International Journal of Humanities and Sustainable Innovation

Material Reinvention Developing Sustainable Textiles from Fabric Waste Streams

Reena Yadav [1*], Dr. Amrita Rajput [2], Shveta Anugrah Katara [3]
[1] Bachelor Of Design Student, Sanjeev Agarwal Global Education University Bhopal, India
[2] Head of Department, Sanjeev Agarwal Global Education University Bhopal, India
[3] Assistant Professor, Sanjeev Agarwal Global Education University Bhopal, India

* Corresponding Author: **Reena Yadav**

Article Info

Impact Factor (RSIF): 8.29
Volume: 02
Issue: 03
May-June 2026
Received: 16-03-2026
Accepted: 14-04-2026
Published: 12-05-2026
Page No: 41-54

Abstract
This study explores the transformation of scrap fabrics into innovative textile surfaces through experimental techniques such as slashing, layering, and stitching. In this process, fabric scraps are inserted and revealed through cuts, creating depth, texture, and a unique visual effect. The use of raw edges, loose threads, and contrasting materials highlights the hidden beauty of discarded fabrics. This approach supports sustainability by reducing textile waste and promoting the reuse of available materials. It also encourages a more responsible and creative design process, showing how waste can be transformed into functional and expressive textiles for contemporary fashion applications.

Keywords: Scrap fabric, textile manipulation, sustainability, surface development, fabric waste, experimental textiles, fashion textiles

1. Introduction

significant amounts of fabric remnants during production and consumption. In garment manufacturing, a considerable quantity of fabric is left unused in the form of cuttings and offcuts, while at the consumer level, garments are often discarded before their full lifecycle is completed. Despite being treated as waste, these materials still hold value in terms of texture, color, and structural properties.

This research paper titled Material reinvention developing sustainable textiles from waste streams, focuses on developing sustainable textile surfaces using scrap fabric waste. The study explores hands-on techniques such as slashing and frayed edge surface manipulation to transform leftover fabrics into new and expressive materials. These techniques allow the inner layers of fabric to be revealed while maintaining a raw and textured appearance, creating unique surface effects. The aim of this study is to demonstrate how simple manipulation methods can convert waste into functional and aesthetically appealing textiles for fashion applications By doing so, the research highlights the importance of rethinking waste as a resource and encourages more sustainable and creative practices in textile design.

Fig 1: Material for reuse

1.1. Process

The process for this project began with the idea of exploring the hidden potential of scrap fabrics through hands-on experimentation. Instead of treating fabric waste as unusable, I approached it as a raw material for developing new textile surfaces.

1.2. Material Collection and Selection

Scrap fabrics were collected from leftover pieces of previous projects, tailoring waste, and unused garments. The materials included different types of fabrics varying in color, texture, thickness, and fiber content. These were then sorted based on their suitability for manipulation techniques.

Fig 2, 3: Scrab Fabric

1.3. Technique Exploration

1.3.1. Slashing Technique

In this method, a base fabric was selected and carefully cut with parallel slits. Scrap fabric pieces were then inserted or pulled through these openings. This created a layered effect where inner fabrics became visible through the surface, adding depth and dimension.

Fig 4,5: Selection of base fabric and scrap materials

Fig 6,7: Fix top and bottom layers together and mark parallel lines on the top layer

Fig 8,9: Final Fabric

1.3.2. Problem Statement

The textile and fashion industry generates a significant amount of fabric waste during production, especially in the form of small and irregular scrap pieces. These materials are often discarded despite having usable qualities such as texture, color, and strength. At the same time, the industry continues to depend heavily on new raw materials, increasing environmental impact. One of the main challenges is the lack of practical and creative methods to reuse these fabric scraps in a meaningful way. Most existing techniques do not effectively utilize small waste pieces or create desirable textile outcomes. Therefore, this study focuses on developing innovative textile surfaces using scrap fabric through techniques like slashing and frayed edge manipulation, aiming to transform waste into valuable and functional materials.

2. Literature Review

Textile waste has been widely studied as a growing environmental and industrial concern within the fashion industry. According to Fletcher (2008) [1], the fashion sector significantly contributes to global waste due to overproduction and rapid consumption cycles. Similarly, Gwilt (2014) [2] highlights that a large percentage of fabric is wasted during garment manufacturing, particularly in the cutting stage, where small and irregular pieces are often discarded despite their usable properties. Sustainable design practices have emerged as a response to this issue. Fletcher (2014) [1] emphasizes that sustainability in textiles involves reducing waste, extending material life, and encouraging responsible design approaches. Among these practices, upcycling has gained attention as a creative strategy. As noted by McDonough and Braungart (2002) [4], upcycling allows materials to retain their original value while being transformed into new products, unlike recycling, which often reduces material quality.

