

The Utilization of Fashion Waste through the Development of Pattern Making and Sewing Techniques to Support Sustainable Interior Products

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ABSTRACT

This study explores the utilization of fashion waste in the design of sustainable interior products through the development and adaptation of sewing and pattern-making techniques traditionally used in the fashion industry. A qualitative experimental approach and practice-based design methodology were applied to select textile waste from local producers and artisans, modify sewing techniques such as sashiko, and create functional interior products. The resulting prototypes were systematically evaluated by experts to assess aesthetic quality, structural integrity, and material efficiency, ensuring that claims regarding the aesthetic value of the products are supported by empirical evidence. The findings indicate that with proper technique modification and material selection, fashion waste can be transformed into environmentally friendly interior products that align with the principles of eco-design, sustainable design, and circular economy practices. The involvement of local SMEs and artisans in the production process generated positive socio-economic impacts, including job creation, economic empowerment, and increased public awareness of sustainable consumption. Overall, this study confirms that the utilization of fashion waste in interior design provides both environmental and socio-economic benefits, promotes sustainable consumption and production in accordance with Sustainable Development Goal (SDG) 12, and offers practical insights for designers, manufacturers, and policymakers interested in circular design and the sustainable creative industry.

KEYWORDS

Patterns, Products, Sewing, Sustainable, Waste

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INTRODUCTION

The fashion and textile industries are among the largest contributors to global waste, encompassing production remnants, pre-consumer waste, and post-consumer garments. When not managed properly, textile waste can lead to significant environmental pollution, including water and soil contamination, as well as the inefficient use of natural resources (Sandin & Peters, 2018). In Indonesia, for example, textile waste generated by home-based industries, small and medium-sized enterprises, and mass clothing production is often disposed of in landfills or discharged into rivers, resulting in serious ecological impacts, particularly river pollution (Rohayati et al., 2017). These conditions highlight the urgent need for sustainable approaches to textile waste utilization that can generate added economic value while simultaneously reducing environmental impacts (Puspitasari & Adams, 2021).

Circular economy and upcycling approaches have emerged as important solutions for reducing textile waste. Upcycling enables textile waste to be transformed into new value-added products, ranging from fashion items to accessories and interior elements (Abrishami et al., 2024a; Kim & Lee,

2025). Previous studies indicate that upcycling not only reduces waste volume but also fosters sustainable creative design innovation (Juanga-Labayen et al., 2022). In Indonesia, the application of upcycled fabric waste in products such as chairs, curtains, and household interior elements has begun to gain traction, demonstrating the potential for the development of environmentally friendly local products (Rohayati et al., 2017).

One of the key technical strategies in textile waste utilization is the development of pattern-making and sewing techniques, which enable optimal fabric use with minimal material residue (Shunqi et al., 2025a). These techniques support zero-waste design approaches for both pre-consumer and post-consumer textile waste, thereby enhancing material efficiency and the aesthetic value of products (Abrishami et al., 2024b; Sandin et al., 2025). Furthermore, creative sewing techniques and adaptive pattern development can be applied to produce sustainable interior products such as decorative panels, furniture upholstery, and household accessories (Djunaidi, 2024; Ratna Delia & Nefo, n.d.). Consequently, the application of pattern-making and sewing techniques not only contributes to sustainability efforts but also opens opportunities for local design innovation and the creative economy.

The increasing volume of textile waste generated by the fashion industry represents a global phenomenon that continues to be dominated by disposal-oriented management practices and conventional recycling approaches, while its potential as a value-added design material remains underutilized, particularly within the context of interior design (Bick et al., 2018). This condition reveals a significant phenomenological gap between the diverse visual, tactile, and structural qualities of fashion waste materials and interior design practices that still predominantly rely on newly manufactured materials, resulting in an incomplete integration of sustainability principles within the design process (Alimin et al., 2022).

