

A PROPOSAL OF PARTICIPATORY DESIGN TOOLS FOR EAST ASIA FOCUS ON ANONYMITY AND PLAYFULNESS

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ABSTRACT

Participatory design approaches involve users in the early phases of design process for imagining and creating new products or services, thus they can help collect users' Kansei data. These approaches have been widely developed in Europe, especially in the Nordic countries where it originated, while it is not common in Japan. Since designing consists of social activities like group discussions, cultural differences between Japan and the Nordic countries might prevent the mapping of the technique into the Japanese context. In this paper, as a step for employing participatory design approach to collect users' Kansei data, the study developed new tools for idea generation. The tools offer anonymity and playfulness where participants are expected to freely express their ideas. The tools were assessed in a lab-based experiment with sixteen Japanese subjects in terms of perceived creativity of the participants and design outcome. Findings show that both playfulness and anonymity lead to higher perceived creativity in idea generation. Besides, the introduction of anonymity increases critical discussion and participants' perceived criticality of themselves in idea selection. These findings have the potential to be used in developing design tools for any specific cultural context.

Keywords: Participatory design, cultural difference, anonymity, playfulness, design tool

1. INTRODUCTION

In highly competitive markets, designing remarkable new products or services requires companies to pay attention not only to product functionalities but also to users' needs and subjective expectations, i.e. users' Kansei (Nagamachi, 1995). Kansei values can be grasped through a participatory design approach, where users are treated as partners in early design

process. (Arrighi & Mougenot, 2016; Gentner, Bouchard, Badoil, & Favart, 2014; Rasamoelina, Bouchard, & Aoussat, 2013; Sanders & Stappers, 2008). As participatory design was initially developed by Scandinavian and North-American designers (Simonsen & Robertson, 2012), it presumes equality, open discussion and commitments from participants (Yasuoka, Nakatani, & Ohno, 2013). As designing is a social activity based on collaboration (Détienne et al., 2016; Mougenot et al., 2017), cultural differences might have a major impact on the way people engage in participatory design approach. Therefore, the overall objective is to create tools for participatory design specifically catered to an East Asian (Japanese) context. In this paper, lab-based experiments with university students in Japan are reported in order to investigate the impact of anonymity and playfulness in group design activities.

2. STUDIES ON FACTORS THAT IMPACT PARTICIPATORY DESIGN

2.1. Cultural Background

Hofstede describes culture as “the collective programming of the mind that distinguishes the members of one group or category of people from others” (Hofstede et al., 2010). Comparing Japan to Nordic countries like Finland, Sweden, Norway and Denmark; where participatory design originated, major differences can be seen in all six cultural dimensions that were defined by Hofstede. More precisely referring to Power Distance scores, 54 in Japan vs. 28 in the Nordic countries, show that Japanese society is more hierarchically organised than Nordic societies, which might be a barrier to a fruitful design collaboration. Individualism scores, 46 for Japan, and 69 for the Nordic countries, show that Japan is a collectivistic culture, where people value the harmony of the group they belong to than their individual expression. Uncertainty Avoidance is high in Japan with the score of 92, one of the highest in the world, while it is rather low in the Nordic countries with the score of 40. This implies that Japanese people are reluctant to do things without any antecedent. Several studies have focused on the impact of culture on design activities in East Asia: sharing ideas freely within a hierarchy (Boeijen & Stappers, 2011; Lee & Lee, 2009; Taoka et al., 2016; Yasuoka et al., 2013), collaborating with strangers (Taoka et al., 2016; Van Boeijen, 2015) and harmony of a group (Lee & Lee, 2009; Yasuoka et al., 2013). Researchers attempted to control verbal interaction by turn management tools (Lee & Lee, 2009; van Rijn, Bahk, Stappers, & Lee, 2006), and by design game (Yasuoka et al., 2013) and on increasing indirectness of showing disagreement by tool intermediating among participants. (Lee & Lee, 2009). Therefore, it is within the knowledge that no tools have been developed to support group ideation and discussion specifically, in a Japanese context.