Traditional textile techniques also reflect sustainable principles. Practices such as patchwork, layering, and hand stitching have historically been used to reuse fabric remnants. According to Gordon (2011), these methods not only minimize waste but also create unique and expressive textile surfaces. Such handcrafted approaches demonstrate how resource limitations can lead to innovation in textile design. In contemporary fashion, designers are increasingly experimenting with fabric manipulation techniques to develop new textile surfaces.

Quinn (2010) discusses how techniques like slashing, layering, and surface distortion can create depth and dimension in textiles. These methods allow designers to reveal inner layers of fabric, producing visually rich and textured surfaces.

Recent studies have also explored the role of sustainability in experimental textiles. According to Niinimäki (2018) [7], combining creative design with sustainable materials can lead to more responsible and innovative fashion practices. However, there is still limited research on the integration of structured manipulation techniques, such as slashing, with raw surface treatments like frayed edges using scrap fabrics. This study aims to address this gap by exploring how scrap fabric waste can be transformed into contemporary textile surfaces through slashing and frayed edge manipulation techniques, contributing to both sustainability and creative textile development.

3. Methodology

This research follows a practice-based and qualitative approach, combining hands-on textile development with a questionnaire survey to understand user perception. The study focuses on transforming scrap fabric waste into new textile surfaces using experimental techniques.

3.1. Research Approach

The research is based on experimental design methods, where textile samples were developed through direct material exploration. Along with this, a survey method was used to gather opinions about the aesthetic and usability of the developed textiles.

3.2. Material Collection

Scrap fabrics were collected from: Tailoring waste, Previous academic projects and Unused household fabrics.The materials varied in color, texture, thickness, and fiber type. These were sorted based on their suitability for manipulation techniques.

3.3. Technique Application

Two main techniques were used in this study: Slashing Technique (Two-Layer Method) Two base fabric layers were used, where scrap fabric was placed between them. The top layer was marked, stitched, and then cut to reveal the inner fabric, creating depth and texture. Frayed Edge Surface

Manipulation Fabric edges were intentionally left raw and frayed to enhance the surface texture. Loose threads and irregular finishes were used as a design element.

3.4. Sample Development

Multiple textile samples were developed by experimenting with: Different fabric combinations, Stitching techniques, Layering density and Texture variations.

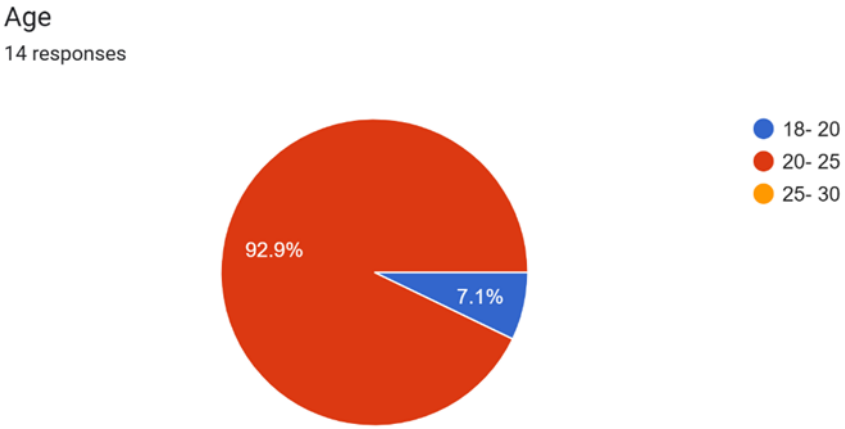
3.5. Questionnaire Survey

A questionnaire survey was conducted to understand people's perception of the developed textile samples. The survey included students and individuals interested in fashion and design. Survey Focus: Aesthetic appeal of the textile, Texture and uniqueness, Acceptability in fashion products, Awareness of sustainability and Willingness to use or purchase such textiles

