Establishing Measures of Qualitative User Research in User-Centered Design: Thinking Critically about Designing

Justin Y. Lai, Maria C. Yang

Massachusetts Institute of Technology
Department of Mechanical Engineering
Cambridge, MA USA
justinlai@mit.edu

Abstract: Measures of qualitative user research data obtained throughout the design process are sought as designers engage with relevant stakeholders. User methods are presented to novices through a reflective framework to make them think critically about how to engage with people, carefully process the information obtained, and act accordingly in the subsequent steps of design. Both qualitative and quantitative analysis is conducted to look for relationships between design action and outcome.

Key words: reflective practice, user-centered design, design process, product development

1. Thesis statement

The key idea in this research is to investigate the value of designers to embrace reflective practice in order to gain empathy with relevant stakeholders [7]. This reflective practice refers to thinking critically about why, when, and how to engage with users, processing the information gathered from interactions and acting accordingly in subsequent steps of design. Contribution of this research is a framework that combines tools and ways of thinking for reflective practice.

2. Problem domain

The domain of this work lies in product design and development and design education. Additionally, reflective practice is employed to make students think critically about their design actions as they interact with potential users. The goal is not to say that there is one "right" way to design products for people. Rather, it is to show students and novices that the design process is not a matter of following routine steps. One needs to think carefully before and after a user interaction in order to make most of the precious time and resources.

3. Related work

Von Hippel looked at interacting with lead users as a way to stimulate creativity and innovation through interaction with users who know best about a product experiences [4]. Goodman surveyed designers' perceptions about user needs analyses methods and examined why some methods are implemented more often than others [2] Hey, et. al. asked students to articulate lessons learned about the new product development process. It was found that students valued the lessons learned about need-finding and customer interaction [3]. Tomico's work described co-reflection between the designers and users in order to gain a deeper understanding [8]. Norman posed the question of whether the rush of trying to create products to meet all our needs is a mistake, filling "necessary holes" [5]. Thus, it is

important that designers think about the steps they take as they design in order to create products that are thoughtful and lasting.

What's missing?

This work takes an alternative approach to understanding how to assess users. First, this work seeks to obtain measures of the qualitative and quantitative user research data that designers acquire as they interact with users. The data is linked with design outcome to determine whether there are predicting factors for success. There are limitations and assumptions of this methodology, but the research hopes to shed light on this component of the design process.

Second, with respect to reflection in the design process, this work is unique in that the reflective practice is among the designers themselves, internally, either as a team or individually. This framework encourages the designer to think more critically about his process and become open to emergent findings.

4. Research goal and methodology

One experiment in this research measures the quantity and quality of user interaction to see whether there is a relationship to design outcome. The methodology takes a case-based approach rather than a controlled study. Qualitative data is taken, such as the lessons learned from students, in order to gain insight into their learning experience and the relationship to their design process.

This study is being conducted in a product design and development class of 80 mid-career professionals as part of their graduate program in Systems Design and Management at MIT. They are divided into teams of 4 members each and given a semester-long project to design a novel, marketable product and create a working prototype. At the beginning of the course, the students are surveyed to understand their expertise level in product design and their familiarity and usage of established design methods for gathering and analyzing user needs. Students are introduced to a select number of tools, such as in-depth interviews and observational studies, giving them an opportunity to use the methods as they design and engineer their product. The students keep track of the usage of the user needs analyses methods as they engage with relevant stakeholders of their product. Trends or lack thereof can raise and provoke questions that relate to how design is taught. Two offerings of this course has been taught and the data has been obtained.

I am looking at measuring the quality of user interactions by students in product design and development courses. By "user interaction", I mean any sort of interaction or meeting that designers (interchangeably used with "students" and "novices") have with people to acquire information and feedback throughout the design process. For example, at the beginning of the process, designers employ needfinding to inform what exactly should be made [6]. Designers can interact directly with users in participant observation or they can obtain large amounts of quick data through surveys. In the middle, designers generate and select concepts to meet a particular need. Finally, designers can go to potential users to test prototypes as the product becomes physically or digitally realized.

Students are made aware of reflective practice implicitly through the means of documenting their process. User interaction forms are created to scaffold the reflective thinking. Before they go into a user interaction, they are to ask themselves, "why are we about to meet with this person? What do we want out of it?" This helps decide

which method to employ.   After they have gathered information, they are asked to wonder, "how does knowing this affect our design process?   Do we see value in returning to this user?   What's our next steps?" Qualitative data is used in documenting how teams of students go through the design process.   Each team's story can provide a perspective on the specific design situation presented to them.

Product design outcome is hard to measure without the concept and artifact actually going out into market. In this study, a panel of expert reviewers are brought in to view the students' final presentations and demonstrations. These various ratings are used as a proxy for "success" and compared to what teams did throughout their process. Additionally, students articulate the lessons they learned from the process.

Considering all the data that represents the design action and design outcome, I can begin to create frameworks that describe the phenomena, create a discourse to try to explain why the data is as such, and prescribe methods of intervention.   This is the process (*observe, describe, explain, prescribe)* that Dorst suggests in attempting to scientifically build up the body of design research knowledge [1].   Likewise, this process is used to help improve how designers create products with people in mind.

5. Preliminary results

Preliminary results show no correlation between quantity of user interaction with design outcome. This is initially surprising.   There are possible explanations for this result.   First, the analysis does not account for the *quality* of the interaction. Since the design process is in the context of the classroom, students may view the task of user interaction as merely an assignment and not thoughtfully interact with users.   Additionally, teams that returned to users later on in the design process tended to do better in the end.   A reflective framework has been created to give scaffolding to students as they go through the design process.   These models can help designers think about their design action.   Also, having documentation of the design process can help designers look back on their work. First, the documentation can be used to look back to see what might have "went wrong."   Second, the documentation can be used for inspiration and learning for future projects and design situations.

6. Future Work

I will continue analyzing the data from the classes to discover new findings and trends.   Considering the data over multiple offerings of the class will provide for a rich set of data.   I would like to see if other engineering and product design departments at other universities have similar data or would like to collaborate in this research. As I go through iterations of the framework, I want to talk to other researchers, especially those in different domains of design to get their opinion and feedback.   For future offerings of the product design course and in other design classroom scenarios, I will use this framework to guide the presentation of user centered design.

7. Citations

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