2.2. Anonymity and Playfulness

Other studies have explored the impact of anonymity on creativity in computer mediated interaction. (Pissarra & Jesuino, 2005) Anonymity offers hiding personal identity, which allows people to put more emphasis on a higher level of their social groups. (Reicher, Spears, & Postmes, 1995) It leads to more satisfaction and higher performance, both subjectively and objectively (Tanis & Postmes, 2008). Introduction of playfulness allows the participants to create distance

from their ordinary life, which makes participants think out of the box, in other words, be more creative (Brandt & Eva, 2006; Brandt & Messeter, 2004; Vaajakallio & Mattelmäki, 2014)

3. RESEARCH QUESTION AND HYPOTHESIS

Building up on aforementioned studies, the objective is to develop a new tool to help Japanese people to express their opinion during idea generation. It is expected that anonymity and playfulness mitigate pressure of following hierarchical order and of keeping harmony of the group and increase freedom of speech and creativity in a group face-to-face setup in the Japanese context.

4. CREATION OF TOOLS FOR ANONYMITY AND PLAYFULNESS

4.1. “Idea Train” tool for idea generation

A tool was designed where each participant has his/her own isolated space and a device sharing ideas anonymously so that participants are able to share their ideas but could not see the owner of those ideas. (cf. Figure 1) In an individual space, each participant is given sticky notes and pieces of thick papers for idea sharing. Participants write an idea on a sticky note, then hang an idea to the tool at the centre of the table. The ideas on sticky notes are moved and shared with the people around through the motion of toy-like train.

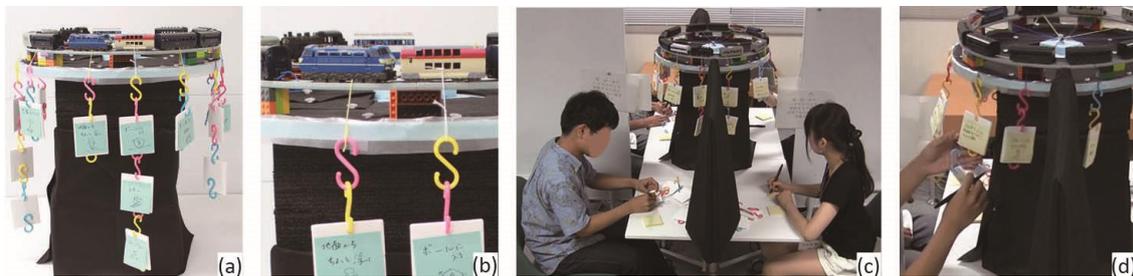


Figure 1: (a, b) tool overview (c) experiment setup (d) participant hooking idea

4.2. “Hidden Judge” tool for idea evaluation

A setup was developed where each idea has its own isolated workspace in which only one participant is allowed to enter to offer anonymity. (cf. Figure 2) Each participant is given a worksheet to indicate in which order they have to visit the four ideas' spaces. (cf. Figure 2.a right-up corner) The participants are asked to move around the spaces at the same time when facilitators ask them to do so. The worksheet and the facilitation allow participants to move around spaces individually and anonymously because the participants cannot know who is in which space. In each idea space, an idea and a grid categorising pros (advocate) and cons (opponent) are displayed on a large sheet of paper. The participants are asked to write as many pros/cons as possible on sticky notes then paste them on the sheet. The setting enables participants to write pros/cons anonymously, whereas they can take advantage of the group by seeing the ideas of other participants.



Figure 2: (a) worksheet (b) experiment setup (c) a shared pros/cons paper for each idea

5. EXPERIMENTAL ASSESSMENT OF THE TOOLS

In order to evaluate the impact of the tools on participation and creativity, sixteen university students are selected and divided into four groups of four and have participated in the experiment in two different conditions. The first session with tools and second session without tools (control condition). A group consists of two undergraduate students and two graduate students. This is done in order to introduce some perceived hierarchical differences between the participants.

