Improving industrial designers work process by involving user research

戴峥 Zheng Dai
Center for Product Development
Mads Clausen Institute
University of Southern Denmark
+45 60728081
twindai@gmail.com

Ólafur Ómarsson
Industrial Designer
Blika ás 14
221 Hafnarfjordur
Iceland
oli@omarsson.com

Abstract

With changing times, new technologies and more opinionated consumers, the modern industrial designer has found himself in need of fresher and more up to date approaches in his daily work. In a fast moving industry, the designer needs to keep a thinking process of dynamic and subjective attitude. User research is part of user centered design (UCD). UCD has a reputation for subjective and reflective practice. In this paper there are two example cases. One is conducted by a classical industrial design process, and another is costing half of energy and time in user research. These examples will give the grounding for believing that the industrial designer needs to adopt user research methods to a level where he can still continue to work under the very nature of industrial design that has made it a successful practice for the last century. The combing of the approaches and attitude will help the designer to stay relevant in today's product development process.

Keyword: industrial design, user research, balance

1. Introduction

During daily life, design is creating newer life styles than ever before. The goal of design requires the designer to explore new method and approaches to fit new times.

1.1 Approaches of design.

From the industrial design education the designer believes the general goal of design is to improve our human living. Coordinate limitations and restrictions in design projects, such as style, function, the requirement and price, the time of the project, development duration and time of appearance on the market. The design discipline needs to advance with the times to achieve the goal of design.

1.2 Goal of design

The goal of design is different dependent on projects. These goals can be solved by variety of solutions. In his book *Designing for interaction: Creating Smart Application and Clever Devices,* Dan Saffer says, "There are four major approaches to finding solutions" (Saffer, 2007, p. 30), he mentions user-centered design and genius design as two main design approaches. His way of categorizing is based on the focus which designer chooses or how the designer defines the goal in a design project. Industrial design is more leaning towards genius design as an important approach.

1.3 A way of working.

Industrial designer has his own way of working based on his current situation, the professional experience leads the designer to make a decision, and his personality and character is expressed during the work of creation. Industrial design profession needs improvement, to fit a new generation of time that has complex technology, a mix of different culture and globalization, higher-level requirement of design, and more varied directions of design.

1.4 User research is a direction for evolution

For facing this kind of challenge, user research is one of the trendy directions and approaches. In the process of user research, User knows best and is involved in every stage of the design process. User research can help the industrial designer conquer the dilemma of what the designer's concept is and how it can conflict with what a user requires in a product or service.

1.5 The structure of the paper

In this paper we will analyze the Features and Issues of modern industrial design. We will also analyze the advantages and limitations of user research. Analysis will go with two examples of projects, one that was based on a classical and typical industrial design approach, and the other is integrated with abundant user research. We want to propose to what extent we can enhance the industrial designer work with a user research tool in his arsenal.

2. Framework of thinking in design process

In design research fields, different approaches were discussed to explore a better method and process for designing. These approaches are based on the different ways of design thinking. We can look at the framework of the thinking in the design process as three main parts. They are: the ground of thinking, pushing forward thinking, and the principle of thinking decision. The ground of thinking is a precondition for starting the think activity. It is the foundation of the design process and decides the basic property and nature. Pushing forward thinking is needed to keep the design process progressing forward; it goes with a certain way or some style. When thinking for decision, there is a principle or criteria to influence the result.

2.1 Feature and issues of tradition industrial design.

Industrial design was always compared with many other design approaches in the design study field. Norman talks about in his book *The Design of Everyday Things* (A. Norman, 2002, p. 155) that a designer designs from his personal experience. That means the personal experience is the ground of the individual designers thinking, that always drives the work to have a personal style of the designer. This knowledge is valuable and builds the profession of designer. It will include how to control a project, how to organize the resource in the design process, and how to position design in the market and in user groups.

Schön mentions in *The Reflective practitioner* (A. Schön, 1983, p. 49-69) the way of thinking of a practitioner is a process of knowing in action and reflection in action. This knowing and reflection generates design knowledge and drives the design process going. At the same time, it builds designer personal experiences as well. Designer does a dialog with himself, and gets knowledge during thinking. He makes a selection in each step and works out the solution in a personal way.

When making the decision, designer always has his own vision about the result. In The paradox of the average (A. Lloyd, 2004) Lloyd talks about the term autocracy as modern industrial design, where the designer has the vision and acts as a director and has the final word in the design process.

The modern industrial design practices have gotten some controversy and this way of work practice and personal style makes the industrial designer think more like an artist and that leads to problems. Lloyd says this way of working has the issue of 'narrow vision' and looks selfish. Lloyd uses the words "The exclusive (self-indulgent) process of 'traditional' design." (A. Lloyd, 2004, p. 6), Norman also says the thinking based on personal experience can lead to a usability failure with users. (A. Norman, 2002, p.155) Most negative aspects are always based on the nature of individual design work.

