

Anthropomorphism as a Strategy to Engage End-Users in Health Data Ideation

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ABSTRACT

Recent innovations in data technology hold great promise for new products or applications. However, creating *meaningful* data applications can be challenging. This is especially the case in a user-centered design or participatory design approach as most end-users find it difficult to grasp the essence and opportunities of an abstract concept such as data technology. This paper presents method to engage end-users in data ideation that draws on people's tendency to anthropomorphize technology. It uses a metaphor for health data by introducing the imaginary concept of omniscient, benign little people residing in one's body. Participants are facilitated in a step-by-step process to formulate questions they would like to ask these little people and the answers they expect to receive. This approach, illustrated with a study on personal health information, resulted in insights for developing meaningful data applications.

Author Keywords

Data; ideation; information needs; technology abstraction.

ACM Classification Keywords

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

INTRODUCTION

People tend to anthropomorphize technology when they talk about or to it [1], making complex systems comprehensible by attributing human characteristics to it. Such anthropomorphism is not limited to technology alone. It is, for example, a core element in ancient tales, fables, and myths. Today, it is still relevant in the domain of Human-Robot Interaction, where anthropomorphism is used to explore the boundaries of human-like interaction. [3]. Also, it has been suggested that anthropomorphism is a powerful concept to apply in the design of interfaces [5]. Expanding on these ideas, we used anthropomorphism to facilitate ideation for new data applications. Where conventional user

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study techniques tend to focus on people's past and current experiences, we created a strategy to engage people in thinking about possible future experiences. As such, we anticipated anthropomorphism to be an interesting approach for so-called generative techniques that aim to gather insights into people's tacit knowledge and latent needs [7] that may be realized in future products or applications.

We based our approach on the Lillidots method [2], an ideation method to create meaning for connected products using metaphors of internet of things (IoT) technology like sensors and actuators. Lillidots are introduced as 'things' of undefined form and size, that can sense anything that happens around them (much like human senses) and that can communicate with each other and with their users. Participants are asked to shape, name, and assign functions to specific (combinations of) Lillidots they would like to use in their own environment in order to generate ideas for meaningful smart products. This abstraction of technology allows people to think about the (future) use of IoT without the need to fully understand the underlying technology. The Lillidot method furthermore breaks down the ideation process in comprehensible chunks rather than confronting participants with questions that are too overwhelming.

We applied the Lillidot principles to generate ideas for meaningful applications of health data. Recent technological innovations made complex operations on data (both big and small datasets) feasible, for instance by aggregating large data sets, by applying algorithms to it, and by displaying the results to end-users through interactive visualizations. Although this has resulted in data becoming more accessible, a remaining challenge is to understand how data can be made meaningful. In order to understand how users can truly benefit from access to data it is crucial to involve end-users in the process of creating future data applications. As it is difficult for many people to grasp the essence and opportunities of abstract concepts such as data technology, we chose to combine the Lillidot method with the strategy to anthropomorphize technology.

In this paper, we describe how we involved end-users in an ideation process to generate ideas for meaningful applications based on health data. For this purpose, we used the Lillidots method and we applied the strategy of anthropomorphism to create a metaphor for health data technology. This allows participants to think about what they

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value rather than what is technologically feasible or what information is present in currently available datasets. As such, this paper provides a fresh perspective for making data both more accessible and meaningful to end-users. It presents a concrete approach to involve end-users in creating data applications that could also be used in other HCI domains involving complex technology.

INVOLVING END-USERS IN IDEATION FOR HEALTH DATA APPLICATIONS

The study that we describe was part of a two-year project that explores scenarios for giving citizens access to validated health data in a meaningful and usable way (personal data in medical records as well as ‘big data’ concerning the entire population). The Lillidots method was used in an early phase in the project aiming to understand what questions people have regarding their health, as well as the motivations underlying their search for health information. In addition, citizens’ expectations and concerns regarding digital personal health data were mapped. In this phase, three specific groups of end-users were involved: people who live with chronic diseases, people who recovered from cancer treatment, and people who currently are, recently were, or want to get pregnant (both mothers and fathers). These subgroups were selected by the project team because they were believed to have an above-average interest in personal health information. By selecting three very different subgroups, we aimed to get a broad understanding of the range of motivations for searching for health information.