5.1. Experimental Design

Two design topics were given in counter-balanced order to avoid order effect: Topic 1 “Imagine crazy solutions for thermal comfort during summer, in office, bedroom or outside” and Topic 2 “Imagine crazy solution for traveling on snow, sand or water”. All sessions were conducted in Japanese to avoid any misunderstanding. Consequently, questions and the design tasks reported in this paper were translated by the authors into English. The design session was designed to follow the second half of the Double Diamond Model (UK Design Council, 2005), where designers first diversify ideas then converge to one idea. The interactions among participants were partially restricted by only using a tool condition to offer anonymity whereas all kinds of interactions were allowed in the controlled condition. The detailed condition of each task is described in the following subsections.

5.2. Experimental Procedure (Design Session)

The first step of the session was idea generation where participants were asked to generate as many ideas as possible in 7 minutes. In the tool condition, a playful and anonymous environment was provided whereas in the controlled condition, the participants conducted the task as a group by following brainstorming rules (Osborn, 1957) in a face-to-face meeting setup. Following the idea generation, the participants evaluated and ranked four best ideas among the idea which the participants generated at a previous step, based on the originality of each idea. First, the participants were given two minutes to eliminate the same idea to avoid splitting votes into the same concept. Then, the participants had five minutes to rank the idea. Four ideas were selected by calculating the sum of ranks of the participants at the session. Four points were given to the first rank idea and one point was given to fourth rank idea. The impacts of anonymity were assessed by contrasting both the tool condition with the controlled condition where participants paste stickers of ideas in front of others. The third step is the pros or cons phase, whose objective

is to write down the pro (advocate) and the contra (opponent) of the idea. The participants had two minutes to think and write both pros and cons of each idea on sticky notes. Consequently, this step took eight minutes in total. The sticky notes are shared on a large piece of paper so that they can take advantage of group work. This is expected to increase anonymity in comparison with control condition where each participant talk face-to-face in front of a board with other participants. The following three steps which are discussion, sketch and presentation were conducted in the same way at both conditions. In the discussion step, participants discussed to select the best idea among the four ideas in five minutes. Then the participants sketched their concept in 1 minute on an A3 paper as a group. Then, in following the presentation step, participants are required to present in 1 minute as a group.

5.3. Data Collection

The questionnaires were completed by the participants. The level of anonymity and playfulness offered by the tools were evaluated by participants. Level of perceived anonymity was evaluated by two questions of seven points Likert scale question, where 1: strongly disagree to 7: strongly agree. They are based on a scale developed mainly for measuring anonymity in online environment. (Hite, Voelker, & Robertson, 2014) The level of playfulness was evaluated at after the ideation and after pro/cons by a question asking “How did you feel when conducting the task”, with seven points Likert scale questions where 1: boring to 7: fun. The experiment was evaluated by two measures; participants’ outcome created during the sessions and questionnaire evaluating participants’ perception of their performance. As a preliminary analysis, the session outcome, the number of sticky notes the participants wrote in each step, were analysed. Participants’ perceptions were evaluated by task specific questions after each activity. In the questions, the participants were asked to choose in seven points Likert scale question, where 1: strongly disagree to 7: strongly agree.

6. RESULTS

The following data was analysed: perceived anonymity of the tool, perceived playfulness of the tool, creativity (individual fluency, group fluency), perceived freedom of expression, perceived individual creativity, perceived group creativity.

