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"Undergraduates' Digital Engagement Towards Global Ingenuity"

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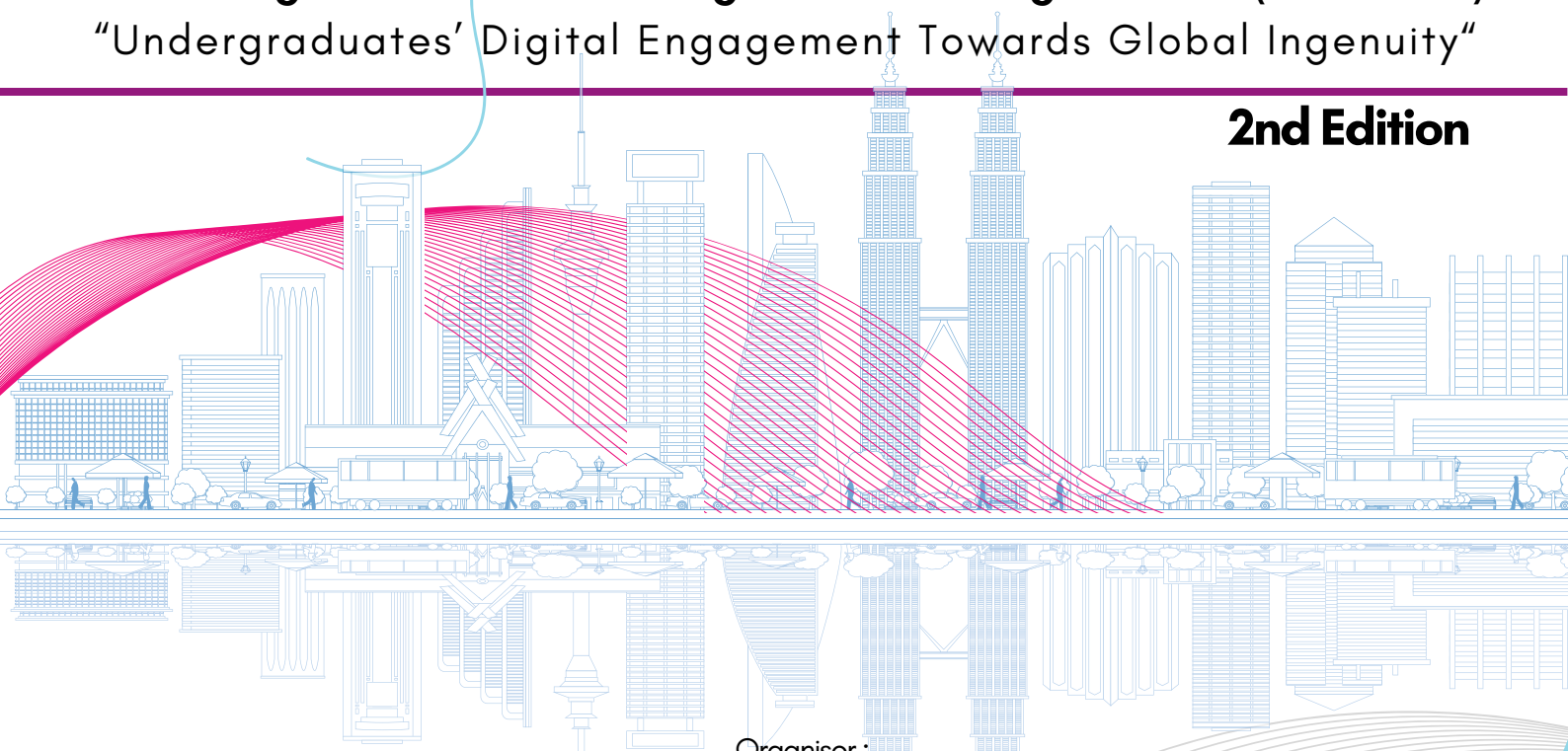

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SAOIRENE: ENHANCED THE OLD

Puteri Alisya Irdina Azmi Nahar[1*], Nur Sufi Fatihah Yahya[2], Nur Adriana Afrina Mohd Fadly[3], and Zainina Syahirah Aleya Zainuddin[4]

Faculty of Build Environment, Diploma in Building Technology, Universiti Teknologi MARA, Seri Iskandar, 32610, Bandar Baru Seri Iskandar, Perak Darul Ridzuan

