Design of user manual for elderly people focusing font types

Experiment to reduce the number of candidates

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Abstract: As Japanese society continues to rapidly age, we must not only improve the design of industrial products but also support the elderly. Since few studies have focused on the design of user manuals for senior citizens, we focused on their design to improve the usability of IT devices for elderly people. In a previous experiment, we concluded that emphasizing target actions is one effective design element to help the elderly understand user manuals. In this paper, we focused on four fonts and performed a experiment to reduce the combination candidates.

Key words: Elderly people, User manual, Usability, Universal design

1. Introduction

According to the National Institute of Population and Social Security Research, in Japan by 2050 one person in three is expected to be 65 years old or over. In such an aging society, the design of products, services, and environments for the elderly and the handicapped must reflect such concepts as universal design, accessible design, inclusive designs, design for all, and barrier free. Japanese society must consider support methods for elderly people. We must not only improve the design of such industrial products as IT devices but also support the elderly so they can enjoy safe, peaceful, and comfortable lives. As one example of support concerning the usability of IT devices, we focused on the design of paper-based user manuals for IT devices because few research has addressed them for elderly people.

In a previously experiment, we concluded that the design attributes of user manuals affect user understanding [1]. Our previous result shows that emphasizing target actions is one effective design element that helps the elderly understand user manuals [1].

In this paper, we focused on the design of Japanese font types to propose better user manual designs for the elderly. We used four different types of Japanese fonts provided by Morisawa: three universal design fonts and one Japanese font based on "Kawaii". For our experiment, we defined three design elements: step titles, target procedures, and operation details. We created 64 combinations of user manuals that contain combinations of four Japanese fonts with three design elements. We performed this experiment to reduce the number of candidates.

2. Font type candidates

In this study, we focused on Japanese font types for user manuals and investigated which ones affect the understanding of elderly people. We used a printer as a target device and the same user manual as in our previous study. We selected Morisawa as a font vendor since its user manual employs fonts provided by Morisawa. Since we focused on universal design, we selected UD Ryumin, UD Shin Go, and UD Shin Maru Go, which were recommended by Media Universal Design [2]as candidates for our experiment. Since this study was also focusing

on the "Kawaii" feeling, we selected Kamoraimu, which was developed by Morisawa to represent "Kawaii". Fig. 1 shows the four font type candidates.

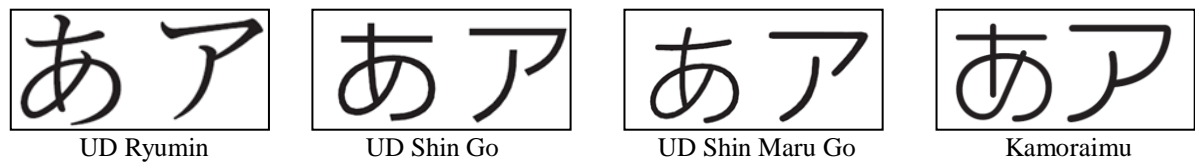| UD Ryumin | UD Shin Go | UD Shin Maru Go | Kamoraimu |

Fig. 1 Font type candidates

3. Experiment

3.1 Method

The purpose of the experiment was to reduce the number of combination candidates for the four font types described above.
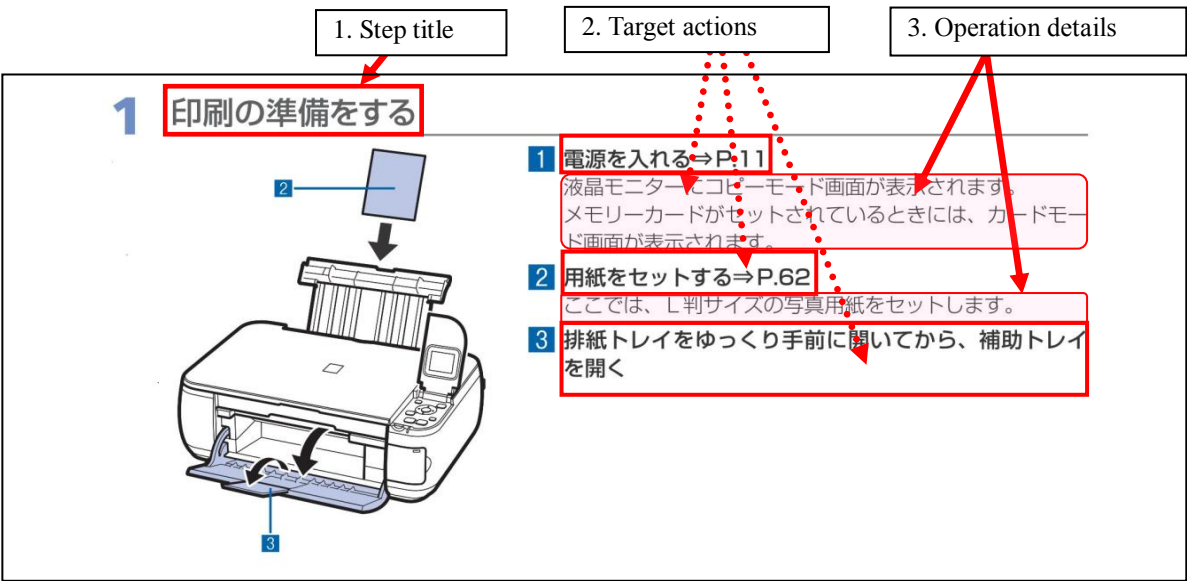

