. They were asked who had performed the improvement, whether it had been completed as a DIY task, or whether professionals had been used, as well as discussing any problems in the process. The task continued until the participants felt that the timeline had captured all of the home improvements, at which point, the investigator read through the timeline, summarising the order of events, allowing participants to add anything else that came to mind. Although part of an energy project, energy efficiency measures were not specifically focused on.

Participants were also asked about any problems with the house such as draughts, damp, condensation etc. The main objective of this was to identify and confirm the problems experienced in these particular types of houses, and then to find out how householders try to overcome these problems. Finally, participants were presented with a hypothetical situation where they had won a prize draw and as a result could make 5 changes to their home. This question was intended to see what home improvements would be prioritised by the participants, if money was no object. Another objective was to see if changes to improve the energy efficiency of the home would feature on the participants ‘top 5 changes’. Reasons why participants had not already made these changes were probed further, to identify wider barriers than cost.

In the second visit, participants were also asked about comfort, their opinions relating to energy and climate change, and were introduced to the emerging technologies being developed within the CALEBRE project. Additionally, data loggers and comfort diaries were left in the homes for a minimum of two weeks.
3.3 Data analysis
Transcribed interview data were analysed using a thematic analysis approach (Braun & Clarke, 2006) using NVivo qualitative data analysis software. Comments were identified and sorted into themes which emerged from the data, which were then validated by another researcher on the project. A sub-sample of interview data was double coded to ensure a consistent approach.

4 Barriers to Home Improvement
In order to fully understand the decisions to make their improvements to their home, it is necessary to understand not only what motivates and enables home improvements, but also what provides a barrier. For the purpose of this analysis, a barrier was defined as something that delays or prevents a home improvement taking place, which can include preventing an improvement being carried out in the desired way. The full list of barrier categories derived from the analysis is shown in Table 1, together with a description of each category. The number of households that mentioned each barrier is also noted, to give an indication of scale of the issue.

<table>
<thead>
<tr>
<th>Barrier category</th>
<th>Descriptions of barrier categorisation</th>
<th>Total number of households mentioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Householders Values</td>
<td>The core values of the householder and what they deem as important, which then impact on the decision making process of home improvement.</td>
<td>12</td>
</tr>
<tr>
<td>Cost</td>
<td>The cost of home improvement or materials either prevents the improvement taking place, delays it or demands an alternative or lesser product is used.</td>
<td>12</td>
</tr>
<tr>
<td>Professionals</td>
<td>Poorly skilled, unreliable or costly professionals may make it difficult to complete home improvements. Certain tasks may have a delayed completion due to the need for a professional person.</td>
<td>10</td>
</tr>
<tr>
<td>Time</td>
<td>Lack of time available or perception of how long a job might take.</td>
<td>10</td>
</tr>
<tr>
<td>Property features</td>
<td>Features including size and shape of the property, and characteristics relating to its original use and purpose.</td>
<td>10</td>
</tr>
<tr>
<td>Life stage</td>
<td>The lifestage of the householder, or the family.</td>
<td>9</td>
</tr>
<tr>
<td>Attitudes to older houses</td>
<td>The intention of the householder to maintain the original style of an older property.</td>
<td>8</td>
</tr>
<tr>
<td>Perceived difficulty</td>
<td>The perceived size or difficulty of a task, including the domino effect of what needs to be done prior to the job being completed.</td>
<td>8</td>
</tr>
<tr>
<td>Regulations</td>
<td>Regulations enforced by the government or local council, e.g. conservation area.</td>
<td>7</td>
</tr>
<tr>
<td>Availability of Parts / Products</td>
<td>Householders may have problems getting hold of suitable parts or products to improve their house. (Closely related to the age of the property).</td>
<td>4</td>
</tr>
<tr>
<td>Disruption</td>
<td>The perceived disruption that the home improvement will cause to the household and daily life.</td>
<td>4</td>
</tr>
</tbody>
</table>
### 4.1 Householder Values

A strong theme emerging from the analysis of the barriers was Householder Values. 60% of households had been deterred from making an improvement due to their personal set of values. These values related to the physical appearance of the house and how aesthetics are prioritised, financial values, quality, craftsmanship, use of professionals & those relating to the perceived worth of making improvements. The following quote demonstrates how values relating to the aesthetics of the house, craftsmanship and new technologies combine to become a barrier to home improvement:

