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PACKAGING DESIGN TOOL: THE EFFECTIVENESS OF OPENING INDICATIONS FOR OLDER PEOPLE

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ABSTRACT

Packaging with a novel appearance and opening method is a powerful marketing strategy. However, accessibility to products can be limited for older consumers due to unfamiliarity with how to open the packaging. This research evaluated the outcomes of a previous study regarding design tools that determined the ease of instructions explaining opening methods of novel packaging for older people. This manuscript is structured into two phases. Phase one evaluates a diagram identifying the effectiveness of opening directions. A triangulation investigation was conducted to compare the evaluations from a researcher, designers, and 36 older participants. The researcher and designers used the diagram to examine the opening instructions of five packages, while older participants opened the packages to help investigate the clarity of the given directions. The results were inconsistent; therefore, the diagram to identify the effectiveness was unreliable. Accordingly, the researcher revised the diagram and combined it with the packaging design tool, utilizing the data from three designer focus groups and older participants' in-depth interviews. The final design tool was a step-by-step checklist guiding designers to analyze opening indications, then identify design problems. Phase two centered on examining two aims: to assess the revised design tool used for creating effective opening directions for older people and to formulate considerations for developing the design tool. Twelve designers applied the design tool to redesign the misleading directions of two packages. It was found that of the two directions for opening the redesigned packages, one was easier to understand for the older participants than the other. The design tool was efficient when the package adopted simple directions. The design tool improvement considered its contents—balancing between thorough checklists and overloading contents; its method—recognizing the difference between older people's and designers' cognition regarding opening indications; and its form—applying graphic-oriented design.

Keywords: Packaging design tool; tool evaluation; understanding opening methods; older people

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1. INTRODUCTION

Since the end of the 20th century, the world's older population has increased continuously (United Nations, 2020). Aging-related physical decline limits their daily activities, like the ability to open packaging; consequently, accessing the contents can be difficult. Blakey et al. (2009), Lewis et al. (2007), Yoxall et al. (2006), and Yoxall et al. (2010) researched opening difficulties due to reduced hand strength. However, limited research has focused on improving older people's understanding of opening methods (de La Fuente & Bix, 2010).

The packages found in the relevant research had similar appearances and opening methods, with novel packages replacing more traditional ones to stimulate sales (Winder, 2006). However, unfamiliar appearances and opening methods demand additional time to understand how to open them. Repeated trial and error bring about frustration and an increased risk of accidents (Winder et al., 2002).

'Opening' in this paper refers to an action that brings out the content inside packaging and then closes it. 'Indication' includes 1) 2D elements—texts and signs, 2) 3D elements—shapes and textures, and 3) other details such as a lid-opened click sound and packaging materials.

Guidelines for standards developers to address the needs of older persons and persons with disabilities (CEN/CENELEC Guide 6), presented by European committees, also recommended characteristics of opening indications on packages to compensate for aging-related sensory, hand, and cognitive impairments. The guidelines aimed to assist developers in writing specific standards for different design fields and contexts (CEN/CENELEC, 2002). However, the guidelines did not specifically suggest characteristics of opening indications for effectively understanding how to open packages. Accordingly, Chavalkul et al. (2011) conducted inductive research and created a diagram and a packaging design tool. To differentiate them from the later versions developed in the current research, they are named 'original diagram' and 'original packaging design tool', whereas their revisions are referred to 'revised diagram' and 'revised packaging design tool', respectively.

Some packaging design tools have aimed to reduce the environmental impact, and have been made available for designers. However, packaging waste in the environment still raises the question of whether there are obstacles to implementing the tools in the design process. It was found that most packaging tools focused on problems rather than solutions. In addition, designers were required to evaluate the usability of these tools to improve implementation (Ma & Moultrie, 2017).

Due to the importance of evaluating design tools, the present research applied a deductive process to assess the packaging design tools from the previous study (Chavalkul et al., 2011). The first objective aimed to evaluate the revised diagram, used to identify the effectiveness of opening indications on packages used by older people. The second objective aimed to assess the revised packaging design tool, guiding how to create effective opening indications for older people. The third objective aimed to formulate considerations to develop the revised packaging design tool. Phase 1 in this article explains the methodology and results according to the first aim, and Phase 2 describes the methodology and results of the second aim, as well as the outcome of the third aim.

2. REVIEW OF LITERATURE

2.1 Design tool

'Tool' is a device used for the convenience of work. The device hereby refers to objects built-up or modified for some specific uses (Hornby, 1995). Design tools extract complex thinking from the designers and transform it into strategic, visual, and tangible mediums so that the ideas are easily understood by design teams (Cross, 2000) and stakeholders. The tools enable designers to increase the effectiveness of their works (Lindahl, 2005), covering all elements and significant considerations in product development.

A variety of design tools have been created to serve different purposes in each process and method. Weytjens et al. (2009) classified architectural design tools and highlighted that evaluation and analysis tools were the most crucial tool in the design process, followed by knowledge-based tools. For the outcomes of the previous study (Chavalkul et al., 2011), the diagram was defined as an evaluation and analysis tool, whereas the packaging design tool functioned as a knowledge-based tool.

As an evaluation and analysis tool, the diagram assisted designers in finding out whether indications on a package were sufficient for older people to understand the opening methods. The packaging design tool aimed to present problems and solutions, a knowledge-based tool, that promoted the understanding of how to open novel packages.

Cross (2000) reviewed several design processes varied by their complexity. However, these design processes shared similar fundamental stages: analysis, synthesis, and evaluation. The design tools in the present research were used in the analysis stage. Therefore, related tools in this stage are examined in the next section.

2.2 Content, method, and form of design tool

The relevant tools to analyze user needs include 1) Value Proposition Design (Osterwalder et al., 2014), 2) House of Quality (Belhe & Kusiak, 1996; Madu, 2006), and 3) Scenario Description Swimlanes (Martin & Hanington, 2012). These tools were analyzed and compared with the conclusion as follows.

Content: These three tools had similar content for serving user needs, but in different contexts. The Value Proposition Design formulated business models comprising data for business value to serve customer demands; the House of Quality focused on product development comprising technical data, a relation of elements, and strategic planning for product development; and the Scenario Description Swimlanes specified more details of a scenario for system developments comprising the business process, tools, and supporting systems.

Method: These three tools had the same consistent methods indicating texts and pictures in each specified item. The display of all different data aspects purposed for data comparison, analysis, and conclusions.

Form: The Value of Proposition Design presented user data in circle and square charts. Each included part divisions for filling out information and symbols. The House of Quality and the Scenario Description Swimlanes applied a table format. The former used numeric data, letters, and symbols, while the latter applied illustrative data, text boxes, and signs.

The conclusion of the design tool components, modified as a guideline for the revision of the diagram and the packaging design tool, in this research, was as follows:

Content: Types of indications and information explaining opening methods, design problems, and design solutions.

Method: The way to clarify the design needs: 1) to identify the difficulty or ease in understanding how to open a package from quantity and types of indications and 2) to analyze design problems and solutions.

Form: The tool's appearance, for example, a table or a datasheet.

3. PHASE I: DIAGRAM EVALUATION

3.1 Methodology

The present research aimed to examine the outcomes of the previous study. Therefore, it was helpful to visualize the connection between the former and current research as shown in Figure 1. An inductive approach was employed in the previous study (Chavalkul et al., 2011) by collecting and analyzing data from the older participants and the related documents. The results brought to the conclusion of the original diagram and the original packaging design tool.

This research adopted a deductive approach (Figure 1) by collecting data from designers using the revised diagram and the revised packaging design tool. Then, the data analysis resulted in the design requirement in the design process, including sketch design, model study, design evaluation, data analysis, and conclusion for the development of the revised packaging design tool. Phase one concentrated on evaluating the diagram. Phase two centered on assessing the revised packaging design tool and outlining considerations for improvement.

