TEXTILE SOLID WASTE MANAGEMENT: ADDING VALUE AND UNIQUENESS THROUGH DESIGN

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Abstract: The global fashion industry is highly energy-consuming, polluting, and wasteful: both production and consumption. The industry is mainly spurred by small and medium enterprises (SME) which have the competitive advantage of recovering textile solid waste, thus contribute to the slow/eco/sustainable fashion discourse. Fashion design university graduates particularly join the SME sector, either as employees or entrepreneurs. Hence, their engagement in sustainable fashion through course projects positions them as potential change agents in the industry. Upcycling is one of the most sustainable circular solutions in the waste hierarchy. Upcycling requires little energy input and can eliminate the need for a new product. Upcycling involves a substantial amount of creativity and vision, based on a fundamental environmental consciousness. The end result is typically a product/item that is unique and sustainable. This paper presents a project undertaken by the author and undergraduate fashion design and textile technology students aligned with the International Federation for Home Economics (IFHE) commemoration of the World Home Economics Day held on 21st March. This year's theme was 'Waste Reduction Literacy'. The students and the author interpreted the theme and created apparel, apparel accessories, soft furnishings, and interior accessories from textile solid waste. The effort provided the students with a business opportunity, alternative source of cheaper materials, enriched creativity, and fun. It is critical for higher education institutions offering fashion design programmes to incorporate sustainability in all courses and prepare students to tackle emerging issues in the industry. The faculty too need to keep abreast with sustainable fashion discourse.

Key words: disposal, fashion consumption, fashion industry, fashion production, slow fashion, upcycle

1. INTRODUCTION

The current consumption cycle is that people extract natural resources from the environment, design valued products, sell them, and after using them for some time, they are disposed of as trash [1]. The fashion industry's Small and Medium Enterprises (SMEs) contribute significantly to any country's sustainable economic development, innovation, and competitiveness. However, the industry's unsustainable production processes immensely result in environmental degradation, especially from large quantities of biodegradable and non-biodegradable solid waste [2]. The global fashion industry is highly energy-consuming, polluting, and wasteful. Nonetheless, even a minor extension of the use phase of clothing can significantly reduce the carbon, water, and waste footprint [3]. Although most textile solid waste originates from household sources, waste textiles also arise during garment manufacture: cut pieces of fabrics, rejected apparel, fasteners, threads, used plastic packets, broken cloth hangers, and empty bobbins [4]. The cloth cutting phase is responsible for 20% of waste fabric from the industry. The solid waste may be landfilled

(impacting land use), incinerated, with or without energy recovery or recycled (impacting resource depletion and climate change) [5].

2. SUSTAINABLE FASHION

Synonyms for sustainable fashion include eco/green/slow fashion, among others. The latter term was coined by Dr. Kate Fletcher, creating an international movement in fashion from "quantity to quality" [6] or garments produced for extended use, thus postpone their disposal [3]. Further, 'slow' is simply an approach in which designers, buyers, retailers, and consumers are more aware of the impacts of products on workers, communities, and ecosystems [6]. This paradigm shift has spurned global designers to investigate alternative materials and link pleasure and fashion with awareness and responsibility. Unwanted clothing recirculates by gifting to friends and family, donating to charity, swapping informally or formally, and selling to resale boutiques or peers via online platforms [3]. Upcycling is disrupting fashion's unsustainable cycle as it offers a mix between upgrading and recycling. Upcycling is taking disposable items and transforming them into products of added value [1]. The products created through upcycling are better than the original ones, unique, and sustainable and they tell sustainability stories such as 'production with zero waste', 'small is beautiful', and 'start local, but think global' [1; 7; 8]. Upcycling is one of the most sustainable circular solutions in the waste hierarchy, since it typically requires little energy input and can eliminate the need for a new product. The process of upcyling involves a substantial amount of creativity and vision, based on a fundamental environmental consciousness [8]. Upcycling also involves the reuse of pieces of an existing article. The opportunity to recycle materials opens up new business horizons for SMEs as well as companies already established in the labour market, enriching their production. Collaborations must be established between large-series producers and the small business environment, comprising small workshops, various non-profit organisations, or school organisations, which have the capacity to reuse them [9].

3. DESIGN FOR SUSTAINABILITY IN HIGHER EDUCATION INSTITUTIONS

Design is crucial for sustainability. It is paramount to educate the next generation of designers in the first years of design education, in all sustainability fields: environmental, social, and economic, and in subjects such as upcycling, zero-waste design, and disassembly, so that they can grow with the idea of designing not just one generation of products [5]. It is paramount to teach not only sustainability and the impact of the fashion sector, but also instill skills, which enable the students to pursue fashion design as sustainable practice [10]. The interaction between student/teacher becomes an obvious source of learning, a way of cooperation, where the teacher becomes an observer and facilitator in the work [11]. Sustainable design should be explicitly incorporated in various undergraduate fashion design course contents. The recommendation is achievable because the faculty understand sustainable fashion and are knowledgeable about its benefits. Consequently, the students employ sustainable design in course projects mainly through the lecturers' encouragement [12]. In concurrence, while teaching Sustainable Fashion Design at California College of the Arts, the students' positive learning outcomes are recognized in their ability to assemble disparate information and to provide discursive argument for relevant sustainable design strategies. As their understanding of sustainability deepens and broadens beyond materiality and processing considerations, so do the directions and opportunities for sustainability practice also open up, including in other studio classes. The students have developed 'critical' skills to reassess their role as fashion designers [10]. Most of Ghana's senior high school visual arts students use

leather scraps to make small- to medium-sized items for non-commercial purposes. Patchwork, thonging, and applique were the most prominently used techniques. The size and extent of defects also determined the usefulness of leather scraps. Leather scraps can be used either as a supporting or dominating material for making leather articles. Joining is a prerequisite for the latter [13].

