Perspectives toward the stereotype production method for public symbol design: A case study of novice designers

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ABSTRACT

This study investigated the practices and attitudes of novice designers toward user involvement in public symbol design at the conceptual design stage, i.e. the stereotype production method. Differences between male and female novice designers were examined. Forty-eight novice designers (24 male, 24 female) were asked to design public symbol referents based on suggestions made by a group of users in a previous study and provide feedback with regard to the design process. The novice designers were receptive to the adoption of user suggestions in the conception of the design, but tended to modify the pictorial representations generated by the users to varying extents. It is also significant that the male and female novice designers appeared to emphasize different aspects of user suggestions, and the female novice designers were more positive toward these suggestions than their male counterparts. The findings should aid the optimization of the stereotype production method for user-involved symbol design.

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1. Introduction

To better address user needs, desires and preferences, there is an increasing trend of involving them as much as possible at an earlier stage in the design process, i.e. conceptual design stage (Greenbaum and Madsen, 1993; Martin et al., 2012; Sanoff, 2000). Representing concepts visually is a common approach that enables users to form and express their thoughts, feelings, experiences, ideas, unmet needs and aspirations regarding product design freely through the use of drawings (Chamorro-Koc et al., 2008; Demirbilek and Demirkan, 2004; Slesswijk Visser et al., 2005; Tohidi et al., 2006). For example, to design user-friendly doors and door handles for a house, Demirbilek and Demirkan (2004) invited a sample of end-users to express their ideas with sketching tools during the concept model phase. To further improve current products such as blenders, alarm clocks, grass shears and barbeque grills, Chamorro-Koc et al. (2008) asked experienced users to draw their ideal designs on a piece of paper. In graphic symbol design, the visual representation of concepts has been established and developed into the stereotype production method (Chong et al., 1990; Hoekstra et al., 1993; Howard et al., 1991; Salman et al., 2007; Sanders, 1992; Schröder and Ziefle, 2008; Ziefle et al., 2008).

The stereotype production method, also known as the sign production method and the population stereotype production technique, involves asking a group of representative users to draw pictorials that best express the symbol referent of interest, i.e. the message that a symbol is intended to convey. The most common pictorials generated for the referent is known as the population stereotype, which is then passed to designers to be transformed into an actual symbol. The stereotype production method has been adopted for the design of various graphic symbols for use in automobiles, photocopiers, military intelligence systems, computer information systems, electronic mobile devices and other public environments. The extent to which the referent characteristics of concreteness, imagery, familiarity and ease of visualization have influenced stereotype production had also been studied (Ng et al., 2012).

Rousek and Hallbeck (2011) specified that a good symbol design is recommended to speed up the cognitive thought process in determining its meaning. The involvement of users at an earlier stage in the design of graphic symbols has been shown to increase the chance of the symbols being interpreted correctly, as the proposed representations directly map onto users' mental models (Schröder and Ziefle, 2008; Ziefle et al., 2008). Under a user-involved design method such as the stereotype production

method, the emphasis of the design process would be shifted from a professional to a user orientation. To sustain the integration of a design method more effectively, there is a need to implement, maintain and develop the method more closely into the designers' thoughts (Bruseberg and McDonagh-Philp, 2002; Goodman-Deane et al., 2008). However, a review of the literature indicates that the perspectives of designers toward the stereotype production method have not been widely explored. This study aimed at obtaining a better understanding of how designers react to incorporating the stereotype production method into graphic symbol designs through the extent to which stereotypes (i.e. user suggestions) impact the design process. Novice designers were recruited for the study because their responses would provide the information necessary to develop useful guidelines for user-involved symbol design.

Differences between male and female designers have been a focus in recent decades (Moss and Colman, 2001; Oudshoorn et al., 2004). McDonagh et al. (2002) revealed a gender discrepancy in designer perception of the relative importance of the main factors associated with industrial and product design. Specific gender groups were also found to have different preferences for the domain of a design task (Okudan and Mohammed, 2006). Previous studies showed significant gender differences in responsiveness to outside suggestions, evaluations and feedback, in which women acknowledge the validity of and express their agreement with responses from others to a greater extent than men (Djamasbi and Loiacono, 2008; Johnson and Helgeson, 2002; Kogan et al., 2010; Lundgren and Rudawsky, 1998; Roberts and Nolen-Hoeksema, 1994). With regard to the perspectives of user involvement in graphic symbol design, female designers could be hypothesized as more sensitive and responsive to the needs and preferences of users in symbol design than male designers.