From an academic perspective, previous studies have largely addressed sustainability issues within separate domains, such as sustainable fashion, textile waste management, and environmentally friendly material development. In contrast, research that integrates the development of fashion-based pattern-making and sewing techniques as both construction systems and aesthetic strategies in sustainable interior products remains limited. This indicates a clear interdisciplinary research gap between fashion design and interior design (Shunqi et al., 2025a). Therefore, this study holds both theoretical and practical significance by proposing a practice-based design research approach that is not only oriented toward reducing textile waste but also toward transforming function, aesthetic value, and extending material life cycles through the design process. The novelty (state of the art) of this research lies in the adaptive exploration of fashion pattern-making and sewing techniques such as modular patterns, patchwork, and decorative stitching positioned not merely as decorative elements but as primary structural systems and visual expressions in the development of sustainable interior products derived from textile waste (Sandin et al., 2025).

Sustainable interior products represent one of the most promising areas for the utilization of textile waste. International studies indicate that textile waste can be processed into decorative panels, acoustic elements, and furniture upholstery that are both aesthetically appealing and functional (Radev & Marinova, 2023; Sandin & Peters, 2018). In Indonesia, research and experimental practices have been conducted to transform pre-consumer textile waste and household fabric waste into interior elements, including curtains, flat-pack chairs, and household accessories, thereby supporting the local creative economy and environmental education (Djunaidi, 2024). Based on this context, this study aims to explore the utilization of fashion waste through the development of pattern-making and sewing techniques to support sustainable interior products, while integrating circular economy principles and creative design innovation.

METHOD

This study employs a qualitative–experimental approach that integrates literature review, waste source surveys, and design–production experiments to explore the utilization of fashion waste for sustainable interior products through the development of pattern-making and sewing techniques, including traditional embroidery techniques such as *Sashiko*. This approach enables the integration of creative design practices with an evaluation of the environmental impacts of materials (Sandin &

Peters, 2018). It also allows for the examination of material properties, production processes, aesthetic qualities, and resource efficiency, in line with recommendations from global textile upcycling research (Rohayati et al., 2017; Sandin & Peters, 2018). In addition, a comprehensive literature review was conducted to understand global and local upcycling practices, as well as environmentally friendly technological innovations in textile waste processing (Abrishami et al., 2024b).

The research was conducted at several relevant sites, including small and medium-sized garment enterprises, garment manufacturing industries, hotels, and local craft centers that generate textile waste in the form of both production remnants and used fabrics. Primary data were obtained directly from actual textile waste collected at these sites, while secondary data were derived from international and national scholarly literature related to recycling and upcycling strategies, as well as pattern-making and sewing techniques for zero-waste design and sustainable interior applications (Zulkarnain Muttaqien & Adiluhung, n.d.). The selection of research locations and samples was based on the representativeness of waste types, accessibility, and relevance to real production practices, ensuring that the experimental outcomes can be practically applied within the context of the local fashion industry (Falahi & Larasati, 2024).

Textile waste was classified into several categories to ensure that handling methods, production techniques, and final outcomes could be optimally adapted. These categories included pre-consumer waste, such as fabric offcuts and rejected production materials; and post-consumer waste, including used garments, fabric scraps, and household textile waste (Martono et al., 2025). Additional classifications were based on material characteristics, comprising blended fibers knitted textile waste derived from yarn remnants or used knitted fabrics; and thick synthetic or technical fabrics, including Cordura, denim, and canvas. The research materials were sourced from two primary suppliers: Multi Sandang Tama Jaya, which provided fabric offcuts from garment production processes, and PT Ateja, which supplied textile waste in the form of cotton, denim, and synthetic materials. This classification was essential to enable the appropriate selection and adaptation of pattern-making, sewing, and embroidery techniques according to fabric conditions, including thickness, fiber composition, elasticity, and reuse potential (Juanga-Labayen et al., 2022; Shunqi et al., 2025).

