

INVOLVING DESIGN STUDENTS IN DESIGN RESEARCH: MAKING THINGS FOR KNOWING THINGS

Gert PASMEN and Stella BOESS

Faculty of Industrial Design Engineering, Delft University of Technology

ABSTRACT

This paper describes and reflects on experiences of educating design students in doing research as part of their design process. It specifically looks at the value of making things as a means to generate knowledge and how this activity can thus be used to involve students in design research. It is argued that because making things for design is something design students love and are experienced with, using it for in a research context could catalyze their interest in design research. Making things for research, however, requires a different perspective from the students, who are trained to consider the objects they make as tentative representations of their final design, rather than instruments which enable them to acquire a better understanding of certain contexts, processes or phenomena. Having students become aware of this switch in perspective and, subsequently, of its implications for the qualities of the objects they design, is therefore considered an important aspect of successfully applying their design skills for research purposes. Examples from a course in which students were stimulated to make things to research are presented and reflected upon. Based on these experiences a number of recommendations for design educators involved in teaching design research are listed.

Keywords: Research through design, design research, prototyping, interaction design

1 INTRODUCTION

In recent years research has quickly become an increasingly important and sizeable part of design as an academic discipline. Researchers, in contrast to designers, are aimed at producing knowledge which enables them to understand, explain or predict how the world is, was or will be. Knowledge is the building material they use to construct theories, state hypothesis or formulate presumptions. The aim of design research can thus be stated as producing knowledge for the process of designing in all its many fields. To acquire this knowledge, design researchers can turn to an extensive set of well-established tools and techniques from other disciplines, such as interviews, observations, questionnaires, controlled experiments etc. However, although these tools and techniques can and do produce very valuable results, they seem to fall somewhat short when it comes to producing knowledge on the complex and dynamic contexts in which designing is taking place today [1]. Products are not simply designed for functionality anymore, but should also evoke experiences that go beyond their physical properties. Thus new tools and techniques were needed that could produce knowledge on non-material issues, such as emotions, user experience, cultural values etc., in ways that would afford application into a design process. In response to this, researchers working in the field of design have started to promote and use designing as an integral part of doing research [2-5]. One of the core attributes of these so-called 'research through design' or 'practice-led research' approaches, is to apply design knowledge, skills and attitude not for the purpose of 'making things', but for 'knowing things' [6, 7].

This paper will reflect on the activity of 'making things' in a research process from an educational perspective, by discussing its value as an instrument to involve and train design students in design research. 'Things' in this particular context are defined as man-made objects, which are built in order to acquire knowledge about certain situations, processes or phenomena. First the differences between making things for design and making things for research are discussed. Subsequently, experiences from a particular course are described, in which at several moments the use of making things for

design research purposes was taught and stimulated. It looks specifically at making things to gain insights into user-product interactions, since it has been noted that the concept of designing interactions is for many students difficult to grasp. Designing interactions requires them to take their design thinking to a higher level of abstraction by considering the objects they are designing not as ends, but as means by which, through a two-way dialogue with the user, certain effects can be achieved. Research is therefore needed to acquire a better understanding of these effects, the context in which they take place and the people that will be affected by them. Making things seems to be especially suited for this kind of research, since it implicitly would have the students make a transition from looking at things as ends to things as means. The paper is concluded by presenting some recommendations for other design educators, involved in teaching design research to design students.

2 MAKING THINGS FOR DESIGN VS. MAKING THINGS FOR RESEARCH

Making things in the form of foam models, cardboard mock-ups, paper prototypes, computer simulations etc. is a significant and ubiquitous activity in any design process and as such an integral part of any program in design education. Throughout the entire process designers create objects of various levels of detail and abstraction, which are used to communicate, explore or evaluate certain qualities of the design in progress. Thus an important characteristic of these objects is that they are always intended to be the primary object of investigation, providing answers to certain design questions directly through their properties. A model's visual appearance can, for example, provide the designer with information about whether the aesthetics of the design will be appealing to the target group, its material attributes about how well it will hold in specific weather conditions, while its behaviour can tell something about how well it is understood by its intended users. Consequently, any study, test or evaluation that will be done with such a model should directly contribute to the further development of the design as represented by it. Making things in a design process therefore ought to be primarily directed at improving the design at hand.

