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# Tailored Scenarios: A Low-Cost Online Method to Elicit Perceptions on Designs using Real Relationships

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**Abstract**

This paper describes the on-going development of a method to elicit perceptions of design ideas for social technologies, through automatically tailoring scenarios presented in online surveys using information gathered from respondents. The work has been driven by a desire to understand perceptions of various information sharing technologies for the home, across a broad population. Reviewing literature in this area from HCI and beyond, we find potential value in generating scenarios that are tailored to each respondent's own household. We explore the results of a study using this method (n=79) and discuss initial comparisons with the results of studies using alternative methods.

**Author Keywords**

Scenario; Storyboard; Evaluation; Methods; Social; Home; Vignette;

**ACM Classification Keywords**

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

**Introduction**

HCI research has moved beyond considering only the individual user to addressing complex social-technical

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systems. In many such cases, it is a challenge to communicate design ideas such that they can be effectively considered by their potential users. Scenario-based studies can be used to collect responses on a wide range of designs from a larger number of respondents than would be possible within field trials or rich enactment methods. However, amongst other distinctions, scenarios are not generally situated in a user's own social context, which can be expected to influence their interactions with such systems. In this paper, we describe our work to develop a research method that retains the low costs of a scenario-based approach, but aims to help the viewer to envision themselves using a technology in their day-to-day lives.

### **Methods and Issues**

In order to elicit reactions to envisioned technologies and inform design processes, a variety of methods have been employed and reflected upon in HCI research. These vary in their costs and applicability to certain forms of technology. Performing field trials with working technologies or high fidelity prototypes is an important method for achieving a situated understanding of how a technology will be used, particularly when the technology has social aspects. However this is challenging in several ways:

- The prototyping of a technology is likely to be a costly development, particularly in areas such as ubiquitous or social computing where significant infrastructure and number of users is necessary for a naturalistic trial to occur.
- Participants consent to spending significant time and effort in a trial, which is costly, and likely to

bias the population willing to take part. Data collection around relationships and personal spaces can be intrusive, but also central to understanding the design space.

- Because of high costs these methods often involve testing only one design. Presenting multiple design ideas can engender a more critical eye, and help to identify issues at an early stage [8]. The process of reaching a design to prototype is therefore important to consider, with lower cost methods such as scenarios commonly directing decisions about which prototype to build.

An approach that supports situated studies of design ideas with lower development overheads is User Enactments [7]. While these reduce prototype development costs, they are still suited only to small numbers of participants as they aim to be situated in the wild or in an approximation of this environment. In this research, we approach the problem from a different perspective, generating low-cost scenarios using details of each respondent's personal relationships, delivered on the web through storyboards and text. Through this, data can be collected at low cost from large numbers of participants. We are finding evidence that this raises issues that are not apparent through similar studies featuring fictional characters, but do arise in field trials.

### **Scenarios as a Research Tool**

Scenarios have been espoused as useful components of design processes in HCI [3]. Finding that the characters in scenarios are often little more than cyphers having limited goals and conforming to simplistic stereotypes, Nielsen argues for the importance of narratives *driven by* characters with multiple traits and interpersonal

desires [6]. Chapman and Millham argue however that as fictional personas become richer, they become representative of less of the user population [4].

Vignette-based studies are a similar use of narrative commonly used in social science research. There is evidence that responses to vignettes can be predictive of later behaviours. However research has found distinctions in emotional engagement between lab-based and vignette studies. Jenkins et al also find that the common use of a fictional protagonist in vignettes can lead participants to adopt a character unlike themselves, and make choices according to their perception of this fictional character's personality [5].

While responses given to these narratives cannot be considered directly equivalent to embodied actions in the home, they offer insights into an individual's beliefs, knowledge, and perceptions about how they would act. Multiple scenarios can also be used to explore expectations and concepts. This is important as the high cost of developing ubiquitous technologies creates a situation where few ideas can be fully prototyped. Interfaces, visualisations and contexts lend themselves well to visual representation, thus storyboards have been widely used to communicate designs to users. The findings of Walsh et al suggest differences in storyboard interpretation based on background e.g. male respondents had difficulty identifying with a female character [9].

### **Context: Information Sharing in the Home**

There is little understanding to date of how to design pervasive systems such that the processes by which they collect and make information available are acceptable to users. These systems often collect

information passively, and therefore present challenges to our current conceptions of privacy. The home is a context of particular interest for these types of technologies: Research suggests many potential benefits, from saving energy to promoting family awareness and togetherness [1]. However, households are diverse places, containing many different kinds of relationships and norms.

Reflecting on our prior use of a static scenario-based online survey method to explore this area [2], we found challenging methodological issues around the interpretation of scenarios by respondents. It is difficult to present the use of social technologies without specific people interacting with them, but we had no sense of whether respondents were able to relate the fictional characters we used to their lives.

