Collaborative UX Design Methods for Developing Social Solutions

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Abstract

This paper introduces NEC's collaborative UX design methods, which allow people with their own knowledge and experience in technologies/operations and in analysis of human behavior and psychology to finely proceed with step-by-step engagement. They can share and empathize User Experiences in order to complement one another's expertise and skills. Therefore, new value can be created in society and in our customers' businesses by using human-centered design (HCD) and Design Thinking in the field of social solutions.

Keywords

Social Value Design, user experience, design thinking, human-centered design

1. Introduction

Social Value Design creates new value for society and our customers' business using human-centered design (HCD) and Design Thinking. Social Value Design aims to create innovation from two design perspectives: (1) User Experience that helps enhance value from a human viewpoint to allow complex systems and services to be used easily and (2) Social Experience that helps enhance value from a social viewpoint so that it makes it possible to smoothly manage a sustainable society.

The social solutions NEC offers include approaches for the management of key facilities, nationwide disaster prevention, protection of people from natural disasters and cybercrime, technologies for smart energy utilization, the achievement of new information infrastructure and egalitarian services such as education and healthcare. Required for the development of social solutions is a new methodology that takes account of what value is for society and customers while putting advanced technology to maximum use. Although HCD is an effective methodology for implementing development from a human viewpoint, a more specific methodology is needed to simultaneously use HCD with design and development processes that take advantage of advanced technology.

At NEC, we have developed a new methodology to combine expertise in technologies/operations and in analysis of human behavior and psychology in order to incorporate HCD and Design Thinking into the development of social solutions. This paper proposes two collaborative UX design methods that allow people with their own expertise and experience in technologies/operations and in analysis of human behaviors and psychology to finely proceed with step-by-step engagement while sharing and empathizing with User Experience in order to complement one another's expertise and skills.

In this paper, the experts with knowledge and experience in HCD for the improvement of customers' experience value are called "UX designers," while those who play the role of carrying out system planning and development from the viewpoint of specific businesses and technologies are called "engineers."

2. Problems with Incorporating HCD and Design Thinking into Development

To better understand users and to create ideas for new systems that can lead to optimal design and development, operations are performed in the sequence of user research, idea de-

velopment and design/development while employing HCD and Design Thinking methodologies. The purpose of this sequence is to create innovative ideas that can improve users' experiential values. Engineers should understand details of their target users by specifying their behaviors and environments as well as their psychological and physical characteristics, thereby leading to optimal design and development.

In the field of social solutions, it is necessary to understand the needs of users by carefully pigeonholing the results of research into cause-and-effect relationships, because users' behavior and psychology are often dependent on circumstances peculiar to each business, such as the operating mission, time and environment. Doing so can help come up with ideas for systems.

Engineers have knowledge of the businesses and technologies that constitute the background of users' behavior, but they lack the knowledge and know-how in HCD that are needed to make arrangements for users' needs and problems from their viewpoints. UX designers, on the other hand, can make these arrangements from users' viewpoints, but they lack knowledge of specific business operations. To apply HCD and Design Thinking-based methodologies to the development of social solutions, knowledge and experience are needed in both aspects of technologies/operations and analysis of human behavior and psychology, so that each expert complements the other in order to achieve the co-creation of systems.

3. Proposal for Two Collaborative UX Design Methods

3.1 Features of the Collaborative UX Design Method

We propose two methods as a means to achieve collaboration between UX designers and engineers (**Fig. 1**):

- **UX Observation Tour**
  While allowing UX designers and engineers to share research experience in fieldwork, this behavioral observation method is used to identify the behavior of users and their psychological and physical characteristics as well as their backgrounds.
- **UX Idea Mapping**
  By visualizing the facts, problems and values that have been identified through the sharing of the UX designers' and engineers' experiences, this idea development method helps to create innovative system ideas.

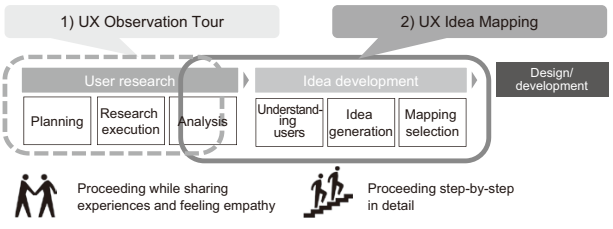

Fig. 1 Two collaborative design methods.

