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An Investigation of the Effectiveness of Post-Occupancy Evaluation Techniques in Characterizing Baseline User Satisfaction, Energy Use and Behaviour in Barbican Centre Dwellings

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Introduction

A post-occupancy evaluation of 2056 residential dwellings was carried out at **the Grade II Listed** Barbican Centre in London.

The 21 buildings use a unique **centrally controlled electric district heating** system, installed during construction in the 1960s.

Project Aims

Characterize baseline **user satisfaction, energy-use and behaviour**.

Investigate options for strategies to **reduce energy consumption** without compromising the heritage value of the buildings

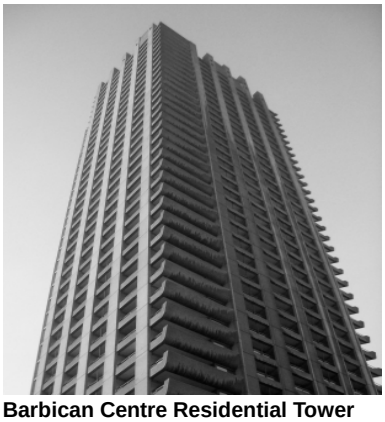
Evaluate the effectiveness of the adopted combination of POE techniques at identifying problem areas and developing workable solutions at the site.

Methodology

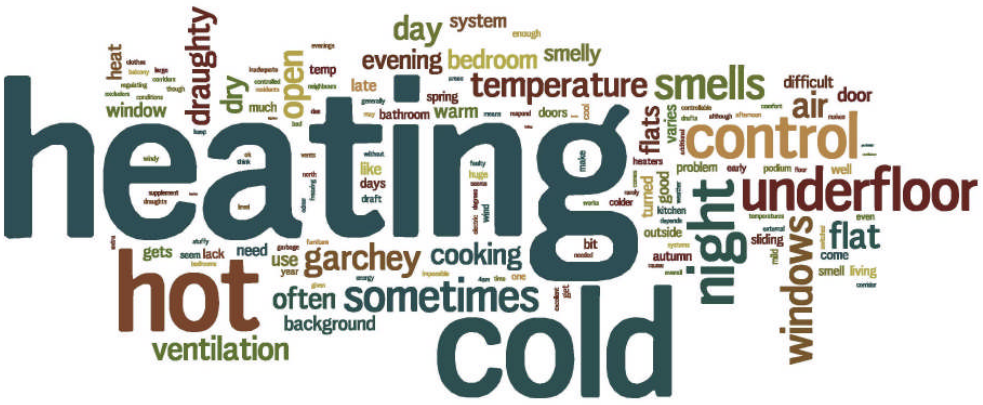
The research comprises a **residents survey**, and an evaluation of **metered heating energy consumption data**.

A questionnaire was developed based on the **domestic BUS methodology**, with additional questions about domestic energy use behaviours added after consultation with the Residents Sustainability Group.

Both **qualitative and quantitative data were collected and analysed** using a variety of statistical and qualitative methods.



Barbican Centre Residential Tower



Word Cloud Showing most frequently used words used by residents in response to the 'Winter Conditions' variable comments box

Results

Overall levels of satisfaction at the Barbican are high, with comfort, satisfaction and forgiveness indices scoring well above BUS benchmarks (99th, 99th and 89th percentiles respectively). **The main areas of dissatisfaction include lack of heating and noise control, perceived dry air throughout the year and variable internal temperatures during winter**. Sub analysis of the blocks revealed that residents in the towers are significantly more satisfied than other residents with 'space', 'storage' and 'needs' variables ($p=0.000003$, $p= 0.0003$ and $p= 0.0002$ respectively).

89% of residents were found to use windows to control the heating during winter. This has serious implications for the estate's energy consumption, as well as the cost of heating to all residents. It was also found that **people who use trimmers to adjust the heating, by altering the electric charge entering each flat, are significantly less likely to open windows to control heating during winter** ($p=0.04$).

Recommendations

Recommendations are made for a programme to **spread awareness about how the trimmers can be used among the residents**. Suggestions are made for a systematic appraisal and adjustment of trimmers across the site to improve energy efficiency and reduce the cost of heating to residents.

The work also offered a critique of the appropriateness of using this combination of POE techniques as a pre-intervention diagnostic tool, and concluded that **although the chosen methods were successful in identifying a workable solution to some of the residents' concerns, there is an opportunity for a more targeted methodology to be developed**.

Current PhD Research

Carrie is presently working on her PhD research project, which is concerned with **understanding the effects of adopting various ventilation strategies in low energy homes**, and is due for completion in September 2014. She hopes to investigate occupant understanding, acceptance and interaction with ventilation systems in low energy dwellings which use mechanical and passive ventilation strategies, with a view to **characterizing the potential impact of choosing different ventilation strategies on national CO_2 emissions.**