We used the Lillidot method after participants completed a two-week cultural probes study to sensitize them with regard to the topic of health data and to set expectations for the next steps (generative techniques rather than traditional user research). Participants were invited to either attend a group session at the university, or to participate in an individual session at home. They did not receive an incentive, to make sure they had an intrinsic motivation to join the study. We organized one group session for each subgroup, with a total of nine participants (4 chronic patients; 2 new parents; 3 people who had cancer treatment) and fourteen individual sessions (6 chronic patients; 4 new parents; 4 people who had cancer treatment). Participants were recruited via calls in publications (e.g. newsletters, member magazines, ...) of the project’s partners and its advisory board. Everyone who responded to the calls were invited to participate. The university’s Social and Societal Ethics Committee evaluated the study’s protocol and participants signed two separate informed consent forms (for the cultural probes study and for the Lillidot study).

ANTHROPOMORPHISM AS A METAPHOR FOR HEALTH DATA

Before applying the Lillidot method, the participants were presented with the project and its goals. We discussed with participants why they chose to participate in the study in order to identify and amend possible unrealistic expectations about their participation. We started the Lillidots exercise by showing participants a world-famous commercial for

Gaviscon® [6], an over-the-counter oral medication that relieves heartburn. In the commercial, the medication is anthropomorphized as tiny firemen who enter the body of the commercial’s main character when taking the medication. Upon entering the body, the firemen extinguish the heartburn (visualized as an actual fire in the stomach), leading to relief on behalf of the main character. We asked participants to imagine that similar little people would reside in everyone’s body with whom we can communicate. These little people, who would be so small that their presence is unnoticeable, would know everything that is going on in our bodies and as such be omniscient about our health. The little persons would be kind and benign: they would only have our best interest at heart. In the entire exercise, we deliberately avoided using technological words like ‘data’ at any time, as it would break the abstraction we tried to achieve.



Figure 1. Completed little people template (left) and a template with four What If extensions (right)

After seeing the commercial and introducing the concept of the little people, we asked participants to list all health-related topics they would like to discuss with the little people in their own bodies. Next, we gave participants paper templates (Figure 1) representing individual little people that each had an individual, human name common in Belgium to further emphasize the idea of an anthropomorphic metaphor for health data.

The templates break down the ideation process in small steps represented by a different questions the participants had to fill in. The templates are folded in such a way that subsequent questions are hidden from view. In the first step, participants select one of the health-related topics they had listed. Also, they write down what they would be able to do with the information the little person would give them (“*John tells me... so that I*”). In the second step, participants formulate a concrete question they want to ask this little person (“*I ask John ...*”). In the third and final step, participants think about the answer they expect from the little person. They indicate when they would expect the little

person to give the answer (“*I expect an answer from John...*”), and what they expect this answer to look like (“*and that answer would look like this: ...*”). After creating several individual little people, we added extension templates with ‘What if’ questions (the colored papers in Figure 1) that could be attached to one of the little people that participants created in the previous step, or to an entirely new little person. This served to introduce opportunities and risks related to health data (again without using technological terminology), such as pattern recognition (“*If he/she would have existed since I was born, then...*” and “*If he/she could communicate with other little people in my body, then...*”), sharing personal data or linking personal data to ‘big data’ (“*If he/she could communicate with others or with the little people of others, then...*”).

During the group sessions we noted observations and participants’ remarks. The individual sessions at home were recorded and transcribed. The cultural probes, the little people templates, the notes, and the transcriptions were coded for analysis. This analysis (not further described in this paper) lead to insights on people’s motivations, questions and health information experiences as well as opportunities for data technology and related concerns.

RESULTS & REFLECTIONS

Together, the 23 participants created 97 little people, 39 of which were created during the group sessions (i.e. by 9 participants), and 58 during individual sessions (i.e. by 14 participants). Below, we give some examples of insights we gained from by describing four little people that were created and we reflect on the usefulness of our method.

Insights – four examples

Below we discuss four little people that were created. For each of these little people we provide the actual content the participants generated and we briefly discuss some insights we derived from the specific little person (both the template and the discussions of that little person during the sessions).

[*Tamara tells me*] about my vitamin levels [*so that*] I know if I should buy supplements. [*I ask Tamara*] whether my vitamin levels are OK. [*I expect an answer from Tamara*] when I ask her, or when my levels reach critical values [*and that answer would look like this:*] red light or a visual scale showing the current level (illustrated by the participant).

Tamara illustrates our finding that the participants are motivated to achieve or maintain good health, but that they worry of being unaware of factors that may affect their health. They want to be able to review their current health status and warned in case of critical situations.

[*Gerda tells me*] about a problem I haven’t noticed yet [*so that*] I can take action. [*I ask Gerda*] Please monitor everything and tell me if anything goes wrong. [*I expect an answer from Gerda*] when she notices a problem, or once a year when everything is OK [*and that answer would look like this:*] in case of a problem: e-mail, badge on app icon, text message, phone call → a notification I won’t miss; in case of

an annual update: e-mail or information on a platform saying everything is OK.