The experiments were conducted using several production techniques tailored to the characteristics of the textile waste: zero-waste pattern cutting to maximize fabric utilization without leftovers; modular pattern manipulation to enable fabric pieces to be reused across different products; mixed adaptive sewing for blended or diverse fabric sources; and *Sashiko* embroidery for thin or damaged fabrics to reinforce them while enhancing aesthetic appeal (Simamora M et al., 2024; Zam & Raharjo, n.d.). The final products included curtains, decorative panels, cushions, furniture upholstery, interior bags, and organizers, which were tested for strength, functionality, durability, and fabric usage efficiency (Andriani Saragih & Studi Pendidikan Seni Rupa Jurusan Seni Rupa Fakultas Bahasa dan Seni, n.d.; Cahyani & Nelmira, n.d.).

Table 1. Techniques Used in the Experiment

No.	Technique Type	Technique Description	Function and Purpose	Interior Product Application	Academic Notes
1.	Asymmetrical Cutting Patterns	Utilization of irregular and randomly shaped textile waste pieces to create unique visual patterns.	- Optimizing the use of textile waste - Creating dynamic and non-uniform visual characteristics - Reducing secondary waste generation	Decorative panels, room dividers, and lampshades	Demonstrates design flexibility and highlights the exploratory potential of discarded textiles as a creative resource for interior applications.
2.	Stitched Padding and Layering	Sewing and stacking multiple layers of textile waste	- Reinforcing material structure - Producing 3D surface textures	Decorative panels, room dividers, and lampshades	Aligned with material ethics, emphasizing the integration of function,

(Layered Textiles)	to enhance material strength and generate three-dimensional textures.	- Enhancing aesthetic value and durability	sustainability, and aesthetic qualities derived from material authenticity. (Strappini et al., 2023)
3. Edge Stitching and Fine Finishing	Adaptation of fashion finishing techniques such as overlock stitching, binding, and topstitching to smooth and reinforce fabric edges.	- Increasing material durability - Ensuring edge safety and user comfort - Creating a refined and professional appearance	Decorative panels, room dividers, and lampshades Provides construction quality comparable to fashion industry standards and enhances the commercial and professional value of interior products made from fashion waste.

The experimental procedure consisted of several stages: sampling and selection of textile waste; material preparation, including cleaning, initial cutting, and sorting; pattern design and prototyping; prototype production; evaluation and documentation; and design and quality validation through focus group discussions with designers, artisans, and prospective users. The evaluation aspects included aesthetics, comfort, material strength, fabric usage efficiency, and market potential (Djunaidi, 2024; Manalu & Studi Pendidikan Seni Rupa Jurusan Seni Rupa Fakultas Bahasa dan Seni, n.d.; Shunqi et al., 2025b).

Data analysis was conducted using qualitative descriptive methods to assess design outcomes and innovations, as well as quantitative methods to calculate fabric utilization ratios. Triangulation was performed through feedback from users and designers to validate aesthetics, functionality, and product acceptance. This approach supports sustainability principles by reducing environmental impacts through the reuse and upcycling of textile waste, as recommended in the literature (Berlianda & Ernawati, 2025; Sandin & Peters, 2018).

RESULT AND DISCUSSION

This study successfully produced sustainable, aesthetically appealing, and functional interior products by utilizing modified sewing techniques derived from the fashion industry. The resulting products included cylindrical lampshades and interior partitions crafted from textile waste. The findings indicate that the utilization of fashion waste not only reduces waste volume but also provides a concrete example of how the fashion industry can contribute to sustainability in interior design. The images below illustrate the application of *Sashiko* sewing techniques on denim fabric waste.



Figure 1. Application of *Sashiko* Sewing Technique on Denim Waste
 (Source: Personal documentation, 2025)

The following are the stages in prototype development:

1. Lampshade

The lampshade was developed using denim waste and incorporated the *Sashiko* sewing technique as a decorative element. Utilizing denim waste produced a strong and durable product, while the *Sashiko* technique not only enhanced aesthetic value but also reinforced the fabric structure. Through the embroidery of geometric lines, the lampshade creates a visually appealing effect suitable as an interior decoration. The prototype development process began with creating a three-dimensional design using SketchUp software.



