



УДК 687.01:677.08

UPCYCLING TECHNOLOGIES IN CREATIVE COSTUME AND TEXTILE DESIGN

SUGAC Olga, BUJOREAN Tatiana, CARELOVA Alexandra
Technical University of Moldova, Chişinău, Republic of Moldova
*olga.sugac1@dtu.utm.md, tatiana.bujorean@dtu.utm.md,
alexandra.carelova@dtu.utm.md*

This article examines the creative and technological evolution of upcycling within the fashion design educational framework. The study analyzes a two-stage progression: from the functional design of women's garments during undergraduate studies to advanced textile research at the master's level. The authors demonstrate how initial experiments with patchwork techniques in vest construction evolved into a deeper investigation of innovative denim manipulation. The findings highlight the importance of continuous material-focused research in developing sustainable design practices and transforming textile waste into valuable artistic elements for the contemporary fashion industry.

Key words: *upcycling, sustainable fashion, patchwork technique, textile design, denim textures, costume design.*

INTRODUCTION

The modern fashion industry is undergoing a transition to a circular economy, where upcycling is a key tool for sustainability. According to the Ellen MacArthur Foundation, less than 1% of material used to produce clothing is recycled into new clothing, representing a significant loss of resources [1]. Furthermore, the UNEP emphasizes that moving toward circularity requires innovative design approaches that rethink waste as a valuable raw material [2]. For young designers, the challenge lies in the consistent development of methods for reusing textile waste. This study explores the evolution of upcycling techniques: from their functional application in garment design during a bachelor's project to advanced textile research in a master's program. By analyzing this progression at the Technical University of Moldova, the article demonstrates how initial patchwork experiments can lead to the development of complex, innovative textile textures.

PURPOSE

The aim of this study is to demonstrate the continuity and development of upcycling technologies in design education. The work analyzes the practical design of women's vests using patchwork techniques and investigates the further creation of innovative denim textures, highlighting the transition from functional clothing construction to sophisticated textile surface research.



RESULTS AND DISCUSSION

The results of the practical implementation of upcycling technologies are examined across different stages of the educational process, reflecting the evolution from garment design to complex material research.

1. Development of Women's Vests (Bachelor's Level). The initial stage of the study was demonstrated through a bachelor's thesis project focused on a range of women's vests [3]. Vests were selected as the primary object because their structural elements allow for the efficient use of small, irregularly shaped textile scraps. In the developed models (Fig. 1, a - d), the authors applied the patchwork technique. This approach enabled the integration of fabric waste into functional parts, such as the central and side panels, and a detachable corset-belt, without compromising the fit. The combination of traditional handwork with experimental textures resulted in eco-friendly products that meet contemporary aesthetic standards.



Fig. 1. Women's vest designs based on upcycling technologies:
a, c – model 1; b, d – model 2

2. Advanced Denim Texture Research (Master's Level). Building upon the practical experience gained during the diploma project, the research was further



deepened during the master's program. The development of denim textile surfaces is based on the principles of zero-waste design and sustainable use of materials, which allows for the most efficient use of recycled resources without losing their aesthetic value. The focus shifted toward the creation of innovative textile surfaces from denim waste (Fig. 2), exploring more complex technological manipulations:

- **Woven Ribbon Structure** (Fig. 2, a): This texture is achieved by interlacing denim strips of varying widths. The composition combines two types of weaving — rectangular and diagonal — creating a complex rhythmic pattern. The interplay of widths and angles results in a dynamic surface with a pronounced structural relief.

- **Mosaic Weaving** (Fig. 2, b): This sample is produced through the precise interlacing of denim strips of uniform width. The "mosaic" weaving technique forms a stable, grid-like textile canvas. The aesthetic value is derived from the alternating shades of indigo, creating a subtle "pixelated" visual effect.

- **Gradient Linear Topstitching** (Fig. 2, c): This technique utilizes narrow rectangular denim remnants. The scraps are stitched in a gradient sequence along straight parallel lines. The overlapping of elements creates a smooth transition of tones and a "shingle" effect, providing both decorative depth and additional material density.

- **Multilayered Chaotic Application** (Fig. 2, d): This texture features a multilayered application of denim squares of similar sizes but contrasting colors. The elements are topstitched in a seemingly chaotic, overlapping manner onto the base fabric. This method creates a rich, marbled visual effect and a high-relief surface, effectively utilizing even the smallest square-shaped remnants.

This progression shows that while the diploma project proved the functional viability of upcycling, the master's research expanded its aesthetic boundaries, offering a professional toolkit for high-fashion textile design.

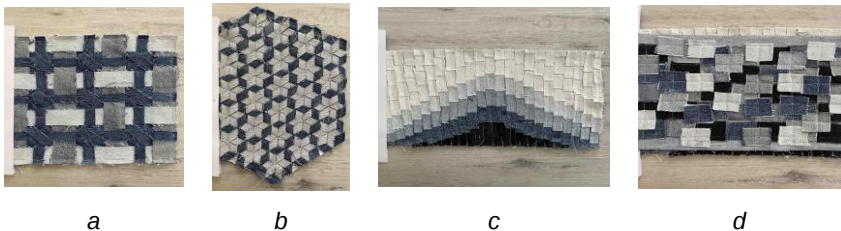


Fig. 2. Experimental denim textures: **a** – rectangular and diagonal interlacing;
b – mosaic weaving; **c** – linear gradient topstitching;
d – multilayered chaotic application.



CONCLUSIONS

The study confirms that upcycling technologies, such as patchwork and denim manipulation, offer a powerful tool for sustainable fashion development. The practical results show that textile waste is not a limitation, but a source of innovative textures and complex visual forms. This approach effectively addresses both ecological concerns and the demand for exclusive, handcrafted design. Furthermore, the integration of these techniques into the educational process (from bachelor to master level) fosters a new generation of designers capable of combining environmental responsibility with high artistic standards.

REFERENCES

1. Ellen MacArthur Foundation. A New Textiles Economy: Redesigning fashion's future. 2017. URL: <https://content.ellenmacarthurfoundation.org/m/6d5071bb8a5f05a2/original/A-New-Textiles-Economy-Redesigning-fashion-future.pdf>.
2. UNEP. Sustainability and Circularity in the Textile Value Chain. – A Global Roadmap. Report. 2023. URL: <https://wedocs.unep.org/rest/api/core/bitstreams/c2f77b11-e92c-4428-a8bf-1a63c9e5ad45/content>.
3. Carelova A. Dezvoltarea sortimentului de veste pentru femei pe baza conceptului de upcycling: Bachelor's Thesis. Chisinau: TUM, 2025.

СУГАК О., БУЖОРЯН Т., КАРЕЛОВА О.

ТЕХНОЛОГІЇ АПСАЙКЛІНГУ В КРЕАТИВНОМУ ДИЗАЙНІ КОСТЮМА ТА ТЕКСТИЛЮ

У статті досліджується креативна та технологічна еволюція апсайклінгу в межах освітнього процесу з дизайну моди. Дослідження аналізує двоетапний розвиток: від функціонального проектування жіночого одягу під час навчання на бакалавраті до поглиблених текстильних досліджень на магістерському рівні. Автори демонструють, як перші експерименти з технікою печворк у конструюванні жилетів трансформувалися у глибоке вивчення інноваційних методів обробки деніму. Результати підкреслюють важливість безперервних матеріалознавчих досліджень для впровадження сталих практик дизайну та перетворення текстильних відходів на цінні художні елементи сучасної індустрії моди.

Ключові слова: апсайклінг, стала мода, техніка печворк, дизайн текстилю, фактури деніму, дизайн костюма.