

IMPROVED BRA DESIGN USING DIGITAL CAD & KNIT TECHNOLOGIES

AUTHORS

Ms. Krissi Riewe Stevenson
Kent State University, Kent, OH, USA
kriewe@kent.edu

KEYWORDS

Digital Knitting, Functional Design, Technology, Bra Design, Garment Fit

DESCRIPTION

Clothing is proven to affect how people perceive themselves, and a properly fitted garment can provide a positive self-perception and sense of dignity. This is especially important to intimate garments such as a bra that are personal and are meant to sit directly on the body. However, this garment is one of the more difficult to fit on the body's unique forms, and few people wear the correct size or style for their shape and body type.

This knowledge combined with the researcher's experience in the bra industry inspired this applied design research utilizing the benefits of digital knitting and Clo 3d to address these problems. For this project, a Stoll CMS ADF-3 16-guage and 7.2-guage knitting machines and proprietary programming software Create+ was used in conjunction with the 3D design software Clo 3d to develop a workflow of shape and textile structure development for a 3D knitted bra garment.

To begin, extensive knit structure and material sampling on the knitting machines was explored to create correct compression and support, pointelle designs, and an embedded underwire channel. The outcome was a double-faced spacer fabric with a silk exterior, elastic spacer yarn, and a cotton-wrapped elastic back. To develop the bra shape, a pattern was developed and fitted using Clo 3d. This pattern was then analyzed as a physical 3D shape, and using mapped lines and physical manipulation, the pattern was transformed into a knittable shape using Adobe Illustrator and Clo 3d. Digital Knitting combines material properties and shape in one piece, reducing the need for separate pattern pieces and separate textiles in one garment. By using digital knitting, the designed structures developed during the materials testing phase can be focused in specific areas providing seamless engineered support. Exact 3D shapes can be made without cut and sew methods using short-row knitting, or in digital knitting goring.

While not designed to work together, these technologies are integrated into a workflow that capitalizes on the benefits of each tool. Clo 3D is used to develop shape and fit, and with knowledge of the digital knit programming process and material study, the pattern is transformed into a knittable shape. This shape was imported into the Stoll Create+ software indicate structure placement. Then the structures and details are programmed, and the file sent to the knitting machine.

This developing research has produced the first version of the bra for fit testing; ongoing work will further improve the process and refine the resulting garment. By establishing this more sustainable, customizable, and comfortable process of bra construction, it can be expanded upon and used in fashion-forward, artistic designs as well as other types of garments or medical products that rely on compression and elasticity to support and shape the body.