Figure 2. Initial Design of the Lampshade 1
(Source: Personal documentation, 2025)



Figure 3. Initial Design of the Lampshade 2
(Source: Personal documentation, 2025)

The next stage involved selecting the denim material to be used according to the initial design, creating the pattern, and cutting and sewing the fabric using the *Sashiko* embroidery technique following the established pattern. Embroidery threads were carefully combined in colors to achieve an aesthetically pleasing effect. Subsequently, the embroidered denim fabric was cleaned of excess threads and then attached to the lampshade surface using adhesive.



Figure 4. Stages of Lampshade Fabrication
(Source: Personal documentation, 2025)



Figure 5. Prototype of Table Lamp 1
(Source: Personal documentation, 2025)



Figure 6. Prototype of Table Lamp 2
(Source: Personal documentation, 2025)



Figure 7. Prototype of Table Lamp 3
(Source: Personal documentation, 2025)

2. Interior Partition

The partition was designed using fashion waste in the form of fabric offcuts, giving it unique and flexible characteristics. The design concept, which combines asymmetric patterns and patchwork techniques, resulted in a product that is not only aesthetically appealing but also functional as a space divider. By utilizing textile waste, the production process reduces the amount of waste ending up in landfills and decreases the need for new materials.

The prototype development began with creating a three-dimensional design using SketchUp software. The asymmetric cutting patterns utilized random and irregular fabric offcuts to form a visually unique pattern, aiming to optimize waste utilization, create a dynamic visual character, and minimize further waste. This approach demonstrates design flexibility and the potential for exploring forms from textile waste.

Subsequently, base stitching and layering techniques were applied by stacking multiple fabric layers and sewing them together to reinforce the material while adding three-dimensional texture.

These techniques strengthen the material structure, produce visual and 3D textural effects, and enhance the product's aesthetic value, aligning with material aesthetics principles that emphasize both function and beauty.



Figure 8. Initial Design of the Partition
(Source: Personal documentation, 2025)

The next stage involved selecting the denim material according to the initial design, creating the pattern, cutting, and sewing the fabric. The completed material was then attached to the wooden frame using a clamping technique.



Figure 9. Stages of Partition Fabrication
(Source: Personal documentation, 2025)



Figure 10. Partition Prototype
(Source: Personal documentation, 2025)

CONCLUSION

This study demonstrates that the utilization of fashion waste in interior product design represents an innovative solution for reducing textile waste from the fashion industry while supporting sustainability principles. By applying sewing techniques, including the traditional *Sashiko* embroidery, the research successfully produced functional, aesthetically appealing, and environmentally friendly interior products. Evaluation through expert assessment and documentation of the design process allowed the researchers to systematically assess aesthetic, structural, and quality aspects of the products, ensuring that claims regarding their aesthetic value were based on observation and quality testing rather than mere assumptions.

The experimental results indicate that modifications in pattern-making and sewing techniques, combined with the careful selection of textile waste materials, enabled the creation of interior products aligned with eco-design principles, sustainable design, and circular design, while maintaining functionality. Product testing and reflective practices during the design process proved to be important tools for evaluating visual suitability, color and texture harmony, and structural integrity.

Furthermore, this study contributes to raising consumer awareness regarding sustainability in the interior design industry. The produced items function not only as design elements but also as educational tools for promoting textile waste utilization and understanding the environmental impact of consumption choices. The involvement of SMEs and local artisans in the production process provided positive social and economic impacts, creating opportunities for local craftsmen and encouraging sustainable lifestyles within the community.

Overall, this study affirms that utilizing fashion waste in interior design constitutes a significant step toward more responsible and sustainable design practices. Through appropriate technique development, systematic evaluation, and collaboration with various stakeholders, the research contributes to the establishment of innovative, environmentally conscious, and sustainable interior design practices, while also paving the way for further advancements in circular design and the creative economy

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