Gerda shows the participants’ need to be aware of every detail of their health and their fear to miss out on important signals. She illustrates that the participants are concerned about information overload; they don’t want to know everything that’s going on if they don’t have problems.

[*Sanne tells me*] about the meaning of a body signal [*so that*] I know if I should worry, change my behavior, see a doctor, [*I ask Sanne*] Is this feeling normal? [*I expect an answer from Sanne*] as soon as I feel something that I worry about [*and that answer would look like this:*] “This is OK, because...”; or “This is not OK, because ...”.

Sanne is an example of the participants’ wish to understand what they experience. They tend to worry about their health and want to be reassured that what they feel is normal.

[*Hanne tells me*] how high my fat percentage is [*so that*] I can change my eating habits. [*I ask Hanne*] How can I keep a tasty but also fat (and sugar) free diet? Who can help me? Dietician is expensive. [*I expect an answer from Hanne*] [*and that answer would look like this:*] My fat percentage on a colored scale (red–orange–green) showing percentages and the mean value (illustrated by the participant); a list of diet suggestions and a list of dieticians I can choose from.

Hanne illustrates our finding that participants want to be empowered to be a more equal partner in their health care. They want to make their own decisions, but often lack knowledge and self-confidence.

Reflections

Anthropomorphizing data technology

Showing the world-famous commercial for a heartburn medication turned out to be a good starting point in our sessions. All participants were familiar with (variations of) the commercial and showed immediate recognition of the firemen animation. Using the same concept of the firemen (or more neutral ‘little persons’) in our ideation exercise also worked well as a way to trigger imagination. Participants immediately talked naturally about the idea of having little people residing inside their bodies and did not show signs of uneasiness as a result of this concept. Using unique names seemed to reinforce the anthropomorphic metaphor for health data as participants used the individual names of the little people they created as if they were real persons throughout the sessions, which facilitated discussion and ideation about the use of health data. We used an equal gender balance between male and female little persons, but during our exercises participants didn’t seem to notice this or to be bothered about this at all and created a similar amount of male and female little persons (52 males and 45 females).

Step-by-step ideation process

Dividing the exercise in small steps and folding the template made participants focus on the current step. Most participants experienced some steps as a repetition at first

(e.g. first thinking about what one would be able to do with specific information and only then formulating a specific question to ask for this information), but they discovered the value of dividing the process after completing some templates. For instance, thinking about what the little person's answer would look like, stimulated participants in later templates to formulate more specific questions.

'What if' extensions

During the sessions we noticed that people saw the 'What if' extensions as a context in which the little people would operate rather than extensions of individual little people. The questions did trigger valuable discussions, but the responses were general thoughts and concerns reflecting philosophical considerations rather than specific data application ideas. In the future, we would use these 'What If' extensions as context cards, to explicitly reframe the context and to introduce specific implications of the technology.

Group sessions vs. individual sessions

We found that our variation of the Lillidots method worked well, both in group settings and in individual settings. The group session allowed participants to inspire each other when creating the little people, but we also noticed that participants were hesitant to continue working on the little people that other participants had initiated. Inspired on the Relay Ideation Technique [8], we had participants give their templates to the next participant after each step on the template. Usually, such a relay approach facilitates collaboration and shared ownership of ideas, but in this study participants considered the little people for whom they filled in the first step on the template as their own little people. The individual sessions at home seemed to work especially well for very personal topics and experiences, which participants might prefer not to discuss openly in a group setting. Both the home setting and the individual nature of the session may have contributed to this effect. These sessions, however, did not allow mutual inspiration between participants, and required the researchers to be more actively involved in the ideation process compared to the group sessions.

Analysis

Analyzing the little people was more straightforward than expected, as the steps on the templates provide a clear structure for coding the data. As the researchers observed the creation of the little people and discussed them extensively with the participants, any incorrect or unclear content could be supplemented or nuanced right away. As such, the templates did not contain ambiguous information. In the analysis, the researchers took special care to interpret the little people on the level of basic health information needs they represent, to avoid bias toward agentive opportunities.

CONCLUSIONS AND FUTURE WORK

Using people's tendency to anthropomorphize complex systems to create a metaphor helped us to involve end-users in ideation about future applications of a technology they do not (fully) understand. In a step-by-step approach based on the Lillidot method, we learned about the information needs

of people regarding personal health data, a topic that most people don't given much thought. The insights gained in this research allowed us to create meaningful applications of health data in the remainder of our project. We believe that the ideation method described in this paper would work in other domains involving complex technology as well.

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