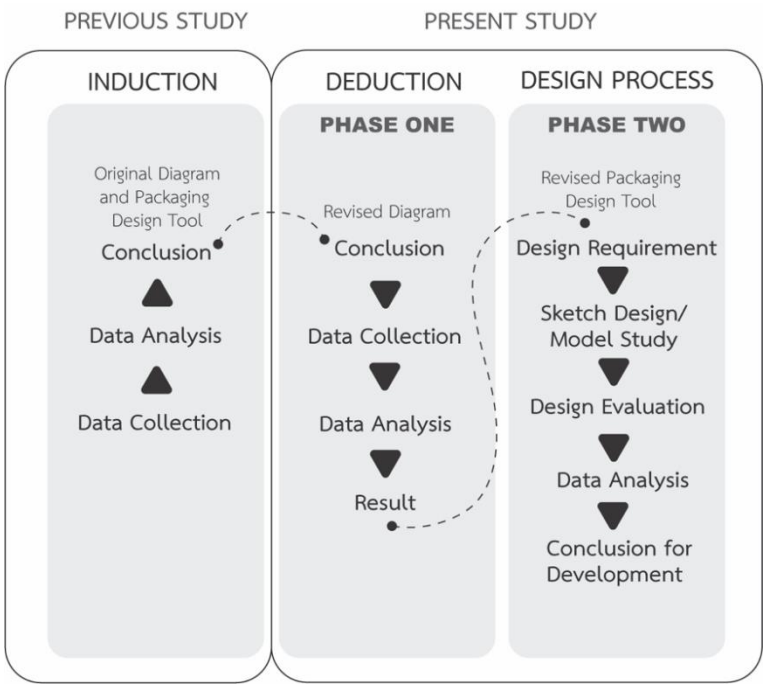


Figure 1: The Deduction and Design Process in the Present Research

3.1.2 Data triangulation

Carter et al. (2014) explained that triangulation is a strategic approach in qualitative research to consolidate research validity. The data source triangulation (Denzin, 1978) was applied by collecting data from 3 participant groups to evaluate the diagram, as displayed in Figure 2.

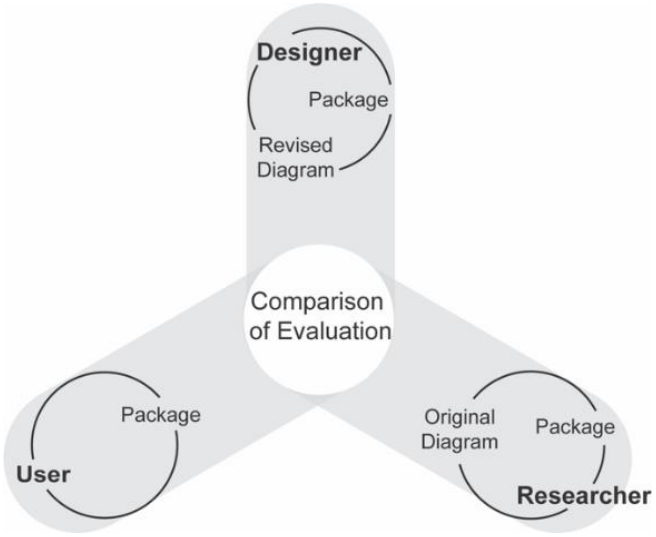


Figure 2: The Diagram Evaluation from the Researcher, Designers, and Older Participants

3.1.3 Participation

There were twelve designers, both male and female, who graduated with bachelor's degrees in package design. Their academic disciplines ensured related fundamental knowledge. A design tool is useful for novices; thus, each designer had less than five years of work experience.

The older participant group included thirty-six people, 21 females and 15 males, at 60–84 years of age. The participants had experienced the following age-related declines but were not severely incapacitated: 1) sight ranges including longsightedness, astigmatism, cataracts, and glaucoma, 2) short-term and long-term

memory, and 3) arthritis. All participants carried out daily activities on their own including opening packages. Their various professions, either at present, before, or after retirement, utilized 1) hand tools, e.g., farmers, construction workers, artisans, and daily employees, and 2) office equipment, e.g., office workers and business owners.

3.1.4 Data collection

Researcher session: The researcher used the original diagram to indicate the difficulty or ease of the older participants in understanding the opening methods of sample packages (Figure 3).

Designer session: The researcher informed the designers of the research purpose and the data were used restrictively for this research, without revealing their identities. The designers wore eyeglasses simulating the older people's eyesight while opening packages. These included 1) narrow field of vision, 2) unclear vision, and 3) yellow vision caused by presbyopia (Goldstein, 1980; Pirkl, 1994), cataracts (Goldstein, 1980; Watkinson, 2005), and glaucoma (Watkinson, 2005). The designers then used the revised diagram to identify the difficulty or ease of various opening indications provided on the sample packages (Figure 3). Scores were also given for evaluating diagram usability. The researcher conducted three focus groups, four people in each group, to ascertain the reasons behind the scores and to analyze the data.

Older participant session: The researcher informed the participants of the research purpose and limitations of using data for this research. Participants were told that their identities would not be revealed. The participants evaluated the package samples by ease of understanding the opening directions (Figure 3). The researcher observed the participants while they were opening the packages to verify the evaluation scores, and interviewed them concerning the reasons behind the scores. The gathered data were then analyzed.

3.1.5 Package samples

The package samples were novel packages whose appearances or opening methods were different from those commonly found in supermarkets. This was based on the selection criteria from the previous study (Chavalkul et al., 2011), which were verified by examining the packages found in the following supermarkets in Thailand: Tops, Big C, Tesco Lotus, Villa Markets, and Gourmet Market (Figure 3). The selected five packages were (1) a detergent bottle, (2) a dishwashing liquid bottle, (3 & 4) two deodorant spray cans (different appearances and opening methods), and (5) a liquid glue bottle.

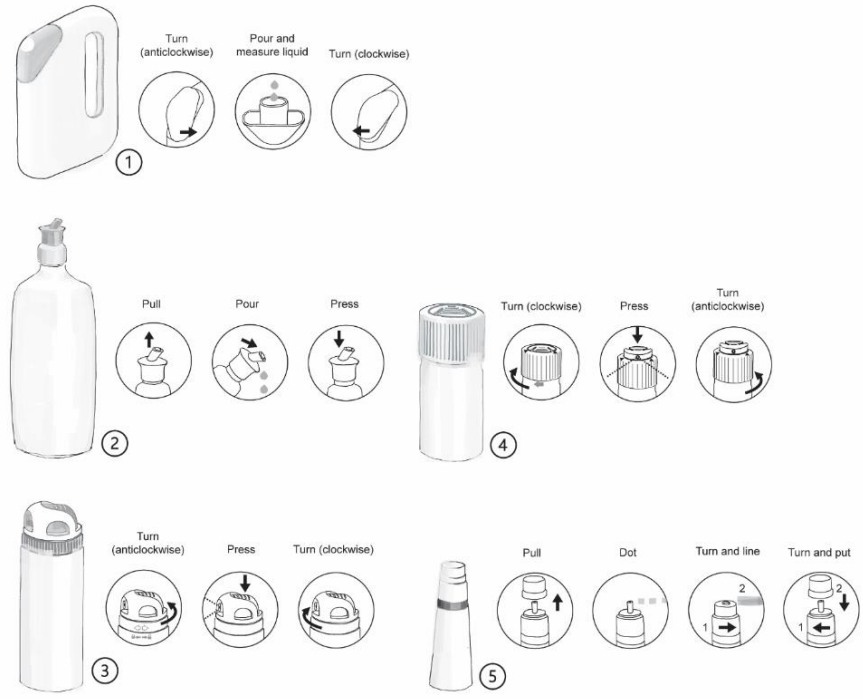
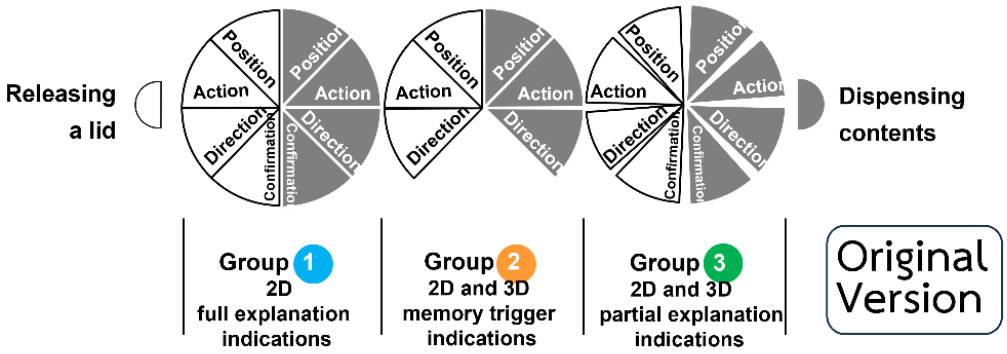