*sufifatihah30@gmail.com

Abstract
For this project, we decided to create jewellery pieces by utilising recycled materials. The national recycling rate of 35.38% in 2023, it is estimated that the amount of recyclable materials that was not recycled is 6.96%, or nearly one million tonnes (Datuk Ahmad Husaini, 2023). Our objective for this project is to demonstrate our commitment in reducing waste and protecting our natural environment for upcoming generations. To continue this project, materials were selected based on their durability and cost. Metal waste and plastic waste were used for our project. To recycle the metals for our project, they will be going through a melting process which is cost-effective. In summary, recycling waste into jewellery is both eco-friendly and cost-effective. It also can spark creativity. Recycled jewellery has a strong commercial potential that aligns with consumers beliefs and industrial trends.

Keywords: *jewellery, reducing waste, recycle, metal, plastic*

1. INTRODUCTION

The jewellery industry, known for its opulence and elegance, has long been associated with luxury and glamour. However, beneath the surface of its dazzling facade, lies a complex web of environmental and ethical challenges. Traditional methods of jewellery production, which often involves mining for precious metals and gemstones, have significant environmental impacts, including habitat destruction, water pollution, and carbon emissions. Moreover, the industry has been plagued by ethical concerns such as human rights abuses in mining communities and the exploitation of labour. In response to these challenges, there has been a growing movement towards sustainable and ethical practices within the jewellery industry. One such practice gaining traction is the recycling of jewellery materials. Recycling jewellery involves repurposing old or unwanted jewellery components to create new pieces, thereby reducing the need for new mining activities and minimising waste generation. This approach aligns with the principles of sustainability, as it conserves precious resources, reduces environmental degradation, and promotes circularity within the industry.

The concept of recycling jewellery is not new, but its importance has become increasingly recognised in recent years as consumers and industry stakeholders alike seek more responsible alternatives to traditional production methods. By repurposing existing materials, recycling jewellery offers a way to minimise the environmental footprint of the industry while also addressing ethical concerns related to resource extraction and labour practices.
In this process, we will explore the concept of recycling jewellery in depth, examining its environmental, economic, and social implications. We will discuss the methods and processes involved in recycling jewellery, the benefits and challenges associated with this approach, and the role of consumers, designers, and industry stakeholders in driving the adoption of sustainable practices. Through case studies and examples, we will showcase innovative initiatives and highlight best practices in the jewellery recycling sector.

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Ultimately, this report aims to shed light on the potential of recycling jewellery as a catalyst for positive changes within the jewellery industry. By embracing sustainable and ethical practices, we can not only reduce the industry's environmental and social impacts but also pave the way for a more responsible and resilient future.

Scope and Objectives

The main goal of this project is to demonstrate the potential of using recycled materials in jewellery manufacturing and to solve the problem of low recycling rate and amount of waste generated. Although the national recycling rate is 35.38% in 2023, about one million tons of recyclable materials are not recycled (Datuk Ahmad Husaini, 2023). The goal of the project is to use this waste material to create durable and affordable jewellery products, reducing environmental impact and increasing livelihoods.

Problem Statement

Despite continuous efforts to increase the recycling rate, a large number of recyclable materials are still thrown away as waste. The national recycling rate in 2023 is 35.38%, which indicates that almost 1 million tons of recyclable materials have not been recycled. These deficiencies contribute to environmental degradation, resource depletion and increased land use, causing serious ecological damage and hindering sustainable development goals. The stone industry, dependent on new minerals, is in a unique position to alleviate this problem. By incorporating recycled materials into the production process, industry can reduce its impact on the environment. Mining for new metals and stones is not only energy intensive, but also harmful to the environment, which includes deforestation, soil erosion and water pollution. These practices contribute to the loss of biodiversity and cause negative impacts on local communities. So, recycling recycled materials to make jewellery can solve this big problem.

In addition, the ineffective use of recycled materials highlights the gap between availability and appropriate use in construction. This area indicates the need for innovative applications and greater awareness of the benefits of recycled materials. Addressing these issues through projects like this can assist in promoting and raising awareness towards a sustainable and responsible approach to ivory production while meeting environmental and economic goals.