When making things for research purposes, however, objects which are to fuel a design process should be replaced with objects which are intended to inform a knowledge gathering process. Rather than tentative solutions for a particular design problem, objects, models and prototypes should be built to act as physical instantiations of particular hypotheses or presumptions [8]. This shift in perspective implies that, unlike in design, things in research will not be the primary object of investigation, but merely the means which enable the researcher to acquire knowledge about something other than the things themselves. Making things in design research can therefore be characterized as 'making for knowing', implying that in this case the act of making is instrumental to improve the understanding of a certain process, situation or phenomena relevant for design.

Because of this, making things should be an ideal tool for design educators to get students involved and experienced in design research, since it uses design students' intrinsic motivations for 'making things' (design) to catalyze an interest for 'understanding things' (research). Moreover, building things for design research purposes requires the application of knowledge, skills and attitude from both design and research, which would provide opportunities to have design students experience the similarities, differences and relationships between these two disciplines in a way that should relate to them much more than through books or lectures.

3 EXPERIENCES FROM EDUCATION

But how does this ideal situation hold up in the real practice of design education? What are the benefits and pitfalls of teaching design students the principles of design research by having them make things? To what degree are they able to reflect on the things they make from a research perspective rather than a design perspective and how can they be trained in this? Does making things enable them to better understand the relations between the material qualities of objects and the non-material qualities that they would like to support, induce or evoke? And does the fact that they can make use of their design qualities to do research help in getting them more interested in this activity?

These issues will be addressed by reflecting on experiences from the course Exploring Interactions, which is a conceptual design project in our masters program Design for Interaction. Starting from a general topic (for example "trade" or "power"), students first have to formulate their own design goal, being the effect(s) they want to create for a specific group of users in a specific context. They are then to explore both existing and new interactions and phenomena in this context and, subsequently, apply the insights gained in the development of new (products) concepts. Since the course propagates

a exploratory and investigative approach, research is conducted in designerly ways as well. Thus the making of things for research purposes is a key ingredient, either as tools to experience certain interactions or phenomena, as instruments to elicit rich experiences from users or contexts, or as means to express a metaphorical image of the qualities of the interactions they want to evoke with their product concept.

3.1 Making things to experience

Because thinking on the level of interactions and phenomena is new to most of the students, a workshop is held right at the beginning of the project, in which role playing is used as a technique to study and understand interactions. In this workshop, ca. 20 students were split into a group of actors, a group of scenario writers, a group of things makers and a group of observers. Each of these groups of four to six students was given a specific situation (“buying a hat in a hat shop”, “mountaineering”...). The students were then asked to explore how the general topic of the course might be expressed in the interactions of people and things in that particular situation. The scenario writers were to come up with a scenario, which the actors had to act out. The things makers had to create a set of unspecified props that would be used in the play. These props had to be rapidly assembled from a collection of tinkering material, leaving no time or resources for perfection or long discussions (Figure 1).



Figure 1. left: A student working on a prop (video still), right: a scenario being acted out

Following the acting, the students held discussions about their first-hand experiences, in which the observers reflected on what they had seen. Interestingly, the majority of the discussions tended to revolve around the effects that the created objects have in the interactions between the actors. Sometimes the scenario was re-played using different props to study the differences this would bring about. Probably because of their low level of detail, the props were not treated as design objects, and it was never considered to make any improvements to them. Making and using things here clearly contributed to having students explore how objects can evoke certain interactions or support certain phenomena.

3.2 Making things to elicit

A substantial part of the Exploring Interactions project involves doing extensive research on the interactions that occur in the context they will design for. A tool which is heavily used in this phase are cultural probes in the form of booklets. Cultural probes are packages of playful assignments to help people observe and reflect on parts of their experience [9]. In design research, the packages are commonly used as a sensitizing tool to prepare participants of generative sessions [10]. However, because of time considerations, most students don't conduct such a session and the booklets are therefore their primary means for data collection (Figure 2).