Figure 3: The Sample Packages for Evaluating the Diagram

3.1.6 Diagram

The purposes of the diagram were to 1) inspect the opening indications on packages and 2) identify whether the packages were easy for older people to understand the opening methods. The researcher also revised the original diagram (Figure 4) as shown in Figures 5-6, considering usability for designers as the intended users. Table 1 compares the original and the revised diagrams' contents, methods, and forms.



Note: ● ● ● = Three types of indications in the original diagram

Figure 4: The Original Diagram

Table 1: Comparison of the Original and the Revised Diagrams

	Original diagram	Revised diagram
Content	Two stages of opening a package were (a) releasing a lid and (b) dispensing contents. Each stage comprised 1.1 2D Full Explanation Indications, 1.2 2D and 3D Memory Trigger Indications, and 1.3 2D and 3D Partial Explanation Indications. Opening information included 2.1 positions, 2.2 actions, 2.3 directions, and 2.4 confirmations.	Part 1: The three indication types (1.1, 1.2, and 1.3) were presented in the upper, middle, and lower rows. Each indication type comprised opening information types (2.1-2.4), as shown in the original diagram. The left column showed the stage of releasing a lid and the right column displayed the stage of dispensing contents. Part 2: The upper frame captured the conclusion of indication classifications. The lower part presented the criteria for defining a package that was difficult or easy to understand how to open.
Method	Classify noticeable indications for older people. Define that it was easy to understand for older people when a package consists of 2.1) indications in both the stages of lid release and content dispense, 2.2) 2 out of 3 indication types (1.1, 1.2, and 1.3) available for each opening stage, and 2.3) each indication type showing 2 out of 3 opening information types as well as confirmation.	Part 1: Check '✓' on indication types perceivable for older people, take notes, and illustrate them. Part 2: Summarize the types and quantity of indications from Part 1. Opening indications on a package are unclear for older people when they do not meet the criteria.
Form	The partial circle diagram displayed the opening stages, indication types, and opening information.	The inspecting checklist included Part 1: Codes, illustrations, and explanations of indication types and Part 2: Checkboxes of indication types and quantity.

3.2 Result

3.2.1 Diagram evaluation

Table 2 presents the packages with opening indications identified as difficult or easy to understand for older people. Unanimously, the researcher, the designers, and older participants defined packages 1 and 2 as 'difficult'. While the researcher and the designers found package 3 to be 'difficult', the older participants classified it as 'easy'. The designers examined that packages 4 and 5 were 'difficult', but both the researcher and the older participants found them 'easy'. The different results provided by the diagram implied its unreliability.

Table 2: The Comparison of the Result of Identifying Difficult or Easy Understanding of How to Open the Packages

Data sources	Understanding of opening methods	
	Difficult	Easy
Researcher	1, 2, 3	4 and 5
Designers*	1, 2, 3, 4, and 5	-
Older participants**	1 and 2	3, 4, and 5***

Note: * The conclusion from the 58–100 percent of designers' outcomes using the revised diagram.

** The conclusion from the older participants' average scores (scores 1–6, 1 = very difficult, 2 = difficult, 3 = rather difficult, 4 = rather easy, 5 = easy, and 6 = very easy). The quantitative data of the rating scales were also verified by the qualitative data of observing the older participants opening the packaging samples.

*** The researcher also selected package 5 for a redesign because the observations showed that 16.67 % of the older participants did not successfully adjust the glue dispenser heads or close the lid.

3.2.2 Considerations of diagram development

The designers' average scores on the rating scale of 1–6 for ease of using the revised diagram are in Table 3.

Table 3: The Revised Diagram Usability Scores of the Designers

Topics	Average scores
Part 1: Release a lid and dispense the contents	3.58
Part 2: The results conclusion	3.75
Part 3: The overall diagram	
The content structures	3.75
The content sequence	4.25
Text explanation	3.58
Illustrations	5.17
Total average score	4.01

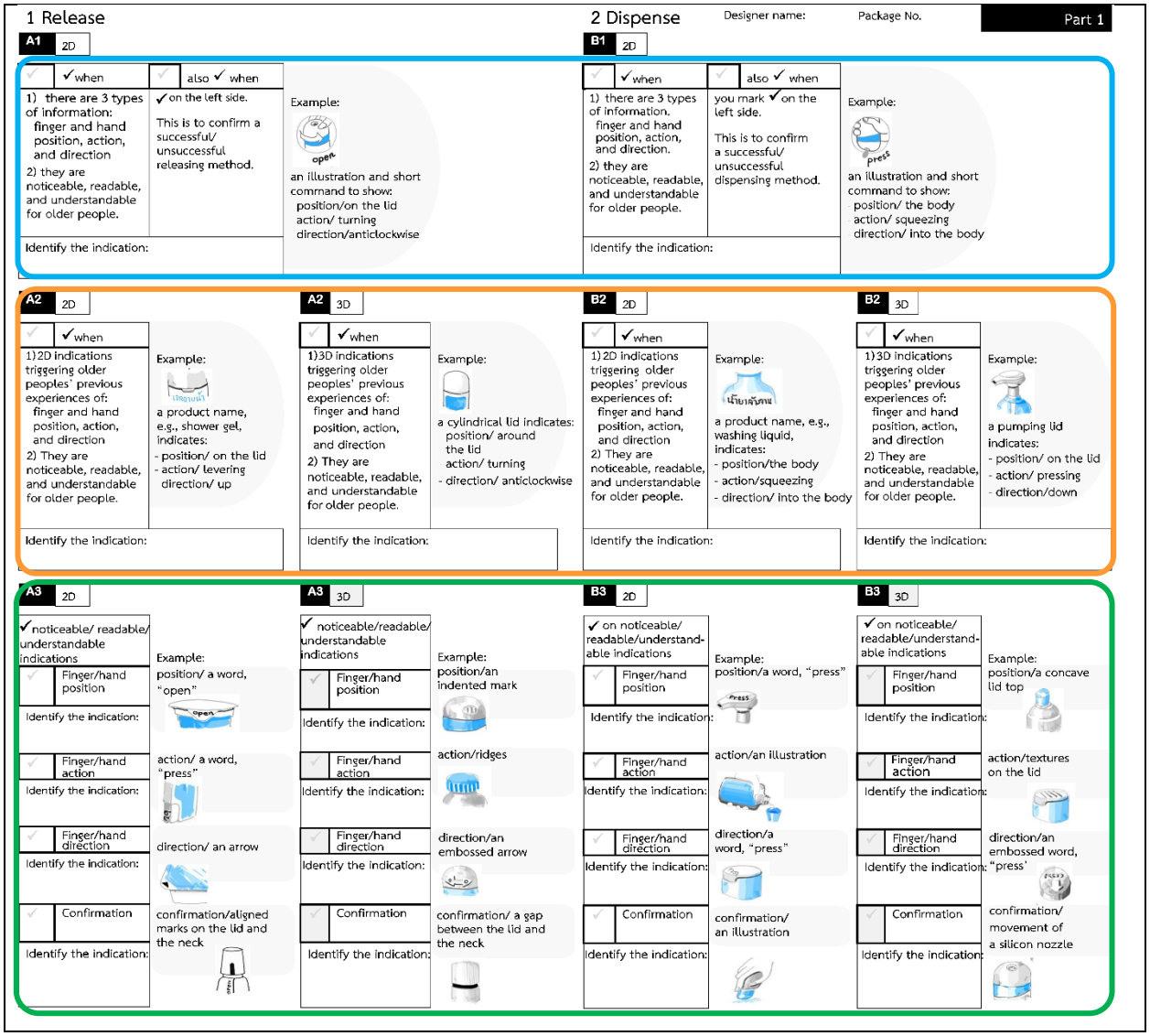
Note: Scores 1–6, 1 = very difficult, 2 = difficult, 3 = rather difficult, 4 = rather easy, 5 = easy, and 6 = very easy