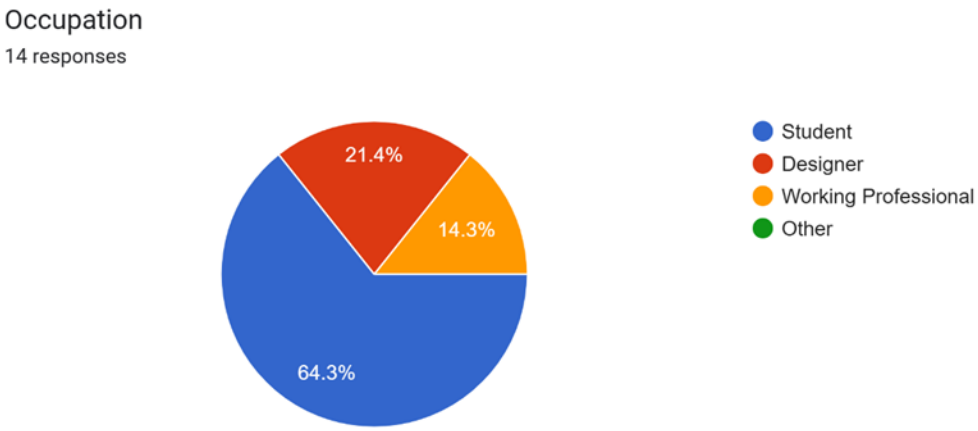
4. Analysis and Discussion

The developed textile samples showed strong visual impact through the use of slashing and frayed edge techniques. The two-layer slashing method created depth by revealing inner scrap fabrics, while the frayed edges added a raw, expressive quality. These elements gave the textiles a unique and contemporary look, making them stand out from regular fabrics.

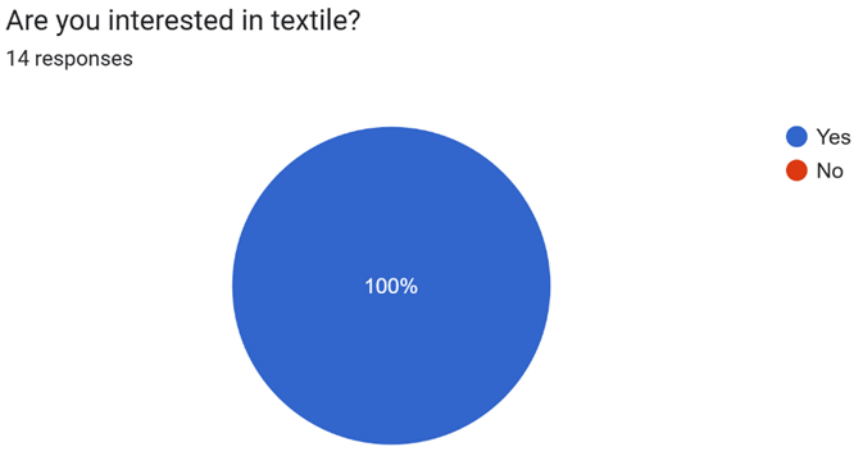
Functionally, the textiles were found to be more suitable for structured products like jackets, bags, and accessories. While the layered texture adds strength, it can sometimes create bulk, which may affect comfort in certain garments.



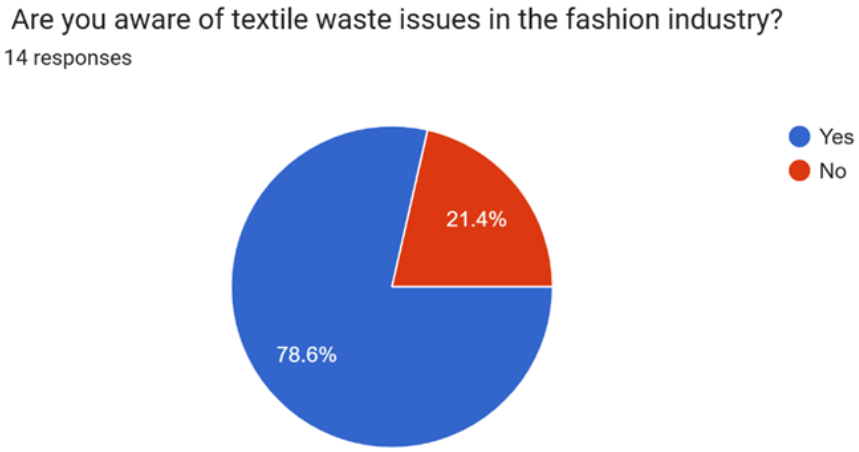
The vast majority of respondents (92.9%) are young adults in the 20–25 age bracket, indicating the feedback represents a Gen Z perspective.



