Beyond Functionality: Fashionable Adaptive Footwear for Individuals with Vision Impairment

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Contextual Review & Concept Statement. Designers and footwear brands have previously developed footwear for individuals with vision impairment (VI). This design scholarship aims to address the existing gap in footwear designs for VI individuals and explore new techniques to meet their needs. This design scholarship focuses on three goals: Firstly, individuals with disabilities desire equal opportunities as those without disabilities. As noted by researchers McBee-Black, Lee, Morris, and Michaelson (2021), adaptive apparel should follow the same trends and styles as clothing designed for individuals without disabilities. In the past, designers used braille on footwear primarily for functionality and did not consider it as a design element. Braille is a system of raised dots that can be read with the fingers by people who are blind or have low vision (What Is Braille?, n.d.). This footwear design investigates techniques to merge aesthetics with functionality by incorporating braille as an embellishment and surface design. Secondly, this design scholarship focuses on using braille correctly and according to standards. Previous footwear designs for VI individuals often overlooked the specific measurement requirements for braille. The braille language included on the surface of the footwear was either larger than the standard size or engraved instead of raised. According to the Braille Authority of North America, the nominal base diameter of braille dots should be between 0.059" (1.5mm) and 0.063" (1.6mm) to ensure legibility for VI individuals. The dots should also be domed or rounded to meet the tactile requirements (Size and Spacing of Braille Characters | Braille Authority of North America, n.d.). Thirdly, previous footwear designs for VI individuals used braille to convey messages unrelated to relevant footwear information. This design scholarship aims to utilize braille to provide VI individuals with essential information about this footwear, such as size, materials, and country of origin. This information is printed on the inner surface of the footwear in both written format and a QR code. Proper implementation of QR codes on apparel can make them accessible to people who are blind or have low vision using assistive technology (Filho et al., 2018).

Aesthetics. The design of this footwear incorporates a wing-shaped element inspired by the Adidas x Jeremy Scott sneaker on the outer side. This wing serves as a flat platform to display information in braille. Additionally, this design scholarship utilizes an existing design element to demonstrate its transformation, making it more inclusive and accessible to individuals with VI. The shoelace-facing pieces on each side of the footwear feature scalloped edges that complement the wing forms. The braille is incorporated as silver embellishments, resembling feather details on the side wings. These embellishments serve both functional and aesthetic purposes. According to the researchers Cho, Aflatoony, Morris, and Uriyo (2020), individuals with vision impairment desire diverse tactile attributes that are pleasant to touch. Hence, in this design, both sides of the leather were utilized to provide different

tactile experiences. The back side of the leather features a slightly darker shade, allowing for not only two different tactile sensations but also two shades of navy color in this design. Furthermore, the white shoelace in this design includes an elastic feature to facilitate easy donning and doffing for individuals with VI (Chang & Lee, 2015). The shoelace is secured on top by a silver-colored screw lock. This approach not only provides a minimalist look but also transforms the lace-up shoe into a slip-on, eliminating the need for tying and untying shoelaces. Thus, the elastic shoelace serves as an ideal solution for individuals with VI.

Process, Technique, and Execution. The design process began with pencil and paper sketching, allowing for initial ideation. Once the desired result was achieved, prototyping commenced using a women's shoe last in size 8.5 US along with a matching classic rubber sole (figure 1). To create the upper part of the shoe, the shoe last was covered with 2" wide masking tape, serving as a base for drawing. Once the desired shape was achieved, the masking tape was carefully separated from the last and placed on cardboard. Patterns were transferred to the cardboard, and seam allowances were added to the patterns. The outer layer of the shoe was cut from genuine navy-colored cow leather. The wing, heel counter, toe box, and lace facing were cut from the flesh side of the leather, while the quarter and tongue were cut from the suede side. The lining, made from ultra-thin cream-colored genuine leather, was cut and prepared separately. Prior to cutting the lining, essential information such as shoe size, material, country of origin, and a QR code containing the same information were printed in black on the lining leather using the Roland LEF-300 UV printer. For additional details, the back pull loop was cut from silver genuine leather. All the pieces of the outer layer and lining were fused together using Tear Mender leather adhesive and ¼" topstitching all around the edge of each piece to secure them (figure 2).

Figure 1.

Figure 2.

Figure 3.

The process of creating the braille embellishment on the wing began by converting the footwear information from text to braille notation using the BrailleTranslator.org website (Braille Translator, n.d.). Then the braille was transferred to the leather wing. An awl tool was used to pierce each of the dots of the braille (figure 3). To achieve the raised texture of the braille, stainless steel ball head pins, commonly used in jewelry making, were inserted into each pierced hole. The diameter of each ball adheres to the

standards set by the Braille Authority of North America, which is 1.5 mm. Each pin was cut in half and folded on the back, allowing it to be fused between two layers of leather. The various pieces of the footwear were stitched together using both a Janome DC1050 computerized sewing machine and traditional hand stitches for leatherwork. Once the upper part of the footwear was completed, it was fused to the shoe sole using Tear Mender leather adhesive. Stitches were then applied to further secure the connection between the upper and the sole.

Design Contribution. In this design, the researcher aimed to enhance accessibility and inclusivity. Firstly, they included important footwear information in multiple formats; written, QR code, and braille. This approach utilizes a range of communication means, making the product universally designed and accessible to individuals both with and without disabilities. Additionally, the braille on the wing was applied as a form of surface design and embellishment. By integrating the braille in this way, it becomes a subtle and integrated feature, rather than standing out as a separate and distinct element. This approach makes braille more appealing to individuals, regardless of their vision impairment status.

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