The total average score, 4.01, implied that the usability of the revised diagram was relatively easy. However, the data derived from the designer focus groups suggested that using the diagram demanded a cognitive load of memorizing and understanding indication types and the criteria to classify the difficulty. Supported by the data from observing the older participants, significant considerations for developing the diagram were made:

Content: 1) Disregard the indication types, names, and code numbers, and 2) include the indication types in the closing stages and the perception by sight, hearing, and touch.

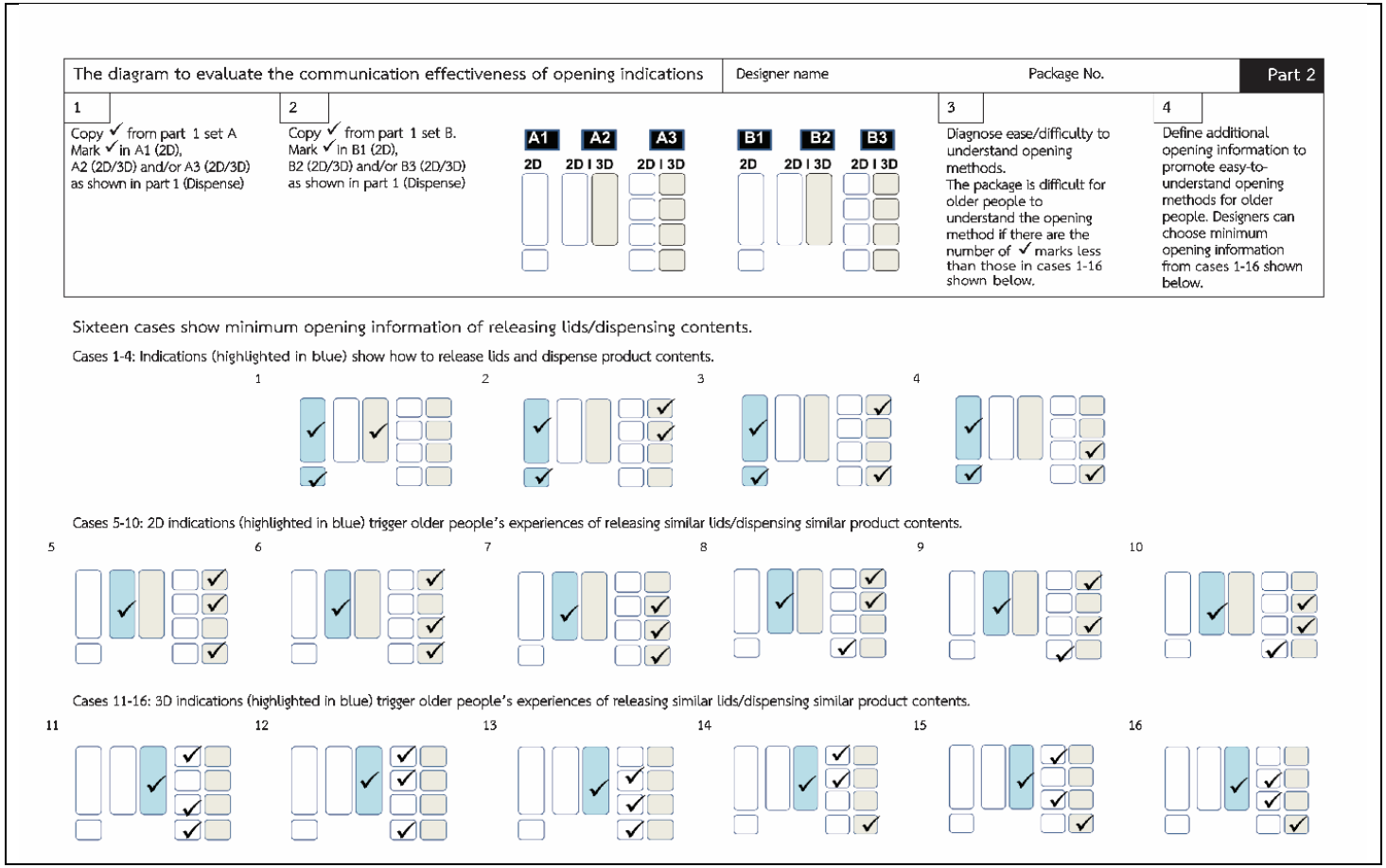
Method: 1) Only define the indications found on the package sample; disregard identifying the indication types, and 2) clarify the missing opening information by inspecting and analyzing the indications.

Forms: Revise the graphics including color codes, text highlights, and symbols to organize information and link them.



Note: ● ● ● = Three types of indications referring to the original diagram

Figure 5: Part 1 of the Revised Diagram



Revised Version

Figure 6: Part 2 of the Revised Diagram

4. PHASE II: EVALUATION OF PACKAGING DESIGN TOOL

4.1 Methodology

Phase two focused on examining the revised packaging design tool. The designers used the revised packaging design tool to define design problems and solutions, or design requirements to redesign packages. The older participants opened and rated the developed packages to evaluate the revised packaging design tools, as shown in Figure 7.

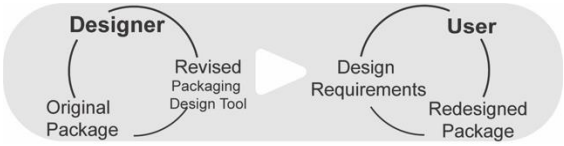


Figure 7: Evaluation of the Revised Design Tool by Designers and Older Participants

4.1.1 Participation

Designers: Twelve designers in this stage had the same qualifications as those who evaluated the diagram (Phase 1). Five additional designers were contacted to replace those inconvenient for the data collection. Two designers were assigned to redesign the packaging samples estimated by the older participants as being the most difficult to open.

Older participants: Older participants with the same qualifications addressed for assessing the diagram (Phase 1) were contacted. The researcher could not access the participants who evaluated the initial diagram; therefore, an additional 36 participants were contacted, 26 females and ten males, 60–80 years of age.

4.1.2 Data collection

Designer session: The researcher informed the designers of the research aims and asked them to use the revised packaging design tool to redesign the packages that older participants had difficulty with. The designers estimated and scored the tool using a rating scale. They explained the reasons behind the given scores through focus groups.

Older participant session: The researcher informed the participants about the research aims as did the designers. The older participants rated the difference in ease of following between the original and redesigned packages to assess the revised packaging design tool. The researcher observed the participants when opening the packages, interviewed them about the reasons behind the package ranks, and analyzed the data.

4.1.3 Package samples

The instructions that were the most difficult for the older participants to understand, defined by the average scores rated by 36 participants, were for the liquid detergent bottle (1), followed by the liquid glue bottle (5) (shown in Figure 8).