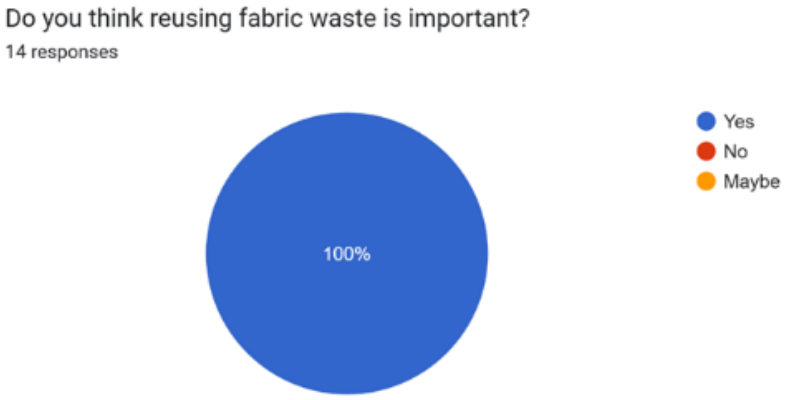
The survey was primarily completed by students (64.3%), followed by designers (21.4%) and working professionals (14.3%).



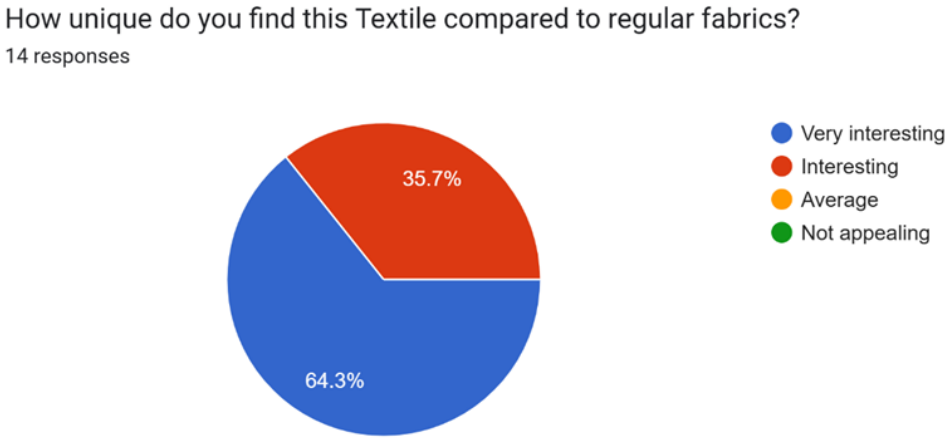
There was a unanimous, 100% positive response indicating total interest in the textile among all participants.

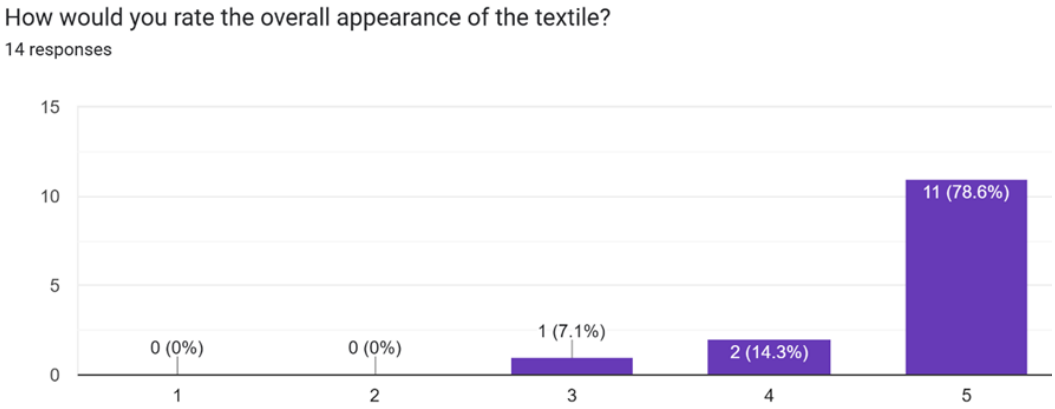


While most people (78.9%) are aware of textile waste issues, nearly a quarter remain uninformed, suggesting a need for further education.

