

## Application of 3D Apparel CAD for Costume Reproduction

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**Abstract :** 3D apparel CAD is one of the remarkable products in advanced technology which enables intuitive design, visualisation and evaluation of garments through stereoscopic drape simulation. The progressive improvements of 3D apparel CAD have led to the creation of more realistic clothing simulation which is used not only in design development but also in presentation, promotion and communication for fashion as well as other industries such as film, game and social network services. As a result, 3D clothing technology is becoming more ubiquitous in human culture and lives today. This study considers that such phenomenon implies that the technology has reached maturity and it is time to inspect the status of current technology and to explore its potential uses in ways to create cultural values to further move forward. For this reason, this study aims to generate virtual costumes as culturally significant objects using 3D apparel CAD and to assess its capability, applicability and attitudes of the audience towards clothing simulation through comparison with physical counterparts. Since the access to costume collection is often limited due to the conservative issues, the technology may make valuable contribution by democratization of culture and knowledge for museums and its audience. This study is expected to provide foundation knowledge for development of clothing technology and for expanding its boundary of practical uses. To prevent any potential damage, two replicas of the costumes in the 1860s and 1920s at the Museum of London were chosen as samples. Their structural, visual and physical characteristics were measured and collected using patterns, scanned images of fabrics and objective fabric measurements with scale, KES-F (Kawabata Evaluation System of Fabrics) and Titan. Commercial software, DC Suite 5.0 was utilised to create virtual costumes applying collected data and the following outcomes were produced for the evaluation: Images of virtual costumes and video clips showing static and dynamic simulation. Focus groups were arranged with fashion design students and the public for evaluation which exposed the outcomes together with physical samples, fabrics swatches and photographs. The similarities, application and acceptance of virtual costumes were estimated through discussion and a questionnaire. The findings show that the technology has the capability to produce realistic or plausible simulation but expression of some factors such as details and capability of light material requires improvements. While the use of virtual costumes was viewed as more interesting and futuristic replacements to physical objects by the public group, the fashion student group noted more differences in detail and preferred physical garments highlighting the absence of tangibility. However, the advantages and potential of virtual costumes as effective and useful visual references for educational and exhibitory purposes were underlined by both groups. Although 3D apparel CAD has sufficient capacity to assist garment design process, it has limits in identical replication and more study on accurate reproduction of details and drape is needed for its technical improvements. Nevertheless, the virtual costumes in this study demonstrated the possibility of the technology to contribute to cultural and knowledgeable value creation through its applicability and as an interesting way to offer 3D visual information.

**Keywords :** digital clothing technology, garment simulation, 3D Apparel CAD, virtual costume

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