PARTICIPATORY PROVOCATION?

LAURENS BOER
Mads Clausen Institute, SPIRE
University of Southern Denmark
laurens@mci.sdu.dk

ABSTRACT

In this paper I revisit the provotyping approach (Mogensen, 1992), and apply it in a participatory innovation setting (Buur & Matthews 2008). Through a case study within the field of indoor climate I describe the implications for the approach when it becomes part of a participatory innovation process, next to the opportunities it creates.

INTRODUCTION

Ever since the "users" became central to a design process, numerous design research methods have been developed to gather information and or inspiration of, from, and with them. Within the interaction design community, the use of materials to achieve this has been explored since the introduction of mock ups in the beginning of the 90's (Ehn, 1992), but gained in popularity after the introduction of cultural probes in the late 90's (Gaver, 1999). Different types of probes have been explored since then, all with their own foci, as for example empathy probes (Mattelmäki, 2002); technology probes (Hutchinson, 2003); primitive probes (Loi, 2007); and urban probes (Paulos, 2005).

A particular string of methods to gather information and or inspiration of, from, and with "users" through materials have been heavily inspired by the notion of Critical Design. The core idea behind critical design is *"to ask carefully crafted questions and make us think… its purpose is to stimulate discussion and debate amongst designers, industry, and the public"* (Dunne, 2001, p.58), which makes its application in design research understandable. The opinions and reflections of "users" hold the potential to outline design spaces and provide guidelines for design directions. Examples within this string are the Critical Artefact Methodology (Bowen, 2009) and Reflective Design (Sengers. 2005). Within this paper I will build on the idea of provocative prototyping, "provotyping" (Mogensen, 1992), which -though it was already introduced in 1992- has strong commonalities with critical design as well. Provotyping is trying to call forth and provoke people's understandings on a particular phenomenon and can be used to bridge initial phases of investigation and design practice. I will elaborate on the idea of provotpying in the next section, whereafter I will explain how this idea has been explored and demonstrated in a participatory innovation setting.

PROVOTYPING FOUNDATIONS

The idea of "provotyping" was posed by Preben Mogensen in his paper: *"towards a provotyping approach in systems development"* (Mogensen, 1992).

Central concern in his paper is how to firstly devise *qualitatively new systems*, and secondly ensure their *usability* in a given practice. He takes the core ideas behind prototyping and activity theory as a starting point to reply to his concern.

Three characteristics of prototyping are described: prototyping is directed to *construction of the future*; it is a *"guess"* at a possible solution, therefore needing iterations; and it provides a *concrete experience* stimulating reflection on issues as usefulness or usability.

Activity theory, as interpreted by Yrjo Engestrom (Engestrom, 1987) is used to create a qualitatively new practice through understanding the current practice. In activity theory, different *levels of human agency* are distinguished: operations (how an activity is performed – for example writing individual letters of a signature), actions (what is being done – writing a signature), and activity (why you do it, including traditions, rules, and meanings in the situation – for example signing a contract). Furthermore, activity theory looks into the *mediated structure* of human action, and how activities are subject to both internal and external *contradictions*.

QUALITATIVELY NEW SYSTEMS

Mogensen's first concern is to develop qualitatively new systems. Typical prototyping aims at construction of the future, which addresses the "new" aspect - it is a sneak preview of that what
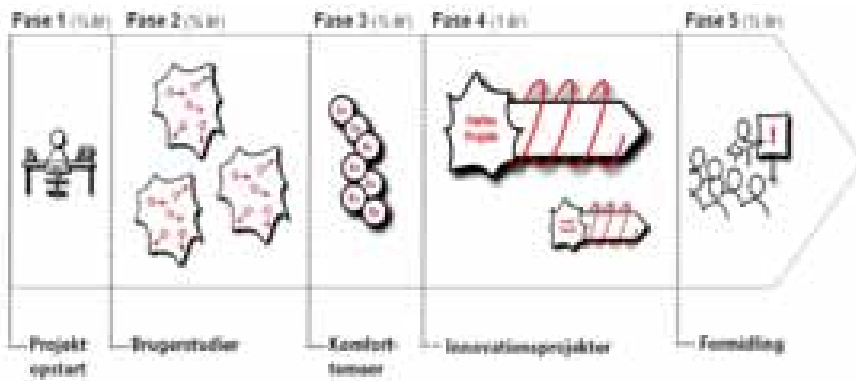
Figure 1: structure of the Indoor Climate project

could be. Activity theory in turn builds on how new activity areas can be discovered through the notion of contradiction. What are contradictions that prompted the development of a particular activity, and how can we elaborate the activity by exposing these contradictions? These elements from prototyping and activity theory can contribute to the development of qualitatively new systems.

