

# Application Development for Gathering “Inexperienced UX” Data for Planning Next-Generation Products

Tomohiro Mori and Miwa Nakanishi

**Abstract** User experience (UX) is a concept that represents the psychological values regarding products. UX can be categorized into two types: one that a user has experienced (experienced UX) and another that a user has not experienced (inexperienced UX). In this study, we gathered experienced UX data and established a method to apply this data to next-generation product ideas. Additionally, an application was developed to gather inexperienced UX data and apply this data to the product design process. The goal was to establish a method to generate ideas for next-generation products in anticipation of the medium- and long-term future.

**Keywords** User experience · Product design · Cars

## 1 Introduction

Nowadays, cars are required not only for their functional values but also for their psychological values, such as providing pleasure. The focus is on the concept of user experience (UX). UX is defined as a user’s experience that generates emotions, especially positive emotions, experienced during his/her interaction with a product [1, 2]. UX is generated by the actual users and not by the product providers; therefore, it is important for the product providers to gather UX data.

UX can be divided into two types: one that a user has experienced (experienced UX) and another that a user has not experienced (inexperienced UX).

In the case of inexperienced UX, the potential experiences and emotions that even the user is unaware of need to be extracted.

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In this study, data on the positive experiences of users were gathered using a smartphone application and a method to apply data to next-generation product ideas was established [3]. In collaboration with a car parts manufacturer, an experiment was conducted wherein designers generated ideas using the gathered past UX data. We found that this method produces ideas that often could not be imagined by designers and is effective for planning products that met the actual and potential needs of users. However, we also found that planning future products that users had not yet experienced was difficult.

In this study, an application was developed to gather users' desires (i.e., inexperienced UX) and apply them to the product design process. The goal was to establish a method for generating ideas for next-generation models in anticipation of the medium- and long-term future.

## 2 Existing Method for Gathering User Experience

This section deals with two existing methods, namely, persona and ethnography.

Persona is a method where product providers hypothesize the desired experiences by defining a specific profile of target users [4]. Ethnography is a method that explores and records user behavior during their participation in fieldwork in some group or society [5].

A drawback of Persona is that product providers are not necessarily able to extract the UX that users essentially desire because the person who defines the profile is not a user but a product provider.

In the case of Ethnography, product providers can extract the essential UX from users; however, it is an experienced UX. Thus, this method is not able to extract a potential inexperienced UX. Additionally, it is a time consuming to do fieldwork on multifarious users.

Two difficulties are experienced in the existing methods: (1) extracting a potential inexperienced UX and (2) gathering a sufficient amount of UX data. Therefore, the development of an application was undertaken to meet the following two requirements to address the abovementioned difficulties.

## 3 Requirements and Definition of the Application

### 3.1 *Embodiment of Requirements*

First, we focus on determining a method to extract a potential inexperienced UX.

In a study that analyzed the UX in housework and cooking [6], the drawing method [7] was adopted to express the desired experiences. The drawing method does not require difficult technology, and it is possible to convey complex ideas

using a simple drawing [8]. Tanaka (2012) conducted a survey that required participants to reply to their desired images by drawing. Consequently, it became possible to express the desired ideas without an explanation. Therefore, the drawing method was adopted in this study.

Second, we focus on determining a method to gather a sufficient amount of UX data. It was challenging to gather large amounts of data because there are time and travel restrictions in completing multiple paper-based surveys. Hence, to reduce the time and travel restrictions, it was decided to gather data using a smartphone application.

Drawing illustrations on a smartphone is comparatively harder than doing it on paper. In a study of activation of drawing expression [9], it was shown that the external environments activate the drawing expression, e.g., a paper with an outline activates the drawing expression but not a blank paper.

Consequently, it was established that a creative activity is promoted by giving clues. Therefore, a way was adopted to let users generate ideas by looking at illustrations that are given to them as clues.

Taking the abovementioned findings into account, the following requirements of the application were determined:

- Gathering sufficient amount of data using a smartphone application
- Enable users to generate ideas by looking at illustrations that are given to them as clues
- Enable users to post their desires for the future as an “inexperienced UX” for various car-related situations

### **Purpose of Developing the Application**

Applications that conduct surveys are not permitted to be distributed via the online application stores; therefore, a different purpose for developing the application was required.

Additionally, because users are usually unwilling to reply to traditional surveys, gathering large amounts of data would not be possible.

For these reasons, an application was developed where users can generate ideas with enjoyment.

The main requirement of the application is to enable users to generate ideas by looking at the illustrations that are given to them as clues. This is similar to “Ohgiri,” a traditional Japanese game wherein players provide funny answers to questions on a given theme. Therefore, the application was developed as an “Ohgiri” game.

Additionally, to let users create ideas in an enjoyable way, functions that allow users to browse other users’ answers were incorporated.

