Style preferences toward the dress recommended based on body shapes

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Background and Purpose: Each woman possesses unique body measurements, weight, and height, that influence their dress and style choices. However, they often internalize blame for poorly fitting garments, leading to body shame (Levine & Murnen, 2009). The Female Figure Identification Technique (FFIT) identifies five body figures: triangle, inverted triangle, rectangle, oval, and hourglass (Simmons et al., 2004). Of these, the hourglass figure, characterized by a 0.7 waist-to-hip ratio, is often idealized as the healthiest by women (Alexander et al., 2005; Connolly et al., 2004; Makhanya & Mabuza, 2020).

Research in computer engineering has delved into body shape-based styling frameworks by examining celebrities' styling data and body shape categories, discerning links between body shapes and dress preferences, and creating data patterns that align clothing styles with body measurements (Hidayati et al., 2021). Some studies concentrate on generating style recommendations using celebrity photo databases (Hsiao & Grauman, 2020), aesthetic features (Yu et al., 2018), and real-time intelligent vision technology (Chao et al., 2009). Nonetheless, scant research has been directed toward silhouette recommendations based on body shapes. Therefore, the current study investigated a novel style recommendation system tailored to body shapes to fulfill consumers' desires for personalized styles and enhance purchase intentions. The objectives included evaluating consumer purchase intentions regarding the female body shape-based style recommendation system by aligning dress attributes with the five FFIT body shapes.

Methods: The basic dress styles suitable for each body shape were identified through an examination of fashion books, blogs, prominent fashion brands, and magazines, including resources like Trunkclub, Stitch Fix, WhoWhatWear, Vogue, and Tan France, as well as "The Body Shape Bible" from 2007. Dress attributes were delineated from design elements, focusing on three primary attributes—necklines, waistlines, and silhouettes—due to their significant interaction with the torso and their ability to alter the perception of body shape. Neckline

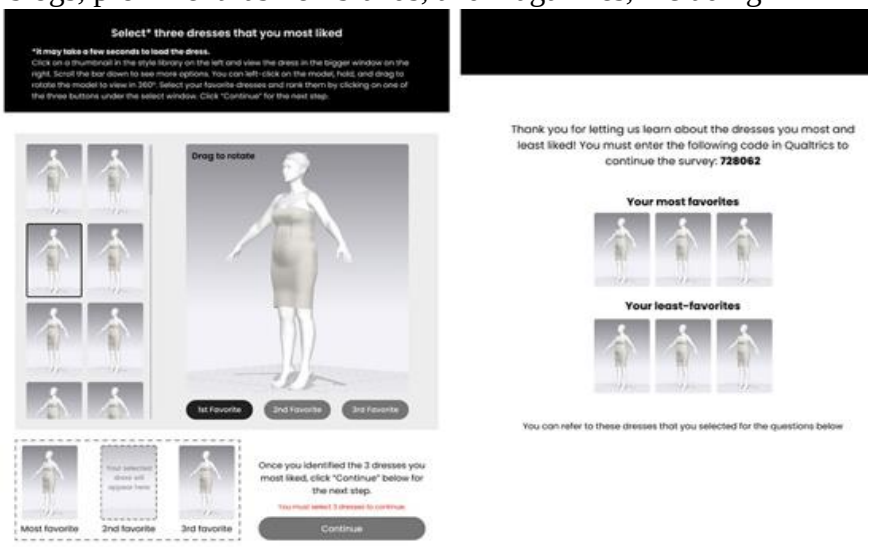

Figure 1. *Interactive 3D style recommendation website*

styles considered were V-neck, scoop neck, and strapless (Shoukat, 2016). Waistline categories included natural, drop waist, and no waistline (Stitch Fix, 2017), with the empire waist being substituted by a no-waist option to enhance the visual distinction in 3D models. Dress silhouettes were narrowed down to A-line and H-line, representing the most observed styles (Stitch Fix, 2017). These dress style combinations were modeled and rendered onto five body shapes using CLO3D for prototyping.

A style recommendation system was developed for an interactive website featuring these 3D-rendered dresses and body shapes. Patterns for the 18 dress styles were created in Adobe Illustrator and transferred to CLO3D, considering three variables: neckline, waistline, and dress silhouette. The garments were visualized on a 3D female avatar representing five body shapes. The website interface was crafted in Figma, incorporating features for participant validation, body measurement input, and dress style preference selection. PHP, CSS, and Three.js were employed to construct the website (Figure 1). Separate subdomains were established for the control and experimental groups. Data gathered from participants on the website were initially stored in cPanel before being transferred to Qualtrics for further analysis.

Before interacting with the style recommendation website, participants were asked about their self-identified body shape, ideal body shape, body satisfaction, purchase intention, trend preferences, self-estimated body measurements, and fit preferences. Their body shapes were calculated according to FFIT's definitions based on self-measured body metrics. After arriving at the website, participants were randomly assigned to the experimental or control conditions. The control group had access to all styles, regardless of their body shapes. In contrast, the experimental group was presented only with dress options recommended for their reported body shapes. All participants indicated their top three liked and disliked dresses. The chosen styles were then compared between the two groups and analyzed in terms of body shapes and purchase intentions.

Results and Discussion: Of 163, 18-65 years old U.S.-based female MTurk users, 60% chose an ideal body shape different from their self-identified one. Twenty percent of ovals, 22% of rectangles, and 18% of triangles preferred the hourglass figure. A mismatch between self-identified and FFIT-calculated body shapes was observed (Kappa = -0.019). Inverted triangle participants favored recommended styles more than other shapes, while triangles were least likely to follow recommendations. Hourglass figures preferred natural waist and H-line dresses; triangle and rectangle shapes chose natural waist with A-line, and ovals favored A-line except for drop waist (2%) and strapless (3%). Inverted triangles liked natural waist with V-neck or scoop necklines. Control group participants (n=106, 40%) commonly rejected strapless, no waistline, and A-line styles, contrasting with 70% (n=57) of the experimental group disliking V-neck, no waistline, and A-line dresses. Fit issues affected 45% of shoppers, primarily concerning length/height (47%), bust (32%), waist (29%), and hips (27%). Yet, 63% felt more confident in A-line, fit and flare, and wrap dresses. Positive purchase intentions were reported by 49% of the

experimental group and 42% of the control group, suggesting personalized recommendations could enhance consumer satisfaction. There was no significant difference in the intention to adopt style recommendations between the control and experimental groups ($p > .05$).

Conclusion: The study's findings suggested that dress style recommendations should vary according to body shape. Distinct preferences for waistlines and silhouettes were evident among individuals with different body shapes, although these preferences may be subject to personal opinions. Despite choosing similar liked and disliked styles as the control group, the experimental group was dissatisfied with the limited style options. The results also showed that both control and experimental groups found drop waist and no waistline styles unfavorable. However, both groups expressed positive sentiments about the style recommendation system's 3D engagement feature, which allowed for avatar and dress rotation. These insights can inform future research into enhancing the 3D shopping experience in retail environments.

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