Exploring Participants' Perceptions of Fit for Customized Dresses

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Keywords: computer-aided design (CAD), made-to-measure (MTM), sizing and fit.

Introduction

Many wearers have significant fit requirements for garments due to their diverse body sizes and shapes. It is important to meet wearers' sizing and fit needs, and customized garments could provide more solutions for garment fit. Utilizing computer-aided design (CAD) technologies is an efficient way for customized garment development (Song & Ashdown, 2012). However, adopting the made-to-measure (MTM) function of CAD systems is usually time-consuming and complex (Ashdown & Dunne, 2006; Guo & Istook, 2023; Song & Ashdown, 2012). Wearers' preferences for fit are relevant to their satisfaction and decisions to ultimately keep or return the garments. The reduced return rate contributes to clothing longevity and fashion sustainability (Nguyen, 2019). As Ashdown (2007) suggested in her conceptual model, both wearers and patternmaking experts could be participants to evaluate the fit. However, their perceptions might be inconsistent. Wearers perceive fit through not only the look but also the feel of clothing, while patternmaking experts mainly judge fit by the appearance of garments (Ashdown & Loker, 2010). Therefore, it is worthy to investigate the perception of fit from both experts' and wearers' perspectives. The purpose of this research was to examine participants' fit perceptions of customized dresses and to analyze the factors that impact garment fit.

Methodology

A part of Ashdown's (2007) theoretical framework regarding "fit issues" was applied to guide the methodology in this research (Figure 1). As different MTM systems would generate various fit results, two varied CAD systems, Gerber AccuMark and Telestia Creator, were chosen to compare the MTM processes and fit outcomes. Gerber AccuMark requires users to develop an MTM system for an apparel design by themselves. In contrast, Telestia Creator has integrated its MTM system (many basic blocks) into its software, and users can adopt the "automatic" function to generate a basic block and then alter the basic block for the desired apparel design. A princess line sleeveless shift dress was used to investigate the influence of body shape on garment fit.

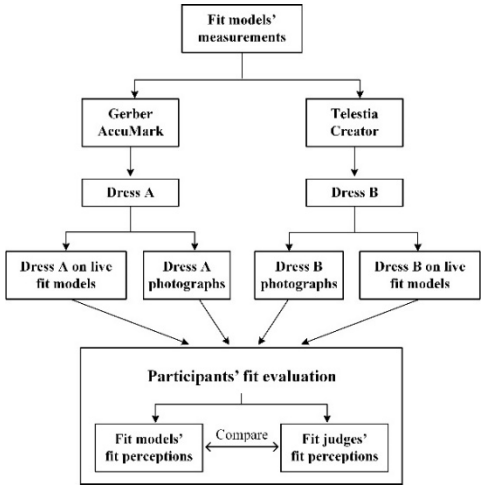

Figure 1. Methodology flowchart.

Five models aged 18-25 labeled as Model 0, Model 1, Model 2, Model 3, and Model 4 were selected for the prototype development and final garment creation. According to Simmons et al.'s (2004) shape categorization, Model 0, who represented a Bottom Hourglass shape, was

only for the MTM system development in Gerber AccuMark. Each of the other four models represented one of the four typical body shapes: Model 1 (Spoon shape), Model 2 (Rectangle shape), Model 3 (Hourglass shape), and Model 4 (Bottom Hourglass shape), for the dress development in both Gerber AccuMark and Telestia Creator. Since the 3D body scanning method using a stationary scanner would result in more precise measurements (Xia et al., 2019), a $[TC]^2$ body scanner was used to obtain all participants' measurements according to the landmarks of each MTM system. After developing the MTM system, Dress A was generated for the four models using the created stylized pattern in Gerber AccuMark. Dress B was individually altered from the basic blocks created for each of the four models in Telestia Creator. As shown in Figure 2, eight customized dresses were developed for the four fit models: Model 1 (1A & 1B), Model 2 (2A & 2B), Model 3 (3A & 3B), and Model 4 (4A & 4B).