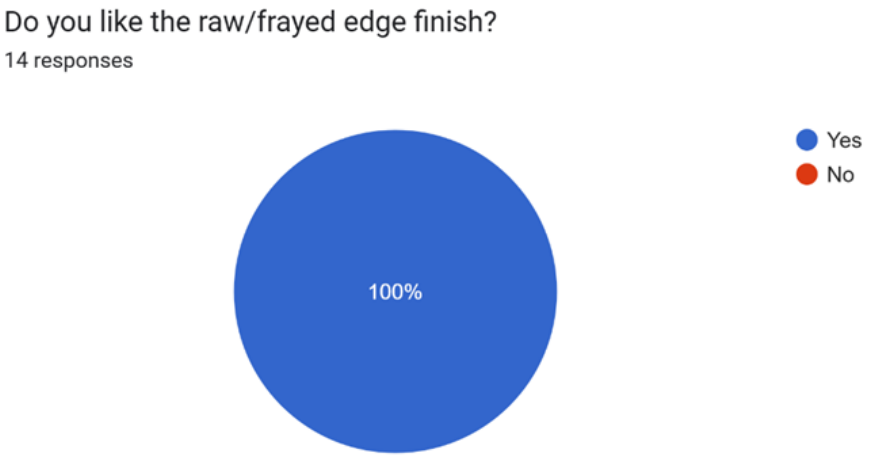


There is unanimous agreement (100%) that reusing fabric waste is important, showing a very high value for sustainability.

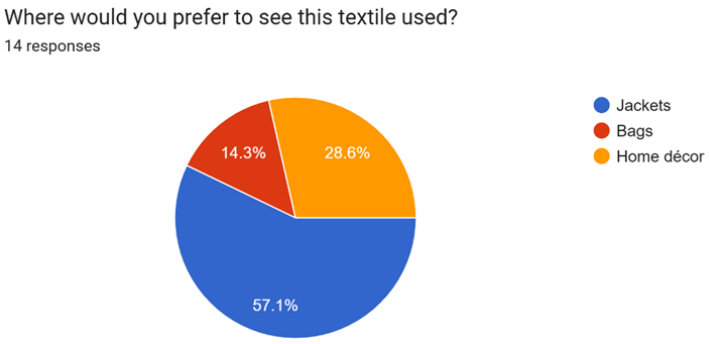




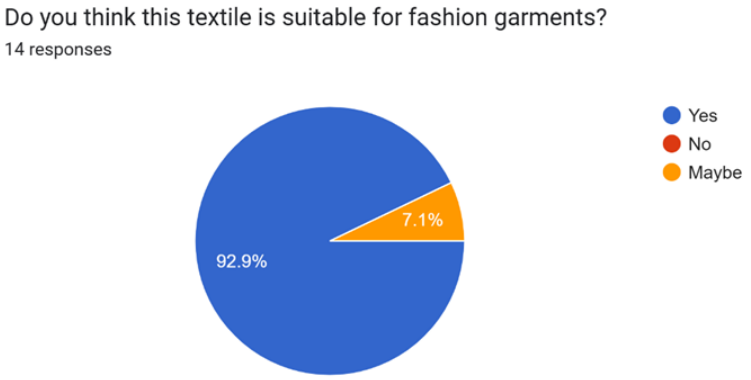
The textile received high praise, with the vast majority of respondents (78.6%) giving it a perfect 5-star rating.



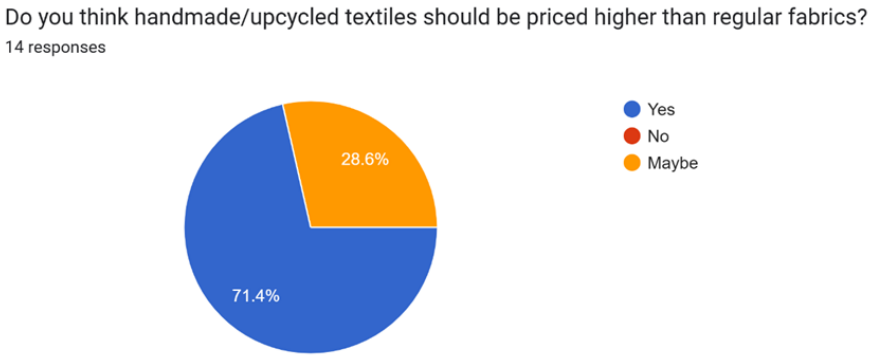
Respondents find the textile highly distinctive, with 64.3% rating it as "Very Interesting" compared to regular fabrics.