A public symbol is a kind of graphic symbol for the provision of warnings, directions, regulations and guidance in all locations and sectors open to public access. Taking public symbol design as a case study, the purpose of this study was to investigate how novice designers would react to incorporating user-involvement design practice, i.e. the stereotype production method, into graphic symbol design and its impact on the conceptual design process. We anticipated that gender differences would exist in the novice designers' practices and perceptions of dealing with user suggestions for this purpose. An equal number of male and female novice designers were asked to draw different public symbol referents with suggestions from users that were extracted from a previous study (Ng et al., 2012) and were then asked to provide feedback on user suggestions in the design process. The extent to which novice designers accepted and included user suggestions in the design for each symbol referent and their perceptions of those suggestions were fully assessed. The results were expected to provide a better understanding of the novice symbol designers, using the stereotype production method, so as to facilitate the process and practice of user-involved design. The results should also help to optimize the stereotype production method for prospective users, designers and design practitioners working together to produce more user-friendly symbols in the future.

2. Method

2.1. Participants

Forty-eight Hong Kong Chinese novice designers (24 males and 24 females) who had 1–5 years of design experience (mean = 2.02 years, standard deviation = 0.92 years) participated in the study. The age of the participants was between 18 and 26 years, with a mean age of 21.51 years and a standard deviation of 0.07 years. They were first- and second-year design students from different universities and colleges, and had never used the stereotype production method for symbol design. Each participant gave verbal informed consent at the beginning of the study. During the consent process, participants were told that they would be required to complete a symbol design exercise independently for about 60 min.

2.2. Stimuli

Twenty-eight referents from the ISO 7001:2007 Graphical Symbols – Public Information Symbols (International Organization for Standardization, 2007a) were chosen. These referents can be used in the context of public facilities, transport facilities, tourism, culture and heritage, sporting activities, or commercial activities. The most common users' pictorial suggestions for the referents were extracted from a previous study (Ng et al., 2012) and consolidated into a booklet for participants to reference in the design process. Each page of the booklet consisted of one referent and the corresponding users' pictorial suggestions. These suggestions were made with 31 Hong Kong Chinese residents attending elderly community centers (16 males and 15 females). The age of these older residents was between 60 and 89 years, with a mean age of 71.27 years and a standard deviation of 7.48 years. None of them reported any prior working experience in design or drawing activities. Table 1 shows the 28 referents used in this study and the most common pictorial representations from users.

2.3. Instruments

A custom-designed answer book was developed for the production of the designs of the 28 symbol referents. For each referent, a response box (63 mm × 63 mm) was provided in which participants were asked to draw a pictorial representation of the referent. The box size was determined in accordance with the ISO 22727:2007 Graphical Symbols – Creation and Design of Public Information Symbols – Requirements (International Organization for Standardization, 2007b). A black broad-tip pen (2 mm thick) was also provided for each participant to draw his or her pictorials in the answer book.

A feedback questionnaire was also developed to capture participants' perceptions of suggestions from users for symbol design. The participants were required to give their subjective ratings using nine-point Likert scales for the following eight closed-ended questions. Ratings ranged from one (strongly disagree) to nine (strongly agree).

1. Do you agree that you could recognize user needs and preferences on symbols based on the suggestions from users?
2. Do you agree that you create better solutions based on the suggestions from users?
3. Do you agree that you create solutions faster with the given suggestions from users?
4. Do you agree that your design concepts are more focused with the given suggestions from users?
5. Do you agree that the suggestions from users could provide motivation to produce user-fit solutions?
6. Do you agree that the suggestions from users could help access to innovative solutions?
7. Do you agree that the suggestions from users could offer evidence on which to base design decision-making?
8. Do you agree that the suggestions from users are valuable to your designing process?

The participants then answered an open-ended question on the participants' open comments about the symbol design process.