Mapping occupants thermal discomfort responses
Understanding dynamics of residential energy consumption

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Method A – QUESTIONNAIRE
An interview is first conducted with the householder using a recognised template, which will enables comparison to larger samples. The questionnaire topics include:
- Household characteristics, housing history, general health and economic activity status, using the Survey of English Housing;

Method B - FOCUS GROUP
At the end of the study all participants join a focus group. This session facilitates the gathering of reported information on thermal discomfort response, which could later be compared to recorded information.

Method C – SURVEY
A visual inspection of the property is conducted both internally and externally, using RdSAP worksheet version 9.83. Data collected includes construction type and details of heating system.

Method D – MONITORING
Onset HOBO-U12 dataloggers are placed in living room, bedroom and externally to record air temperature, RH and light intensity. Internal data are measured at waist height. The results will be used to model PMV values through the 3 day experiment.

Method E – DIARY
A SenseCam is handed out to each participant. This device provides a visual diary of participants’ wear-abouts in their home and forms a record of measurements taken by each sensor, but excludes audio recording. This wearable recording device takes photographs when triggered:
- Manually
- Automatically:
  - Timer
  - Sensors:
    - Temperature sensor;
    - Light level sensor;
    - Passive infrared detector;
    - Multiple-axis accelerometer;
    - Magnetometer.

Fig 1. Field Experiment
Thermal Discomfort Response: a Cup of Tea

Introduction
This poster presents the methodology used for a pilot study, which is part of a wider research project, entitled ‘Mapping and matching mental models of home thermal comfort systems’.
Although much of the research on heating patterns in dwellings has focused on achieving thermal comfort, less is understood about the way occupants form their responses. Existing approaches are based on climate chamber\(^1\) and field studies\(^2\), aiming to set out an optimum temperature for comfort. Recent studies have focused on adaptive behaviour: adaptive lag, adaptive opportunity\(^3\) and forgiveness factor\(^4\).

Aim of the Pilot Study
To compare methods to capture the diversity of occupants’ mitigation responses toward thermal discomfort.

Research Questions
What type of response do householders adopt toward thermal discomfort? How, when and where are these responses formulated?

Approach
Using empirical methods drawn from social and cognitive sciences, a small sample of UK households were monitored during winter of 2010 (ongoing study).

Anticipated Outcomes
1. To support the mapping process. Householders’ responses will be translated into representations of mental models of home thermal comfort systems.
2. To be compared with existing models, Heat Balance Equation, Predicted Mean Vote (PMV) and Predicted Percentage Dissatisfied (PPD).

Fig 2. Data Collection Sequencing

References

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