Literature Review

A large body of research demonstrates the environmental benefits of using recycled materials in a variety of industries. For the jewellery sector, recycled metals and plastics offer a sustainable alternative to renewable raw materials. Recycled metals such as gold, silver and platinum retain their properties and value after processing, making them ideal for the jewellery industry. Ensuring that the environment is safe is important. For example, gold recycling can reduce greenhouse gas emissions by 99% compared to new gold mining (GoldFellow,2023). In addition, recycled plastic can be made into beautiful and durable decorative pieces, reducing plastic waste and the demand for female plastic production (plastic for Change,2024). Consumers' demand for sustainable products is increasing over the years. Research conducted show that consumers are more aware of the environmental impacts of their purchases and they prefer products which are produced ethically and sustainably. This trend is particularly evident among young consumers, who are more concerned about sustainability and willing to pay more for green products. These findings support the introduction of recycled materials in cosmetics and suggest that this practice is not only beneficial for the environment but also to meet the needs of the growing market.

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Method

Recycling jewellery involves repurposing old or unused components to create new pieces. The process involves assessing and sorting old jewellery, cleaning, and preparing it, and separating metal components from gemstones. Precious metals can be melted down using specialised equipment whereby gemstones can be sorted based on their type, size, and quality. Cleaning and polishing are then performed to restore shine and lustre of the metals. The quality of each gemstone is then assessed to determine if it can be reused as-is or if it needs to be recut or reshaped.

Designing new pieces based on available materials and creative vision is crucial. Fabrication and assembly involve metalwork, setting gemstones, and assembling the components. Polishing is done to remove surface imperfections and enhance shine. Quality control inspections are then conducted to ensure the recycled jewellery meets desired standards. Packaging and presentation are done in eco-friendly materials, such as recycled paper or cardboard boxes, avoiding plastic packaging. By following these steps, old or unused jewellery components can be transformed into beautiful new pieces, contributing to a more sustainable and ethical approach in jewellery making.

Main Result

This project has successfully demonstrated that recycling waste into jewellery is environmentally friendly and sustainable. Jewellery made from recycled metals and plastics is not only durable and beautiful, but also aligns with modern consumers' needs for sustainable and traditionally made products.

Durability and Quality: Recycled pieces have demonstrated durability and quality comparable to jewellery made from freshly mined materials. The modified plastic items with beads and decorative elements are durable and beautiful.

Cost-effective: The recycling process used is cost-effective, reducing production costs and reducing environmental impact. The use of available waste materials improved the economic viability of the project.

Market Experience: The final product has received positive feedback from potential customers, indicating market potential. Aligning with consumer trends towards sustainability and ethical manufacturing practices means that recycled jewellery can compete well in the market.

Summary

This report presents a comprehensive approach to making jewellery from recycled materials and demonstrates the environmental, economic, and creative benefits of this practice. The project contributes to a more sustainable life using waste and emphasises the growing market demand for ecological products. The successful integration of recycled metals and plastics into cosmetics not only addresses the important issue of waste management but is also an example of sustainable practices in the fashion industry.

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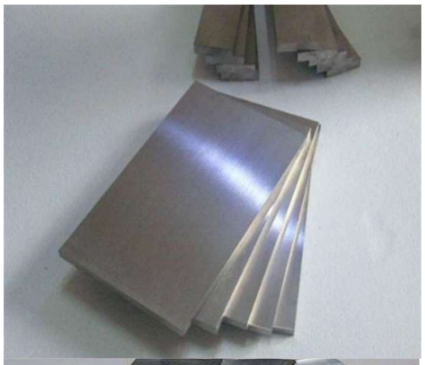
2. MATERIALS

Silver: Silver is another popular metal used in jewellery production, valued for its affordability and versatility. Like gold, recycled silver can be obtained from old jewellery items, silverware, and industrial scraps. Recycling silver reduces the need for new mining and minimises environmental impact. It can be melted and transformed into new jewellery components, such as chains, pendants, and earrings.

Platinum: Platinum is a rare and precious metal known for its strength, purity, and resistance to tarnishing. It is often used in high-end jewellery due to its rarity and durability. Recycled platinum can be sourced from old jewellery pieces, catalytic converters, and industrial applications. Its high melting point and corrosion resistance make it suitable for recycling, allowing it to be reused in new jewellery designs with minimal loss of quality.

Palladium: Palladium is a precious metal closely related to platinum, known for its white colour, durability, and hypoallergenic properties. It is commonly used as a substitute for platinum in jewellery making due to its lower cost. Recycled palladium can be obtained from various sources, including old jewellery, catalytic converters, and electronics. It can be melted and alloyed with other metals to create white gold or used in its pure form for crafting jewellery pieces.