In Context and Conceptualization, a more theoretical course which runs in parallel with Exploring Interactions, provides the students with instructions as well as examples on how to make a booklet. Students tend to follow these instructions and examples quite strict and as a consequence almost all booklets that are being used in the design course have the same size (A5 with about 12 pages), the same kind of questions (“What is your most positive experience with ...?”) and the same set of

exercises (“Please fill in a timeline”, “Please create a collage”). The potential danger of this approach is that they collect data which is not providing them the desired insights into their context. A careful consideration of the content of their booklets is thus needed before actually designing them.

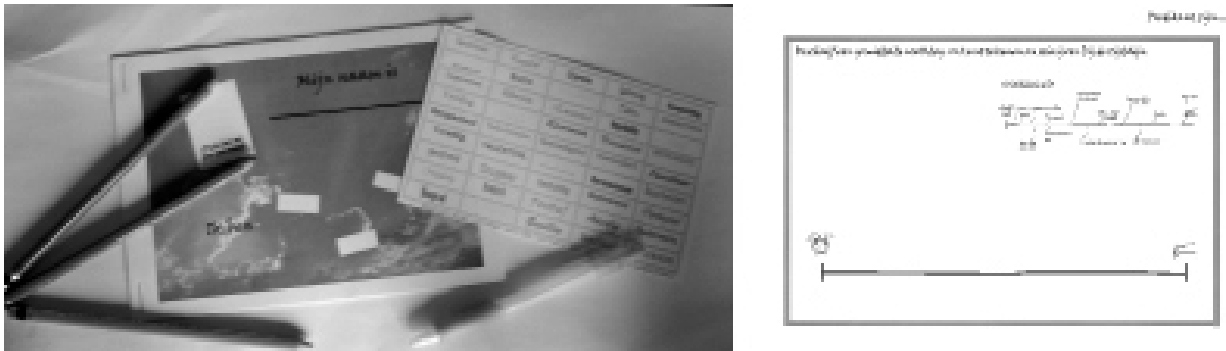


Figure 2. A typical example of a booklet used in the course

Most students really love to make the booklets, spending a lot of time on perfecting their visual qualities to make them look attractive. A positive effect of this is, of course, that students get enthusiastic and involved in the research, noticing that they can use their design skills for research purposes as well. However, while these visual qualities will probably to some extent contribute to the enthusiasm and dedication with which people will fill them in, it can also be a waste of effort if the wrong data is collected. Moreover, making the booklets look ‘too designed’, might have the added effect of people becoming reluctant to make changes to them. Nevertheless, in their evaluations afterwards some students expressed a concern that the booklets would be too childish, resulting in poor feedback from their participants. Finding the right balance between appearance (design perspective) and content (research perspective) is definitely an important and difficult part of creating a good booklet, and as such of the activity of making things for design research.

3.3 Making things to envision

A pivotal point in the project is when the students have to generate an initial design concept based on the results of their contextual research. To help them make this transition, they are asked to come up with a personal interaction vision, which is defined as a unified idea of the character of the interactions that they want their design concept to express. For this they should refer to and analyze an existing situation which is unrelated to their own context in which this character manifests itself, in order to identify those qualities which are contributing to this context. These qualities should then be transferred to their own context to be integrated in their design concept. The situation which is analyzed in the interaction vision thus becomes a metaphor for the new design concept. For example, for a project which was aimed at enabling intercontinental travellers who are ‘trapped’ in an airplane to experience the freedom of travel by means of the breakfast they get served, the interaction vision was stated as: the interaction between the passengers and their breakfast should be characterized “like a Sunday morning walk at the park”. The qualities that were identified after analyzing this situation were “engaging”, “invigorating” and “challenging”.

Almost all students find it extremely difficult to formulate an appropriate interaction vision. They struggle with identifying a situation, moment or event other than the one they have been studying intensely in the past weeks and, subsequently, with analyzing this situation in a metaphorical way. Although they are encouraged to express their vision as rich as possible, using words, images, sounds, models and movies, most of them are quite happy if they can come up with a sentence that in words describes the character of the existing situation. This also usually implies that their analysis is very limited, resulting in an interaction vision which gives very little direction to their further design process.