ENSURE USABILITY

To develop usable systems Mogensen builds on the element of concrete, hands-on experiences that can be found in prototyping. Providing these experiences is a way to evaluate the usability of the system. Activity theory provides an instrument to understand the relationship between the individuals and the practice in which they are engaged. What, how, and why is the individual doing the practice in this way?

Combining prototyping and activity theory leads to Mogensen's proposition of exposing and elaborating on issues that are inherent to particular activities, in order to provoke, *through concrete experience*, that what is usually taken for granted.

Provotyping is intended to be used in between activities of initial investigation and design of the new; "*to find out what to develop*". It can be seen as a bridge between analysis and design: it uses discrepancies or issues found in the analysis of the current practice as starting points, and by exposing these it facilitates the construction of first 'guesses' in a development process. Through developing and deploying provotypes the system developer can on the one hand come to a deeper understanding of the analysis, and on the other hand provoke reflections on that what is usually taken for granted – and

by doing so outline design directions. Provotyping as proposed by Mogensen was mainly focused on software development and is closely linked to the traditional Human Computer Interaction field.

THE INDOOR CLIMATE PROJECT

The study where the core ideas behind the provotyping approach will be applied is part of the project entitled "Indoor Climate and Quality of Life". This project is facilitated by the SPIRE centre of the University of Southern Denmark (SDU), which has its roots in the "Participatory Innovation" approach (Buur, 2008), an approach that aims to *"overcome some of the practical organizational difficulties encountered when applying user-centred development practices in industry"*. This is illustrated well in the set-up of the Indoor Climate project: it is a collaborative project where 5 companies work together with 2 universities, of which one is SDU. The companies involved all deliver products or services related to the indoor climate, being windows, natural ventilation, mechanical ventilation, insulation, and

quality consultancy and assurance of indoor climate. Furthermore, one university is broadly speaking interested in quantitative studies that concern the indoor climate – the scientifically measurable indoor climate, whereas SDU is more interested in qualitative studies concerning this aspect – the daily experience of indoor climate.

The aim of the project is to create new knowledge about people's experience and understanding of "comfort" in homes, offices, and institutions in order to demonstrate innovative indoor climate solutions which can improve people's quality of life and open up new development directions within the building industry.

The SDU conducted ethnographic studies concerning the indoor climate (Jaffari, 2009), and followed 5 families throughout the day at their homes, offices and institutions (more specifically the kindergartens). Interviews and observations were conducted at each of these places. Analyzing these studies led to the development of 6 so called "comfort themes": themes that provide an insight into the relation between indoor climate and a comfortable indoor environment, across the different field sites that were investigated.

One of those themes was *"bringing feeling, observing and understanding in tune"*, which outlines how people's perception on indoor climate is shaped through their experiences with it. The field studies showed that this is through interaction with trusted "experts" concerning indoor climate issues, and through experimenting with the often hidden system and its corresponding indoor climate experiences. It is about
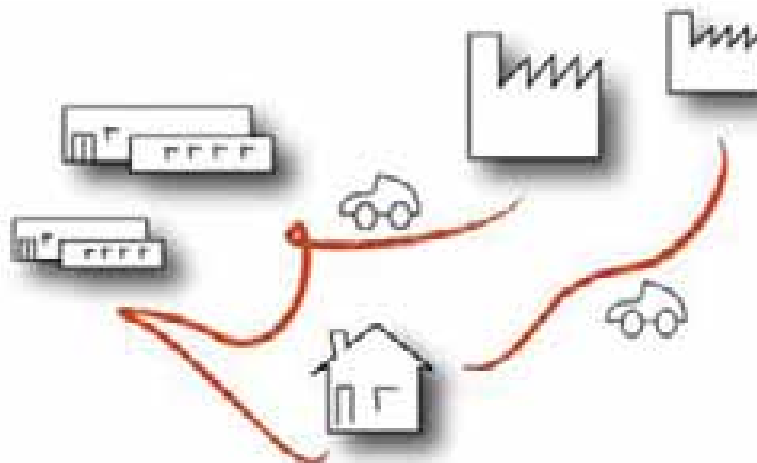

