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ANGELA SCRIPCENCO, IONELA VLADA GRAUR
Technical University of Moldova, Republic of Moldova

REDESING, REUSE AND 3D PROTOTYPING AS EFFICIENT APPROACH OF SUSTAINABLE FASHION

Purpose is to develop proposals based on sustainable fashion principles, especially, the recycling of physically or morally used products. The denim fabric was chosen as the prototype, which has become a textile material often used, especially among the youth.

Keywords: sustainable fashion, recycled denim clothes, design, virtual prototype.

Objectives: to study of public opinion among young people regarding the sustainable approach in everyday life, as well as the visions regarding the processing of used clothes; getting familiar with the principles of the circular economy and identifying the methods of application in the field of fashion; identifying the methods of recycling denim clothing products; applying denim recycling methods to create new products; applying 3D design methods by simulating designed products as a sustainable approach to the process of creating new models; validation of the results by making the designed product.

Methodology. As a methodology of find out consumers' opinions and perceptions regarding sustainable fashion principles and recycled clothing was use survey conducted online on the Google Forms platform. Based on the opinion of young consumers about redesign old and used clothes, the project is developed on 2D and 3D modeling for getting patterns.

Research results. the digital models (2D and 3D prototypes) of recycled women's clothes from denim were developed in this paper and made prototypes in experimental part.

Fast fashion is characterized by the rapid creation and release of new and cheap clothes, which have shot life cycle and soon end up in landfills. To reduce this effect, efforts are being made to reduce the production of cheaper clothes and extend their lifespan or applying principles of cycle economy [1, 2]. The production of textile materials requires a large consumption of water and agricultural land. Globally, 79 billion cubic meters of water are used; 20% of global clean water pollution comes from

the textile industry (dyeing of products) [3,4]. Also, washing synthetic fibre clothes generates primary microplastics that end up in the environment [5,6]. The negative environmental impact is evident.

Nowadays researchers and scientists are working about the technology to reduce negative impact of fashion industry on the environment.

To identify the importance of sustainability in fashion, a survey was conducted among student youth. The applied questionnaire contains 22 questions with multiple answers. The questions were formulated based on the concept of sustainability [3]. The survey shows us that 88.6% know the meaning of sustainability. This percentage is a positive one, because the youth know what sustainability is, and what ideas are being promoted.

Following the analysis of the survey, it was observed that the terminology of sustainability among young people is well known, because in recent years, it is being talked about more and more in schools, universities, on the Internet, social networks, being a good solution for a big problem, and namely 88% have knowledge about sustainability. The percentage over 50%, we concluded, that the youth opts for durability, sustainability and methods such as recycling, donation, etc., approx. 73% currently sometimes use sustainability methods, this gives us hope for a cleaner future of the planet.

Application recycling methods for the creation of new products from denim. The fashion industry is always changing, but denim products will always be trendy and favorable to people.



Fig. 1. **The collection of woman clothes made from worn-out denim products:** a – corset, b – skirt and top, c – jacket, d – dress

To apply denim recycling as a sustainable method, a collection of 5 products was made, a corset and top, a skirt, a jacket and a dress (fig.1). The collection uses morally and physically worn-out denim products, and also uses other textiles, which combine with denim.

The 3D virtual simulation is a software that helps us to create the prototype 0. Through the Clo3D software, the virtual prototype of the corset and the skirt was created, using denim as textile material. Virtually made products were tested on the mannequin with the dimensions of the wearer, through this stage, the design mistakes were identified, which determined the good arrangement on the body, so that later we finally have the perfect patterns for making the physical prototype (Fig. 2).

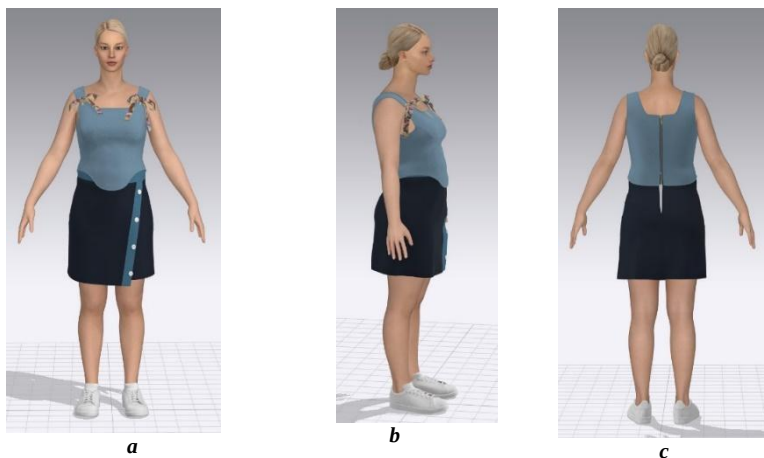


Fig. 2. **Simulation of models in CLO 3D:** a - front view, b – side view, c – back view of designed garments

For the realization of the physical prototype, the sustainable method chosen was the recycling of denim products, which are physically or morally worn. Namely, the manufactured products were recycled from pairs of denim pants. We opted for the recycling of denim pants, because most of us own a multitude of pairs of pants that are not worn, but take up space in the closet. The bodice is made from a pair of denim trousers, with recycled floral cotton bib stock processing. The skirt is made from three pairs of denim trousers, the batting was used and recycled from one pair of trousers, the processing of the spares is with recycled floral cotton ribbon.

Conclusion. In recent years, ecology, pollution, sustainability, recycling has become the biggest problems, when environmental pollution, produced by human industrial activity, has increased. Because the evolution of the modern economy consists in the massive use of natural resources, and the industrial evolution has a direct connection with pollution. The research contains analyze, use and explore the methods of recycling used clothing

products, which can contribute to the reduction of pollution sources caused by the clothing industry production. By applying the principles of sustainability in fashion, there exist opportunities to reduce the negative impact of industry. In this paper, a collection of women's clothing products, made of recycled denim material, is presented. That material is extremely sought in the wardrobe of young people. Recycled clothes in young people's wardrobe became a mainstream as forming one of the rational approaches to use all types of resources, as well as the financial [8].

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