> ‘I don’t want PVC, I like this style of house, I like wooden window frames, we’re in a conservation area, there’s no restriction on whether you have PVC, but to me it spoils the house, the aspect of the visual pleasure that you get from looking at skilled work. This window is fantastic if you look at all the work that’s gone into it. It gives it character...People have said, ‘why don’t you have double glazing’ – I don’t like double glazing, sorry!’ (Household 5, Female)

In the following interview, the household placed a high value on the quality and expense of items, and accepted that in order to have these, there would be a time delay:

> ‘It’s not finished, ... I’m so picky, I like really expensive things and really nice quality and sometimes you cannot have everything in one go. You need to buy little by little, if you see something you like you buy it, if you don’t like, I wait until I find something.’ (Household 10, Female)

### 4.2 Cost

Cost was an equally strong theme that emerged from the data. There were cases where householders were unable to finance their optimum choice of improvement, or where they were unable to finance any improvement at all. Householders mentioned the need to ‘save up’ for improvements, or dividing an improvement into chunks to manage the cost e.g. having only a portion of windows replaced at one time.

> ‘We had some [windows] done a couple of years ago...we had most of them done [but] then there was something like 3 upstairs that we didn’t have done because we didn’t have the money.’ (Household 3, Male)

In some cases, cost provides a barrier to home improvement where the householder places greater value on other things, as demonstrated in the example below:

> ‘My feeling about that is I can cope with [the leak] and I’d rather spend my money on something else like extravagant holidays or buying a load of books or whatever.’ (Household 1, Male)
In some households, the only way improvements can be made is through generosity of others or through grants:

‘No money. I’m on pension. Government pension, that’s what you do, and having had to buy my husband out of the house, his half of the house in the first place, rather than sell the house, you know there’s not much money left. So it’s a case of having to do it yourself.’ (Household 5, Female)

4.3 Professionals
Issues surrounding the use of professionals was also a strong theme, mentioned by half of the householders in relation to their home improvement experiences. Issues included struggling to obtain appropriate professionals, unreliability, and perceived poor skills.

‘We tried to get professionals in [to fix the flat roof]. The ones that did arrive couldn’t do it. The ones that probably could have done it, never turned up, so I’ve done it, and it’s alright for a bit.’ (Household 1, Male)

In certain cases, improvements carried out by professionals were deemed to ruin the house, and therefore improvements had to be either ‘made good’ by the householder, or redone. In one case the householder had to threaten to sue the company before they would agree to repair damage caused through the failure of their product.

‘Then the damp proofing went wrong...We had an enormous struggle with the company that did the damp proofing.. And then we offered to sue them. Then we had it redone but they wouldn’t pay for all the [redecoration]...because they chipped out all that was done originally...and then the damp was worse.’ (Household 13, Male & Female)

Several householders suggested a lack of appropriate skills relating to renovating older properties in particular. The quote below illustrates some of the difficulties householders experienced with professionals:

‘They’ve halved the bricks on the cavity, to match in the bond, because that’s another part of the problem of people doing restoration. They get these new brickies in, and they just slap it up in regular bond.’ (Household 19, Female)

4.4 Time
Householders were unable to perform improvements when they perceived they did not have enough time to carry them out. The amount of time to be spent on a job may include looking around and making decisions on changes, as well as carrying out the improvement itself. Householders referred specifically to lack of time as a barrier, or in some cases would comment ‘I haven’t got around to it’ which would suggest that time is filled doing other things. The barrier of time may be better defined as the householders’ perception of time. This will in turn be related to the Personal Capacity of the householder, for example, where there is limited capacity to make home improvements. This may be perceived as a lack of time, but the barrier may not be removed with the addition of time.

‘The thing is, I can do that, I just have to source the materials, and I just have to have motivation and time.’ (Household 14, Female)

4.5 Property features
In many of the households, property features, particularly relating to older homes, provided a barrier to home improvement. These related to the shape or size of the house, the way it was built, or the property’s original use. This category is of particular importance when trying to increase domestic retrofit, as many hard to treat homes from
the Victorian era and before face similar issues. Barriers to making home improvements related to being in a conservation area which affected predominately the replacement of windows, older foundations not being able to support substantial rebuilding of the property and unusual or misshapen features that led to the need for bespoke and therefore, more expensive, solutions.

4.6 Attitudes to older property
Many of the householders specifically mentioned they liked owning an older property, whilst others mentioned factors which may be more commonly found amongst older properties, such as character, style, high ceilings and architecture. These householders were often intent on maintaining or restoring original features of the property and in particular many householders were not keen to replace windows unless they were sympathetic to the style of the house.