Figure 2: following families throughout the day

Figure 3: Sketch of the lamp with its 5 boxes

developing sensibilities concerning the differences between what is "told" the indoor climate is by for example measurements, and that what is experienced. The "comfort theme" instigated the development of the provotype: *how can the process of bringing feelings, observations, and understandings in tune be exposed and experienced in new and different ways?*

Within this paper I will focus on a case study with a provotype that was brought back to one of the participating families, and was deployed in their home for 9 days. The case study aimed to bridge the "research" part of the project and the part of the project where innovative indoor climate related propositions are demonstrated.

THE PROVOTYPE

One cluster of findings within the comfort theme showed that there appears to be a friction between that what is concretely measured about the indoor climate and that what is being experienced. This can be illustrated by the quote from one of the sites: *"it becomes the thermometer that determines if it's hot or cold"*, where the temperature meter became the point of reference to argue why or why not the temperature should be changed – where your experience of the temperature might tell you something different.

A provotype in the form of a lamp was developed to relate to these issues, and aimed to provide new ways of experiencing indoor climate measurements. What if indoor climate measurements are not presented in a set of numbers, but in one "holistic" view? How would this view be used as reference point? And would this instigate experimen-

tation with the indoor climate in new ways?

The lights in the lamp were chosen to visualize the different indoor climate parameters, where the shape and colour of the lamp itself were minimalistic (white and square), in order to stimulate reflection on the lights rather than the lamp itself.

The core idea behind the lamp provotype is that it measures the most dominant indoor climate parameters temperature, humidity, sound, light, and CO_2, and tries to holistically reflect this in the light the lamp shines. The lamp exists of the main lamp and 5 boxes that each measure one of parameter, and couples these to the properties of the light. To be concrete:

- the measurement of temperature is coupled to the colour of the light;
- the measurement of CO_2 is coupled to the height of the light;
- the measurement of light in the room is coupled to the intensity of the light;
- the measurement of sound is coupled to the amount of lights that are shining around the height of the light
- the humidity measurement is coupled to the vertical angle in which the light shines

The boxes can be either placed in the back of the lamp, so all boxes sense at one place; or the boxes can be taken out of the lamp and placed somewhere in the room (and wirelessly transmit the measurement to the lamp). In this way exploration of the indoor climate is

stimulated, which on its turn stimulates experiencing indoor climate in new ways.

Based on the comfort theme, we were interested in how the family would interpret the light and how they related to it. Would they try to relate the light back to that what is being measured, or would they couple the light to what is going on in the room and how you feel about the indoor climate. The lamp wasn't designed to serve as a moralistic object saying the indoor climate is good or bad; it was rather about the perception of the lights. Especially since people should have concrete everyday experiences with the lamp over a period of time, the lamp should serve like a clock: one view on the lamp shows the status of the indoor climate. What would happen if the light, and thus the indoor climate, *would not* change but the experience of it does? What if the light *would* change, but the experience of it not? Is the relation between the perceived indoor climate and the measured indoor climate fixed? Reflections on these issues by the family could call forth new ways of understanding indoor climate, which in combination with the lamp can be used to develop new design directions.

PROVOTYPE DEPLOYMENT

The lamp was placed at a Danish family consisting of two parents and 4 children for a period of 9 days. The family was involved in the projects' previous ethnographic field studies, so they were

Figure 4: the lamp provotype

Figure 5: the lamp provotype deployed

aware of the indoor climate project in the sense there was research going on about the phenomenon.

When the lamp was deployed, the family was told that the 5 boxes in the lamp each measured one indoor climate parameter, but no explanation was given which parameters were measured. This could increase engagement in exploration. The mapping would be "revealed" at the interview that would be conducted at the end of the trial.

The family chose to locate the lamp in the corner of the sitting area in the living room, in between two couches.

THE INTERVIEW

The interview had a semi structured character, and was conducted with the man of house by the three SPIRE researchers who also developed the provotype. One person shot video, one person conducted the interview, and one person made notes and supported the interviewer.

A set of materials supported the interview. Firstly, a "diary" of the positioning of the lamp and boxes was made: stickers were placed on a pre-made map of the house indicating where and when the lamp and the boxes were located throughout the week.