3.2 How to Implement Collaborative UX Design Methods

3.2.1 UX Observation Tour

(1) Planning the research

First of all, brainstorming sessions are held to draw up research plans. This also serves as a preliminary rehearsal for collaborative work. The subjects are announced in advance to allow the participants to share and discuss the purposes of the project and the targets of the research. Discussion is held about the research targets regarding both the current status of the system and the way it should be. In regards to research into the current status of the system, some suggestions for the types and positioning of the research object and competing systems and services are listed, while utilizing the engineers' knowledge of operations and technologies. As for the research into the way the system should be, cases in which the value provided to users is similar, the example that leads to a trend and competing systems in terms of the provided value are listed. While this discussion is carried out, the UX designers with knowledge in HCD cite examples of cases with similar provided value, as shown in **Table 1**, to encourage the engineers to express their opinions, in order that the research target areas may be listed together.

Moreover, the research target are discussed and summarized in a research project report. This report is made in such a way that engineers who are not familiar with observation research can review the details of research target candidates during the execution of the research, so that the report can serve as a guide to help the engineers in the observation research.

(2) Executing the research

The execution of the research takes the form of a "Tour"

Table 1 Examples of cases with similar provided value.

Purpose of the system	Case with similar provided value
Insurance sales representative: Recommendation of appropriate products according to conditions	Cosmetics salesperson: Pleasant introduction of appropriate cosmetics
Monitoring system in a flight control room: Capability to maintain extended monitoring operations	Game arcade: Capability to maintain complex, extended operations while maintaining high motivation
Store support system: Provision of appropriate guidance according to customers' needs	Hotel concierge: Appropriate, pleasant reception according to guests' requirements

Table 2 Sample advice from UX designers to engineers.

Engineer's problem with the research method	Sample advice from a UX designer
The engineer can't grasp all stakeholders including observation targets and the people concerned with them.	Record the people to whom the person you are paying attention to has spoken and those who are around them.
The engineer focuses only on the service provider perspective or on the user perspective.	Make a record so that neither viewpoint mentioned in the Observation Record Sheet is omitted.
The engineer only pays attention to material objects such as the working environment, interior design and tools.	Pay attention to relationships between people and between people and material objects.
The engineer can't well understand the reasons for user behavior and psychology.	Make observations while hypothesizing about the psychology and environment as to the reasons of user behavior.
The engineer is taking the attitude of a bystander or critic.	Ask some questions as if you were a user.

with the participation of staff members consisting of UX designers and engineers. The capability of the engineers themselves to understand the users with empathy and practical sense is valued; engineers with different specialties and standpoints are included and a multitude of viewpoints is valued over the length of research time. The Tour takes half a day or one day. When engineers observe user behavior, they are sometimes incapable of observing the behavioral patterns and psychology of users because they get caught up in superficial phenomena. To enable the engineers to make independent research while the UX designers confirm their observations, the advice shown in **Table 2** is given.

(3) Review and summary of information

A review time of about 60 minutes is set up on the day of the research so that the results of the research can be summarized as a reminder. Background speculation and noteworthy points, as well as observed facts, are recorded without omission in the Research Results Summary Sheet.

3.2.2 UX Idea Mapping

(1) Analysis and consideration of the research results

Work model analysis is performed to find the potential needs of users based on the Research Results Summary Sheet. Although engineers tend to pay attention only to the target users who usually use the system, the values and relationships for those concerned who do not directly use the system are also investigated here. Therefore, the UX designers proceed with this process while not overlooking the surrounding people who are concerned with the operation.

(2) Detailed understanding of the users

Based on the behavioral patterns clarified by the work model analysis, users who show similar patterns are grouped into a user group. While UX designers are very familiar with how to pigeonhole user groups, the engineers' knowledge of operations and technology is required to identify the characteristics of the users on which the grouping is based, so these procedures are carried out collaboratively, with thorough discussions. Then each user group is summarized as one "Persona" based on the research results of the UX Observation Tour. After examination of the points which have significant effects on the users' activities such as the final goals of the users, the roles they play when using the products and services and the operations and technologies from a business viewpoint, the operational and technical characteristics and the personal characteristics are summarized as the Persona.

(3) Creation of a UX Idea Map Framework

The framework of a UX Idea Map is then created (**Fig. 2**).

