Assessment of User Democratization in 2D to 3D Garment Assemblage

Lida Aflatoony, Colorado State University, Fort Collins, USA

Li Zhao, University of Missouri, Columbia, USA

Kerri McBee-Black, University of Missouri, Columbia, USA

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Introduction. Studying the previous literature, which considered user involvement in the apparel design and construction process, revealed the gap between users' skills and the task in a do-it-yourself task designed for them. As an example, McQuillan et.al. (2018) used digital textile printing to create what they defined as a "way-showing system," for assembling garments but found in initial testing that extensive instructions were needed for inexperienced users. Further, studies have shown that women attract a source of happiness and a positive sense of well-being by sewing their clothing (Martindale and McKinney, 2020). However, according to a recent study, only around 12% of Americans know how to tailor clothing (*Home Improvement: 32% of Americans Lack Basic Household Skills*, 2019). Although these users represent regular consumers because most consumers don't have this basic household task, very few studies have investigated the relationship between users with limited or no skill in apparel production and their feelings toward completing a transformable garment without requiring any garment construction techniques. Therefore, this study aims to obtain the non-skilled users' points of view and preferences regarding the transformable design strategy to empower them to contribute to the final garment assembly.

Theoretical framework. The theoretical framework of this study introduces and describes the importance of democratization in design and the reasons for user involvement in the making process. Two other subjects used in this theoretical framework are hedonic features and sustainable design. In general, democratization speaks about empowering consumers to have the same design opportunity as designers have (Björgvinsson, Ehn, & Hillgren, 2010; von Hippel, 2005). This approach questions the status quo of the fashion designer by encouraging transparency as well as democratizing knowledge and information (Hirscher, 2013). By involving consumers in the creative process, design, and/or construction of a garment, the emotional bond between the consumer and the product will be stronger and consequently, they will tend to keep the garment for a longer period (Cramer, 2011; Diefenbach, Jung, Diller, Franze, & Maciejczyk, 2018; Teichmann, Scholl-Grissemann, & Stokburger-Sauer, 2016). Cramer (2011) suggests that involving consumers in the design and construction process has two potential results: first giving consumers a voice in design, and second encouraging consumers' consumption behavior towards a more sustainable one.

Method. For this study, a participatory approach to design research (PD) was determined to be the best approach as this methodology encourages collaboration between users and designers in the design process, with the view that knowledge from both is equally valid and important (Ehn, 2008). A focus group was conducted after Institutional Review Board approval. A total of 8 skilled participants (Young & Casey, 2019) joined a semi-structured focus group. Skilled participants or lead users (Morris &

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Ashdown, 2018) were recruited based on their technical abilities and interest in slow fashion. The Sanders and William (2003) Framework was applied throughout this stage to Harness the Creativity of the focus group. In this stage, the researcher collected first-hand data in response to the first and second research questions of this study: (RQ1) How does a hands-on experience shift the roles of users with limited/no clothing making skills from passive consumers to active users? (RQ2) How are design challenges alleviated during the transformable garment design process?

Design Strategy. Next, the information received from the eight participants in the focus group regarding the design strategies was combined with the researcher's tacit knowledge and literature to determine the final design for this study. The 2D to 3D apparel design in this research relates to the transition of the 2D flat textile into a 3D garment with clear instructions implemented on 2D flat surface. Additionally, transformability in this garment occurs by providing two different sleeve styles (Figure 1). Then a total of seven non-skilled users participated in semi-structured interviews. The data received from the in-depth interview revealed the end users' opinions and attitudes regarding the 2D to 3D transformable garments and their feedback towards the designed sample for this study (Figure 2).

Figure 1. Two different styles of the transformable garment designed through participatory design method.

Figure 2. Final users' feedback and testing during an in-depth interview session. Throughout this session, Users' opinion, and attitude regarding the 2D and 3D transformable garment were assessed.

Data Analysis. In this study, the data analysis occurred twice: once after the focus group in the second stage and one time after the interview section. In both stages, the qualitative basic interpretative analysis designed by Tony Castro (2021) was used to analyze the data. Transcripts were coded, and the final themes and results were reported in a written format.

Results. Due to the nature of this study, using both focus group and interview methods, the researcher compared the data from both methods and discovered similarities between the two stages of data. The researcher discovered that the themes (a) *clear instructions*, (b) *intuitiveness for the maker*, and

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(c) *hedonic attributes* were found in both focus group and interview data. participants emphasized that *clear instructions* lead to an easy assembling experience. Subjective instructions, having defined answers, and more points of connection help lead consumers in the assembly process. Also, in both groups, participants stated that transformable garments must be intuitive for the user. Reducing the number of variations available and applying clear assembly instructions are two ways participants suggested for removing frustration and inserting intuitiveness for the users. Finally, *hedonic attributes* are the third common theme between focus group and interview data. Findings from both the focus group and interview revealed that a 2D to a 3D transformable garment with well-defined assembly instructions fosters creativity and raises the level of enjoyment in users.

Future Implications and Future Research. The study's findings provide innovative design solutions for user engagement in the making process for consumers/users with limited or no prior garment-making knowledge. Moreover, this study considers user-friendly design strategies and details that guide users through the clothing assembly process with a minimum of difficulty. Finally, this study stimulates consumer awareness of sustainable fashion by engaging them in the clothing assembly process. Future research could explore more variations of transformable garment styles for participants' evaluation.

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