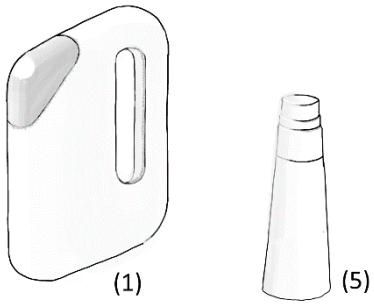
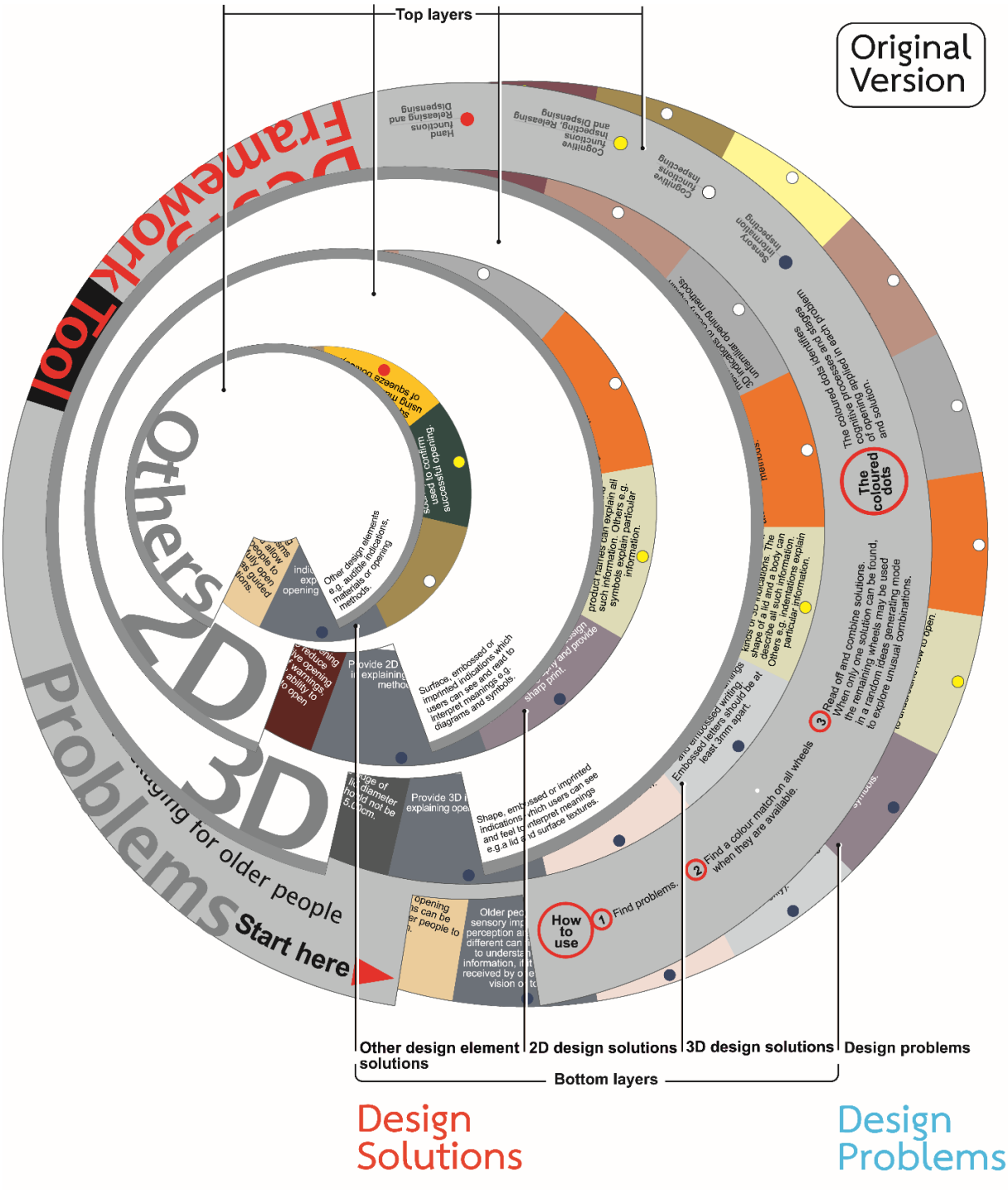


Figure 8: Package Samples for Estimating the Revised Packaging Design Tool

4.1.4 Packaging design tool

The tool aimed to define problems and solutions to redesign opening indications that were difficult for older people to understand. The original packaging design tool (Figure 9) was in the compact information form of multiple circle layers. However, selecting a design problem was random. According to the evaluation conducted in

Phase one, the inspection and analysis of the indications adopted in the revised diagram effectively facilitated the designers in identifying and recognizing design problems. Therefore, the diagram's strategy was integrated into the revised packaging design tool (Figures 10–14), which eventually comprised ten steps. Table 4 compares the original and the revised packaging design tools' contents, methods, and forms.