Titanium: Titanium is a lightweight and durable metal that has gained popularity in contemporary jewellery design due to its modern aesthetic and hypoallergenic properties. While less common than gold, silver, and platinum, recycled titanium can still be used in jewellery making. It is often sourced from industrial scraps, aerospace components, and medical implants. Recycling titanium reduces the need for new extraction and conserves resources, making it a sustainable choice for jewellery production



Aluminium: Often overlooked in traditional jewellery, aluminium offers unique qualities such as lightweight, affordability, and hypoallergenic properties. Recycled aluminium can be sourced from various industrial applications and household items. Its lightweight nature makes it comfortable for everyday wear, while its affordability allows for accessible jewellery options. Additionally, aluminium's corrosion resistance ensures longevity in jewellery pieces.

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Recycling aluminium reduces the need for new extraction and minimises environmental impact, making it a sustainable choice for contemporary jewellery design.

3. RESULTS AND DISCUSSION

For this innovation, utilising recycled material was used in the making. Certain materials come from recycling companies and people who drop them by themselves. On 19 December 2023, Datuk Ahmad Husaini Abdul Rahman addressed that Malaysia could have saved RM291 million this year if it had recycled items instead of throwing them out. The use of recycled material as a jewellery will help Malaysia to achieve national recycling rate of 40% by 2025 (The Star, 2023).

The study explores recycled materials in jewellery fabrication, including metals like aluminium, copper, and brass from reclaimed sources, post-consumer plastics, repurposed glass fragments, recycled paper, and organic materials like wood veneers and upcycled fabrics. These materials contribute to aesthetic diversity, sustainability, and a unique twist on jewellery designs, while also promoting eco-conscious practices and a commitment to sustainability.Recycled jewellery's aesthetic appeal was meticulously examined, drawing from sustainable design principles and cultural inspiration.

Designers aimed to elevate recycled materials into wearable art, celebrating their journey from waste to beauty. With diverse motifs and innovative techniques like upcycling, jewellery pieces are captivated with unexpected textures and colours. Narrative elements added depth, fostering a connection between consumers and ethical values. In essence, recycled jewellery blended creativity, sustainability, and storytelling, offering a transformative experience that celebrated the beauty of repurposed materials.

In the exploration of prospects within the domain of recycled material jewellery, the study delved into emerging trends and technological innovations shaping sustainable jewellery design and manufacturing. This forward-looking analysis encompassed industry trends like circular economy initiatives and material innovation, poised to transform how recycled jewellery is produced and sourced responsibly. Advancements in additive manufacturing technologies, laser sintering, offer exciting possibilities for customizability, scalability, and waste reduction in jewellery production, enabling designers to craft personalised and eco-friendly collections tailored to individual preferences.

Moreover, the adoption of blockchain technology and supply chain transparency initiatives holds promise for enhancing traceability and accountability across the recycled jewellery value chain. By facilitating collaboration between industry stakeholders, academia, and NGOs, the study identified opportunities to drive innovation and promote best practices in sustainable jewellery design, fostering systemic change towards a more equitable and environmentally responsible jewellery industry.

4. CONCLUSION

This report has explored the innovative approach of creating jewellery from used steels, aiming to combine sustainability with artistry. Through detailed research and practical experimentation, we have demonstrated that repurposing used steel not only contributes to environmental conservation but also opens new avenues in jewellery design.

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The summary of findings that we can get from this innovation are sustainability benefits, cost-effectiveness, and design and quality. The findings of this report have significant implications for the jewellery industry. By adopting practices that involve repurposing used materials, jewellers can contribute to a circular economy, promoting environmental responsibility while maintaining high standards of quality and design. This approach can inspire other sectors to explore similar sustainable practices, thereby broadening the impact. While this report provides a comprehensive analysis of making jewellery from used steels, it acknowledges certain limitations. These include the variability in the quality of scrap steel and the potential challenges in sourcing consistent supplies. Future research should focus on developing standardised processes for assessing and refining used steel to ensure uniformity in quality.

Additionally, exploring advanced techniques in metalworking and design can expand the creative possibilities for jewellery made from repurposed materials. Investigating consumer perceptions and market trends will also provide valuable insights for optimising product offerings.