Figure 2. Four Models' Dress A and Dress B.

We designed a questionnaire specifically to assess the fit of the customized dresses on each of the four models. A seven-point scale (ranging from -3 to 3) was adopted for the ratings at seven locations, including the front neckline, front princess line, back neckline, back princess line, shoulder seam, armhole, and side seam, and for measurement ease, including the neckline ease, total bust ease, total waist ease, total hip ease, and armhole ease. After the four models and eight experts evaluated the twelve categories above, they were asked to rate the overall fit of each garment.

For qualitative data collection, a column of comments/adjustments for the twelve categories and a page of sketches of the dress were included in the questionnaire for participants to either draw or circle perceived fit problems. Eight experts were recruited based on their patternmaking experience. The four fit models and eight experts attended a live evaluation meeting and completed the same questionnaire. Each of the four models wore and showed the dresses to the eight experts live. After the experts evaluated all model's Dress A and Dress B live, each model's photographs shown on a big computer monitor as a reminder were only for one question: "Which Dress do you think is better for the Model?" The quantitative and qualitative data on the participants' fit perceptions were collected and analyzed.

Results and Conclusion

Pairwise comparisons of means and one-tailed paired *t*-test were performed for the quantitative data analysis. The qualitative data were analyzed based on the category and frequency of the participants' comments. In addition, we compared the models' and the experts' perceptions of the customized fit of Dress A and Dress B. The fit issues of the dresses were determined from the participants' perceptions. From the result of one-tailed paired *t*-test, Dress B was significantly better than Dress A at the front neckline, front princess line, back neckline, neckline ease, and total hip ease. The result of the pairwise comparison of means showed that Dress B

was rated higher than Dress A in all categories except for the side seam. The qualitative results showed that the participants primarily assessed the customized fit based on the measurement ease, seam placement, and wrinkle occurrence. The majority of the models (wearers) and experts preferred Dress B created using Telestia Creator to Dress A developed using Gerber AccuMark.

The participants' fit perceptions also revealed that many factors, such as the CAD systems, participants' fit preferences, models' body characteristics, fabric, and measurement ease, influenced the fit outcomes. In comparison to the models, the experts identified more fit issues, which may correspond with Ashdown and Loker's (2010) findings that wearers focus more on the comfort than the look of garments. The comparison of the two CAD systems could provide valuable insights for users to utilize these systems. The research results would also be beneficial for apparel companies and technical designers to perform fit evaluations and enhance their product development processes.

References

Ashdown, S. P., & Dunne, L. (2006). A study of automated custom fit: Readiness of the technology for the apparel industry. *Clothing and Textiles Research Journal, 24*(2), 121-136.

Ashdown, S., & Loker, S. (2010). Mass-customized target market sizing: Extending the sizing paradigm for improved apparel fit. *Fashion Practice*, *2*(2), 147-173.

Ashdown, S. P. (Ed.). (2007). *Sizing in clothing: Developing effective sizing systems for ready-to-wear clothing*, xix. Woodhead Publishing, Cambridge.

Guo, S., & Istook, C. L. (2023). Evaluation of 2D CAD technology for garments customized for body shape. *Fashion Practice, 15*(1), 136–162.

Nguyen, A. (2019). Want to be sustainable? Stop returning your clothes. *Sustainable & Social.* https://sustainableandsocial.com/decoded-fashion-returns.

Simmons, K. P., Istook, C. L., & Devarajan, P. (2004). Female figure identification technique (FFIT) for apparel, Part II: Development of shape sorting software. *Journal of Textile and Apparel, Technology and Management, 4*(1), 1-15.

Song, H. K., & Ashdown, S. P. (2012). Development of automated custom-made pants driven by body shape. *Clothing and Textiles Research Journal, 30*(4), 315-329.

Xia, S., Guo, S., Li, J., & Istook, C. (2019). Comparison of different body measurement techniques: 3D stationary scanner, 3D handheld scanner, and tape measurement. *The Journal of the Textile Institute, 110*(8), 1103-1113.