

# The Development of a Checklist for Evaluating Elderly User Interface Ability

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**Abstract.** As the technology becomes convenient and affordable for users, the issues related to user interface also become important to technological design for users in their daily life. Not only young generation, but also the elderly use technological products for various purposes from health management to general daily uses. The use of interface design for elderly becomes an issue for technology development. However, there are still limited researches consider elderly ability of using interface. There are still no testing methods for understanding the interface use behaviors for aging population. In this research, a checklist of exploring elderly interface use behaviors was developed. A comprehensive literature review was conducted to outline the structure of interface use abilities for elderly population. Specific items were developed for the matching abilities. The development of this testing tool will improve the investigation of the variation of user interface ability. This will also provide the future developers and researchers an approach to improve the development of suitable user interface for the elderly.

**Keywords:** interface design, aging, user interface

## 1. INTRODUCTION

Aging of population has been an issue globally. The percentage of people above 65 in Europe will reach 24% by 2030 and approximately to be 12% in Asia and Latin America (Kinsella and Velkoff, 2001). Not only young generation, but also the elderly use products with technology for various purposes from health management (Free et al., 2013), ability strengthening (Charness and Boot, 2009) to general daily uses (Roupa et al., 2010). However, aging causes declines in sensation, perception, cognition, and movement abilities and further influence the interaction of interface in technology (Fisk et al., 2009). Therefore, a comprehensive detecting tool to test elderly interface ability is needed to provide a further understanding for evaluating elderly interface use ability. In this research, the structure of interface use ability would be established and the testing checklist based on this structure

would be developed.

## 2. METHODOLOGY

### 2.1 Domain Structure Establishment

The literature search of aging process with ability deterioration was conducted. The searching criteria focused on elderly interface use related abilities. In other words, only the aging declines related to interface use was considered. According to the interface use related aging ability declines from previous literatures and the summarization from the research team, the domain structure was established.

### 2.2 Elderly Interface Use Difficulties Specified

Based on the established domain structure of interface use related aging abilities, the difficulties of using interface

for elderly were specified for each domain ability. In this phase, the possible interface use difficulties were selected from previous findings and the research team discussion.

### 2.3 Developing Matched Questions

Considering clear and concise inquire methods, the matching questions for asking each interface use difficulties were developed. The testing scale for the questionnaire was also decided by the research team. In this phase, only representative questions were considered to be kept in order to make the questionnaire to be simple and concise enough.

## 3. RESULT

### 3.1 Domain Structure

The domain structure was established through literature reviewing and research team discussion. The physical and cognitive domains were structured the whole model. Five movement related abilities were further classified in physical domain, including fine motor, gross motor, vision, eye-hand coordination, and response time. Six cognitive and perceptual abilities were considered in cognitive domain, including managing data, spatial ability, problem solving, working memory, mode change, and visual search.

### 3.2 Elderly Interface Use Difficulties

Based on the established domain structure of interface use related aging ability, the difficulties of using interface for elderly were specified for each domain ability. In this phase, the possible interface use difficulties were selected from previous findings and the research team discussion.

### 3.3 Matched Questions

Matched questions for each interface use difficulties were developed. Considering the target population to fill out this questionnaire will be the elderly users, the inquire sentences were designed to be understandable and words friendly. Totally 14 questions were contained in physical domain, and 11 questions were in cognitive domains. All questions were developed following the established structure in previous steps. For example, the sample question for difficulty of focusing on specific function under visual search ability in cognitive domain is asking if the elderly feel difficult to find out the specific icon in the complex display. The binary scale is used for the future target population to fill out this checklist by checking whether they have the problem or not.

## 4. CONCLUSION

In this research, a comprehensive structure of interface use ability regarding to aging was established under physical and cognitive domains. The Checklist for Evaluating Elderly User Interface Ability was developed. The next step is to further conduct research for validation and establishing the reliability of this checklist. This tool will enhance an understanding of interface use ability for aging population. In addition, it can also provide future researchers and designers a suitable direction to improve design of interface for elderly. The improved design of technology will enhance the usability of interfaces for elderly and improve their quality of life to fulfil the ultimate goal of aging with dignity successfully.

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