### 3.2 *Experimental Determination of the Details of Giving Situations*

A paper-based questionnaire was conducted to determine the details of giving situations.

**Method.** Six participants, who were men and women in their 20s, were divided into two groups for the experiment. They replied with their future desires by looking at car-related illustrations. The participants in group A and B were asked to express their desires by looking at illustrations with detailed and rough descriptions of the situations, respectively. Two situations were given to each of the participants, and they were allowed to respond with multiple answers. Figures 1 and 2 show the questionnaire forms of group A, and Figs. 3 and 4 show those of group B.

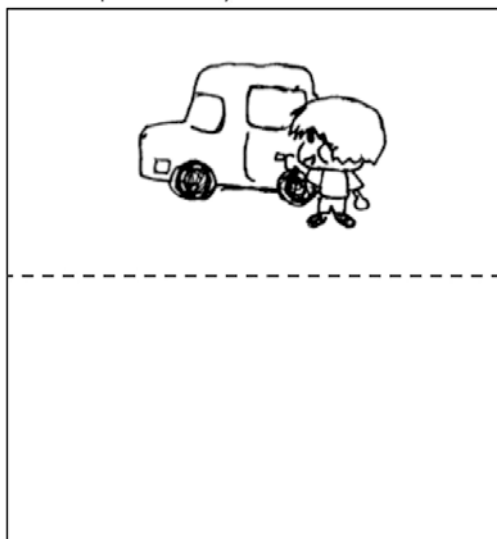
**Results.** The following two points were examined in this study: (1) whether it is easy to generate ideas and (2) whether the generated ideas are correctly related to cars.

Assessment of (1) was done by comparing the number of ideas generated by each group. The total number of the ideas by group A was 14 and by group B was 6. Because the number of generated ideas by group A was more than that by group B, it was deduced that the conditions of group A made it easier to generate ideas.

Point (2) was examined by comparing the number of car-related ideas generated by each group. The total number of car-related ideas generated by group A was 14 and that by group B was 4. Hence, it was deduced that the conditions of group A made it easier to generate car-related ideas.

**Fig. 1** Questionnaire forms of group A(1)

Your clothes you have are dirty when you are trying to ride.  
What experience do you desire?



Your baby sitting on the back seat begin crying  
when you are driving.  
What experience do you desire?



Fig. 2 Questionnaire forms of group A(2)


	details
Who	
Where	
When	When you are trying to ride
What	
How	

What experience do you desire?

Fig. 3 Questionnaire forms of group B(1)

	details
Who	
Where	
When	When you are driving
What	
How	

What experience do you desire?



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Fig. 4 Questionnaire forms of group B(2)

These results provided evidence that the conditions for group A (giving illustrations with a detailed description of the situations) were suitable for both of the examined points. Therefore, an application was developed for this method that lets users generate ideas by looking at the illustrations and provides clues that give a detailed description of the situations.

3.3 Implementation of the Application

Figure 5 shows a flowchart of the screen transitions. Figures 6, 7, 8, 9, 10 and 11 show various screen shots of the application.

The screen transitions occur between the three tabbed pages, namely, the Browsing Tab, Posting Tab, and My Page Tab.

All of the user’s posts are listed on the My Page Tab, which contains a link to the Caution Page.

All situations are listed on the Posting Tab, where each situation links to the Posting Page. An illustration and a detailed description related to the chosen situation are displayed on the Posting Page. Users can post their future desires for a given situation.

All situations are also listed on Browsing Tab, where each situation links to the Browsing Page. Posts from all users related to the chosen situation are listed on this page.

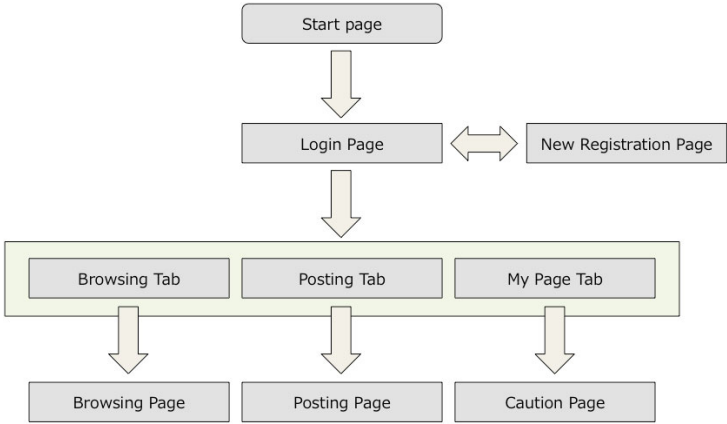


Fig. 5 Flowchart of the screen transitions

Fig. 6 Start page



Fig. 7 Browsing tab



Fig. 8 Posting tab



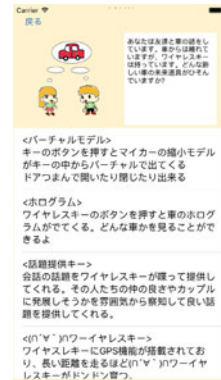
Fig. 9 My page tab



Fig. 10 Posting page





**Fig. 11** Browsing page

### 3.4 Operational Status

The current status of the study is as follows:

- The developed application is available on the App Store (Application name: Car-giri).
- The total number of users is 22 (average age: 25.1 years old).
- The total number of posts is 147 (from December 15, 2015 to February 5, 2016)
- Ethics committee approval (No. 28-44; Faculty of Science and Technology, Keio University) was obtained.

