Vision-Proposal Design Method

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Abstract. The "Vision-proposal Design Method" discussed in this paper is a practical method for designing in an age of ubiquitous computing. This comprehensive method makes possible new and innovative services, systems and products that are currently unavailable, as well as proposing advances for those that currently exist. It encompasses the entire HCD (Human-Centered Design) process, and presents a new vision with experiential value for both user and business from an HCD viewpoint. It creates specific ideas for services, systems and products while also delivering their specifications. This paper reviews evaluation results of its utility and effectiveness through a brief summary of the method with examples of its application.

Keywords: Structured scenario-based design method, vision, scenario, persona.

1 Introduction

In the present day, product development for matured markets requires a research method of user needs that even users do not yet anticipate. In the case of products using ICT (Information Communication Technology), considered to be ubiquitous computing, a designing method is needed which meets users' intrinsic needs while avoiding functions and performance which do not engage those needs, such as those referred to as "Osekkai" [1]. Furthermore, in order to create attractive experiential value, it is necessary to develop services, systems and products not from the viewpoint of technical elements, but from the viewpoint of value to be provided.

Under such circumstances, it often happens that the problem-solving design approach for existing services, systems and products no longer works sufficiently, and therefore a new design approach is expected as a complement. This is a vision-proposal design approach that can create new services, systems and products which

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are sure to be introduced and attractive to people and society in general. It proposes new visions of provisional values that meet users' intrinsic needs from the viewpoint of HCD (Human-Centered Design).

Since 2007, the authors organized a working group within the Ergonomic Design Research Group of the Japan Ergonomics Society. This research has established the vision-proposal design approach, making it a practical and serviceable methodology useful for development of future generation services, systems, and products from the viewpoint of HCD. In 2009, we completed development of the "Structured Scenario-based Design Method" [2], in which a scenario was utilized consistently for the development process. This method helps to create ideas for services, systems and products from the provision values, and provides specifications utilizing personas and structured scenarios in three stages.

In addition to the Structured Scenario-based Design Method, the various methods effective for the vision-proposal design approach are widely used in the field of design, especially in information design. They include interview and observation methods for getting user data, the Superior-Subordinate Relationship Analysis Method [3] and the KJ Method[4] used for abstracting and/or structuring the users' intrinsic needs, and the Persona Method or Scenario Method [5] which create new provision values and user experiences. However, since they are used for only a portion of the design processes, it is difficult to consistently utilize HCD activities. Also, how and where in the design process each method can be used appropriately is another issue.

Therefore, we continued research with the aim of developing a comprehensive design method which consistently allowed for the introduction of HCD into the design process by advancing our Structured Scenario-based Design Method. The result is the "Vision-proposal Design Method." We discuss the outline of this method and evaluation results for successful findings.

2 Vision-Proposal Design Method

2.1 Characteristics of the Vision-Proposal Design Method

The Vision-proposal Design Method is a comprehensive design method which covers an entire HCD process. It is used for proposing new services, systems and products, as well as for making new proposals for those that currently exist. This method facilitates the creation of new visions of experiential values that can be embraced by people and society by offering practical ideas for services, systems, products and specifications based on HCD consistently. It emphasizes values that both parties, provider and receiver, can share. In particular, this method intends to satisfy both viewpoints of business policies (profits for business) and users' intrinsic needs (user experience). Further, a repeating process of emanation (creation) and convergence (evaluation) is stressed to arrive at new ideas. In this way, personas and scenarios are utilized proactively as a means of expression for an exact sharing of ideas. In addition, there are a sufficient number of templates prepared as hands-on tools.

The following are summarized characteristics of the method:

1. Gain ideas from value level.
2. Clarify the users' intrinsic needs.
3. Drive the specifications of services, systems and products from users' intrinsic needs.
4. Repeat visualization and evaluation by stages.
5. Consider collaboration with experts having specialties in other fields (user viewpoint / business viewpoint).

2.2 Basic Model for the Vision-Proposal Design Method

At its core, the basic model for the Vision-proposal Design Method uses the Structured Scenario-based Design Method. The user image is gradually elaborated to the personas along with users' intrinsic needs and business offering policies, then input to the core. Utilizing personas and scenarios through the Structured Scenario-based Design Method, particular ideas for services, systems, and products as well as their specifications are output. Figure-1 illustrates the basic model for the Vision-proposal Design Method.

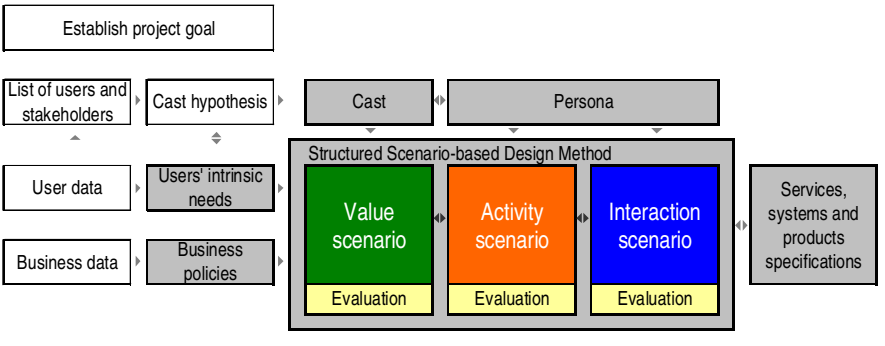

Fig. 1. Basic model for the Vision-proposal Design Method

2.3 Process and Elements of the Vision-Proposal Design Method

The Vision-proposal Design Method can be accomplished in five major steps. Various existing methods used for HCD are utilized in each process. An outline of each process and its relative activities are shown together with a sampling of the templates developed as hands-on tools. (Fig. 2-7)

1) Establishing project goal
At the beginning of a project, user experiences and business themes must be confirmed to ensure accuracy of the project goal.

2) Establishing users' intrinsic needs and business policies
The users' intrinsic needs are identified by user-related research data. Various existing research methods can be applied. For example, questionnaires as a

quantitative approach, or photo diaries, photo essays [6], interviews, or observation as a qualitative approach. Analyzing user data using appropriate methods such as the Superior-Subordinate Relationship Analysis Method to give a hierarchy of needs, users' intrinsic needs are clarified at its uppermost realm. The business offering policies are identified as project policies based on business data including business domains, possessive technologies, business strategies and business environments.

3) Establishing target users and creating personas

In the Vision-proposal Design Method, ideas are developed in the sequence of "project target setting," followed by "values to be provided," then "user activities" and finally "interaction." Target users are elaborated in the sequence of user list, hypothetical cast, cast and Persona. By linking the target users and each scenario in respective stages, the process of emanation and convergence of idea generation can be achieved with creativity. Persona is especially useful when embodying the user's experience into activity scenarios and interaction scenarios. Personas help to describe concrete users' activities, behavior patterns and goals in the scenarios.

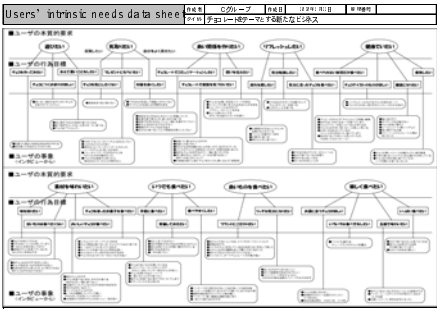

Fig. 2. Template: Users' intrinsic needs sheet

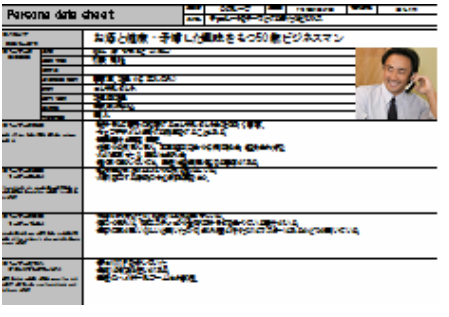

Fig. 3. Template: Persona sheet

4) Creating and evaluating ideas using Structured Scenario-based Design Method

The Structured Scenario-based Design Method is used to create new ideas for services, systems and products from the view points of HCD and to deliver their specifications by illustrating scenarios meeting the three structured layers step-by-step. After confirming requirements, creation of ideas, scenario development and evaluation are conducted in each stage.

i) Creation of ideas

Ideas are created hierarchically in three steps through the scenario development. Vision-proposed ideas that go beyond problem solving can be created from the viewpoint of superior provisional values. These ideas confirm consistency with the current scenario as well as those before and after it through repeating processes.

ii) Scenario development

Ideas are visualized in the form of a scenario. Scenarios are described by three steps; the "value scenario" describes the values provided to users by business, the "activity

scenario" focuses on users' experiences, and the "interaction scenario" shows the interaction between users and systems and products. The activity scenarios and interaction scenarios illustrate user experiences in detail through personas' activities and interactions. Furthermore, user experience is visualized effectively using a wide range of expression, including sketching, paper prototyping and acting out.

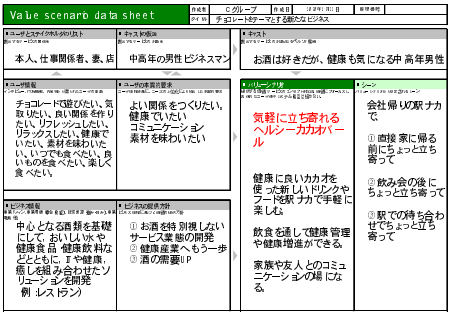

Fig. 4. Template: Value scenario data sheet

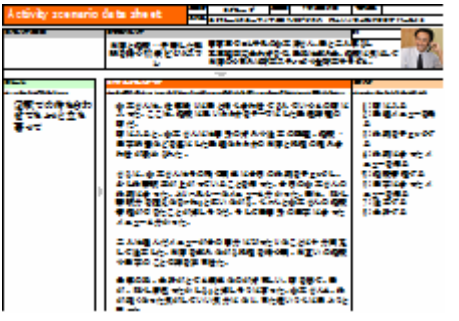

Fig. 5. Template: Activity scenario data sheet

Fig. 6. Template: Interaction scenario data sheet

Fig. 7. Template: Value scenario evaluation sheet

iii) Evaluation

The evaluation of ideas is a key process which determines the achievement of the project. The objects of evaluation are structured scenarios characterized and described in three layers. Each scenario is evaluated at each stage, then revised after reflecting on the results of evaluations. The evaluation criteria consist of two aspects: the user's viewpoint, including attractiveness, effectiveness and efficiency, and the business viewpoint, including strategic characteristics, sociality, marketability and business feasibility. The weight of evaluation criteria of each aspect can be changed to meet the project goal. User evaluation and expert evaluation, such as check lists, are available as evaluation methods. The ideas will be fitted to the project goal by repeating the creation and evaluation of ideas using the structured scenarios. There are five points of evaluation, as follows:

1. Evaluate from the upper stage
2. Evaluate structured scenarios by each stage
3. Visualize ideas for evaluation
4. Clarify the evaluation criteria
5. Evaluate from both user viewpoint and business viewpoint

Since scenarios are illustrated hierarchically by each persona, a high volume of scenario descriptions are required if we attempt to systematically illustrate all possibilities. However, the purpose of this method is not to cover all potential solutions, but rather to create attractive ideas that satisfy the project goal from the viewpoint of HCD. At this point, we narrow down on the attractive ideas generated by the results of evaluations.

5) Realizing specifications
Based on the requirements from interaction scenarios, the services, systems and products specifications are discussed while considering consistency with the three structured scenarios. For example, use case scenarios can be used. The major objects of description are technical elements, which are evaluated from a technical perspective.

2.4 Expected Effects of Vision-Proposal Design Method

Benefits of the Vision-proposal Design Method include;

1. Easy-to-use products and services can be developed
2. Customer value can be discovered as a resource for effective competition in future generations.
3. Acceleration of development and cost savings can be designed.
4. Development of high sales merchandise and attractive services become possible.
5. Vectors of business become clearly defined, promoting effective business management and forecasting.

3 Application of Vision-Proposal Design Method

We conducted an evaluation workshop to apply and to verify the utility and effectiveness of the method.

3.1 Overview of Evaluation Workshop

An outline of the evaluation workshop is shown below:

1. Theme: Proposal of design of new services, systems and products using “Chocolate”
2. Participants: 43 individuals (including product designers, user interface designers, information designers, usability and computer experts, university faculty and students) divided into six groups.
3. Process: After a lecture about the method, people split into groups and worked. Using fourteen types of templates prepared for different themes, practical ideas were created and presented in accordance with the processes of

this method. Due to time constraints, the policies of provision of Persona and business were prepared in advance.

4. Term: Two days (Afternoon on the first day and morning of the second day)
5. Method of evaluation: Subjective evaluation using questionnaires for all participants of the workshop after practicing the method, and participant observation by one member of each group, those being the individuals who developed the method.

Following is one of the design proposals presented from the six groups which gained the highest score as a result of mutual evaluation among participants.

Value scenario: "Healthy Cacao Bar – Right around the corner." It is possible to enjoy healthy food and drinks containing cacao in a convenient location, such as "Ekinaka," the shops found in train stations, and promote good health through food and drinks. It can also be a good place to meet and communicate with family and friends.
Activity scenario: (abbreviated) When Mr. and Mrs. Yamamoto entered the bar, the bar staff recommended a combination of dishes with an appropriate Cacao liquor to enjoy with their meal, based on their preferences, record of past orders, and health conditions. Furthermore, Mr. Yamamoto came to know that his body fat percentage had slightly increased after performing a simple physical check at the bar counter. He understood that the menu recommendation for him was healthier based on his current state of health. (Abbreviated) Satisfied with the personalized menu, they placed their orders accordingly. (Abbreviated)
Interaction scenario: (Abbreviated) The "Recommended Menu," which was selected based on information such as preferences, health information and order history, was displayed on the tablet terminal. Mr. Yamamoto pressed a button labeled "Physical Check-up" on the screen. By gripping the handles of the tablet and pointing it towards his face, the instrument analyzed his palms along with his face image and presented a reading of his current physical body condition. His body fat seemed to have increased, and the "Recommended Menu" was updated to display healthier items. He customized the listing and created a menu optimized to his preference, type of cacao flavor, and strength of alcohol. (Abbreviated)

The Fig. 8 illustrates this idea based on the delivered specifications. It realizes a new vision and an experience at a bar concerned with health and entertainment. Food and drinks may be ordered based on both users' intrinsic needs and business policies.

Fig. 8. Image of the case example

3.2 Evaluation Results

Among all workshop participants, 32 people answered the questionnaire. The effectiveness and satisfaction of respective processes were evaluated using five rankings. The percentages of grade-four or higher are shown below:

- Mutual interview and laddering :Effectiveness: 84.3%, Satisfaction: 74.9%
- Business offering policies :Effectiveness: 65.5%, Satisfaction: 53.0%
- Value scenario :Effectiveness: 71.8%, Satisfaction: 71.8%
- Activity scenario :Effectiveness: 65.5%, Satisfaction: 53.0%
- Interaction scenario :Effectiveness: 71.8%, Satisfaction: 59.3%

These results show that the participants recognized high-level estimation for effectiveness and satisfaction. Also, in answer to the question, "Do you wish to implement the Vision-proposal Design Method at your workplace or school?," 78.1% answered "Yes," 0% answered "No," and 9.3% answered "No opinion." It was understood from this response that people highly evaluated the general effectiveness and efficiency of the method.

According to the free comment column, the following points were especially valued: "It is a method based on HCD, one searching for users' intrinsic needs and utilization of the Persona scenario, where both user and business aspects have been considered. Further, it is a comprehensive method where specifications are output when user and business data are input." However, some opinions were as follows: "It takes time to implement the entire method. It becomes confusing when dealing with the evaluation criteria of the scenario, and the relationship between templates is difficult to understand. The method itself is fundamentally sound, but there are issues with the templates which must be considered for future improvement."

In findings from participant observation, there was no deviation in their subjective evaluation. There were some difficulties, such as describing three scenarios differently and then performing scenario evaluation. These can be improved by more effectively guiding the procedure among the functions of templates. As for the size of the entire method being too large, development of simplified versions may be required, along with a guide function enabling simple customization of processes and methods within various projects.

The results of the evaluation workshop show that features of this method are realized, and together with the above-mentioned results, the utility and effectiveness of the method has been confirmed.

4 Summary and Future Work

This paper has introduced the Vision-proposal Design Method, a comprehensive design method which illustrates a vision having new experiential value with regard to both user and business aspects from the viewpoint of HCD. It creates specific ideas for services, systems and products, while also delivering their specifications. In addition, the results of application using templates as practical tools, along with its utility and effectiveness were confirmed.

We continue our activities to verify the method and to further its usefulness by setting up a SIG as well as holding practical workshops and exchanging information.

The application of this method is already being used in various locations. In education, there are currently five universities utilizing this method in their design classes with more considering its adoption. In business, its utilization is spreading as well. We intend to advance this method through a wide range of practices.

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