



Title:

**Visual Perception of Digital Textile Prints in Judging the Attractiveness of Female Body**

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Introduction:

With the fast growing development of the computer technology, applications of software provide a capable platform for the apparel industry in simulating digital textile prints and virtual 3D body models.

In view of this, the objective of this research is to develop an interactive digital prints on 3D body models for apparel industry through the study of critical parameters that influence physical attractiveness of female body.

The developed digital prints on 3D models are able to support designers in creating attractive garment prototypes more easily and accurately during the process of sample development; while the system can also be adopted as a useful tool and comprehensive platform for educational purpose.

Background:

Many researchers derived their studies from judging female physical attractiveness based on the most popular indicator, Waist-Hip-Ratio (WHR) that was developed by Singh [5]. In different counties, there are diverse views in ranking the importance of these shape parameters (waist and hip width) towards female physical attractiveness; and various types of image simulations from line drawings [5-6] to computer-manipulated photographs [2] and 3D figures were used in studying the attractiveness of female body figures.

Meanwhile, the demand for computer-related skills in apparel industry is increasing throughout the past decade and it is predicted that the skills required in different areas will increase from 5 to 15% by the next 5 years [4]. The use of computer technology speeds up the development cycle especially in the areas of computer-aided design (CAD), digital textile design, 3D garment design and drafting, and product lifecycle management (PLM) systems in apparel business [1]. There is a research gap in the development of digital prints on 3D body models to enhance the attractiveness of body shape. The successful development is suitable for use digitally in all aspects of apparel industry.

Main ideas:

The main ideas of this study are to investigate the parameters that influence the judgement of the body shape attractiveness within a group of college-age students in Hong Kong and then morphing the digital prints for fabric based on the importance of these parameters. Virtually try on the developed 3D body models and explore the differences in perception of fabric prints before and after morphing in judgment of the body shape attractiveness.

### Methods and results:

The research methodologies used in this study include comprehensive literature review, questionnaire surveys, data analysis, conducting experiments and design prototype development.

#### *Phase 1 - Preliminary study to find out the essential parameters in judging the attractiveness of body figures*

A preliminary questionnaire survey was distributed to 127 college-age students in Hong Kong to explore the principal parameters of forming attractive 2-dimensional body shape and rank the importance of these parameters.

Results show that the waist girth is ranked as the most important one, second is the hip girth and the least important parameter is the shoulder width.

#### *Phase 2 - Experiments study to explore the differences in perception between 3D photographs and outline images in judging the attractiveness of body figures*

Based on the analysis in the phase 1 - preliminary study, a set of experiments are designed and simulated for further study, which contain 3D figure photographs and outlines with different measurements of parameters. An intermediate questionnaire survey was distributed to 176 college-age students.

The aims of this study are to investigate the influence of the parameters, shoulder-width (S), waist (W) and hip girth (H) on the attractiveness of female body image; figure out the ideal proportion and body measurements for female figure; and explore the differences in perception between 3D figure photographs and outlines. Results show that the ideal female figures for 3D photograph and outline are quite similar.

#### *Phase 3 - Prototypes study to investigate the difference in perception between original and morphed fabric prints in judging the attractiveness of body figures*

The use of different design elements on fabric prints is able to create optical illusion on the body, in order to enhance the appearance of the wearer and to improve the perception of the body shape [3]. In addition to the findings obtained in phase 2 - experiments study, design elements are included to generate fabric prints. The ideal body shape with different combinations of parameters is then used as a basis to morph the original fabric print design. Two sets of new fabric prints for each design are generated using computer application, one with the two parameters, waist and Hip (W+H) while the other one with the three parameters, waist, hip and shoulder (W+H+S).

“Garment silhouette is the outer shape of a garment; the silhouettes come to life when the garment is viewed on the body” [3]. In view of this, a prototype of 3D body model is developed and virtual try on experiments are conducted to replace image simulation to investigate the changes and influences on silhouette when mapping with original and morph fabric prints.

A questionnaire survey was distributed to 15 college-age students, the objectives are to explore the differences in perception between original and morphed fabric prints when mapped on the 3D model, as well as the influence of digital fabric prints in judging the attractiveness of female body figure.

### Conclusion:

Results show that the original fabric print (no parameters added) is least attractive in comparison with two morphed fabric prints. Attractiveness of body figure with fabric prints increases dramatically when the two parameters (W+H) are considered. Shoulder parameter added on the top of a garment will increase the attractiveness gradually. In conclusion, two or three parameters applied to fabric prints can enhance the attractiveness of body figure.

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