Secondly, a blank timeline of the week was provided, and the interviewee used it to reflect on the behaviour of the lamp throughout the week. When did which light shine, and what was going on at that moment? After finishing the exercise, a timeline of that week's outdoor climate was provided to instigate a discussion if relations with the indoor climate could be discovered. As a closing activity for the timeline, little text labels with a variety of emotions on them were provided, and the interviewee was asked to relate them to his moods throughout the week. Hereafter was asked if he could see relations between his moods and to the behaviour of the light at that moment.

Thirdly was discussed how the sensor boxes were connected to the behaviour of the lamp. After discussing the guesses of the interviewee the different types of sensors were revealed, and how they related to the behaviour of the lamp.

Fourthly, the reflections on the lamp were used to reflect on the actual indoor climate. Could the interviewee reflect on his understanding of indoor climate "through" the lamp? Were there discrepancies in his experience of indoor climate and the status of the lamp? As a final exercise the interviewee was asked to envision what an "ideal" indoor climate provotype would be like, in order to find out what he believed is of value within the indoor climate context.

RESULTS

The interviewee seemed to be generally interested in the indoor climate aspects and showed to have significant know-how about climate aspects. From the ethnographic studies was known that he part of a project that aims at saving energy, and has a mechanical ventilation system installed that ensures a stable temperature and air flow. The quotes from the interviewee "*I think the last two days the climate inside the house went from humidity about 60, 65 % to 35. And that is because the wind is from the north*", and "*And I can tell you that the lamp uses 13 Watts, as an average all the time, so that's actually not too bad. That's 119 Danish crowns for a year.*" indicate the know-how and engagement with energy consumption.

Having the ventilation system installed made the colour of the lamp behave stable. ("*The last four days the colours have been more or less like this*" and "*It is actually 22 or 23 degrees all the time*"). When asked to draw the different lights throughout the week, the response "*you want to have the curves and the colours?*" indicated that the colour and height/position of the light were most noticeable.

Being engaged with the indoor climate seemed to evoke an explorative ap-

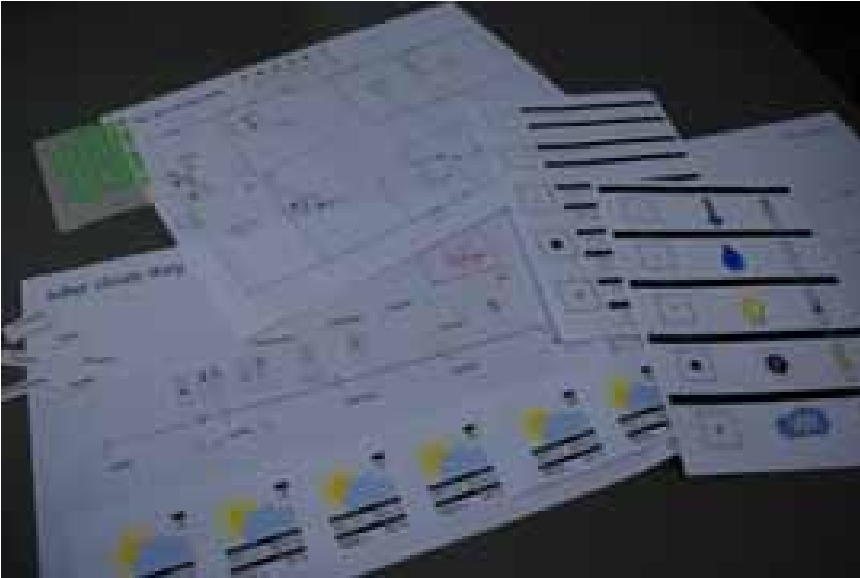*Figure 6: conducting the semi-structured interview*

Figure 7: Supporting materials for the interview

proach towards the placement of the sensor boxes. The interviewee numbered the boxes and made notes on where the boxes had been throughout the week. Discovering which box sensed which parameter was perceived as a challenge and appeared to increase curiosity and engagement. During the interview was revealed which sensors were used and how they related to the light, which showed that 4 out of 5 sensors were guessed right, but two not in the right box. Sound wasn't considered as indoor climate parameter: *"Sound has not been an option for me I guess"* and *"Sound, I didn't think about that at all, I didn't relate it to the indoor climate"*. The measurement of sound was related to the amount of lights that were shining in the lamp, leading to an "a-ha" response: *"Of course that explains a lot about this, especially in the afternoon, because the kids are noisy"*.