### **Developing Tailored Scenarios**

For this reason we developed an approach to automatically deliver 'Tailored Scenarios' through software. The process (fig. 1) begins by asking for information about the respondent and each member of their household (e.g. their name and relationship with the respondent). The system has been implemented as a Wordpress plugin, allowing us to easily create additional scenarios, use other plugins to generate visualisations using household members on the fly, and create forms for eliciting feedback from respondents.

As a simple example of creating a narrative through this data, one of the household members could then be selected to be the 'focus' of a scenario, with this person distinguished from other members of the household as appropriate, for example to show the exercise or energy use of the focus person to be relatively high.

## Scenario Technologies

*Energy Monitor:* This provided information about each household members electricity consumption overall, or a more detailed breakdown by appliance. This was given either for the current day or the previous month as a bar chart.

*Smart Fridge:* This presented each person's intake of fruit and vegetables, either generally as a bar chart showing total number of portions, or more specifically in terms of actual type of produce eaten (fig. 2). This was presented for either the current day or prior month.

*Fit Shoes:* This shared information about exercise through shoes given to each person. The output either showed a total amount of exercise in that day, or daily average that month. The detailed designs broke this down by activity: walking, running and gym.

*Let's Meet Up:* This presents location information. In the current designs the respondent is told that the focus person is in the local park, while in historical designs the system predicts that they will be in the park based on previous behaviour. The detailed designs tell them who they are with.

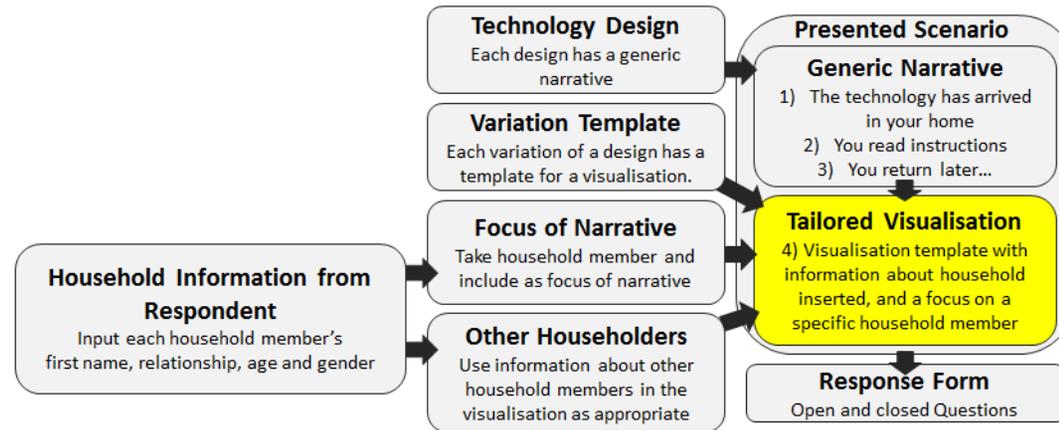


Figure 1: The Tailored Scenario process used in this study

## A Tailored Scenario Study

Using this method it is possible to rapidly get feedback on perceptions of a large number of designs. We are also interested in distinguishing the impact of particular design characteristics across technologies. In this study, we elicited feedback on four different technologies, and four variations in the design of each of these (showing a high or low level of detail and showing current or historical data). The box to the left describes these technologies and variations. 79 respondents took part in the study, 46 male, 33 female, aged between 18 to 71, with the majority (43) falling into the 21-40 years age bracket. Each respondent was shown one version of each of the four technologies in a random order. After viewing each scenario, respondents answered a series of open and closed questions, asking for their interpretation of the data shown, if they would do anything in response, whether they like the technology (fig. 3), and how happy they would be to share this information (fig. 4).

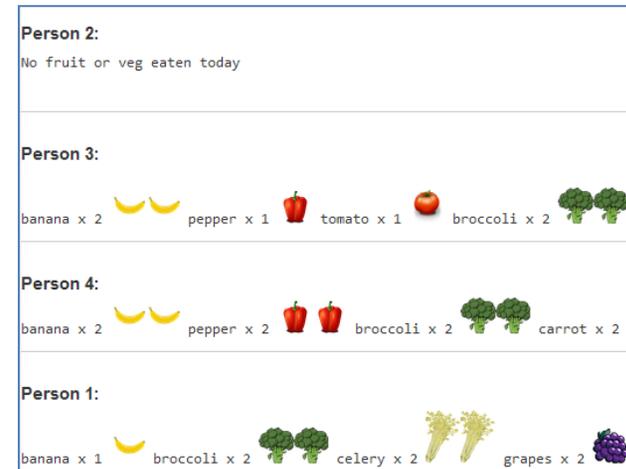


Figure 2: Template for visualisation from Smart Fridge scenario ('Person x' would be replaced with household member's names, Person 2 is the focus of the narrative in this case).

