Tran Thu-Trang
Jaehwa Lee, Woosung Park, Kiwon Lee
Sungjong Park, Joohyeon Oh, Younghak Oh
Junehee Eune
Kunpyo Lee
Department of Industrial Design, KAIST
Department of Industrial Design, KAIST

1. Introduction
Throughout the design research history, there are numerous user-centered design (UCD) research methods and their offsprings currently in used and reported academically and commercially. Despite the influx of tools, thoroughly understanding all the methods and being able to select the appropriate set of methods to apply to a specific design problem appear to be a difficult job for many designers and researchers. Therefore it is a significant need of organizing these rich resources into taxonomic order yet maintaining the flexibility in structure, as it is part of the nature of design practices.

There have been several attempts to classify the research methods in both academic and commercial field. Although much work has been done to date, there exist some limitation, mainly including (1) number of actual UCD research methods covered or considered are small and (2) the dimensions of classification only cover a few aspects of practical design project. This study attempted to address these two key issues and create a ready-to-go toolbox for designers and researchers from all levels to quickly grasp the essence of the UCD research methods and effectively plan their set of methods within the given constraints. The study was carried out as the core activity of "User Research Methodology", a graduate-level course taught in Fall semester 2007 in Department of Industrial Design, KAIST.

2. Research process
The procedure of this project was divided into four phases:

2-1. Review of existing frameworks and methods
We scanned the big landscape by collecting various frameworks and research/design/analyzing methods. At the end of this phase, 8 frameworks of classification and more than 120 design research related methods were reviewed. Among the frameworks, Melican's diagram (1997, 2004) organized the methods in terms of level of focus from stake holders, research activity, and research-design process. Sanders (1999) correlated the levels of user experience and user’s participatory levels. IDEO (2003) method cards classified each method based on the researcher’s activity (learn-look-ask-try). The collaboration of ThoughtForm Inc. and DaedalusExcel (T&DE) (2005) suggested organizing the methods in two dimensions: user’s level of conscious of needs and (also) researcher’s activity (ask - observe). Most recent map from IIT Institute of Design (2007) categorized the methods by process modes and focused issues. Several other (unfortunately, confidential) studies also focused on the classification by process and level of issues revealed. At the same time, the obtained methods first went through preliminary screening to discard non-UCD methods (i.e. methods that focus on industry or business rather than design problems and users). The remaining methods were then roughly categorized into groups of family methods - primary methods and their sub-methods or offsprings methods - based on the nature of research activity and methods’ origins.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>User study</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business/ marketing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Criteria range    |               |               |            |                                 |                             |
| Process           |               |               |            |                                 |                             |
| Research activity  |               |               |            |                                 |                             |
| Collective outcomes|              |               |            |                                 |                             |
| User’s participation|             |               |            |                                 |                             |
| Stakeholders      |               |               |            |                                 |                             |

Table 1. Classification framework comparison

2-2. UCD methods anatomical study
The representative methods of each family were thoroughly investigated by secondary research. Materials for study were collected from academic papers and articles, our past practical projects, as well as reliable online sources. The study of each method was condensed and composed into the format including: (1) Origin of development and related methods; (2) Definition/ description (3) Procedure and notes for conducting; (4) Empirical examples; (5) Pros and Cons and (6) References for further study. Our current database contains 42 representative UCD research methods.

2-3. Categorization
Various categorizing criteria were initiated based on
characteristics of the design project, focus and application of method, research activity, setting and resource issues, and deliverables, etc. Those criteria then were structured by applying KJ method and condensed into one framework.

In our process, phase 2 and 3 were not conducted separately but rather being overlapping. This process (as shown in figure 1) provided the project participants the flexibility to go back and forth between micro-analysis and meta-categorization framework.

![Figure 1. Research process](image)

2-4. Synthesis

We finally combined the analysis of all methods into one complete checklist. Final framework was applied to analyze each method. The final outputs were published under poster format and under construction of an interactive web-based database/website.

3. Results

Appendix 1 exhibits the categorization framework. According to the taxonomy every method can be

and format of the information you will deal with and how they are to be presented as deliverables.

5. Process: Which part of the design process you can apply this method.

In application, designers and researchers can use this framework as checklist in project planning stage. Because the framework covers a wide range of aspects in research/design projects, researchers can easily match their project constraints with the lists to create short list of matching methods. They then will be able to compare the detailed attributes to select the appropriate set of methods. Finally the methods can be thoroughly studied though in-depth description available in database.

4. Conclusion and further research

The 5Ps framework has fulfilled our initial intentions: covering wide range of UCD research methods and including many aspects dealing with practical design problems. The ready-to-go toolbox, in poster format, was successfully generated with 42 methods depicted in the framework. The detail outcomes and database of this project can also be accessed online through the website http://dpl.kaist.ac.kr/design-methodology/Main_Page

However, because the amounts of data as well as number of aspects are varied, we acknowledge that the display of taxonomy framework is still looking complex. Beside that new creative methods are created every day. It is suggested that revision of framework format and updates of database are valuable as further development.