2.2 Advantage and limitation of user research

User centered design is a good approach and direction for developing the thinking in design process. In the book User centered product design (Binder & Buur, 2006. p.3-8) they argue that the attitude of user centered design methods of reflective and experimental way of working is important to keep up with fast transitions in the field of product development. User research may solve and balance some property of personal industrial design and promote the development of the design discipline.

User-oriented is the principle of thinking in user research. It is a starting point for keeping the focus on users. "User knows best, the people who will be using a product or service know what their needs, goals, and preferences are." (Saffer, 200p31) User has professional knowledge and valuable experience of using product. This knowledge and experience work as a ground and they are the reason of why user should be involved in every step of process.

In Every step user has different task for pushing the progress of a project. "Designers are involved simply to help user achieve their goals."(Saffer, 2007, p. 31) That means user research use dialogue thinking between users and a designer to keep thinking and developing. They do interaction and discussion to inspire each other, and get more objective perspective to understand the facts.

Saffer says "The designer then determines the tasks and means necessary to achieve those goals, but always with the user's needs and preference in mind" (Saffer, 2007, p.32), the user factors deeply influence the decision thinking of the designer. The criteria of making decision in user research are based on user data. By keeping the goal of a project on user's perspective will be a guarantee for the product success. (A. Lloyd, 2004, p.5),

Meanwhile, if a project relies on user aspect too much, designer will lose his goal and vision. Projects has many constrains such as time, budget, and technology problems, so it always needs to be under control of the designer. Another point is that one design can't satisfy all users, and some users may think from different perspectives about design. Lloyd also gave us the arguing about the paradox of average to point out that, addressing an average need can deliver basic satisfactory product to user but cannot create uniqueness in design. (A. Lloyd, 2004).

3 Examples of projects

Hereafter we will discuss about two examples of projects to discuss the advantage of applying user research. We will raise a discussion of problems we found and talk about how to and to what extend can these two approaches be combined and balanced.

3.1 Examples of remote control

It was a project for designing a remote control for children some years ago. It was more like a personal design work and mainly based on Personal experience. The designer worked out the design from his self-knowing during his research, and used personal strong vision to evaluate the result. In this project, he carried out the style and details by industrial design experience and skill, which impressed the client. The requirement of an attribute to set it apart from other remote controls and a requirement of not making it too childish

were the restrictions from the client. The concept included a typical round shape everywhere for better looking object and handling, included faded colors as button icon to keep it not too contrast with the whole design, and included a special bended form to distinguish it from simple and general remote controller. The designer did these design decisions without too much thinking, and they went with the designer's intuition sense. In this case, the designer did not need to think why he should use a round shape and faded colors, because as a designer experience, a comfortable in-hand remote control always goes with a round surface, and the faded color can give a harmonic feeling to people. Client was impressed by the professional design knowledge as well. That is why normally, industrial designer relay on his professional experience to build design and to convince a client.

During the development of the remote control, the process also included some research and investigation, for keeping designer thinking and helping solve problems. The designer's daughter was the most relevant factor for pushing him thinking process. She was 3 years old at the time and growing rapidly, and she made the designer notice that, children hand size are vary from different age groups. That became a reason for designing a bended-shape controller, which can be used by two hands. The bended- shape looks like it has two parts. One part is for holding and the other is for pressing. This style is the most unique feature of this controller. Other existing competing products always had one part.

At last, this design was as what the designer expected early on, it is a suitable design for children to hold without text by just using graphic icons. The whole process is under designer's control and he was satisfied with the shape and color, because it had strong link with his vision from the beginning of the process.

But at the same time, this design also got some negative feedback. In the first test, many children didn't like it because they thought that it was not attractive. The color was too gray and the style resembled a broken stick. Many real users provided these feedbacks.

The designer speculated the main reason for failure with children was that his vision of a remote control was for himself when he was a child. It was

an assumption of a 26 years old adult to address the needs of 3-10 year old children. He should have involved real user in the design process to ensure that his assumption was correct and make necessary testing.

3.2 Example of flow meter development

The following case is a project integrated classical industrial design process with abundant user research. Our development team includes 5 people, and our goal was to design a water-saver flow meter. As the need of user research, it began from a user observation. We shadowed the activity of using water, and analyzed how people use and wastewater. We found out that a lot of reusable water was wasted. Usage could be optimized if you could reuse water that went down your sink for other purposes, like watering plants, water for toilet. We designed a system for water saving in households, and this system was evaluated by user interviews.

The design mostly came by a rational way, and relied on the user data. But the concept generation was still from personal perspective. Our developers came from different country, included Germany, Iceland, China, and Denmark. From personal experience, in Iceland and China the price of water is cheap and there is enough of it, but In Denmark water is expensive and different attitude towards water waste. After living in Denmark, we have a new view about water and waste. The Danish who are around us thought that water reusing should be a necessary way to deal with any situation of water wasting. A product that helps people to collect wasted water was our vision in this project.