Note: ● ● = Design problems and solutions in the original packaging design tool

Figure 9: The Original Packaging Design Tool

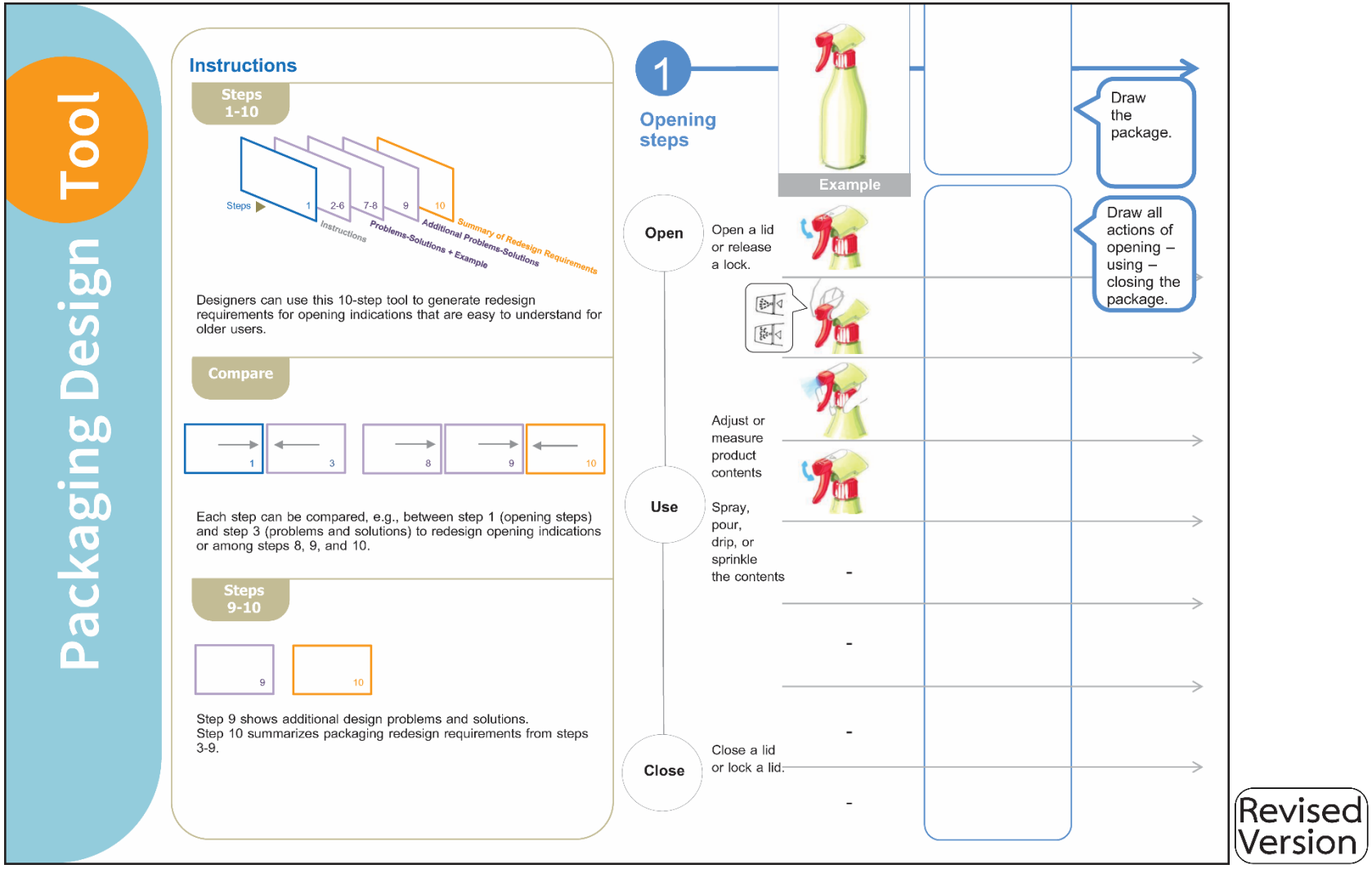


Figure 10: Step 1 in the Revised Packaging Design Tool

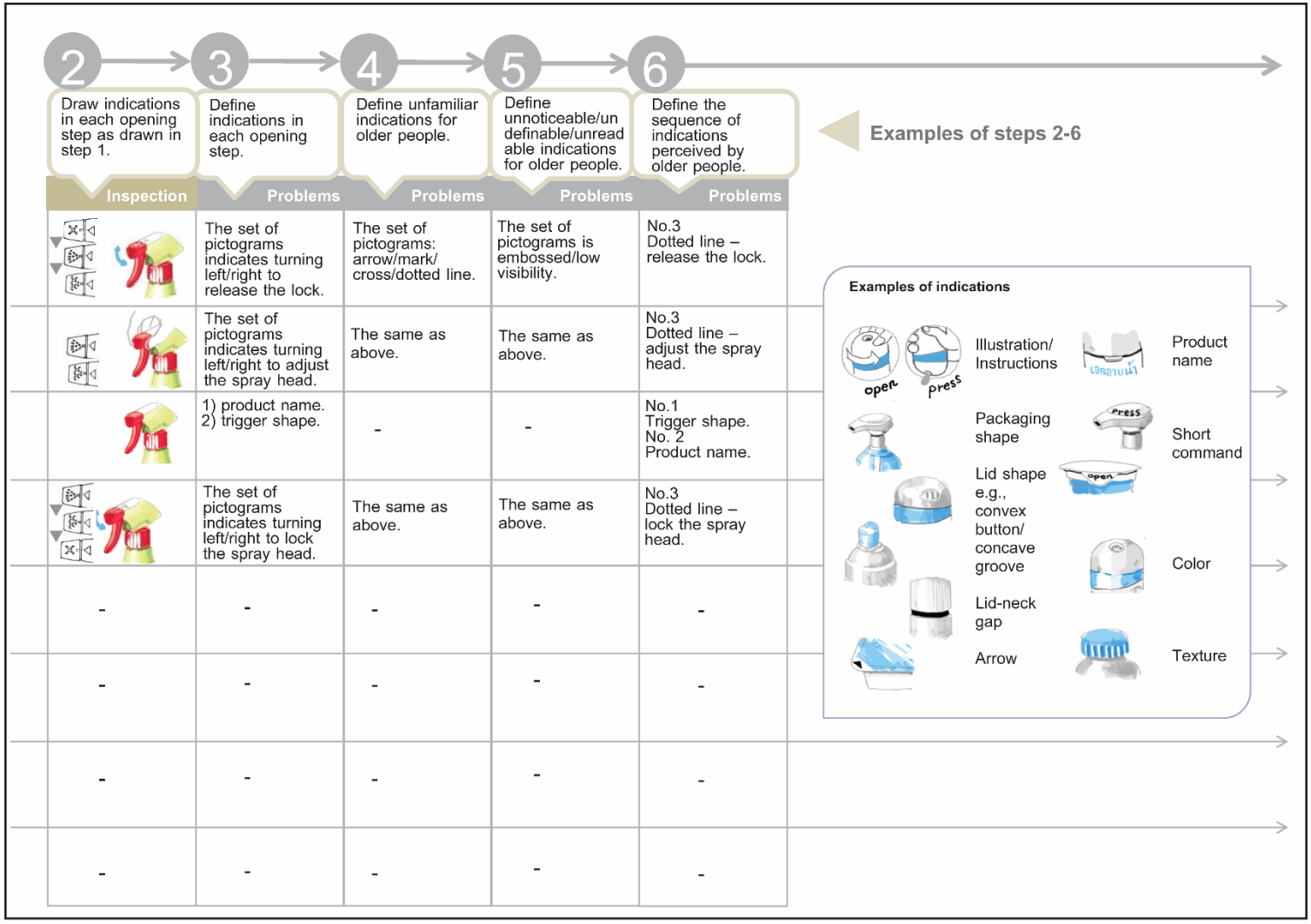
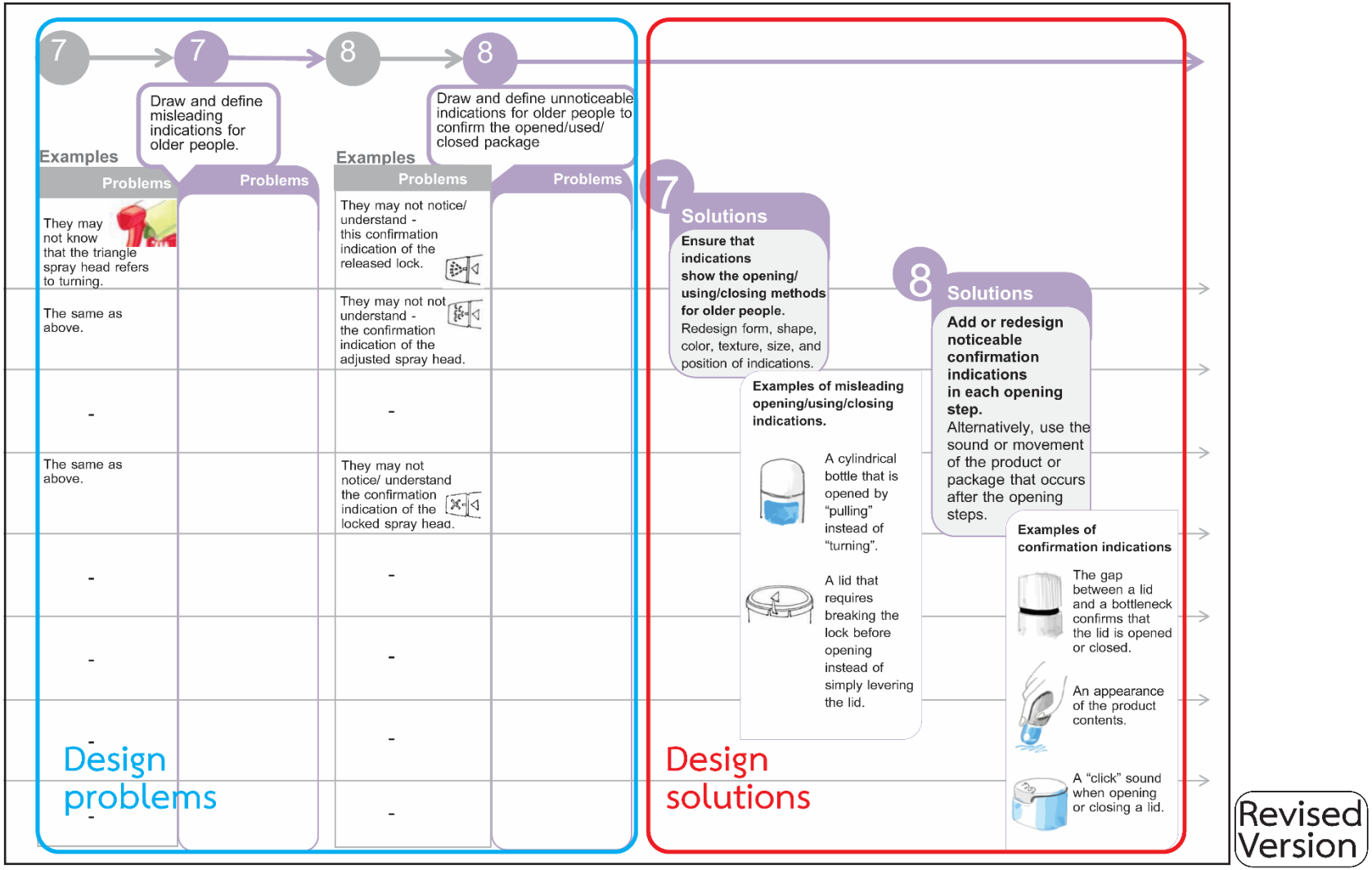
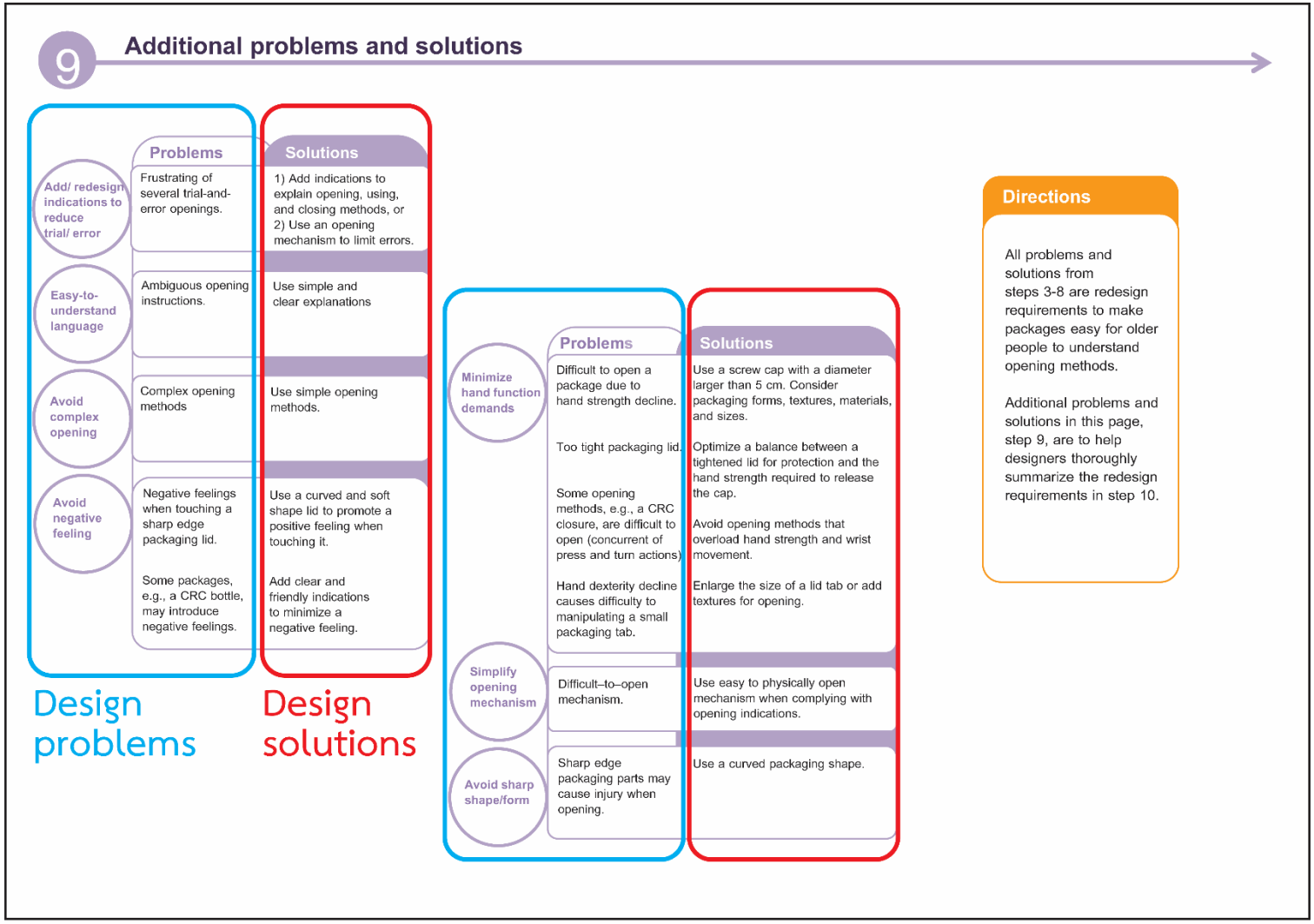