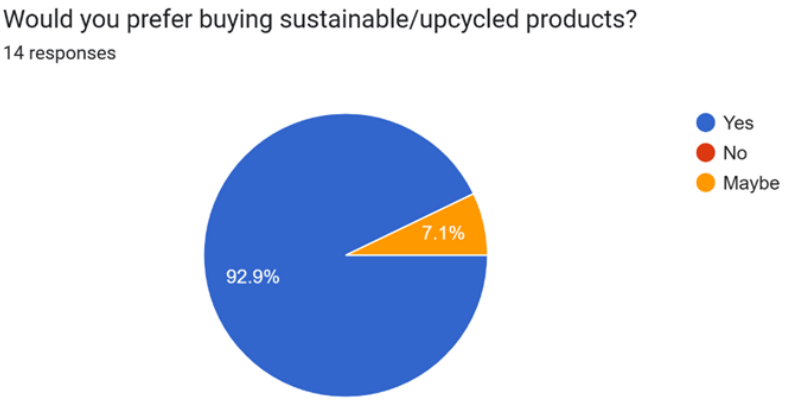


The raw/frayed edge finish was a complete success, receiving a 100% "Yes" approval rating from the group.
Most people (57.1%) would prefer to see this textile used for Jackets, followed by home décor and bags.

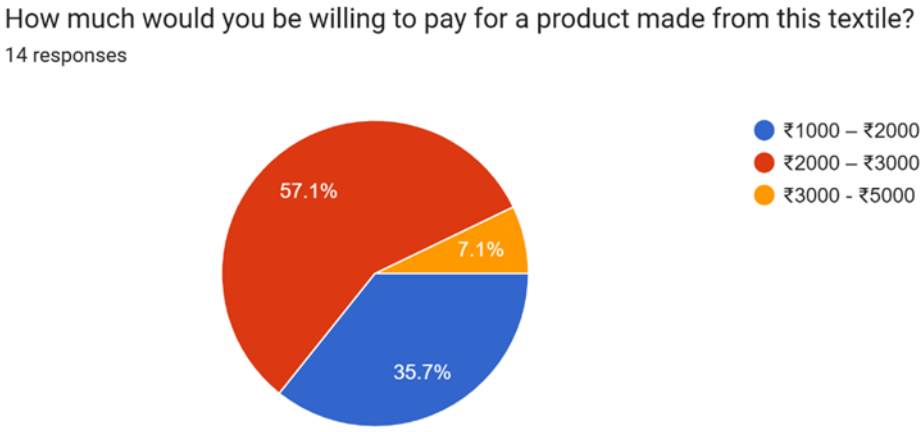


A significant majority (71.4%) believe these textiles deserve a premium price, while the remainder (28.6%) are undecided.
An overwhelming 92.9% believe this textile is suitable for fashion garments, confirming its potential in the apparel market.

