Validation of A Brainstorming Tool “IDEATOR”

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Abstract

The study carried out the validation on the designers’ working efficiency during ideation by using IDEATOR as a support tool, what is an achievement of previous research and project. Observations were applied to investigate the differences on the behavior linkages and the idea sketches between the designers’ ideation with IDEATOR and without IDEATOR. The results show that: 1) a coding scheme with 10 design behavior codes is made by reviewing the behaviors of designers’ ideation with IDEATOR and without IDEATOR. The designers with IDEATOR presented gathering information (GA) and generating ideas (GI) behaviors more frequently than the designers without IDEATOR in the ideation; 2) designers with IDEATOR in the ideation can be inspired both by words and images but the designers without IDEATOR in the ideation mostly inspired by images; 3) IDEATOR do support designers’ lateral thinking in the early design based on the analysis of designers’ idea sketches.

1. Introduction

In a previous study on design support systems, Ozkaya and Akin [1] explored the integration of the architecture and design fields, investigating methods of formulating questions and forms. Ozkaya and Akin proposed requirement–design coupling, creating a continuous interactive design system that aids architecture designers in their design thinking processes, spanning from the design of the initial idea to actual construction and the final maintenance phases. Ahmed [2] developed a knowledge-indexing method to promote design knowledge reuse. His observation of engineering designers revealed that approximately 24% of them spent most of their time collecting information. Therefore, he claimed that information searches are an essential part of the design process that would be aided by indexing design-related knowledge. Segers et al. [3] constructed an idea space system that aided architects in performing design thinking. The word–image connections in the system served as stimuli for designers to produce diverse aspects of creative thinking, thereby enhancing their work efficacy.

Compared with the aforementioned foreign studies on design-support systems, IDEATOR places greater emphasis on recording the word-triggered thinking processes and paths of designers. An keyword in the record of idea thinking can not only serve as a source of inspiration in the follow-up process of ideation, but also as a tool for idea communication and sharing in group brainstorming sessions. Therefore, this app supports idea development among individual designers and creates more satisfactory communication effects in both the self-reflection of a single designer and group design tasks. By comparison, the idea space system developed by Segers et al. [3] used the words written by designers to trigger image feedback from the system, which could build up the image references to form the image-initiated thinking ability of designers. Most previous studies have maintained that the mental imagery of designers is triggered by substantial information or visual clues [4-10]. This mental imagery further enables designers to conceive ideas at that specific moment [11]. Therefore, in the previous stage of the present study, IDEATOR was developed to enable designers add their idea sketches and short explanations to each keyword of the idea record, presenting the idea development process as a self-report. Any keywords, explanations, idea sketches, and representative images designers add to the process can serve as part of the stimuli or contents in the seeing part of the
seeing–moving–seeing model proposed by Schön and Wiggins [10]. In addition to allowing designers to develop ideas from infinite image stimuli, this function enables enriching the database of IDEATOR, where references related to design tasks could be stored for future references.

Besides, protocol analysis cannot retrieve and analyze the nonverbal thinking behaviors in the design process; it has limited capacity in the research of design activities [12]. The study adopted IDEATOR as an ideation support tool, which may support designers’ creative thinking, whereas the keywords and referenced items will be recorded in the process by IDEATOR while designers are taking design tasks, which may serve as a key research tools for the researchers. In other words, IDEATOR simultaneously served as a facilitator of creative ideation and a data-recording tool, as an effective data-collecting method for cognitive studies on design, specifically for design thinking. Therefore, the study aims to verify and determine whether the designers using IDEATOR in the ideation can assist them in forming and developing creative ideas.

2. Research method

The present study employed IDEATOR, the result of a previous stage of this study, as a support tool for ideation among designers to verify their efficacy in this process. This study investigated whether differences existed between the behavioral connections and sketched ideas of designers who used or did not use IDEATOR. The research method and details of its execution are presented in the following section.

2.1. Three core functions of IDEATOR

In IDEATOR, the “mind map idea development function” supports the design thinking needs; the “search engine image search function” supports the needs related to image stimuli and references, and the “sketch pad sketching function” supports the design action needs. Furthermore, users can freely switch among several functional interfaces of IDEATOR to form mutual associations.

2.2. Observation records of the progression of design tasks

To provide relatively objective analysis results, the present study involved developing different methods to record the behaviors of participating designers. For participants who used IDEATOR, their design process was videotaped; in addition, a screen-recording program for mobile devices (Shou.TV mobile game streaming 0.7.13) was employed to record the ideation processes of designers when using IDEATOR. For participants who did not use IDEATOR to facilitate their creative idea development, their design process was videotaped and a computer screen-recording program (Camtasia Studio 7.0.1) was adopted to record the searching process the participants performed on a personal computer.

2.3. Participants

This study adopted judgmental sampling to recruit 30 designers who possessed more than 2 years of work experience in graphic design-related fields (e.g., media, marketing, and advertising; all participants were required to be current design practitioners). The participants comprised 12 men and 18 women; the average work experience of the participants was 5.96 years. 22 of them are working for a design firm, include advertising company and media company, 8 are working for an individual visual studio.

The participants were categorized into two groups because of the between-subjects design of this study; each group consisted of 15 designers. One group received an iPad mini with Internet access and had IDEATOR installed as the ideation support tool, and the other group was asked to collect data, search references, and perform ideation using a personal computer with Internet access.

2.4. Design task and test environment

To ensure a relatively objective analysis of the results, the same design task, developing a logo for a coffee house named...
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