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The Effectiveness of Circular Economy in Achieving the Sustainability of Evening Wear Produced from 3D Fabrics Using the Draping on the Mannequin Technique

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Abstract:

Sustainable development is a comprehensive approach that aims to balance environmental, economic, and social requirements, ensuring the needs of the present generation are met without compromising the ability of future generations to meet their own. Sustainability has become a global concern across various sectors, especially in industries with significant environmental impact such as the fashion industry, which is one of the largest and most resource-intensive industries worldwide. Therefore, this research aimed to apply sustainability principles and the circular economy by recycling garments made from three-dimensional fabrics using draping techniques on the mannequin. The goal was to reduce environmental waste and extend the life cycle of garments by innovating eveningwear designs that offer both functional and aesthetic value. The importance of the research lies in integrating sustainable design practices with draping techniques, contributing to waste reduction and promoting innovation and economic efficiency by reusing resources in more sustainable ways. This supports the principles of the circular economy and sustainable fashion. Accordingly, the research problem was formulated through the following questions: What is the potential for applying the concepts of the circular economy and sustainability in recycling garments made from three-dimensional fabrics into new products to reduce waste? How can draping techniques on the mannequin be utilized to innovate eveningwear designs using three-dimensional fabrics and add value to discarded materials? To what extent are the executed designs successful from the perspectives of specialists and consumers? The research adopted an applied methodology by implementing a set of designs through recycling garments made from three-dimensional fabrics using draping techniques on the mannequin. These designs were presented to a panel of academic specialists in fashion and textile fields, as well as to a group of female consumers, to assess the validity of the research hypotheses. The results revealed the following: Statistically significant differences were found among the executed designs in terms of fulfilling design principles and elements, according to specialists' opinions. Average evaluation scores and quality coefficients were calculated, indicating high quality scores. Statistically significant differences were found among the executed designs regarding their innovative values, as assessed by specialists. The designs achieved high success rates and acceptance among the specialist panel: design 4 scored a quality coefficient of 100%, designs 1, 2, and 5 scored 98.33%, and design 3 scored 93.33%, reflecting strong success in meeting the second axis indicators. Statistically significant differences were found among the designs in terms of functional values and sustainability achievement, based on specialists' evaluations. Designs 1 and 4 scored 98.67%, design 3 scored 97.33%, and designs 2 and 5 scored 93.33%, all indicating successful realization of the third axis indicators. Statistically significant differences were observed among the designs regarding overall evaluation criteria according to specialists' assessments. Overall quality scores were as follows: design 4 scored 96.25%, design 2 scored 95.83%, designs 1 and 5 scored 94.16%, and design 3 scored 92.08%, all indicating successful fulfillment of the evaluation axes. Statistically significant differences were found among the designs according to consumers' evaluations. Average consumer ratings and quality coefficients were calculated: designs 2 and 4 scored 95.24%, design 1 scored 89.29%, design 5 scored 84.52%, and design 3 scored 76.19%, all showing that the designs were successful in meeting the questionnaire indicators. Sixth hypothesis: Statistically significant differences exist between the evaluations of specialists and consumers regarding the executed designs. To verify this, Spearman's rank correlation coefficient was calculated between the rankings of the specialist and consumer groups, resulting in a statistically significant correlation value of 94% at a significance level of 0.01. This indicates a high degree of agreement between specialists' and consumers' preferences for the proposed designs.

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Circular Economy, Sustainability, Wear Evening, Three- dimensional fabrics, Modeling on the Dress Stand

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