Both the designer and user know that our topic is saving water, but during the progress of the project the designer expected more to design a functional product for collecting water, but user expected more to get a product for alert them when they waste water. Designers thought a saving tank is a necessary and the main part of this product. But the users hoped this device would have audio alarm, colorful lights, and even video display for educational purposes. These two fundamental understandings about the project were followed by communication between user and designer. This knowing in action among many people is crucial to push user research project forward.

At the end of this project, the decision was driven by users' vision. The water saving tank had gone, the goal of the product went from saving and reusing water to minimizing water wasting and educating user. Colorful light and automatic stop function were designed in a faucet. This device is completely what the users expected. Users were satisfied with the result of the project.

On another hand, In the middle of the project, the designers gave up their vision and took over user's vision. Designer's vision did not exist yet, but it inspired the user's vision. In the latter stages of the project, the process was no longer under control and the designers didn't know what the product would be, how much time was needed, how much work need to be devoted in, and it was hard to balance user idea and practical implementation. User got what they wanted and knew, but they were not amazed or surprised by this design.

4. Discussion
4.1 Involving user research

From both of the two projects, we can get the impression that research and new approaches are useful and necessary to be involved in a design process. Research is becoming more and more important to a designer. Design study and research devoted useful knowledge for improving design in general. The design practice should be on a higher level than now, and be involved in research and development, not only follow and work under the R&D groups to just design style and function. A necessary improvement can make the industrial design discipline valuable and relevant to success of modern product development.

4.2 The advantage of the approaches

From these two examples, we can see some important and useful advantage aspects. These advantage aspects can be complementary for the other approach. The advantage aspect of industrial design is that, designer has confidence in controlling the process. He knows where the project is going and what the main points are to focus on in a project. In the remote controller project, the designer can appropriately make full use of the 10 days, and know which level the detail will reach. In this way, the designer can use a more strategic approach in design based on his experience, e.g. focus on things that matter for production.

Another advantage aspect is that the individual

designer can work out a more creative, impressive, visionary and amazing design concept. That could not have been realized if designer had been grounded in working fulfilling user's common need. The remote controller has a bended-shape. This is the biggest feature of this product. If the designer did user study and follow user's decision, it would lose this uniqueness. Users find it hard to predict their future need, hard to accept a visionary idea in a short time and hard to see the potential of an immature concept. Designer's innovative concept could tell user what's there 'deeper' need, which they can't recognize by themselves.

In user research, one advantage aspect is that it is easier to lead a product to a user satisfaction. With a guaranty of relative success in the market, this advantage could be used to convince designer's clients. And make individual designer think more relevantly about users. The feedback from user of each step in the design process keeps the progress approaching user's expectation. In our water saver project, after each feedback, the user altered designer's personal judgment. A water-collecting tank is not what the user want but an alert light make the user could buy this product. It shows that if users drive the design process, the result can be more relevant product for users to consider buying.

The second advantage aspect of user research is more participants can provide a more objective perspective and broad vision to think the project. Designer can have a deeper understanding about the project by discussion with users. Both user and designer build their vision by inspiring each other. Users didn't know what a water saver could be at first, a water collecting tank told them that it is not what they needed, from this point the users realized that a product focused on education is more relevant to what they need.

4.3 The combining of the approaches

Design process should be under control of the designer. Involving users in each step, the designer should lead and organize design activity by taking initiative, and the designer should still make the decision. This control makes the designer more responsible for the marketing success of the product.

The outcome of a design project should be innovative and fascinate the user. User can do innovation and give their restriction, but the designer should not be limited by this condition, and instead get inspiration from this context.

The user satisfaction is an important evaluation to a final product. Designer should make the final decision for a product and then user should make the final evaluation before the product enter into the market.

Keep an objective perspective by involving more participants is necessary for making a reasonable and appropriate decision. On another hand keeping the designer personal vision and passion is important to give product a uniqueness that can set it apart on the market.

5. Conclusion

Industrial design should be improved for these new and user opinionated times. Industrial designer needs to turn to research and studies more for facing this challenge. User research allows designer to do more focus on research and as result it is easier for Industrial designer to move to an R&D group for entering in a higher position of product development. User has his own useful knowledge for product development, but designer should not entirely follow user in the working process. The designer should balance personal perspective and user perspective. To what extend to involve user research in industrial design is dependent on situation of specific project. User research is one of the most valuable approaches for industrial designer to continue to be influential participant in future design projects.

References

[1]. Saffer, D. Designing for Interaction: Creating Smart Applications and Clever Devices (1st ed., p. 248). Peachpit Press, (2006). p. 31, 32.
[2]. Norman, D., & Norman, D. A. The Design of Everyday Things. Basic Books, (2002). p272
[3]. Schon, D. A. The Reflective Practitioner: How Professionals Think in Action (New Ed., p. 374). Ashgate Publishing, (1995). p. 49-69
[4]. Lloyd, P Paradox of the average: why users need designers but designers don't need users. Design philosophy papers, . (2004). 1-7, p. 5, 6
[5]. Buur, J., Binder, T. User Centred Product Design. Mads Clausen Institute for Product Innovation, University of Southern Denmark, (2006). p. 3-175