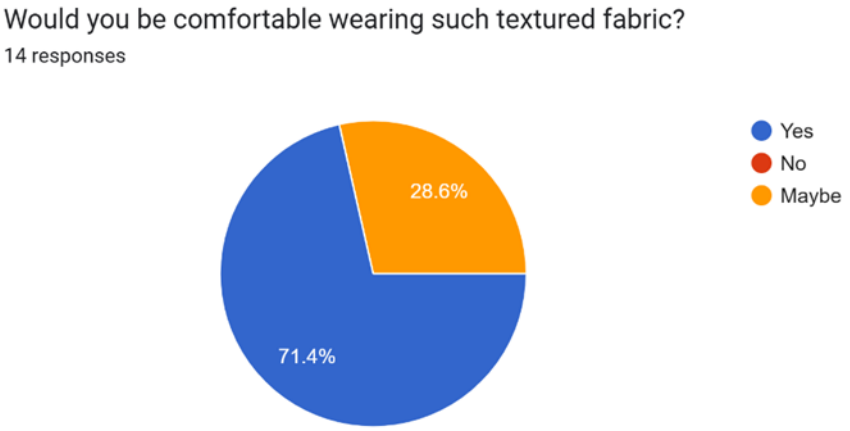


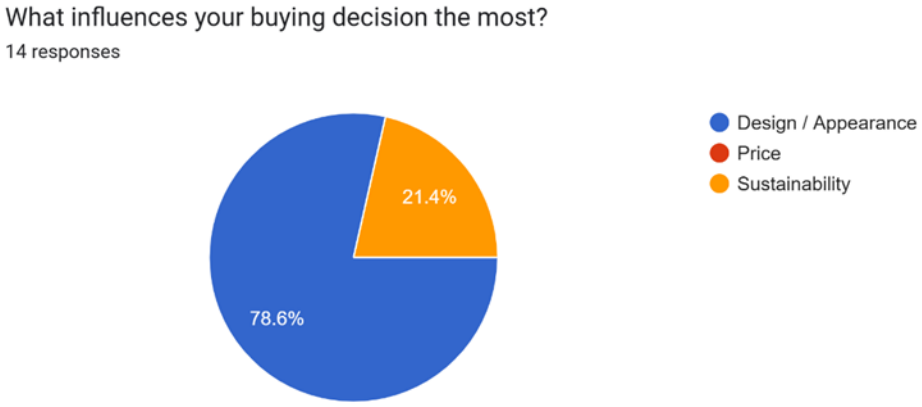


The most popular price point is the mid-range of ₹2000–₹3000 (57.1%), though over a third prefer a lower entry price.



Consumers are extremely open to eco-friendly options, with 92.9% preferring to buy sustainable or upcycled products. The majority (71.4%) are comfortable wearing the textured fabric, though about 28.6% are still hesitant or uncertain.





Design and Appearance (78.6%) is the leading factor in purchasing decisions, significantly outweighing price and sustainability alone. Survey responses indicated that most people found the textiles interesting and unique. Many preferred their use in statement pieces rather than everyday wear. From a buyer perspective, respondents showed willingness to purchase such products, especially if they are sustainable and visually appealing. The preferred price range was mostly between ₹2000–₹3000, with some willing to pay more for unique, handmade designs.

Overall, the study shows that scrap fabrics can be transformed into creative and valuable textiles. The concept of Unseen Value is clearly reflected, proving that waste materials can become desirable through thoughtful design.


स्वर्णिम
2026
Shine Like Gold


स्वर्णिम
2026
Shine Like Gold


स्वर्णिम 2026
Shine Like Gold
SAGE UNIVERSITY
BHOPAL
स्वर्णिम 2026
Shine Like Gold

5. Conclusion

This study explored the transformation of scrap fabric waste into innovative textile surfaces through experimental techniques such as slashing and frayed edge manipulation. The results demonstrate that discarded fabric pieces can be effectively reused to create visually rich and textured materials suitable for contemporary fashion applications. The developed samples highlight how simple design interventions can add value to waste materials by enhancing their aesthetic and functional qualities. The slashing technique, combined with layered construction, created depth and dimension, while frayed edges contributed to a raw and expressive surface identity.

References

1. Fletcher K. Sustainable fashion and textiles: design journeys. London: Earthscan/Routledge; 2008. (2014 ed.).
2. Gwilt A. A practical guide to sustainable fashion. London/New York: Bloomsbury/Fairchild Books; 2014.
3. Gwilt A, Rissanen T. Shaping sustainable fashion: changing the way we make and use clothes. London: Routledge; 2011.
4. McDonough W, Braungart M. Cradle to cradle: remaking the way we make things. New York: North Point Press; 2002. (Revised ed. 2013).
5. Gordon JF. Textile design and sustainable practices.
6. Earley R, Goldsworthy K. Centre for Circular Design, University of the Arts London: research on circular textiles and sustainable material innovation. London: University of the Arts London; n.d.
7. Niinimäki K. Sustainable fashion in a circular economy. Helsinki: Aalto University; 2018.
8. United Nations Environment Programme (UNEP). Sustainability and circularity in the textile value chain. Nairobi: UNEP; 2020.
9. Ellen MacArthur Foundation. A new textiles economy: redesigning fashion's future. Cowes: Ellen MacArthur Foundation; 2017.
10. Textile Exchange. Preferred fiber & materials market report. Lubbock, TX: Textile Exchange; n.d.
11. Sustainable Apparel Coalition. Higg Index and sustainability measurement tools for the apparel industry. San Francisco, CA: Sustainable Apparel Coalition; n.d.
12. Fashion Revolution. Environmental impact of fashion. London: Fashion Revolution; n.d.

How to Cite This Article

Yadav R, Rajput A, Katara SA. Material reinvention: developing sustainable textiles from fabric waste streams. International Journal of Humanities and Sustainable Innovation. 2026;2(3):41-54.

Creative Commons (CC) License