6.1. Evaluation of perceived anonymity and playfulness in all sessions

The analysis shows that significant differences on the questions about anonymity in all phases Table 1 ($p < .05$). The result implies that the participants felt significantly more anonymity in the tasks with the tools. In the table Q1 represents “I am confident that others do not know which ideas I generated” and Q2 is “I could identify owner of each idea”. The questions were slightly modified to fit into the context of the task. For instance, “I could identify the owner of each comment” were asked after pros/cons session. The average score of Q1, in control condition is 3.50 whereas the score in tool condition is 4.81. It means that the participants were more strongly confident with the fact that the others could not trace the owner of the idea. As the nature of the

Japanese language, it is slightly tricky to be understood in English. Both of the result concluded that the participants felt more anonymity in the tool condition. The analysis regarding playfulness questionnaire shows that significant differences at all phases as

Table 2($p < .05$). The result implies that the participants felt significantly more fun in the ideation step, whereas they felt bored in the pro or cons step.

Table 1: Average and Standard deviation of questionnaire regarding perceived anonymity

	Q1: Certainty of not being identified			Q2: Inability of identifying others opinion		
	Control Average (SD)	Tool Average (SD)	Sig. (2-tailed)	Control Average (SD)	Tool Average (SD)	Sig. (2-tailed)
Ideation	3.50 (1.00)	4.81 (1.51)	$p=.009^*$	4.56 (1.46)	2.63 (1.49)	$p=.003^*$
Ranking	2.13 (1.17)	5.63 (1.47)	$p=.001^*$	5.19 (1.47)	2.19 (1.55)	$p=.001^*$
Pros/Cons	2.60 (1.36)	4.38 (1.17)	$p=.004^*$	5.13 (1.26)	3.56 (1.58)	$p=.027^*$

Table 2: Average and Standard deviation of questionnaire regarding perceived playfulness

	Control Average (SD)	Tool Average (SD)	Sig. (2-tailed)
Ideation	4.25 (1.61)	5.38 (1.15)	$p=.039^*$
Pros/Cons	4.81 (1.60)	4.06 (1.06)	$p=.002^*$

6.2. Assessment of the tool for idea generation

The number of ideas generated in the ideation session were measured by counting the number of sticky notes which each participant wrote. Both individual and group fluency were statistically analysed (cf.

Table 3). The individual fluency was significantly increased, but not the group fluency. The task specific questionnaires showing significantly different score ($p < .05$) were accumulated in the

Table 4. In the table, Q1 is "To what extend did you feel the freedom of expressing your thought?", Q2 is "How creative do you think you were during the task?" and Q3 is "I am satisfied with the amount of idea our group made in this task."

Table 3: individual and group fluency

	No tool Average (SD)	"Idea Train" Average (SD)	Sig. (2-tailed)
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Individual fluency	4.25 (2.86)	6.27 (2.41)	p=.010*
Group fluency	20.67 (7.51)	26.00 (2.00)	p=.109

Table 4: Average and Standard deviation of task specific questionnaire

	No tool Average (SD)	"Hidden Judge" Average (SD)	Sig. (2-tailed)
Q1- Perceived freedom of speech	3.75 (1.44)	5.00 (1.58)	p=.046*
Q2- Perceived individual creativity	2.88 (1.45)	4.19 (1.42)	p=.013*
Q3- Perceived group creativity	3.38 (1.22)	5.13 (0.86)	p=.002*

6.3. Assessment of the tool for idea evaluation

The number of critics generated in the pros/cons session were measured by counting the number of sticky notes. The number of ideas generated by an individual were statistically analysed in Table 5. It shows that the participants have written significantly more number of pros, cons and both of them ($p < .05$). There were no significant differences in group level. However, the questionnaire asking their perceived own criticality did not show significant differences. ($p > .05$) The increase in the number may not be significant enough to increase the participants' perception as the increase is less than one. It means the number of comments generated in an idea were the same in some ideas.