Fig. 2 Sample of user manual

We defined the following three design elements of user manuals to use the four font types, and Fig. 2 shows examples of each design element. The following are their definitions:

1. Step title: name of each procedure
2. Target action: indicates what user needs to do on printer
3. Detail operations: provides details for operating printer

Fig. 2 also shows part of an original user manual, in which the font types of each design element have the same font type. There are 64 combinations of three design elements for the four font types. We experimentally reduced the candidates of these combinations. Table 1 shows examples of the combinations of this user manual.

Table 1 Samples of font type combinations

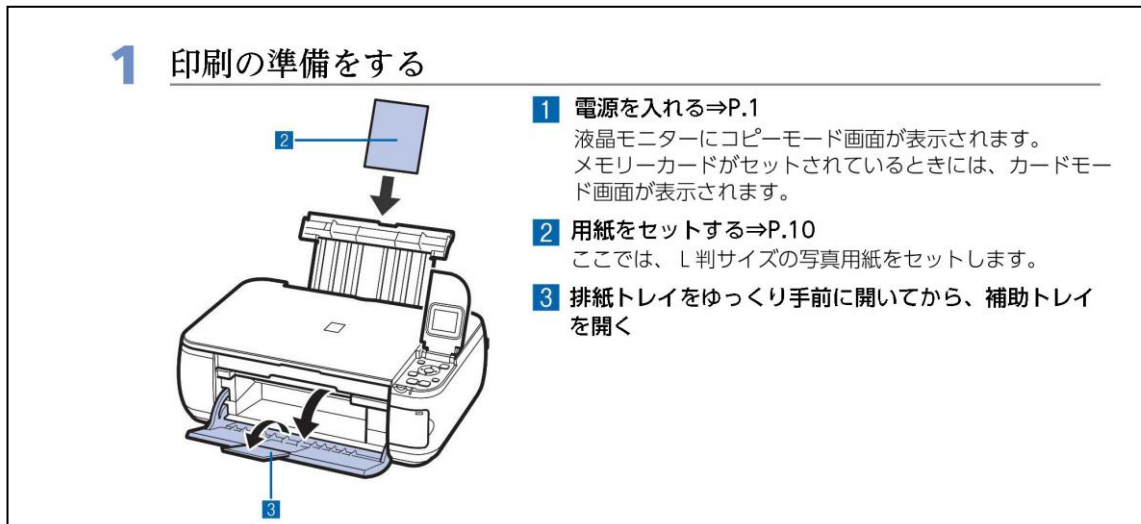| #	Design elements		
	Step titles	Target actions	Detail operations
1	UD Ryumin	UD Ryumin	UD Ryumin
2			UD Shin Go
3			UD Shin Maru Go
4			Kamoraimu
5		UD Shin Go	UD Ryumin
6			UD Shin Go
7			UD Shin Maru Go
8			Kamoraimu
.		.	.
.		.	.
61	Kamoraimu	Kamoraimu	UD Ryumin
62			UD Shin Go
63			UD Shin Maru Go
64			Kamoraimu

Fig. 3 Example of user manual (#8 in Table 1)

Our subjects read and evaluated 16 parts of a user manual that contained identical font types for step titles and 16 combinations for target actions and then answered questionnaires. Fig. 3 shows an example of a user manual with UD Ryumin for the step titles, UD Shin Go for the target actions, and Kamoraimu for the operation details. Table 2 shows 16 combinations of fonts for the target actions and operation details.

In the questionnaires, we used a three-point Likert scale to evaluate the combinations of font types: 1) easy to read and see, 2) neither, and 3) difficult to read and see. In addition, subjects answered the following questions.