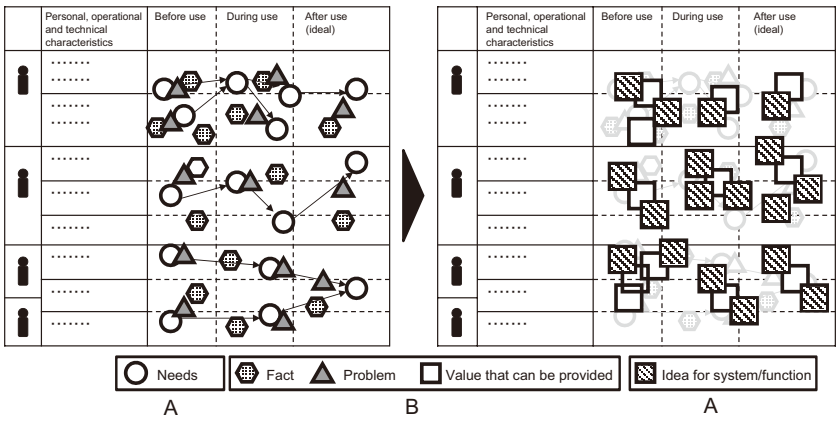

Fig. 2 UX Map: Framework and Scenario/Idea Mapping.

The y-axis is the personal axis and the x-axis is the time axis. The personal characteristics and the operational and technical characteristics specified in the Persona Sheet are recorded in the personal axis. Shown on the time axis from left to right are "before," "during," and "after" the use of the system. Also located on the far right of the time axis are the ideals and desires of using the system. The time axis, until it reaches the objective, is divided into 3- to 4-minute intervals. Since the engineers are likely to pay attention to fine steps, they are advised by the UX designers on how to set up the axes.

(4) User Scenario investigation

The needs identified through the intrinsic value extraction method are mapped on the UX map according to the personal and time axes. A user scenario is then created, once user behavior and psychology has been investigated, while supplementing the gaps in order to determine the way the user should be. The results from the Research Results Summary Sheet are mapped as facts. Even the engineers can easily proceed with this operation by comparing the user scenario in the map with that in the document. Furthermore, these needs and facts are compared with one another to examine the gaps in order to map problems.

(5) Development of ideas

While the facts, needs and problems of the target user are brought into focus, ideas on the value the system can offer are presented. At this time, the engineers tend to present ideas on specific functions and systems, so the UX designers advise them to talk about users' needs while they carry on with this discussion. Then ideas for systems and functions that can deal with these needs are presented. These ideas are then mapped according to users' behavior. Finally, the ideas are prioritized and selected from the viewpoints of users, businesses and technologies. Compared to standard UX Mapping methods, which are composed of user needs and system ideas, our method can make the "facts and problems" and the "provided value" more clear and even shareable between UX designers and engineers. This makes our method an original idea development method that can create innovative system ideas from both points of view.

4. Applied Results and Effects

After having applied our proposed methods to the development of social solutions, such as agent systems for telecommunications carriers, teleconference systems for executives, door-to-door sales systems for insurance agents, service systems for store visitors, business-use projection systems and broadcast image distribution systems, we have found them to be effective in the following cases:

4.1 Applied Effects of the UX Observation Tour

Because engineers and UX designers proceeded with the UX Observation Tour collaboratively and also collaboratively examined behavior and observation points depending on the operations and technologies of the assumed users who were the research targets, the engineers could gather enough information to understand the users in detail. It was also found that the UX designers could deepen their understanding of specific professional operations and technologies by sharing and empathizing with the viewpoints of the engineers through the experience of the Tour.

4.2 Applied Effects of UX Idea Mapping

It was found in listening to the engineers that their ability to understand the users increased after a single implementation of the project and they became more capable of thinking from the users' viewpoints than they were before the project. The engineers were also able to increase the detail and accuracy of their ideas - even at the earliest stages - through examining value to users, while gaining confidence by linking their ideas, in a visible manner, to the solutions that can be offered as well as to the facts, needs and problems of the users.

It was also found that the UX designers could implement the development of ideas in collaboration with the engineers for developing systems where knowledge of specific professional operations and technologies is required. This could be achieved under the situation that UX designers able to share, in a visible manner, the engineers' viewpoints, such as the facts and problems comprehended only by the engineers.

5. Conclusion

In the field of social solutions at NEC, many results have been witnessed from these two collaborative UX design methods. One has knowledge and experience in technologies/operations and the other has them in analysis of human behavior and psychology. Specialists who have different knowledge and experience finely proceed the collaborative UX design methods with step-by-step engagement while sharing and empathizing with users' experiences in order to complement one another's expertise and skills.

These methods are also effective as co-creation activities that examine the ways our customers' businesses and municipalities should be. We will continue to contribute to helping our customers provide new value though these commitments to addressing solutions for people and society.

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