Examples of posts are shown below.

**Balloon of parking.** Air bag cushions swell when the car is about to crash into something.

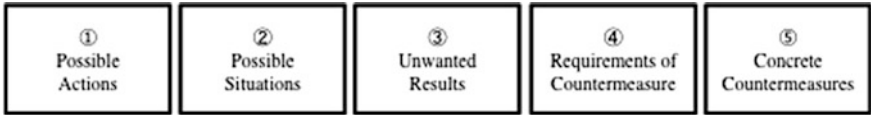
**BGM understanding the situation.** BGM that is appropriate for the mood in the car is played automatically.

**Resort during a traffic jam.** People on this car can savor the feelings of the resort by changed sound, smell and landscape when they are bored during a traffic jam.

**Talking car.** This car says “Have a nice day! Do your best again today!” when we closed the door.

### 3.5 Problems and Developments

Two new problems were identified while users operated the application. The first problem was the briefness of the description used as clues for illustrations. As a countermeasure, application of a method that uses illustrations as clues is proposed. Hazard prediction training covers topics regarding the prevention of human errors [10]. In this training, the clue illustrations are used to imagine the possible states



**Fig. 12** The flow of illustrations analysis of hazard prediction training



**Fig. 13** The flow of gathering inexperienced UX

and objects in a specific situation. Hence, it can be said that effectiveness of clues for generating ideas is high. Application of the illustrations analysis method of the hazard prediction training is cited as a recommendation in this study.

The second problem was that the application was unable to gather many experiences. A fewer number of psychological values (desired experiences for the future) were gathered compared with that of desired functions. As a countermeasure, application of the flow of illustrations analysis of the hazard prediction training is proposed. Consequently, not only desired functions but also desired psychological values can be gathered. Figure 12 shows the flow of illustrations analysis of the hazard prediction training. Figure 13 shows the flow of gathering inexperienced UX.

In Fig. 13, “(4) Requirements of Cars” and “(5) New Ideas of Cars” are the parts that were gathered by the application. It can be considered that “(1) Occasions in Daily Life” is the part where illustrations were given. Therefore, the application has to be improved to gather information on “(2) Desired Possible Situations” and “(3) UX as a Result.”

## 4 Conclusion

This study attempted to establish a method to gather inexperienced UX data for the interaction between users and cars with the aim of applying them to the product design process. Specifically, the requirements for gathering inexperienced UX were defined by extracting problems from existing methods and conducting an experiment. Consequently, a smartphone application was developed where users generate ideas by looking at illustrations and a detailed description of the situations that were given as clues; this approach gathered data from 147 posts.

However, two problems were identified. One is the briefness of the description used as clues for illustrations. The other is the inability of the application to gather sufficient data. Further development of the application is required.

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## References

1. Hassenzahl, M.: User experience (UX): towards an experiential perspective on product quality. In: Proceedings of the 20th International Conference of the Association Francophone d'Interaction Homme-Machine. ACM (2008)
2. Watson, D.L., Tellegen, A.: Towards a consensual structure of mood. *Psychol. Bull.* **9**(8), 219–235 (1985)
3. Hama, D., Nakanishi, M.: UX-based design-planning process: a practical study for car accessories. Graduation thesis, Keio University (2014)
4. Cooper, A.: *The Inmates Are Running the Asylum*. SAMS (1999)
5. Van Maanen, J.: *Takes of the Field*. University of Chicago Press (1988)
6. Tanaka, Y.: Analysis of user experience in housework and cooking—development of design process methodologies for home appliances. Graduation thesis, Keio University (2012)
7. Kearney, K.S., Adrienne, E.H.: Drawing out emotions: the use of participant-produced drawings in qualitative inquiry. *Qual. Res.* **4**(3), 361–382 (2004)
8. Fleury, A.: Drawing and acting as user experience research tools. In: Proceedings of the 10th Asia Pacific Conference on Computer human interaction. ACM (2012)
9. Oda, K., Takahashi, T.: A study of the art curriculum in preschool that aims at comprehensive art education. *Hum. Dev. Res.* **26**, 39–50 (2012)
10. Japan International Center for Occupational Safety and Health: Retrieved from <http://www.jniosh.go.jp/icpro/jicosh-old/index.html>. Accessed 18 Jan 2016

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