Development of Tactile Garment Design Strategies for Women with Visual Impairments

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There are 1.3 million people in the U.S who are visually-impaired (National Federation of the Blind, 2017) and clothing is of special importance to them due to their physical limitations and the impact it has on their independence. Appearance is an important player in social participation, especially for people with disabilities (Kabel, McBee-Black, & Dimka, 2016). Many researchers have identified the lack of appropriate garments for people with disabilities in the mainstream market. Few studies addressed the clothing needs of people with visual impairments (VI). The handful of attempts that did focus on people with VI investigated closure preferences (Chang, & Lee, 2015) or clothing selection challenges (Kulyukin & Kutiyanawala, 2010). The previous attempts by researchers to disclose the exact needs and contexts of apparel needs of people with VI, especially when it comes to design requirements, are limited. In this population, people with long-term visual deprivation due to profound blindness often leads to an increase in capabilities of auditory and tactile senses (Cattaneo, & Vecchi, 2011). This phenomenon is called sensory compensation and may influence the apparel preferences of people with VI because visual impaired participants may have sharper sensations in their fingertips than sighted participants. With this in mind, the purpose of this exploratory study was to understand the clothing needs and choices of women with VI to understand their apparel preferences. Rosenblad-Wallin's user-oriented framework (1985) was applied to guide this study. The two key research questions were derived from this framework and sensory compensation belief: how do different senses other than sight assist participants in distinguishing clothing components, and how are clothing components experienced by participants related to functional and symbolic values, as defined by Rosenblad-Wallin (1985)?

Study Design: The researchers collected qualitative data through focus groups with women with VI. A focus group format provides multiple and diverse perspectives on the clothing needs and choices associated with the participants' clothing choices voiced in their opinions spontaneously (Roller & Lavrakas, 2015). Using purposive sampling, the researchers identified a support group for women with VI in a campus town that was hospitable to the study and provided information-rich cases. The researchers pilot-tested the focus group questions with a participant who was blind and the final questions focused on exploring the symbolic and functional values that participants attributed to their clothing choices. The researchers attended three support group meetings where they conducted focus groups. Attendance at the first meeting was to build rapport with the participants. At the second meeting, the researchers asked the focus group questions. And at the third meeting, the researchers shared with the participants three designs concepts which the researchers developed based on findings from the second meeting,

each uniquely interpreting specific themes in the data. All of the focus groups were audio-recorded or video-recorded and transcribed. The data were analyzed using theme analysis using a-priori codes derived from the research questions to focus on the direct experience of participants in a phenomenological approach.

Results: Eight women aged between 35-74 years participated in the focus groups. The data analysis of the focus group revealed that the participants had both functional and symbolic values concerns. Functional value themes arose including mobility, tactility, donning and doffing, utility, and recognition. Mobility addresses the interaction between clothing and the activity of the person wearing the clothing. Tactility refers to the need for fabric hand to be comfortable to the touch. Donning and doffing refers to the need for clothing fastening systems that allow easy dressing/undressing. Utility addresses the need for additional storage components in garments, while recognition referred to the need for clothing identification systems. The symbolic values themes that surfaced were social assimilation, a strong theme that indicated the need for clothing to conform to current social standards of dress; and tactile sense, a theme that illustrated how fabric hand evoked aesthetic sensations in users.

Based on these findings, the first three authors each developed a garment that focused on specific themes resulting from the data. The first design focused on the functional value of *recognition* through the use of raised textures to assist the user to locate specific parts of the garment. *Donning and doffing* were addressed by creating a fully reversible garment that featured an identical garment back and garment so that users can identify the appropriate direction of wear. The second design focused on the functional values of *tactility* and *recognition* by transposing verbal descriptions of color into tactile expressions of color, thus expanding the understanding of color variation of garments for women with VI. The third design focused on the themes of *mobility, utility,* and *donning and doffing*, through the application of a wrap-around cape system with added storage pockets and tactile closures for easy dressing/undressing. All design concepts were developed with the social assimilation theme in mind, as designers applied current, age-appropriate elements to the garments to help the user 'fit-in'. When evaluating the three design concepts, the participants thought each design uniquely addressed the given functional and symbolic values selected. The feedback called for more consideration of fabric weight, fit, and choice of fasteners used, suggesting the use of lightweight materials, producing the garments for each of the participants based on their various sizes, and applying easy to identify fasteners.

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