Figure 11: Steps 2–6 in the Revised Packaging Design Tool



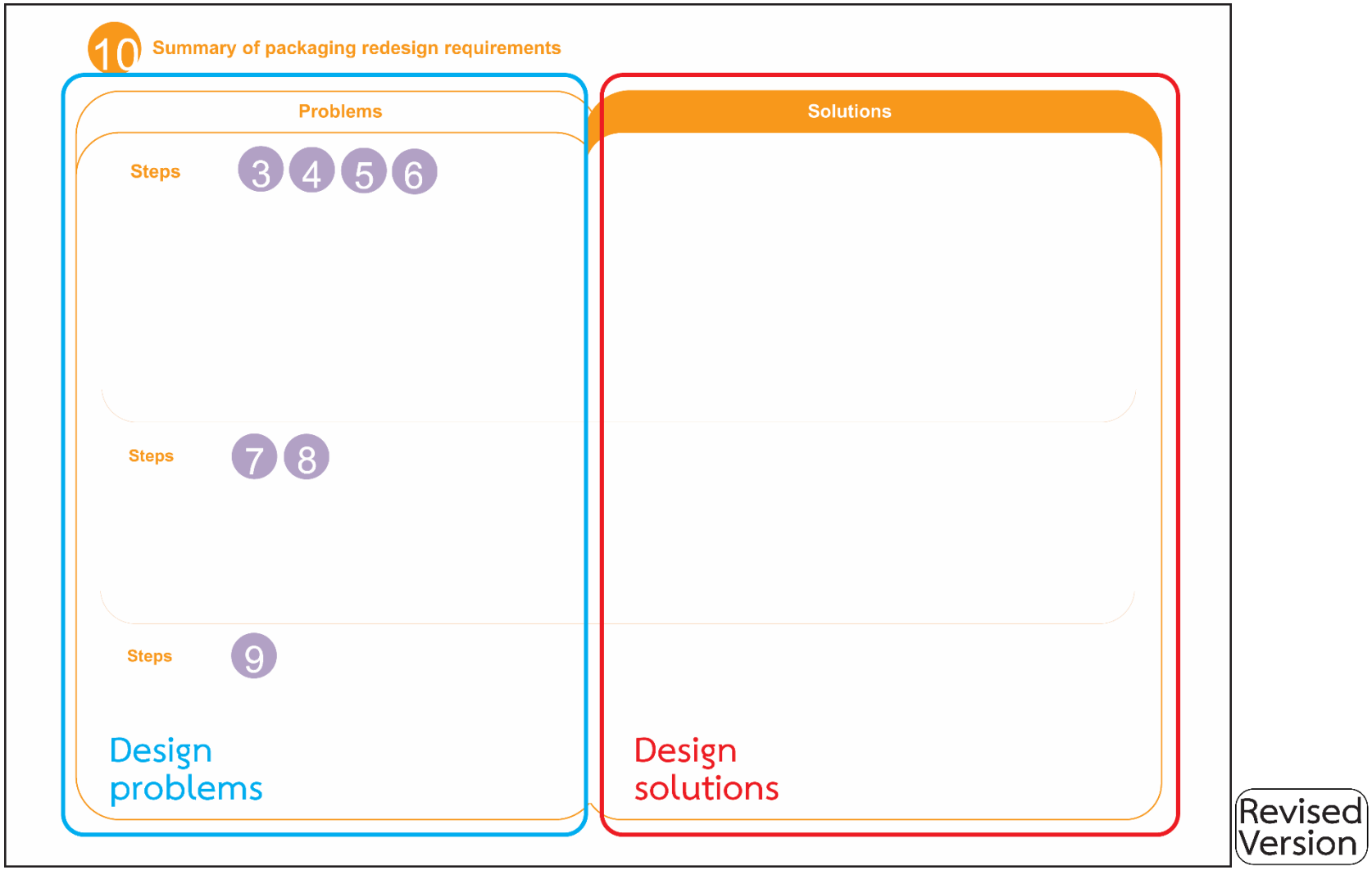
Note: ● ● = Design problems and solutions referring to the original packaging design tool