The objective of this project was to inculcate in the Kirinyaga University undergraduate students pursuing Fashion design and textile technology degree, the role of designers in promoting sustainable/slow/eco fashion. That students can practice sustainable fashion while undertaking their studio projects. Thereby, create a pool of responsive fashion designers. Further, it was aimed at coaching students to interpret fashion themes and produce themed creations.

The author is a member of the International Federation for Home Economics (IFHE). The IFHE celebrates World Home Economics Day annually on 21st March. This year's theme was Waste Reduction Literacy. The author shared the information with the students. Brainstorming sessions were held with the students about fashion's unsustainable consumption and production practices, and how to address the IFHE theme. The students and author created various items at their own time.

4. RESULTS

The creations included apparel, apparel accessories (bags), soft furnishings (floor mat and organizer), and interior accessories (flower vase, storage basket and bag, and paintings). The apparel comprise a dress constructed from upcycled second-hand blouses and organza pre-consumer waste (Fig. 1); dress from second-hand curtain (Fig. 2); trouser from bandana and white cotton fabric scraps (Fig. 3); culotte and blouse fashioned from second-hand curtain and bow from second-hand silk pillowcase (Fig. 4); and denim flared trouser from old ripped denim trouser and used chiffon dress (Fig. 5). The fashion accessories consist of bags constructed from second-hand bedsheets (Fig. 6 and 7), and new *Maasai* cloth scraps (Fig. 8). Soft furnishings include a woven rug made from yarns constructed from a second-hand bedsheet and embellished with waste knitting yarns (Fig. 9) and an organizer fashioned from pre-consumer fabric waste (Fig. 10). The interior accessories comprise a crocheted basket for storing sewing equipment and notions constructed from braided yarns made from old clothes (Fig. 11) and a storage bag for the same purpose constructed from pre-consumer scrap fabrics (Fig. 12); a flower vase made with pre-consumer fabric scraps and decorated with bottle caps covered with fabric from used pillowcases (Fig. 13); paintings fashioned from a torn *Maasai* cloth mounted on a wooden frame, treated and painted (Fig. 14 and 15); and wall hangings from waste paper and aluminium foil (Fig. 16) and bottle caps covered with fabric from old pillowcases (Fig. 17). The students were able to express their creativity in the projects and foster sustainable design. The students' opinion about the project was positive: "Designers can make great things out of waste fabrics from their studio projects. Those small scraps of fabrics when given a thought will not disappoint in making whatever kind of garment a designer wants. Upcycling is cheap and profitable. My model loved the patchwork and went an extra mile of buying it to wear for a modelling competition as street wear". "Recreating new outfits from old clothes is a good and easy way of reducing waste in the fashion industry. One can make bags, jewellery, headwraps, crop tops, shorts, and many other items from old outfits that one is not using instead of disposing them". "I greatly enjoyed taking part in this project and it gave me a cheaper alternative material to draw my paintings on since the canvas fabric that is used for painting is a bit expensive and that can be limiting at times". "This project can help to reduce the textile product waste that is disposed to the environment".

5. CONCLUSION

The projects demonstrate the participants' creativity, application of apparel construction techniques such as patchwork and quilting. The finding resonates with [13], that patchwork was one of the most prominently used technique. The size, defect, quality of pre- and post-consumer waste influenced the final product. Upcycling offers unlimited design ideas from apparel, accessories, soft furnishings, to interior accessories, as well as cheaper alternative raw materials. In addition, it opens up new business for designers. One student sold the trouser (Fig. 3). The result concurs with [9], especially for fashion SMEs, to which most graduates venture as employees or entrepreneurs. Capacity building on sustainable fashion be conducted for faculty instructing fashion design undergraduate degree programmes to enable them impart the same to the students. For instance, a training manual to be developed and shared in an open access format.

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APPENDIX

Apparel

Fig. 1: Author's	**Fig. 2: Student's**	**Fig. 3: Student's**	**Fig. 4: Student's**	**Fig. 5: Student's**

Fashion accessories

Fig. 6: Student's	**Fig. 7: Author's**	**Fig. 8: Author's**

Soft furnishings

Fig. 9: Student's

Fig. 10: Student's

Interior accessories

Fig. 11: Student's

Fig. 12: Student's

Fig. 13: Student's

Fig. 14: Student's

Fig. 15: Student's

Fig. 16: Student's

Fig. 17: Student's