



Intentional Pattern-Making: Development of Repeatable Designs for Repurposing Apparel

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The growth of the fast fashion industry has increased the rate of consumption of fashion products, resulting in an abundance of still functional, second-hand clothing. Consumers often purchase new clothing because the style is outdated rather than lack of functionality. While some of this clothing may still find a life with new consumers through the second-hand market, much is thrown away. The EPA (2018) estimates that textiles account for approximately 10.5 million tons of the municipal solid waste stream, or about 7.6% of the total content of landfills. This may not seem like much, but it is overwhelming to know that almost 100% of this textile waste is recyclable in some way. Recycling textiles prevents additional waste from entering the landfills and saves energy as well. It is important to note that some studies use the term ‘recycling’ interchangeably with upcycling, repurpose, reuse or re-design. Lewis, Park, Netravali, and Trejo (2017) describe recycling as returning a textile product back into its original fiber form. In this study, ‘recycling’ textiles back into fibers is the adopted description and that ‘repurposing’ or ‘re-designing’ is described as a process which utilizes used apparel goods to create new textile-based fashion products. According to Woolridge, Ward, Phillips, Collins, & Gandy (2006), repurposing one ton of polyester only uses 1.8% of the energy used to produce virgin polyester and reusing one ton of cotton only uses 2.6% of the energy used to produce virgin cotton. Very little energy and resources are needed to re-create unwanted textile products into something fashionable that consumers would be willing to purchase.

Previous research has suggested that repurposing apparel and textile-based items into new products is a possible solution to the overconsumption of fashion goods (Fletcher, 2008) and that unwanted garments could be transformed into meaningful, functional, and re-valued products through repurposing (Young, Jirousek & Ashdown, 2004). Currently, no formal process for repurposing apparel and textiles exists. One possible reason for the delay in development of a formal process is the time-intensive nature of completely repurposing a product (deconstruction through reconstruction). Additionally, many repurposed garments/products are individually produced where each repurposed item is completely unique, considered ‘one of a kind’ and sold at a premium price (Fletcher, 2008), making consumption of these repurposed items not affordable for the majority of consumers. Developing a process where repurposed apparel could be mass-produced on a small-scale could more efficiently utilize the excess of second-hand

apparel and lower the selling price, making repurposed apparel more attractive and attainable to the average consumer.

Irick (2013) proposed a model for repurposing apparel and textiles as a result of surveying designers who practiced repurposing in their design businesses. Identified from this research were three levels of repurposing; Redecorating and repurposing (renamed ‘restyling’), subtractive repurposing and additive repurposing. In level one, restyling, minor alterations in fit or style and/or embellishments are made to the original garment. In level 2, subtractive repurposing, involves cutting a smaller garment from a larger garment or textile. In level 3, additive repurposing, smaller pieces of fabric, either deconstructed from the original garment or pre-consumer scraps are pieced together to create a new textile. Research by Irick and Eike (2017) added a fourth level of repurposing to this model; intentional pattern-making, in which a discarded clothing item is deconstructed and new product patterns are purposefully designed and cut to utilize available fabric, working within existing shapes and area.

The purpose of this research is to determine the effectiveness of the model proposed by Irick (2013) and amended by Irick and Eike (2017). The original model was developed from the traditional apparel product development model of Gaskill (1992) and the C2CAD model by Gam, Cao, Farr and Heine (2009). Gam et al (2009) used knitwear as proof of concept for C2CAD model. This research used a similar proof of concept process with men’s and women’s suiting items (jackets and trousers). Irick and Eike (2019) found that men’s and women’s suiting items were among the most abundant and unsellable items in second-hand stores. For this reason, suiting items were selected to be repurposed in this study. Because level 4 of the repurposing model, intentional pattern-making, is the most complicated and involved, it was chosen by the researchers to determine proof of concept of the model.

Three researchers participated in this study, following level 4 of the repurposing model and each followed the same process from the model; research, sourcing, deconstruction, design development, production and cost evaluation. Each researcher created an outfit using one jacket and one pair of trousers. Deconstruction was done with a seam ripper to preserve as much of the fabric from the original garment as possible. Patterns were created based on the availability and size of the materials deconstructed from the original garments, but the developed designs were at the discretion of the researchers. No discussion occurred between the researchers regarding the designs they were creating, so as not to influence each other’s designs. The researchers recorded time spent in each phase of the repurposing model while creating their outfit, as well as cost of materials to achieve a potential selling price for each design. Preliminary results indicate that

repeatable patterns can be produced using level 4 repurposing, which is the most complicated method of repurposing. Comparisons of the processes, including cost evaluations for each of the three designs are incorporated. Future directions for this research follow a similar proof of concept for levels 1-3 of the repurposing model.

EPA: Textiles Material Specific Data (2018, July 17). Retrieved from <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/textiles-material-specific-data>

Fletcher, K. (2008). *Sustainable Fashion and Textiles: Design Journeys*. New York, NY: Earthscan Publications Ltd.

Gaskill, L.R. (1992). Toward a model of retail product development: A case study analysis. *Clothing and Textiles Research Journal*, 10(4), 17-24.

Gaskill, L.R. (1992). Toward a model of retail product development: A case study analysis. *Clothing and Textiles Research Journal*, 10(4), 17-24.

Irick, E. (2013). *Examination of the design process of repurposed apparel and accessories: An applicaiton of diffusion of innovations theory*. Oklahoma State University. Retrieved from <https://search.proquest.com/docview/1520789665?accountid=10906>

Irick, E., & Eike, R. J. (2017). Teaching the repurposing mindset: The introduction of a repurposing project into an advanced apparel construction course. In *International Federation for Home Economics Conference Proceedings*. Sligo, Ireland.

Irick, E. & Eike, R.J. (2019). Analysis of the availability of second-hand clothing as the raw materials for repurposing. Accepted for presentation at *Sustainability in Fashion Conference*. London, England.

Lewis, T. L., Park, H., Netravali, A. N., & Trejo, H. X. (2017). Closing the loop: A scalable zero-waste model for apparel reuse and recycling. *International Journal of Fashion Design, Technology and Education*, 10(3), 353–362.
<https://doi.org/10.1080/17543266.2016.1263364>

Woolridge, A.C., Ward, G.D., Phillips, P.S., Collins, M., & Gandy, S. (2006). Lifecycle assessment for reuse/recycling of donated waste textiles compared to use of virgin material: A UK Energy-Saving Perspective. *Resources, Conservation and Recycling*, 46, 94-103.

Young, C., Jirousek, C., & Ashdown, S. (2004). Undesigned: A study in sustainable design of apparel using post-consumer recycled clothing. *Clothing and Textiles Research Journal*, 22(1/2), 61-68.

