
EVEN BAD NEWS CAN BE BENEFICIAL

Every architect knows how to design a house – but very little is still known about how residential buildings actually perform in use. Initiatives such as the Usable Buildings Trust in the UK are trying to change this by developing new planning and learning processes that could greatly improve the quality of our built environment.

Interview with Fionn Stevenson & Bill Bordass
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Professor Stevenson, Dr Bordass, you are both active in the field of Post-Occupancy Evaluation (POE) of buildings. While interest in POE has slowly but steadily grown in the non-residential sector, we still know very little about how residential buildings actually perform in use. Why is this?

FS: One reason is that it is quite difficult to do a systematic post-occupancy evaluation in the field of housing. Often only specific aspects of feedback or specific types of housing (such as passive houses) have been investigated. It is relatively easy to do a rather superficial mass survey of residents or a mass monitoring of homes, but difficult to get the occupants to agree to everything that really needs to be looked at in depth. On one hand, you have to measure their energy use and internal environment, which not everyone will accept; on the other, the actual usability of the home needs to be assessed. This means that we have to enter the homes to look at how they are being used, which is much more of a privacy violation than in an office or public building. There are also huge variations in the demographics of residents, and the typologies and tenures in housing. With this tricky task, we are still at an early stage in discovering how best to deal with this level of variety.

How has interest in POE in the housing sector developed so far?

FS: Historically, there has been little need for the private housing industry in the UK to evaluate its products once they are sold.

This is slowly changing. Some developers – particularly the larger ones – are now waking up to the fact that POE might give them a leading edge in the market. Interestingly, they are doing so in the middle of a recession in order to be better prepared for the time afterwards. Recently, there has also been encouragement through government funding and events to get developers and designers engaged with this kind of work.

The difficulty, I think, is not so much the housing developers that have resources, but all those that don't have any margin to invest in this kind of knowledge transfer.

What attitude do architects and engineers show towards the subject?

FS: My experience is that housing developers are often more prepared to be honest about what is happening with their products than architects are. This came as something of a surprise. Many architects seem to be rather defensive, which may have something to do with the current market situation: developers are increasingly commissioning architects for multiple portfolios, so architects are looking for repeat business with the same client. This makes architects and design teams nervous about things not performing, as they are afraid that this will damage their reputation and they will not be hired again in the future.

BB: Engineers seem to be better able to deal with bad news. In the 'Probe' studies

"[...] There is little housing building evaluation. Unfortunately [...] lessons are still not learned, in spite of the crying need to close the feedback loop and get our buildings performing radically better.

from Adrian Leaman, Fionn Stevenson & Bill Bordass (2010):
Building evaluation: practice and principles, Building Research
& Information, 38:5, 564–577

we did between 1995 and 2002, where we investigated the performance of twenty recently-completed buildings and published the results, we had two potential lawsuits. Both were from the architects, although most of what we had been looking at was the engineering.

FS: I think this also has to do with the education of architects. They are trained to deliver a product but don't have much understanding of the production process of buildings – or of their actual use. Some of us at the Usable Buildings Trust are now trying hard to make post-occupancy evaluation part of the curriculum. Architects must understand that part of their service consists of revisiting what they have produced, and of evaluating it.

What benefits are there in building evaluation – particularly for designers?

BB: When we started broadcasting results from POE studies in the 1980s, the professions treated them as if they were radioactive! During the last five years, however, some leading practices have got more closely involved and are facing up to the fact that their buildings often do not perform as intended. They were thinking, "If we don't tackle this problem, we should not be surprised if we lose our market position in five or ten years." Interestingly, publishing even bad POE results may have beneficial consequences. For example, two leading engineering firms in the UK both collect user feedback. One has been publishing the results even if they were poor, while the other has not. As a result, the first firm has gained credibility and reportedly taken market share from its competitor.

I imagine communicating bad results is not a straightforward task?

BB: We have been doing it successfully for quite some time. The important thing is to use the case study of the particular building to illustrate what is going on more widely, so that one can help everybody to understand what has happened and how things might be improved. Those directly involved in the project must also be thanked for allowing the results to be published. The problem comes

when other people – media, politicians and bureaucrats – use the information to produce sensational articles, blame the participants or 'shoot the messenger'! The feedback – good and bad – must be seen as a learning experience, and essential if the industry is to improve its products and services. It also helps clients and government to know what to ask for.

FS: Some interesting work is being done in the UK to try and overcome this problem, the Carbon Buzz website www.carbonbuzz.org for example. Here designers can report anonymously the energy performance and CO₂ emissions of their buildings and compare design predictions with actual outcomes. Here at least, measured data is made public but we cannot yet get to the 'stories' behind these results.