The provotype was accepted in the home (*"It would actually be nice to have it a little longer"* and *"I wrote down here, in the start we got used to it quite fast"*) and the idea to visualize indoor climate through lights seemed appealing: *"There are so many things regarding comfort in the home space, it's not good to smoke inside and all these things. An indoor climate lamp, I think it is a good idea to let a lamp tell you what the climate is during the day and over a period of time. I would be interested in buying something like that"*. Though, since the interviewee is involved in energy savings he indicated that *"...somehow we could put in the energy factor… Every-body is talking about saving energy to protect our environment"*.

Furthermore it was suggested that further information about the light could be added in the form of for example a PC application, in combination with recommendations for changing the indoor climate.

CONCLUSION

How can the process of bringing feelings, observations, and understandings in tune be exposed and experienced in new and different ways? was one of the questions raised after analyzing the ethnographic field studies, which instigated the development of the lamp provotype. The provotype seemed to provide a new way of experiencing the indoor climate phenomenon by on the one hand providing measurement tools that aren't fixed to a location which stimulates spatial exploration, and on the other hand holistically monitoring the measurements in the form of a light.

During the deployment of the lamp it did not become a reference point for the family to discuss feelings about indoor climate, which on its turn did not lead to tuning understandings with the lamp. This could be attributed to the knowledge that the participant already had about indoor climate; the other points of references to indoor climate that were present in the context (being a humidity and temperature meter); or to the lack of opportunities to do additional experiments once the researchers revealed which sensor box measured which parameter.

Some reflections on indoor climate itself were provoked, for example concerning the sound aspect, but the reflection mainly concerned the new way of experiencing indoor climate. These reflections can instigate the development demonstrators of innovative indoor climate solutions and open up new development directions within the project. For example on aspects such as how, what, and why to communicate indoor climate to people. In that sense it can be concluded that the provotype was a first "guess" at this, and thus providing a bridge between analysis and design.

DISCUSSION

This paper described how the provotyping approach has been applied in a participatory innovation project. In the following section I will first discuss what the implications were in doing this, followed by ideas concerning who is actually provoked.

PROVOTYPING IMPLICATIONS

Some elements of Mogensens proposal were valued differently in this project. Mogensen used the provotyping approach from a system developer perspective. Within the indoor climate project, SPIRE mainly takes the role of facilitator rather than developer. The aim of the project is not to develop a complete qualitatively new system, it is rather to sketch and demonstrate potentials for innovative indoor climate directions. Thus the focus isn't on defining a problem (overcoming unwelcome situations), but on exploring opportunities (enabling possibilities). This means that the role of provocateur is perceived from a facilitator perspective: on the one hand supplying both companies and people from the ethnographic studies with the techniques to explore a range of possibilities themselves, and on the other hand provoke them in order to experience the indoor climate phenomena in a different way. Furthermore, since Mogensen takes the system developer perspective, he aims at the experience of current practices in new ways to ensure usability. Within the project there is not a clear practice in play, since multiple companies are involved that all have their own products and services which can be practiced. Therefore the focus is on the indoor climate phenomenon as a whole, rather

than a specific practice. This shifts the focus from experiencing current practices in new ways into experiencing a phenomenon in new ways.

Four reasons can be mentioned why this adapted take on provotyping could have been or has been of value within the project: Firstly, it provided a bridge between the ethnographic studies and the demonstration of innovation potentials.

Secondly, taking a questioning approach could have provided a deeper understanding on why and how people are living with indoor climate the way they do. Providing a concrete experience in the context, enables people to reflect in the moment, rather than about moments (as for example in an interview).

Thirdly, climate is always present, which makes it something that is taken for granted. By calling this forth, you are making something "visible" that what was "invisible" before. In this particular project this can be seen both literally and figuratively, since we developed new experiences with the "invisible" indoor climate, by making it "visible".

Fourthly, the name "provotyping" still has strong connotations with prototyping, but communicates as well that its purpose is to "provoke" a reaction. We are in an innovation project where we deal with companies on the one hand, but have our own research agenda on the other hand. Provotyping is a name that has shown to be accepted in both arenas, since it has the practical component of prototyping; and a more theoretical component of provoking a reaction to inform and or inspire a design process.