In conclusion, making jewellery from used steels presents a promising blend of sustainability and innovation. By repurposing materials that would otherwise contribute to waste, this practice not only benefits the environment but also enriches the jewellery market with unique and meaningful products.

5. ACKNOWLEDGMENT

We, the authors of this report, would like to express our heartfelt gratitude to those who have supported and guided us throughout the process of completing this work.

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Lastly, we extend our appreciation to everyone who directly or indirectly supported our group in the successful completion of this report. Your contributions, no matter how small, are deeply appreciated.

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INTERCHANGEABLE SHOES

Mohamad Hazriq Hakim[1], Muhammad Kiflly[2] Amirun Danish Husaini[3] and Siti Najar Huda[4]

Department of Built Environment Studies and Technology, College of Built Environment, Universiti Teknologi MARA, Perak Branch Seri Iskandar Campus, 32610, Seri Iskandar , Perak Darul Ridzuan.

*2023483438@student.uitm.edu.my

Abstract
Our shoes are unique because they can change their appearance using old windbreakers. We take old windbreaker jackets and use the material to give our boots different looks. The jackets' robust and waterproof fabric makes our shoes durable and weather-resistant. You can easily swap out the windbreaker casing to match your style or mood. It's like having many shoes in one! Plus, using old windbreakers gives new life to materials that might otherwise be thrown away. So, not only do you get stylish and versatile shoes, but you also help reduce waste.

Keywords: *windbreaker, old materials, versatile*

1. INTRODUCTION

How much of innovation is inspiration, and how much is hard work? If it's mainly the former, management's role is limited: Hire the right people and get out of their way. If it's essentially the latter, management must play a more vigorous role: Establish the right roles and processes, set clear goals and relevant measures, and review progress at every step.With the masterly subtlety that is his trademark, Sanya Canyon comes down somewhere in the middle. Innovation is real work, and it can and should be managed like any other corporate function. But that doesn't mean it's the same as other business activities. Indeed, innovation is the work of knowing rather than doing.

Imagine a shoe that's like a puzzle. The bottom part is solid and steady, made from recycled plastic. The cool part is the outside, which you can change, like changing clothes. You can use old T-shirts, jeans, or any fabric to make it look different. It's like giving your shoes a makeover whenever you want! This helps the planet because we're reusing old stuff instead of throwing it away. Plus, if the outside gets dirty or torn, you can switch it out for a new one instead of removing the whole shoe. It's like having a shoe that's always fresh and new.

2. MATERIALS AND METHODS

Materials and Methods for Interchangeable Shoes Using Upcycled Windbreakers

1. Material Selection and Preparation: Old windbreaker jackets made from durable, water-resistant fabrics like nylon or polyester are chosen as the primary material for constructing the base shoe, ensuring they are in good condition and free from significant damage. Compatible sections of the windbreaker fabric or other parts of the jacket, such as zippers, pockets, or logos, are selected and repurposed for creating interchangeable elements like straps, overlays, or decorative accents.

2. Design Process: A base shoe design is developed to optimise the use of windbreaker material, considering factors like fabric strength, water resistance, and breathability.

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Reinforcement techniques or additional layers are incorporated where necessary for durability and structure. Interchangeable element designs are created to complement the windbreaker fabric and enhance the shoe's versatility, experimenting with different shapes, sizes, and attachment methods to achieve the desired functionality and style.

3. Manufacturing Procedures: The windbreaker fabric is cleaned, washed, dried, and cut into appropriate patterns and sizes for the base shoe and interchangeable elements, preserving any unique features or details of the original garment. Sewing machines or hand stitching techniques assemble the base shoe components and attach interchangeable elements securely, with seam sealing techniques or waterproofing treatments applied to maintain the windbreaker's performance attributes.

4. Testing and Quality Assurance: Fit trials with different foot sizes are conducted to ensure that the shoes are comfortable and provide adequate support. The functionality of interchangeable elements is evaluated through user trials to assess ease of attachment, durability, and overall performance. Water resistance testing involves subjecting the shoes to simulated wet conditions or moisture penetration tests, with necessary adjustments to improve waterproofing performance.

5. Environmental Considerations: The environmental benefits of upcycling old windbreaker jackets, reducing waste, and diverting materials from landfills are highlighted, emphasising the eco-friendly aspects of using repurposed materials in footwear production. End-of-life considerations ensure that the shoes are designed with recyclability in mind, using materials that are easily detachable for recycling or composting at the end of their lifecycle.

