Interweaving E-Waste

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Contextual Review and Concept Statement. Emerging design technology is releasing every year, which brings to the next level of innovation in the fashion industry. At the same time, the result of this advancement also generates tremendous material wastes that give a negative impact to the environment. The invention of electrical and electronic equipment advanced individuals' life in many ways but also generates electronic wastes (e-waste) (Hossain et al., 2015). The growth of e-waste has been significantly increasing, and Hossain et al. (2015) stated that this waste occupied 8% of the total volume of solid waste worldwide. Design technologies used in the creative design scholarship have been increasing for the past two decades (Hwang et al., 2018). Designers create novel designs through using leading-edge technologies, but often do not fully think about this impact to the environment. As we live in the digital transformation era, more state-of-art technological equipment will be introduced to the globe and fashion companies will adapt those to be compatible at the market. