ServDeWS: The service design workshop on utilizing multi-viewpoint and diversity of participants based-on human centered approach for R&D Specialists

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Abstract

In the highly volatile and uncertain world, integrating multi-viewpoints such as human-centered, technological and business viewpoints is necessary to design attractive and competitive service concepts. Generating synergy by combining diverse opinions from various stakeholders is also important. However, it is difficult, especially for technology researchers and developers who are design novices, to understand the importance of this approach in a short period of time. Our solution, ServDeWS, is a novel two-day workshop that tackles these problems. It has three main features as follows. 1. Selecting a target user from workshop participants and closely assessing the user's situation, 2. Dividing work time into individual and group activities for better utilizing the diverse opinions of participants, 3. Taking the human-centered, technological and business viewpoints in isolation, and then integrating them for a multi-viewpoint understanding. We conduct a case study of ServDeWS and assess the effectiveness of this approach.

KEYWORDS: service design, human centered design, workshop design

Introduction

As the market is dramatically changing due to the high volatility and uncertainty of the world (Kail, 2010; Lawrence, 2013), it is increasingly important to rapidly discern user needs and design services to suit. Human centered iterative design and development approaches are widely utilized (Brown, 2006; Hussain et al., 2009) achieve the services needed. In addition, a standard for human centered design (ISO9241-210, 2010) exists that supports designers by providing a common ground for various stakeholders to better utilize the human-centered approach. It is also necessary to consider the values of the services as perceived by various stakeholders when designing and perfecting the services (Stickdorn et al., 2012). This implies that the multi-viewpoint approach based on human centered is extremely important in

service design. In this study, multi-viewpoints include user-centered viewpoint, technological viewpoint and business viewpoint. For instance, a design team should consider which technologies provide the best competitive advantage from the technology viewpoint, as well as the sustainability of the service from the business viewpoint. In this process, various stakeholders such as target users, and technology and business specialists should participate to maximize the diversity of ideas in service creation. The participatory design approach is one of the most famous approaches as it fosters the collaboration of various stakeholders (Muller et al., 2012).

Unfortunately, non-designers find it hard to understand and utilize the multi-viewpoint approach and the diversity of participants. Although learning the design approach by hands-on experience is the best solution, non-designers such as research and development specialists, have little chance to repeatedly experience this approach, because they have to focus on their main work. However, even non-designers are increasingly required to have a basic understanding of the service creation approach to collaborate with service designers and other stakeholders to collaboratively design new services.

To advance this field, we are proposing ServDeWS, a novel two-day workshop program that allows participants to experience and understand service creation through the utilization of the multi-viewpoint and diversity of participants. Figure 1 shows an overview of our proposal. The main target of ServDeWS is the non-designer; nominally a specialist active in research and development. This workshop sets itself two objectives to help participants understand the service creation approach. The main objective is to understand and utilize the diversity of participants for service creation based on the human-centered approach. The other objective is to understand the concept of multi-viewpoints in service creation; this covers user-centered, technological, and business viewpoints.

To achieve the above objectives, ServDeWS has three features. First, it selects a theme that casts the participants as the target user. Second, it clearly divides group work time into individual work time periods and utilizes the two axes plot technique for efficient collaboration. Third, it clearly apportions work time to assess user-centered viewpoint, technological viewpoint and business viewpoint, and then conducts a synthesis session to support participants in fusing these viewpoints for service creation. In addition, a case study yielded by the proposed workshop is introduced as an example of ServDeWS in action.

The second section discusses related works, while the third section details the workshop. In fourth section, we introduce the case study, and discuss the effectiveness of ServDeWS features in achieving the two objectives based on the result of a case study in the fifth section. Finally, Section 6 summarizes the proposal and discusses future work.
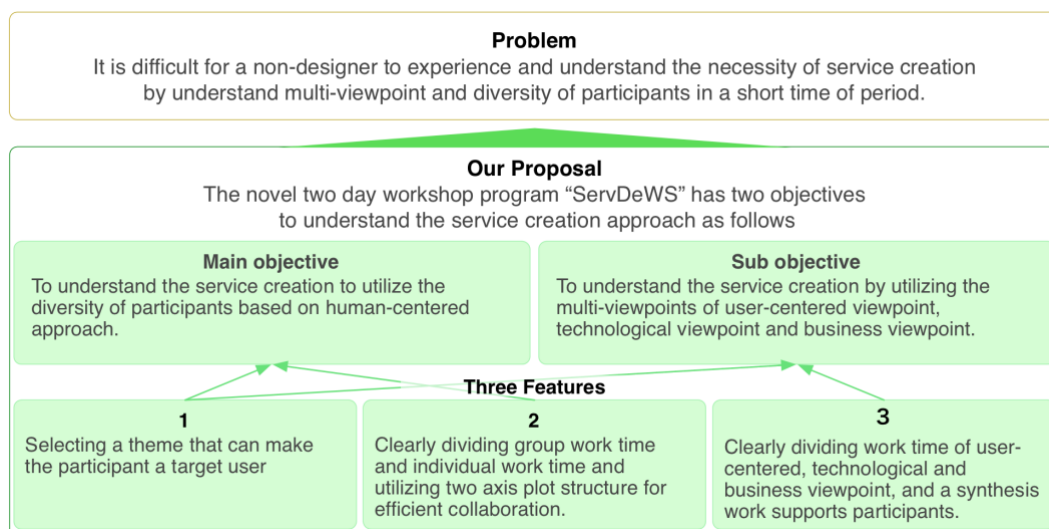
Figure 1 – Overview of ServDeWS

Related Work

Design Thinking is one of most famous human-centered approaches for designing solutions (Brown, 2008; Kelly et al., 2001). This approach is iterative, creative and human-centered, and is attractive to users. Some design education institutes have used it to establish one to two year education programs (e.g. d.school at Stanford (d.school, 2010) and i.school at Tokyo University (i.school, 2015)). In addition to the human-centered viewpoint, a designer should be supported by raising the issues of technical feasibility and business stakeholders value chain. T. Brown mentioned that designing solutions should consider the desirability (human-centered), feasibility (technology), and viability (business) of products or services (Brown, 2008). Furthermore, other research detailed the eight viewpoints of service design: Usefulness, Instrumentality, Technical excellence, Social significance, Mutual advantage Collective welfare, Aesthetic values and Moral implications (Arvola et al., 2016). They represent a finer-grain analysis than the three-viewpoints which are desirability, feasibility and viability. Research has shown the importance of having multi-viewpoints for service design.

Service Design has been utilized in various fields, and successful case studies have been reported (Stickdorn et al., 2012). In the software development field, several support approaches have been developed under the heading of user-centered agile development (Hussain et al., 2009; Beck et al., 2000). Lean start-up, which is an iterative business design approach, has been utilized in the entrepreneur field. These examples show the wide penetration of the human-centered approach in the design and development fields.

In service creation, multi-viewpoints and the diversity of stakeholders are essential. In addition, the designer must try to properly fuse the disparate viewpoints in creating truly innovative and attractive service ideas. Diversity includes the value judgements of a variety including designers, engineers and target users. Hence, it is important to encourage people to express and discuss their opinions if diversity is to help in the creation of service ideas.

Although the human-centered approach to service creation is effective, a lot of training is needed to gain adequate fluency. Since this approach is difficult to understand as knowledge, practical experience is necessary. This raises difficulties in designing rapid training programs. Of particular importance, technology researchers and developers of technology have their hands full with their regular work; they lack the time and opportunities to experience long term practical training programs. Hence, short-term experience programs are needed that suit researchers and developers who are not specialist in service design, and reducing the facilitation cost is important for permit regular scheduling of training workshops in a company. One example is the ninety-minute training program that provides experience in the design thinking process released by d.school (d.school, 2017). In addition, d.school also provides the four-day workshop program called Design Thinking Bootcamp. These programs focus on the design thinking process and mind-set based on experiencing human-centered approach. Bootcamp is a well supported but high cost training program, since its student-teacher ratio is five to one. The Graduate School of System Design and Management at Keio University has held various System x Design thinking workshops and also released a support tool to design workshops themselves (MEXT, 2014). Above workshops mainly target participants who know the effectiveness of such methods and are motivated to learn. These workshops clearly define the objective, and select a limited number of methods to satisfy the time constraints. ServDeWS adopts the same strategy in providing training in service creation for technology researchers and developers. In addition, to design the most attractive training workshop we carefully considered the characteristics of technology researchers and developers who have no knowledge of service design effectiveness.

Proposed Workshop: ServDeWS

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The main target user of ServDeWS is the beginner in service creation based on human-centered viewpoint; in particular, young technology researchers and developers of a company. The proposed method supposes that participants do not know the effectiveness of service design based on the human centered approach. ServDeWS is a two-day workshop program designed as a first step in learning the effectiveness of service design. Figure 2 shows a program example of the workshop. This workshop is designed to be adopted as a training program of a company. This workshop can be conducted in eight hours per day, with one-hour lunch breaks.

This workshop has two objectives allow a participant to understand the service creation approach. The main-objective is to understand service creation by utilizing the diversity of participants based on the human-centered approach. A sub-objective is to understand how to utilize multi-viewpoints for the service creation; it addresses the user-centered, technological, and business viewpoins. We note that this workshop does not attempt to provide rigorous training in service design methods or specific processes; it cannot guarantee the quality of the service ideas generated in the program.

	Day1 (8 hours)	Day2 (7 hours)	
	Introduction	Introduction	
Group	Ice break	Q&A of Day1	Group
Group	Team building (Introduce each other & Create team name)	Update persona & story prototype	Group
	Preparing Design Note (WS tool)	User Interview 3 with story prototype	Group
	Theme introduction		
Individual	Thinking their daily work	Considering business plan (pitch format)	Individual & Group
Group	Sharing their daily work (group)		
Group	Select a target user from team	Pitch presentation	
	Short break	Introduction of free discussion	
Group	Select a target user from other team	Lunch break (1h)	
Group	User Interview 1		
Group	Create pragmatic persona		
Individual &Group	Problem definition		
	Lunch break (1h)	Free discussion with Human-centered, Technological, Business viewpoint	Individual & Group
Group	Modify persona		
Individual	Selecting three technologies		
Individual	Analyzing technologies by enabler framework		
Individual	Force association method by the problem definition x three technologies	Pitch presentation in each class	
Individual	Pick-up an idea and create structure	Voting in each class	
Group	Sharing the idea with structure & voting	Select a representative team in each class	
Group	Force association method based on selected idea by the problem definition x three technologies	Final presentation	
Individual	Selecting an idea and create structure	Voting	
Group	Sharing the idea with structure & voting	Closing	
	Short break		
Group	Creating story prototype based on the selected idea		
Group	User Interview 2 with story prototype		
Group	Updating persona and story prototype based on interview results		
	Pitch presentation & Closing		

Figure 2 –Program Example of ServDeWS

Three Features of ServDeWS

ServDeWS has three key features that allow rapid understanding of the multi-viewpoints and diversity of participants for service creation based on the human-centered approach. First feature is selecting a theme that allows participants to become a target user. For example, if the facilitator selects "a novel service for workplace" as a theme, every participant who is an employee of company is a target user. Based on the theme, participants discuss their own

problems and needs in the team, and decide which of the target users has the strongest needs or problems. The target users introduce themselves and their problem and needs to all participants. Finally, each team selects a target user who is not team member. This process intended to cross-fertilize the teams with the needs/problems of other teams. Every team invites a target user from another team, conducts interviews, and proposes a solution. Furthermore, every team creates and updates a pragmatic persona to represent a group of target users through interviews and prototyping. This feature lowers the threshold to understanding the target user because a target user is in a adjoining group, and allows a facilitator to reduce the cost to invite and guide target users in the workshop.

Second feature is clearly dividing group work time and individual work time and utilizing the two axes plot structure for efficient collaboration. An example of the two axis plot structure is shown Figure 3. The structure encourages participants to understand the diversity of their opinions. This feature solves the communication problem that makes it difficult to express and compare individual opinions in group work. Concretely, the ideation phase and the story prototyping phase of ServDeWS clearly divide individual and group work. After individual work, each team members introduce their opinion based on the structure and silently vote on which opinion is best for the target user. This feature is important to researchers and developers who are unaccustomed to collaboratively working with others in completely different fields.
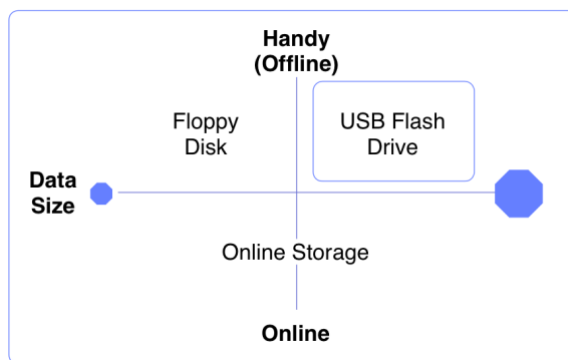

Figure 3 – An Example Two axis Plot Structure

Third feature is clearly apportioning work time among user-centered viewpoint, technological viewpoint and business viewpoint, and the subsequent fusion of these viewpoints. The separation encourages participants to individually refine important findings from the user-centered viewpoint and technological viewpoint. Furthermore, participants conduct the force association method to create service ideas from user-needs and the features of potential technologies. After creating the service idea, participants consider the competitiveness and sustainability of the service from the business viewpoint. This process is iterated in the workshop program. It allows participants to experience the service creation process, which encourages individuals to consider each viewpoint and synthesize a multi-viewpoint understanding.

Expected Efficacies

ServDeWS offers three efficacies as follows. A. Allow participants to experience iterative service creation based on user evaluation through story prototyping. B. Allow participants to experience maximization of their abilities and the full diversity of opinions in teamwork. C. Allow participants to experience working with each viewpoint and synthesizing multi-viewpoint understanding. We elucidate the validity of these benefits through a case study.

Case Study

This section introduces a case study of ServDeWS. Figure 2 shows the ServDeWS program that was used in the case study. Sixty participants joined the workshop. All were developers or researchers in an ICT company. The researchers were specialists in fundamental technology, applied research and the development of services and products. The employer expects them to have basic knowledge of service creation. All participants were required to participate in the workshop as a training program of the company. Hence, target users of the proposed workshop were joined by non-target users (e.g. fundamental technology researchers little interested in service creation, infrastructure development and who have had chance to consider the needs of end users.

In this case study, based on the first feature of ServDeWS, the theme chosen was "a new service (product) to support efficient work in the post 2020 era". All participants of the workshop were thus possible target users, since they are full-time workers at a company. Second feature was not modified in this case study. The third feature was modified; because of the time constraint, less time was spent on the business-viewpoint. This was possible because all participants participated in another training program that focused on the business viewpoint. It was conducted by staff not associated with this study.

An author of this paper designed and assisted the workshop as the main facilitator. The participants were split into three groups, and each group was supported by its own sub facilitator. Sub facilitators had no experience in facilitating service creation workshop. Their role was to answer participant's questions related to the workshop, and to provide feedback on service ideas. Before commencing the workshop, the main facilitator introduced details of the workshop and the role of the sub-facilitators in ninety minutes.

Data Acquisition

We conducted a questionnaire to confirm the validity of the three features of ServDeWS. After the workshop, we asked the participants for their agreement that this questionnaire would be used for research purposes, and only participants who agreed submitted their questionnaire responses. As a result, we got 59/60 (valid answer ratio is 98%) answers.

The items of the questionnaire are shown in Figure 4. Each item was to be answered using the five point Likert scale method (1 is strongly disagree, 5 is strongly agree). In addition, we gathered NPS (Net Promoter Score). NPS is a method to measure customer satisfaction. NPS is calculated based on the responses to a single question, "How likely is it that you would recommend our company/product/service to a friend or colleague?". The scoring for this answer is based on a 0 to 10 scale (Reichheld, 2003; Grisaffe, 2007). We discuss the effectiveness of the three features of the proposed workshop based on the above data.

No.	Questions (1: Strongly disagree - 5: Strongly agree)
1	I understood iterative service creation based on human-centered approach through the WS.
2	I understood iterative service creation by Human-centered, Technological, Business viewpoint through the WS.
3	Individual work time allowed team members to utilize individual ability.
4	Group work time allowed team members to achieve higher outcome to achieve by individuals.
5	Structure helped me to share differences of member opinions
6	The created service is valuable for the target user.
7	The created service is highly evaluated by the target user with concrete reasons.
8	I well understood iterative service creation by Human-centered, Technological, Business viewpoint before participating WS.

*All items are translated from Japanese

Figure 4 – Questionnaire items for the case study

Results of Questionnaire

Figure 5 shows the results of the case study questionnaire. Q8 (I well understood iterative service creation by Human-centered, Technological, Business viewpoint before participating WS) found that 80% of participants had scant experience in the multi-viewpoint approach to service creation. That is, most participants were potential target users of ServDeWS. Q1 to Q5 showed the satisfaction of participants. All four questions received positive responses. Especially Q1 (I understood iterative service creation based on human-centered approach through the WS), Q3 (Individual work time allowed team members to utilize individual ability) and Q4 (Group work time allowed team members to higher outcome which was not created by individuals) received higher scores than the other questions.
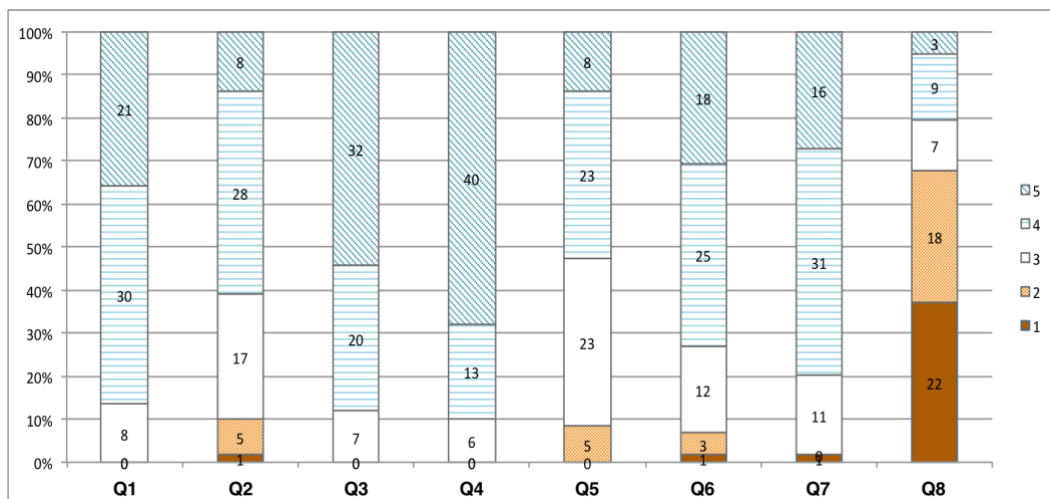

Figure 5 – Questionnaire responses in the case study

As shown in Figure 5, Q6 (The created service is valuable for the target user) indicated that more than 70% of participants were confident that service ideas suitable for target users could be identified. In addition, Q7 (The created service is highly evaluated by the target user with concrete reasons) indicated that more than 80% of participants got positive feedback with concrete reasons from target users.
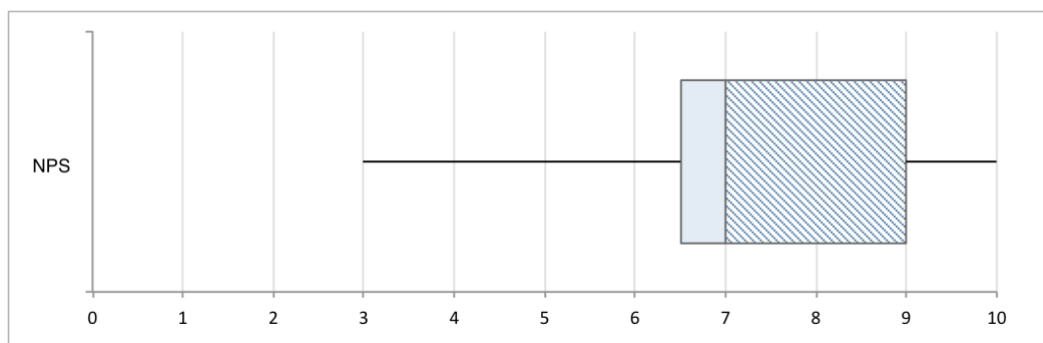
Figure 6 – NPS results in the case study

Finally, the NPS is +3.4%, see the box plot in Figure 8. The median is 7, the first quartile is 6.5, and the third quartile is 9. Three participants gave scores of 3.

Discussion

In this section, we discuss the effectiveness of the three features of ServDeWS based on the results gathered.

Effectiveness of First Feature

The result of Q1 shows that participants could understand the human-centered viewpoint. In addition, the high scores of Q6 and Q7 show that participants felt confidence in their service idea based on user feedback through prototyping. Some participants voluntarily interviewed target users in the free discussion time. Furthermore, in the final presentation, their target users mentioned specific positive points of their service idea. This means that the first feature helped participants to experience to service creation based on the user-centered viewpoint. This result means the first feature (Selecting a theme to make the participants target users) enables efficacy A (Experience iterative service creation based on user evaluation through story prototyping).

Effectiveness of Second Feature

The results of Q3 and Q4 show that participants highly evaluated the effectiveness of clearly dividing group work time and individual work time. Some participants commented that the balance of individual work and group work was very good for service creation. This shows that they experienced the utilization of individual ability, discussed the theme based on various opinions, and reached high quality outcomes that could not be achieved by individual ability. Thus the second feature (Clearly dividing group work time and individual work time and utilizing the two axis plot structure for efficient collaboration) enables the efficacy B (allowing participant to experience maximization of individual ability and diversity of opinions in a team work). In addition, the effectiveness of the structure for opinion sharing was highly rated by more than half of the participants as shown by the results of Q5 (Structure helped me to share differences of member opinions).

Effectiveness of Third feature

The results of Q3 and Q5 were relatively positive, but lower in score than Q1, Q3 and Q4. In addition, some participants commented about the difficulty of creating structures by two axis plots. In particular, it seems that participants who felt the effectiveness of the force association method with the user-centered viewpoint and technological viewpoint gave high scores to Q3, and contra versa. This result suggests that, unlike the first feature, participants

could not fully utilize the multi-viewpoint approach for service creation. However, since 36 participants choose 4 or 5 on Q2 (I understood iterative service creation by Human-centered, Technological, Business viewpoint through the WS), and 31 participants choose 4 or 5 on Q3, more than half participants felt that fusing the multi-viewpoints was effective. This suggests that the third feature (Clearly apportioning the work time among the viewpoints, and the synthesis work supported participants in fusing these viewpoints) and so allowed more than half the participants to experience efficacy C (Working with each viewpoint and fusion of user-centered viewpoint, technological viewpoint and business viewpoint).

Value of ServDeWS through NPS

In Japan, most NPS results are minus values, because Japanese tend to choose around five (average score) (NTTComOMS, 2017). Furthermore, the participants of this case study were forced to participate the workshop as the training program of their company, and they had various backgrounds. This suggests that +3.4% is a relatively positive score. This suggests that the workshop was valuable to the participants target users. However, it is difficult to compare to the NPS score of brand image and workshop. We should gather more NPS data as regards the service creation workshop by conducting other case studies.

Overall Evaluation

Above the discussion of the case study shows the effectiveness of the ServDeWS workshop. First, we summarize the effectiveness of this workshop. The participants well experienced service creation based on the user-centered viewpoint, and the diversity of opinions. It means the workshop achieved the main objective (To understand service creation by utilizing the diversity of participants based on the human-centered approach). The other objective (To understand service creation through the utilization of the multi-viewpoint approach, a fusion of the user-centered viewpoint, technological viewpoint and business viewpoint) was achieved by more than half the participants. These results suggest that the propose workshop program was well accepted by technology researchers and developers. Of particular note, the second feature proposed was highly appreciated by the participants, though this feature is well suited to technology researchers and developers. Of particular note, the second feature proposed was highly appreciated by the participants. It shows that this feature is well suited to technology researchers and developers.

Second, we discuss suggestions raised for workshop improvement. The questionnaire scores related to the other objective were lower. This indicates the need to improve the experience of fusing multi-viewpoints, and opinion sharing by using the two axis plot structure. For instance, providing more examples of structuring technologies, much detailed instruction and work steps should better demonstrate the second feature. In addition, the force association method by human-centered viewpoint and technological viewpoint is hard for participants who are not used to the method to understand. This explains why the participants had difficulty in experiencing the efficacy of fusing multi-viewpoints. Improvements might include more detailed instructions and work steps. Furthermore, increasing the number of iterations (two iterations were used in this case study) will be good for training in the method and achieving both objectives. In addition, we should consider more practical applications for researchers and developers after experiencing the proposed workshop program. Touch-point based methods will offer good hints to support users in utilizing detailed multi-viewpoints. Touch-points are the points of contact between a service provider and customers. For instance, the card-based toolkit for touch-point based service innovation was proposed and its effectiveness has been confirmed (Clatworthy, 2010).

Third, in this case study, we conducted ServDeWS in two days for sixty young researchers and developers by a main skilled facilitator and three sub facilitators who are not used to service design. This suggests that the workshop program is more cost effective than other workshops. Fourth, as already mentioned above, most participants are potential target users

as shown by Q8. However, some participants of this case study were not likely target users. Hence, we need to carefully screen the participants, when we conduct more detailed evaluations of case studies.

Conclusion

In this study, we proposed "ServDeWS", a novel service design workshop that allows technology researchers and developers to experience service creation by utilizing the multi-viewpoint approach and the diversity of participants. We introduced two objectives of the proposal. The main objective is to understand service creation through the utilization of the diversity of participants based on the human-centered approach. The other objective is to understand service creation through the use of the multi-viewpoint approach, which fuses the user-centered viewpoint, technological viewpoint and business viewpoint. ServDeWS is equipped with the following three features to tackle the above objectives. First feature is selecting themes that are likely to cast the participants as target users. Second feature is clearly dividing group work time and individual work time and utilizing the two axis plot structure for efficient collaboration. Third feature is clearly apportioning work time of user-centered viewpoint, technological viewpoint and business viewpoint, and fusion work to help participants to use these viewpoints for service creation.

We introduced a practical case study of ServDeWS, and confirmed the effectiveness of the three features in achieving the two objectives. Finally, based on the result of the case study, we discussed the limitations of the current workshop and ideas to improve ServDeWS.

In this paper, we focused on the workshop design for service creation by utilizing multi-viewpoints and diversity. However, utilizing design for problem solving is becoming more important day by day. It is essential that design utilization tools should be easier to use with greater coverage. Thus, we will continue to expand and optimize design tools that allow various people to easily understand the possibility of creating, optimizing, and utilizing designs in various fields.

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