PARTICIPATORY PROVOCATION?

People with different roles and aims are involved in the Indoor Climate project: researchers from two universities, company partners who all have their different background ranging from engineering to management, and the people where the ethnographic studies were conducted. Being a researcher and developer of the provotypes we can aim the provotypes either at the people that were involved in the ethnographic studies, but also at the company partners.

When we aim to provoke the people that were involved in the ethnographic studies, the starting point for the pro-

votypes will be the findings from the studies. This preferably extends the understandings of these findings. The reflection on the deployment of the provotype, which will involve both the "users" and the researchers, could open up the design space for innovative indoor climate demonstrators and provide information and inspiration for the project.

We could also embody the findings from the field studies in a provotype that provokes the company partners, which could instigate a dialogue about the direction we actually want to go into with the project. An example of this type of provocation is described by Sitorus and Buur (Buur, 2007). Another way to provoke the company partners is by developing a provotype that embodies the discussions that arise when the different company perspectives in the project actually meet, for example the more technically minded with the more socially minded. Deploying these kinds of provotypes at the companies and reflecting on the experience of it in a project meeting could instigate a dialogue about the direction we actually want to go into as well. This application of provotypes is currently in development.

Participatory Innovation seeks to bring different stakeholders from a field together, in order to instigate an innovation process. In this paper I have attempted to show how the ideas behind the provotyping approach could support this process in bridging stages of analysis and design. I showed implications of the method and sketched on the one hand how findings from the ethnographic studies can be taken back to the field in a provocative manner; and on the other hand how these could also provoke company partners.

As researcher and provotype developer I also felt that my understandings were provoked during the provotype studies, since they provided me with new thoughts and perspectives on the indoor climate. In that case, could we speak of a process of participatory provocation between stakeholders of a participatory innovation process?

ACKNOWLEDGMENTS

REFERENCES

Bowen, S. J. Getting it right: Lessons learned in applying a critical artefact approach. In: Proceedings of Undisciplined! Design Research Society Conference. Sheffield, UK, 2008.

Buur J, Matthews B. 2008. Participatory innovation. International Journal of Innovation Management 12:255-73

Buur J and Sitorus, L: Ethnography as Design Provocation. Ethnographic Praxis in Industry Conference (EPIC 2007) Keystone, Colorado

Dunne, A. & Raby, F. Design noir: The secret life of electronic objects, 2001, Birkhauser.

Ehn, P., and Kyng, M., Cardboard computers: mocking-it-up or hands-on the future, Design at work: cooperative design of computer systems, Lawrence Erlbaum Associates, Inc., Mahwah, NJ, 1992.

Engestrom, Y., Learning, Working and Imagining: Twelve Studies in Activity Theory. Orienta-konsultit OY, Helsinki, Finland. 1990.

Gaver, B., Dunne, T., Pacenti E. Cultural Probes. Interactions, Vol 6, Issue 1 21–29, 1999.

Hutchinson, H., Mackay, W., Westerlund, B., Bederson, B.B., Druin, A., Plaisant, C., Beaudouin-Lafon, M., Conversy, S., Evans, H., Hansen, H., Roussel, N., Eiderbäck, B., Lindquist, S., & Sundblad, Y. Technology Probes: Inspiring Design for and with Families. In CHI 2003 (17-24). ACM Press, 2003.

Jaffari, S., Matthews, B., From occupying to inhabiting: a change in conceptualising comfort. IOP Conference Series: Earth and Environmental Science, Vol. 8, 2009.

Loi, D. "Reflective probes, primitive probes and playful triggers." Working paper, EPIC07: Ethnographic Praxis in Industry Conference, Keystone, Colorado, 2007.

Mattelmäki, T. and Battarbee, K. Empathy Probes. In: Proceedings of the Participatory Design Conference, 23-25.6 2002, Malmö Sweden.

Mogensen, P. H. Towards a provotyping approach in systems development. Scandanavian Journal of Information System, 4, 31-53, 1992.

Paulos, E. and Jenkins, T. Urban probes: encountering our emerging urban atmospheres. In Proc. CHI 2005, ACM Press (2005), 341-350.

Sengers, P., Boehner, K., David, S., & Kaye, J. (2005). Reflective Design. Proc. Critical Computing, 49-58.