Table 5: Average and Standard deviation of the number of criticism

	No tool Average (SD)	"Hidden Judge" Average (SD)	Sig. (2-tailed)
Pros	1.14 (0.52)	1.47 (0.67)	p=.041*
Cons	1.28 (0.60)	1.69 (0.73)	p=.043*
Pros/Cons	2.42 (0.96)	3.16 (1.30)	p=.023*

6.4. Discussion session

There are statistically significant differences ($p < .05$) on the following questions; Q1 is "How critical* were you in the task? * criticize: To express your disapproval of someone or something or talks about their faults" and Q2 is "Anonymity matters when I share my thought with others." although the discussion task itself is the same in both conditions as in Table 6.

Table 6: Average and Standard deviation of task specific questionnaire

	No tool Average (SD)	"Hidden Judge" Average (SD)	Sig. (2-tailed)
Q1- Perceived criticality	3.00 (1.27)	3.81 (1.33)	p=.032*
Q2- Perceived importance of anonymity	3.56 (1.69)	4.44 (1.54)	p=.027*

The result of Q1 shows that they perceived themselves more critical during discussion in tool conditions. Q2 results shows that the participants consider anonymity significantly more important after the session in tool condition.

7. DISCUSSION

7.1. Anonymity increasing freedom of speech and efficiency during the task

The significant differences on perceived anonymity results in the significant perceived freedom of speech (No tool: 3.75 (1.44) vs "Idea Train": 5.00 (1.58), $p=.046$) at idea generation step. The ideation tools successfully increase perceived individual creativity (No tool: 2.88 (1.45) vs "Idea Train": 4.19 (1.42), $p<.013$) and group creativity (No tool: 3.38 (1.22) vs "Idea Train": 5.13 (0.86), $p=.002$). The consistent result was observed in individual fluency of the design outcome (No tool: 4.25 (2.86) vs "Idea Train": 6.27 (2.41), $p=.010$). The selection tool significantly increased objective outcomes of the task. (No tool: Pros/Cons 2.42 (0.96) vs "Hidden Judge": 3.16 (1.30), $p=.023$). The results supported hypothesis 1 and hypothesis 2 partially. The introduction of anonymity created more perceived freedom of speech. It resulted in a more creative discussion in terms of fluency and a more critical discussion in idea selection. The differences might influence on perceived importance of anonymity. These results are consistent with Tanis' work in computer mediated interaction. (Tanis & Postmes, 2008). Further analysis on originality of generated ideas and quality of criticism is needed to implement anonymity in a practical context.

7.2. Securing anonymity in part of the design process impact following phases

Statistically significant differences of perceived anonymity at the pro or cons phases seem to lead the significantly higher perceived critical discussion at the discussion step (No tool: 3.00 (1.27) vs tool: 3.81 (1.33), $p=.032$). It seems that the securing anonymity is a part of the converging phase, could improve productivity of the overall converging phases. The differences can be justified by the fact that the participants have generated a larger number of pros and cons in previous tasks.

7.3. Anonymity may decrease playfulness of design activities

During the pro or cons step of design activities, the perceived playfulness in an anonymous (No tool: 4.81 (1.60) vs "Idea Train": 4.06 (1.06), $p=.002$) setting was significantly lower than in a non-anonymous setting. It could lead to the perception that participants think of themselves being

more critical. It can be said that the introduction of anonymity leads to lower playfulness of the task.

8. CONCLUSION

In this paper, it is reported that the development of two design tools, “Idea Train” and “Hidden Judge”, that aim at incorporating anonymity during the generation and the evaluation of design ideas in a Japanese context. The impact of these tools on creativity and participation was assessed through an experimental evaluation. The results show that introduction of anonymity increases perceived freedom of speech in the idea generation phase and significantly higher perceived creativity of the task. The higher perceived creativity is supported by a significantly higher fluency of the design outcome. The results in the idea selection show that anonymity increases the number of judgments in idea evaluation. Overall, anonymity helps the participants to express their own opinion with group members. However, anonymity compromises perceived playfulness in design tasks. The withdraw of anonymity could be mitigated by the introduction of playfulness factor in the design tool. Further research with participants from different culture is recommended to map the result into different cultural contexts.

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