　1. Why do you feel the manuals are easy to read or easy to see?

　2. Why do you feel the manuals are difficult to read or difficult to see?

Table 2 Samples of font type combinations

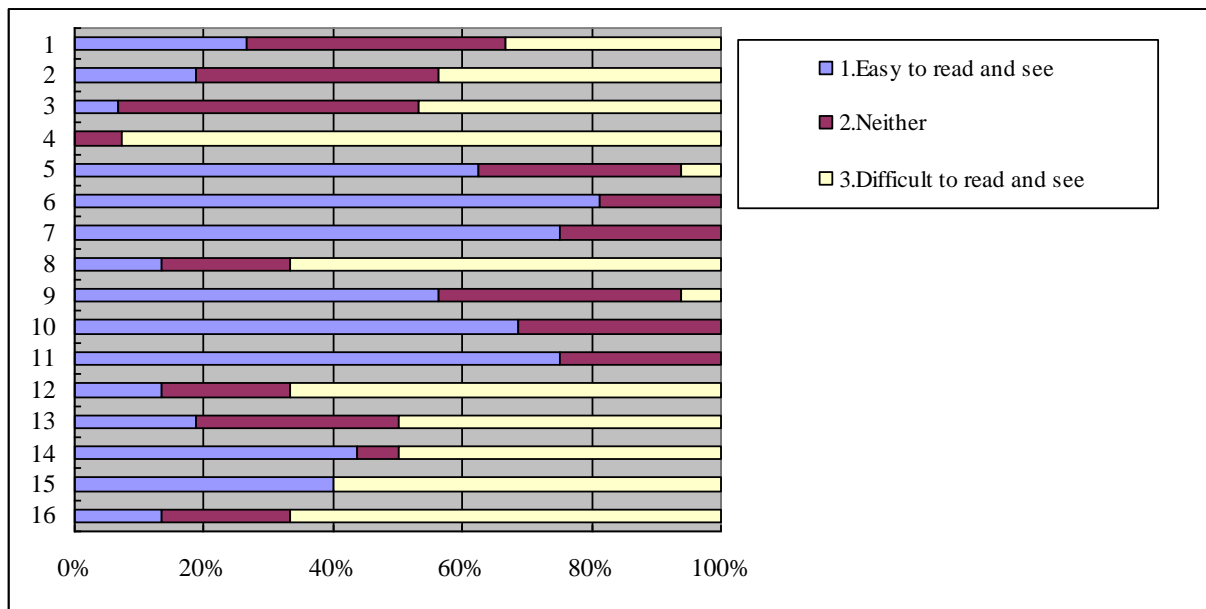| #	Design elements	
	Target actions	Operation details
1	UD Ryumin	UD Ryumin
2		UD Sin Go
3		UD Shin Maru Go
4		Kamoraimu
5	UD Sin Go	UD Ryumin
6		UD Shin Go
7		UD Sin Maru Go
8		Kamoraimu
9	UD Sin Maru Go	UD Ryumin
10		UD Shin Go
11		UD Sin Maru Go
12		Kamoraimu
13	Kamoraimu	UD Ryumin
14		UD Shin Go
15		UD Shin Maru Go
16		Kamoraimu

Fig. 4 Questionnaire results

Table 3 One-factor ANOVA results

Factors	Sum of squared deviation	Degrees of freedom	Mean square	F-Value	P-Value
Combinations	76.83984	15	5.122656	10.971	0.0000**
Error	112.0625	240	0.466927		
Total	188.9023	255			

3.2 Result

We conducted our experiments with 16 male students and university staff in their twenties and thirties. Fig. 4 shows the questionnaire results, where the horizontal axis shows the ratio of the number of answers and the vertical axis shows the combinations of the font types shown in Table 2. Table 3 shows the result of a one-factor analysis of variance. The main effect of the combinations of the font types was significant at a 1% level.

Most subjects felt that it was easy to read and easy to see the combinations of UD Sin Go and UD Shin Maru Go for the target actions and the operation details. They felt it was easy to read and easy to see the combination of UD Sin Go and UD Shin Maru Go for the target actions and UD Ryumin for the operation details.On the other hand, most subjects felt that it was difficult to read and difficult to see Kamoraimu for the operation details.

4. Discussion

Kamoraimu was difficult to read and had low visibility for target actions and operation details. On the other hand, UD Shin Go and UD Shin Maru Go were easy to read and easy to see for target actions and operation details. These results suggest that different font types affect readability and visibility depending on the combinations of font types for each design element.

Although a combination of UD Ryumin for target action and operation details is difficult to read and see, a combination of UD Shin Go or UD Shin Maru Go for target actions and UD Ryumin for operation details got higher scores than that combination. These results also imply that different combinations of font types affect readability and visibility.

From the questionnaire results, we selected three combinations of font candidates for the target action and operation details shown in Table 4 based on the top two scores and the bottom one core. From the experimental results for the combinations, UD Shin Go and UD Shin Maru Go have almost the same score, suggesting that they have no differences. Therefore, we employed one of these as a candidate font.

Table 4 Candidates for target action and operation details

#	Target action	Operation details
1	UD Ryumin	Kamoraimu
2	UD Shin Go (UD Shin Maru Go)	UD Ryumin
3	UD Shin Go (UD Shin Maru Go)	UD Sin Go (UD Shin Maru Go)

5. Conclusion

In this paper, we focused on four different font types to design better user manuals for elderly people. We experimentally reduced the combination candidates of font types and obtained a combination of font types for target action and operation details. We performed a further experiment to determine the combinations of font types for three design elements including step titles. Based on the results described in this paper and our further experiment, we performed a usability experiment that focused on different font types for elderly people to design a better user manual for them.

6. References

[1] Shimada, T. Ikeda, S. and Ohkura, M. (2012) *Design of user manuals for elderly people*, In Proceedings of the 10th Asia Pacific Conference on Computer Human Interaction.

[2] Media Universal Design, http://www.media-ud.org/