‘We kept the original [single glazed] wooden windows, I was absolutely determined I wasn’t going to replace them; a real feature of the house, beautiful windows.’ (Household 18, Female)

‘There’s one window that we haven’t replaced because they can’t do it in a nice way that’s sympathetic to the style.’ (Household 3, Female)

4.7 Life stage
Different stages of life prevented or delayed home improvement, e.g. starting a family, having elderly parents or entering older age. In many of the households the presence of young children provided a barrier to home improvement:

‘Well, when we decorated in here, we put a DVD on in there and sat him in his bouncy chair because he couldn’t move. So that was actually fairly easy. It would be harder to decorate now because he’s moving around.’ (Household 16, Female)

The other very significant life stage that provided a barrier to home improvement was older age. Some householders described feeling less able to carry out DIY:

‘Well I’ve given up decorating. No I’m not agile enough to decorate any more.’ (Household 20, Male)

‘[My husband’s] not so good with heights anymore, so we try to get people in.’ (Household 17, Female)

4.8 Personal Capacity
The personal or emotional capacity of an individual or household provides a barrier when they do not feel able to undertake a home improvement, perhaps lacking motivation or energy. This is of interest as there may not be any tangible reasoning, but is just the householder’s own impressions of their capacity at that time.

‘When you do things like [replacing appliances], there’s disruption, there’s decision making process, there’s all that emotional hassle that goes with it so it’s not really worth that.’ (Household 6, Male)

‘It’s a big consideration that we need to...we know we need to do it. I’m burying my head in the sand at the moment.’ (Household 12, Female)
4.9 Lack of consensus
In some of the households, and often numerous times within a household, the lack of consensus between household members meant that an improvement was delayed until a decision or compromise could be made; this delay could last for many years, e.g.:

‘So we know we need to upgrade our boiler to a more efficient boiler, but its whether we replace it with an equivalent one in the kitchen or whether we go for a combi boiler which would need to be put in the loft ... I favour the combi boiler to tidy up ... get rid of all the tanks in the loft ... so we can board it and make more use of it, where [my wife] favours replacing the boiler down here, don’t you? So we haven’t done anything yet!’ (Household 12, Male)

5 Discussion
The thematic analysis of the study data has highlighted a range of interrelated and sometimes rather intangible barriers to making home improvements to older, hard to treat properties. These expand and elucidate the three primary barriers of Information& awareness, Hassle and Cost, identified by EST (2011). The Green Deal is designed to alleviate the financial barriers to making energy saving improvements to existing homes. However this study suggests that many householders would still resist taking advantage of the scheme because of the wider social and emotional barriers to change. This research has unpacked a range of social and emotional barriers that can cause inertia or even halt projects for many years. Factors relating to personal capacity, perceived difficulty of a job, likely disruption and inability to reach consensus with a partner have all been highlighted as reasons why home improvements have not been undertaken as expediently as they might have been.

The barriers identified in this research show a range of interrelated factors, many particular to older properties. The vast majority the householders interviewed had chosen to live in older properties at least partly because of their character and appearance. Features had been lovingly restored and preserved even in the face of compelling financial reasons to modernise. There is clearly a need to better understand the priorities, values and aspirations of these owner occupiers who choose to live in harder to treat homes. This is needed in order to equip both policy makers and building professionals with the specialist knowledge that is needed to sympathetically retrofit energy saving measures whilst maintaining the character of the house and overcoming the idiosyncrasies of older properties. The depth of property-related knowledge held by many householders regarding their older properties was surprising, causing great frustration when professionals did not share the same specialist knowledge. Clearly, competent and appropriately skilled professionals will be required to meet the expectations of these householders.

6 Conclusion
This study of owner occupiers who live in solid wall houses has uncovered a variety of barriers to undertaking home improvements. By grounding the research in understanding of past behaviours, it is possible to provide a realistic context to the future retrofit of energy saving measures. Although a number of barriers have been identified, there are clearly opportunities for retrofitting, given the range of home improvements already being undertaken, many of which relate to the energy usage of the home.
7 Acknowledgement
This work forms part of the CALEBRE Project which is funded by the Research Councils UK Energy Programme and E.ON, to whom the authors express their gratitude. Thanks are also extended to the participants, without whom this study would not have been possible. For further information on the CALEBRE Project, email Dennis Loveday, Loughborough University, d.l.loveday@lboro.ac.uk (www.calebre.org.uk).

8 References