BB: Carbon Buzz is developing. Participants can remove the anonymity from their results if they elect to, so in due course it will be showing the performance of named projects. The website is also being developed to incorporate links to supporting information when available. Behind every good result there is a context that needs to be understood, and often this context is closely related to the particular individuals who have been driving the project.

In recent years, the Usable Building Trust has helped to develop a process called Soft Landings in order to better prepare buildings for their actual use. Can you briefly explain how Soft Landings works?

BB: Soft Landings is designed to run along any procurement process, for any building work in any country. It aims to make better connections between the production of a building and its operation, and to get client, design and building teams to look much more at outcomes, not just specifications. The *Framework* document, published in 2009, identifies five main stages:

1. Inception and briefing, in which more attention is given to the anticipated outcomes in relation to the performance of other relevant buildings
2. Expectations management during design and construction, reviewing

progress in relation to the original intentions

3. Preparation for handover, helping to ensure better readiness for occupation by both the building and its occupiers
4. Initial aftercare, where the occupier is supported, systems tuned and feedback obtained
5. Longer-term aftercare and POE once the building is working normally.

Case studies of Soft Landings in action reveal the benefit of having client support from inception. Even before they are appointed, all members of the design and building team know they will be working on a Soft Landings project, with more focus on outcomes and follow-through after the building is completed. Everybody can then organise their work accordingly; it is more a question of organisation than more time and money, at least until Stage 5. Somebody will need to pay for the longer-term aftercare and POE, usually the client directly, as the construction contract will be over by then.

As the project develops, we have found it helpful for there to be a person – we call him or her a 'champion' – who maintains a focus on the outcomes and can challenge the project management, which otherwise tends to concentrate more on the cost and speed of delivery. The champion is not a new team member – it is a role that can be taken on by somebody already there. Indeed, a project can have several champions (one each for the client, designer, builder and, where possible, the eventual occupier). What is important is to maintain the focus on outcomes.

What do you consider the main benefits of Soft Landings?

BB: Buildings and refurbishments that cost no more to build (and quite probably less), cost less to run (in one school, electricity consumption was halved) and perform better for their occupiers. If we find a problem when doing a POE in a new building, its cause is seldom a shortage of money – it is not spending that money in the right places. A better result would have often have been achieved by making things simpler, paying more attention

to detail, and providing some aftercare to make sure that things worked and that any lessons learned were incorporated in future designs.

More than anything, the process entails a change of attitude in mind – to see the job of producing a building as not just finishing it off as a physical object, but in getting it to work. Apart from the POE phase, it does not usually mean much more work, only more concentration. The initial learning period will of course take some time and money for any organisation. Ideally clients would pay for it, but many are reluctant. However, some designers and builders are now realising how important it will be for them to deliver more predictable outcomes, and so are funding work on Soft Landings and

POE from their marketing, research or training budgets.

Let us get back to the evaluation of housing. From the studies conducted so far, are there any general findings about the preferences of occupants, and about what 'works' and what does not?

FS: The overriding aspects about a home are where it is and how much it costs. A good location and a good price usually mean a big 'forgiveness factor' from people buying or renting, which makes up for other, less favourable aspects. The next thing for residents is the 'feel' of the home, which includes design issues such as spatial quality and daylighting. Once these are satisfied, people become increasingly concerned with usability, which relates to

controls but also to functionality. For example, residents are often disappointed with the kitchen layout. However, probably the most frequent complaint is about storage space: there never seems to be enough in modern homes. Although everyone – housing developers, architects, users – tends to agree, the problem persists, probably because additional storage space obviously means extra costs.

What did you find out about building services and their operation?

BB: In both residential and non-residential buildings, increasingly complex technologies are being imposed in the name of energy efficiency. In practice, the complication often gets in the way of basic good practice, and performance

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suffers. There seems to be a problem with the promise of technology, the lobbying power behind technology, and people's fascination with technology, that gets in the way of basic functionality, usability and fitness for purpose.

FS: POE studies in the residential sector show that people no longer understand intuitively how to run their home efficiently. Many do not even bother to adjust their thermostatic radiator valves, or even know what the thermostat scale from 1 to 5 means. Likewise, they do not understand that the systems have different summer and winter operating conditions. It is quite astonishing how many people do not use the controls of their heating or ventilation systems. A number of demographic factors also come

into play here. One is age. Younger people tend to be much more able to deal with the controls in their home, while the elderly just give up. There may also be a gender issue: in many households, it is the man who takes 'control of the controls', while women can be a bit more shy in dealing with these things.