6. Regulatory Compliance: Windbreaker fabric and any additional materials used in shoe construction are ensured to comply with relevant safety standards and regulations for footwear, particularly regarding chemical composition and durability.

7. Cost Analysis: Cost savings and environmental benefits achieved by using upcycled windbreaker materials compared to traditional footwear manufacturing materials are calculated, considering material acquisition costs, labour expenses, and waste reduction.

8. Community Engagement: Educational workshops or online tutorials engage the community in sustainable fashion practices and DIY upcycling techniques, encouraging participation and creativity in repurposing old garments for new purposes.

9. Future Development Considerations: Opportunities for innovation in upcycling techniques or alternative materials that can further enhance the performance and sustainability of interchangeable shoes are explored. Collaboration with material scientists or fashion designers is considered to develop new eco-friendly solutions. At the same time, market demand for sustainable footwear options is assessed for potential scaling up of production or expansion of product offerings based on consumer preferences and trends.

3. RESULTS AND DISCUSSION

Creating interchangeable shoes from upcycled windbreaker materials presents a novel and sustainable solution to footwear design. These shoes offer versatility, eco-friendliness, and style by repurposing robust, weather-resistant fabrics like nylon and polyester from discarded windbreaker jackets. Rigorous testing confirms their comfort, performance, and durability, ensuring they meet the standards expected of footwear.

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The key innovation lies in the interchangeable windbreaker casings, which enable wearers to effortlessly customise their shoes, providing multiple looks from a single pair. This feature reduces waste by breathing new life into old garments and resonates powerfully with environmentally conscious consumers seeking eco-friendly fashion choices.

Given the increasing demand for sustainable products, the shoes' potential market impact is substantial. However, challenges such as sourcing consistent materials and ensuring proper fit necessitate ongoing research and development efforts. Collaborations with fashion designers and sustainability experts could further enhance product innovation and market competitiveness.

Beyond their environmental benefits, these shoes have the potential to spark meaningful conversations and initiatives within communities, promoting awareness and action towards more sustainable consumption habits. As consumers become increasingly mindful of their environmental footprint, products like interchangeable shoes made from upcycled materials stand poised to impact the fashion industry significantly. With continued refinement and strategic marketing efforts, they have the potential to become a staple choice for environmentally conscious consumers seeking both style and sustainability in their footwear options.

4. CONCLUSION

In conclusion, developing interchangeable shoes using upcycled windbreaker materials presents a promising avenue for sustainable footwear innovation. The principles inferred from the results indicate that repurposing durable and weather-resistant fabrics like nylon and polyester from old windbreaker jackets can yield versatile, eco-friendly, and stylish footwear options. Wearers can enjoy multiple looks from a single pair of shoes without compromising comfort, performance, or durability by incorporating interchangeable windbreaker casings.

However, certain exceptions and challenges exist, including the need for consistent material sourcing and ensuring proper fit between interchangeable elements and base shoes. Addressing these issues requires ongoing research, collaboration, and innovation within the footwear industry.

The theoretical implications of this work extend beyond footwear design to broader discussions on sustainable fashion and consumption practices. The successful implementation of interchangeable shoes using upcycled materials highlights the potential for creative solutions to mitigate environmental impact while meeting consumer demand for customisable products.

Practically, the implications are significant for both manufacturers and consumers. Manufacturers can leverage upcycled materials and interchangeable designs to create more sustainable and marketable footwear options. Consumers, on the other hand, are empowered to make eco-conscious choices without sacrificing style or performance.

In conclusion, the development of interchangeable shoes using upcycled windbreaker materials represents a step towards a more sustainable and consumer-friendly footwear industry. Ongoing collaboration, innovation, and consumer education are recommended to advance this concept further. By embracing these principles and recommendations, the footwear industry can contribute to a more sustainable future while meeting the evolving needs of today's consumers.

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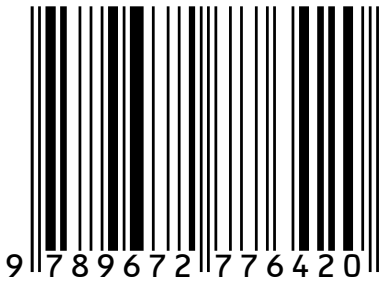

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