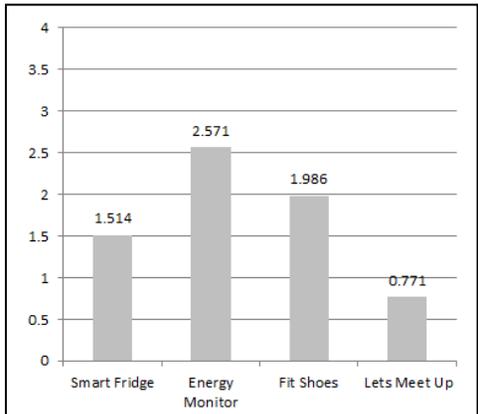


Figure 3: Mean responses to statement 'I would like to have this technology in my home'. From (0) Strongly Disagree to (4) Strongly Agree"

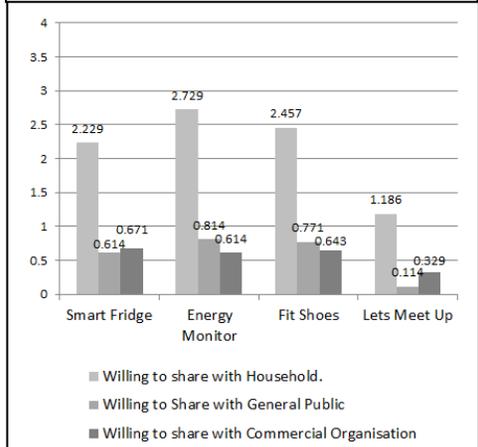


Figure 4: Mean responses on willingness to share this information with different groups. From (0) Strongly Disagree to (4) Strongly Agree"

## Results

The quantitative results from this study suggest that the type of data shared was more important than other characteristics, such as the level of detail, or current vs. historical data. Location was seen as a particularly sensitive data type, with the Let's Meet Up technology considered least desirable, while the Energy Monitor and Fit Shoes scenarios were well received (fig. 3). The results suggest that when respondents could identify a clear use to information sharing, technologies can share potentially sensitive data without this being considered intrusive in the home. Respondents make a consistent, strong distinction between sharing information within the home and sharing outside (fig. 4).

### Comparison with Other Methods

As part of our wider project in this area, we first ran a static scenario-based study using similar technology scenarios [2]. We also ran field trials where a display sharing information about individual's physical activity is installed in a communal area of homes (similar to the Fit Shoes scenario). In each case we have used a set of identical open and closed questions, enabling us to compare responses. In terms of cost/effort, the tailored scenario study was comparable with a small in-home field study (4 households for one week each). With a pre-existing platform for generating Tailored Scenarios, these costs could be further reduced. Our initial findings show that Tailored Scenarios elicit data with additional depth, and raise issues not found in our static study, which used fictional characters in the scenarios. We are also finding that these issues are subsequently raised in field trials.

For example expected nuances of competitiveness amongst household members emerge strongly through

Tailored Scenarios, and respondents identify several issues not found in scenarios with fictional characters. It is expected that competition will be affected by differences in individual routines and lifestyle, with the system failing to equally capture all data about a person connected to the 'value' the data was supposed to represent (e.g. exercise, healthy eating). This also emerged in field trials, where some forms of exercise were missed, and sensors failed or were lost. These limitations seriously impact on social interest in data.

The qualitative responses to tailored scenarios suggest how interpretations of information about others occur. We find this employs knowledge about a person's routines, personality and values. These can provide both a reason why differences are acceptable, e.g. the person "watches more television than me, but that this is largely explained by the fact that he spends more time in the home", or presented data can go against expectations, which instead informs interpretation, e.g. "the norm in our household is the opposite (due to... work). I would assume that (focus person) had been incapacitated in some way by illness or injury". These kinds of insights rely on eliciting data about real relationships, and are therefore an area to which the Tailored Scenario method is suited, and complements a field trial approach, where micro details of individual interpretations may not be visible to researchers.

Compared to our previous scenario-based study using fictional characters [2], respondents also drew a stronger distinction between sharing within the home, and sharing information outside (fig. 4). This suggests that respondents considered their privacy more carefully when encountering data about their own household, rather than fictional characters.

## Discussion

Our work to date suggests the efficacy of this method in the study of technology for information sharing at home, and its potential application to understanding social implications of various technologies. The method provokes responses with additional detail, which are important for understanding processes by which interpretations and actions are made. By replacing the need for fictional characters to give depth to narrative, a tailored scenario approach can be seen to avoid the 'curse of dimensionality' that prevents characters from being both representative and rich when used in expressing design ideas [4]. Building on [9], there is potential in areas such as assessing cultural differences in perceptions of social technologies.

A major reason for adopting this method was that responses in our previous study varied in their perspectives. Most comments were made via imagining fictional characters, which can be problematic [5]. Replacing these makes this clearer. The process of tailoring appears to increase realism and engagement with each scenario, as respondents do not feel compelled to imagine the social context. Through this method we can begin to unpack differences between information sharing issues in household relationships. In our future work, we will further explore how perceptions of scenarios are altered by the use of real or fictional characters, and explore the potential for further tailoring and interactivity as a means of bringing situated details into low-cost scenario based methods.

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