Does the industry react to these issues?

FS: The manufacturers of 'active' technologies such as boiler controls tend to be at least aware of the issue. However, in housing there are often major problems with the usability of standard, 'low-tech' building elements such as windows, which one would hope to be able to take for granted. On several occasions, for example, I have been able to remove a tilt-and-turn win-

dow completely from its frame! In other words, housing occupants tend no longer to have sufficient control over their environment, or be able to operate building elements in a secure way. There are many usability problems of this kind in homes now. BB: What really worries me is that if some designers and manufacturers find that occupants cannot operate their products properly, they start blaming them for stupidity. Instead, they should examine the products, designs and services they are providing.

FS: We were recently involved in an evaluation of products used in a major housing project. 40 manufacturers who supplied their products were interviewed. Only about a quarter of them had fully tested their products in situ on ordinary people!

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"The architect has [...] a range of ways to gain knowledge: he can use his own experiences and his reflections on his experiences, his observations of the behaviors of other users, the conclusions he draws based on the long-term material consequences of these behaviors [...] The benefit of such an individual engagement with very different types of buildings is beyond all question [...]"

Riklef Rambow and Jörg Seifert in: Graz Architecture Magazine 03, 2006

Many window manufacturers, for example, had not tested their windows in situ on people at all, or only on workers in their own factory. Surely this is not a good test because the factory workers will know too much about their product – they may also not want to displease their employer!

Does it make any difference to usability whether a home is specifically designed for its occupants?

FS: Not really, because the involvement of the end-user tends to be limited to the choice of only a few products. A lot depends on the usability of the products themselves and their fitness for purpose as part of the overall design, e.g. controls located in the right places and not hidden away. If they are usable, it is irrelevant whether the occupant has gained a 'sense of ownership' by being involved in their specification, provided the design intent is made clear.

The handover process can be as important for usability as the specification itself. Here a lot of training needs to be done, particularly regarding new technologies. Quite frequently the people who show residents how to use their ventilation and heating systems do not themselves understand the design intent or how to operate them properly. This is a real worry.

How much, and what kind of, adaptability and flexibility do users expect from their home, and how much is recommendable?

FS: Modern UK housing has very little flexibility or adaptability. Our feedback is that residents would like much more open plan, much more 'flow' in their home, and the possibility to use their personal technology wherever they want. Neither the government nor the housing industry has yet got this right. In the UK, at least, there is still an old-fashioned understanding that someone working from home will need an 'office' – whereas all you need in this case is flexibility! Occupants really value being able to use different spaces in multiple ways. Yet the housing industry is still a long way from meeting this market demand with their products.

BB: The most flexible homes in the UK, built at high density, could be the urban

terraces constructed in the eighteenth and nineteenth centuries. I live in a house of this type myself and find it extraordinary how adaptable the designs have proved within very simple plans. You tend not to get that in modern housing – both the spaces and the technologies constrain you.

FS: I agree. In the UK, space standards have been reduced, to the extent where they are one of the lowest in Europe. That has 'designed out' a large degree of forgiveness and flexibility. Nowadays, you can only use a kitchen as a kitchen, but no longer as a kitchen/dining room. Flexibility is also closely related to storage. If you have some extra storage space, you can reconfigure your home much more easily. If you do not, it is quite hard to.

Historically, there has been – and still is – a distinction between adaptable buildings that rely on moveable elements and buildings with inherently flexible spaces. Which approach has more potential in your opinion?

FS: Adaptability, as we know it from prefabricated buildings with moveable walls or floors, is rarely actually exploited by residents. For real flexibility, it is more important that the rooms themselves are generous enough for the user to reconfigure them without the need for changes in the building fabric. This involves far less contingency, there is no need for different trades to be involved, and far fewer restrictions apply. For me as an architect, the way forward is, therefore, really to intensively reinvestigate the way in which space, in and of itself, can be used in different configurations.

Dr Bill Bordass is a scientist who started his career in the building sector at RMJM London, where he became Associate in charge of building services, energy and environmental design. He then set up William Bordass Associates, which studies and troubleshoots building performance in use. He is also research and policy adviser to the Usable Buildings Trust, a charity dedicated to improving building performance. In 2008, he received the CIBSE low-carbon pioneer award.

Dr Fionn Stevenson is Professor of Sustainable Design at the University of Sheffield and Director of Technology in the School of Architecture. She started her career as a housing architect, but quickly found out that she needed to engage more with the occupants of her buildings to find out if they really worked in practice. She now specialises in building occupancy performance and feedback research and is an advisor to numerous government agencies.