However, those students which actually do make a thing, like a collage, a model or a movie, to express their interaction vision, are usually better able to make the difficult transition from research to design more quickly and smoothly. While these might also simply be the better students, some of this effect might also be contributed to the fact that they did not stop with a linguistic representation of their vision, but actually started making things to get to know more about the qualities of the situation they had picked. This is also the main reason why creating an interaction vision in the course is considered

to be a research tool and not a design tool, because it is not a future version of the concept that is being created, but rather a thing that is made to generate knowledge on the qualities of the intended interactions.

4 RECOMMENDATIONS

While the examples presented so far have been from one course, experiences from other courses, workshops or projects have also clearly demonstrated the activity of making things to be a powerful tool for getting design students involved and trained in design research. Based on lessons learned from these experiences, a number of recommendations for design educators are formulated:

- **Build on students' enthusiasm for making things.**
Design students primarily come to design schools because they want to become designers, not researchers. They are intrinsically, and by training, interested in making things, questioning the workings of things, and interactions with things. Thus tapping into the comfortable and inspirational activity of making things provides design educators with a powerful means to get design students interested, involved and trained in the process of doing research, which many students at the start perceive as something difficult and intimidating. Moreover, by building on their design knowledge, skills and attitude, students can gradually become more confident about their abilities to conduct research through experiencing the added value that their specific qualities can bring to a research process.
- **Have them experience and play with the balance between appearance and content.**
Design students tend to take pride in having the things they make look beautiful and attractive. While these are important traits in a design process, they should become aware that for research purposes the design qualities of the things they make should be instrumental to the research goals they want to achieve. Making things look 'too good' from a design perspective might make the people who will have to use and interact with them feel reluctant and afraid to make mistakes or modifications. Furthermore, making things look 'too definitive' could give people the impression that there is no room left anymore for their own interpretations. Getting the right balance between appearance ('design') and content ('research') is therefore an essential component of successfully making things for research. Having students make and try out different versions, looking critically at the balance between design and research, thus will improve the quality of their research.
- **Have them explicitly reflect on the things they make from a research perspective.**
Making things for research requires design students to consider the qualities of the objects they create on their instrumental value for acquiring knowledge or gaining insights, rather than on their applicability of supporting a certain task or function. For many students this is a difficult transition, being trained to look at things primarily from a design perspective. For example, the by some students considered to be rather simplistic or even childish appearance of the probing booklets, contributes from a research perspective directly to the process of gaining knowledge, since the informal character of the booklets lowers the threshold for people to fill them in and adapt them to their own preferences. Thus it is recommended to have distinct moments in which students are asked to explicitly reflect on the things they make from a research perspective. What role did the material qualities of the things they made play in their research process? What would they change or improve next time? And what have they learned that would also be beneficial for them as designers? Making them conscious of the effects that the design qualities of the things they make can have on their research process, again helps them in becoming more aware of the impact that they can have on a research process through their design knowledge, skills and attitude.

5 CONCLUSION

Designers with research abilities are currently in high demand from industry, since they are able to provide rich and deep insights into today's rapidly changing and expanding global context, in which people are confronted with more and more social and technological opportunities and challenges, for which appropriate solutions will have to be created. Design research has therefore quickly become an increasingly important part of many design programs. This paper has put forward that (the activity of) making things is a valuable tool for design educators having to engage and train design students in

research. Building on their specific design qualities as well as their drive for creating (physical) objects, the making of things clearly facilitates the transition from a design perspective to a research perspective, which is perceived as difficult by many students.

Furthermore, it does help to invigorate the stereotypical image of research being rigid and complicated, conducted in labs by men wearing glasses, who are deeply involved in crunching numbers. In course evaluations students often reported to be surprised to discover that research could be such an inspiring and even fun activity. Experiencing that they can also conduct research by making things, which they love and are trained to do, clearly contributes in building such a positive image. Many students thus perform research in their final project, in which they often make things as part of their process. Some of them even have started their own design research agency after completing their study, bringing new and interesting perspectives to the maturing field of design research.

To conclude, although at present no hard data is available that supports the claim that the making of things also improves the quality of the research process, it is felt that the specific qualities of this activity which have been addressed in this paper clearly are a valuable addition to the existing tools and techniques of a (design) researcher.

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