Figure 12: Steps 7–8 in the Revised Packaging Design Tool



Note: ● ● = Design problems and solutions referring to the original packaging design tool

Figure 13: Step 9 in the Revised Packaging Design Tool



Note: ● ● = Design problems and solutions referring to the original packaging design tool

Figure 14: Step 10 of the Revised Packaging Design Tool

Table 4: Comparison of the Original and the Revised Packaging Design Tool

	Original packaging design tool	Revised packaging design tool
Content	Design problems and design solutions were divided into three types of indications: 1) Three-dimensional elements, e.g., lid shapes and lid textures. 2) Two-dimensional elements, e.g., illustration and symbols. 3) Other such as sound, materials, or opening methods. The indications were grouped in accordance with cognitive processes, i.e., perception, thinking, and action.	1) The tool instructions 2) Contents: 2.1 Design problems and 2.2 Design solutions for releasing a lid, dispensing contents, and closing the lid were classified in accordance with a cognitive process. 3) How to use the tool and illustrations of indication samples.
Method	Step 1: Choose a problem: Slide the outermost circle to select a design problem and notice the color of that problem. Step 2: Find a design solution: Move the three inner circles, including 3D, 2D, and other design solutions whose background colors are like that of the problem from Step 1. Then, conclude the problem and solution. Step 3: Combine design solutions: The solutions found may comprise 3D, 2D, and other design elements. If only one design solution is found, randomly choose other solutions to trigger design ideas.	Step 1: Inspect methods of releasing a lid, dispensing contents, and closing the lid. Step 2: Describe opening indications. Step 3: Examine the indications from Step 2 to whether they explain the methods shown in Step 1. Step 4: Clarify the unfamiliar and misleading indications for older people. Step 5: Define the indications that older people cannot notice, identify, or read. Step 6: Describe the sequence of noticing the indications inconsistent with the opening stages in Step 1. Step 7: Inspect ambiguous indications. Step 8: Determine the indications that confirm the successful opening. Step 9: Check further design solutions. Step 10: Conclude all design problems and solutions.
Form	Four circle data sets showing design problems and solutions.	Ten-step checklist to inspect and analyze opening indications.

4.2 Results

4.2.1 Evaluation of the packaging design tool

Liquid detergent bottle: The older participants selected the redesigned bottle as it was easier for them to understand how to release the lid, dispense the contents, and close the lid than the original package. Thus, the revised packaging design tool enabled designers to redesign an easy to understand bottle for older participants.

Liquid glue bottle: Compared with the original package, the redesigned bottle was easier for the older participants to understand how to dispense the contents, but not how to release the lid and close the lid. The revised packaging design tool was effective only for enhancing the indications in some stages of opening this package.

4.2.2 Considerations for developing the packaging design tool

The average scores of the evaluation by the 12 designers on the difficulty or ease of using the revised packaging design tools (using the rating scores of 1–6 by the meaning previously explained) are shown in Table 5.

Table 5: Average Scores of the Evaluation for the Revised Packaging Design Tool

Topics	Average scores
The tool instructions and the ten steps	
(a) Instructions	3.5
(b) Step 1; releasing a lid-dispensing contents-closing a lid	4.83
(c) Samples of Steps 2–6	4.08
(d) Steps 2–6	4.08
(e) Steps 7–8, including the samples	4.25
(f) Step 9; additional design solutions	4.58
(g) Step 10; conclusion of design requirements	4.5
The total average score	4.26
The overall tool	
(a) Structure of contents	3.58
(b) Sequence of contents	4.33
(c) Text explanation	3.33
(d) Illustration	4.83
(e) Symbol	4.92
(f) Content numbering	4.67
The total average score	4.28

The topic with the lowest average score was the text explanation (3.33), followed by the instructions of how to use the tool (3.5), and the structure of contents (3.58). The topic with the highest average score was the symbol (4.92), followed by the illustrations (4.83), and Step 1 (4.83). It was noted that the text explanation and the structure of contents were complicated for the designers to understand.

Considerations to develop the packaging design tool derived from the designer focus groups are explained in Table 6.

Table 6: Comparison of Strengths and Considerations for Developing the Packaging Design Tool

	Strengths	**Considerations of developments**
Content	1) Explore the specific problems related to the understanding of releasing a lid-dispensing contents-closing a lid. 2) Clarify the process sequences. 3) Explain the tool objectives and the steps of using the tool.	1) Introduce the tool usage by explaining the overall tool principles and the result of each step, reducing the steps, and showing more samples in each. 2) Explain when and how to use the design solutions noted in Steps 3–8.
Method	1) Allow designers to write explanations freely. 2) Thoroughly analyze opening stages by inspecting packages. 3) Define problems by following the tool steps. 4) Trigger ideas by the provided design solutions in each step. 5) Conclude problems and solutions altogether in Step 10, facilitating comparison and review.	1) Minimize the data invalidity from which designers must think as they are older people in the aspect of familiarity with indications and the sequence of the noticed indications. 2) Use the digital platform tool to make it more convenient for designers. 3) Decrease the repeated tasks of writing the design solutions to solve problems.
Form	1) Maintain the continuity and sequence of the content by numbering each step. 2) Comprehend the tool and indications by illustrations. 3) Easily understand the language used to explain the design solutions in Step 9.	Develop graphics as follows. 1) Improve the step continuity and sequence and the guideline of how to fill in the information. 2) Differentiate between the steps themselves and between the steps and their examples. 3) Arrange all steps on the same page for comparison. 4) Add more filled-out information spaces. 5) Use illustrations or symbols instead of texts. 6) Use samples of easy and quick-finished drawings or provide ready-to-use drawings in digital form. 7) Define specific terminology used. 8) Reduce formal language. 9) Explain concisely.

5. DISCUSSION

Discussion of the results focuses on developing the packaging design tool in which the diagram's strategy was incorporated as follows.

Content: Specific contents were one of the essential design requirements (Lofthouse, 2006). Although considerable content of the packaging design tool in this research is in the form of a checklist, Kimita and Shimomura (2014) noted a checklist can help designers thoroughly examine design problems.

Method: The tool in this research adopted an analysis method as used for other tools, namely Task Analysis (Martin & Hanington, 2012) and Service Blueprint (Chasanidou et al., 2015). However, the unique method developed in this research facilitated designers in effectively extracting design problems related to opening indications, thereby promoting the validity of the tool's outcomes.

Form: The researcher tried to improve design tool usability as Rath et al. (2011) suggested that a design tool should be easily usable. However, further development of the tool form is needed.

6. CONCLUSION

The revised packaging design tool assisted the designers in efficiently redesigning one out of the two packages for older people to understand the opening method at all stages. The contents and methods of the packaging design tool enabled the designer to generate in-depth design problems and solutions. The considerations for improving the packaging design tool in this research are as follows:

Content: Clarify the principles and outcomes of using the tool. Classify the contents and steps of the packaging design tool to reduce the complexity of overloading information.

Method: Conduct further research on older peoples' familiar indications and noticing indication sequence. The study result would encourage the development of how to use the packaging design tool.

Form: Develop the visual system, information continuation, and step sequences.

7. RECOMMENDATIONS

The research data had been collected before the promulgation of the ethical regulation for research involving humans. The researcher, however, informed the participants of the research purpose before deciding to provide any data. The data were limited for use only in this research, and their identities were anonymous.

The older participants relied on the noticeable and readable indications when opening unfamiliar packages. Therefore, the older peoples' visual decline significantly impacted the understanding of the opening methods. Focusing on visual impairments would be beneficial in developing the content of the packaging design tool. Future research for the tool development involves further studying older people's familiar indications and their sequence of noticing the indications, and an alternative packaging design tool in digital form.

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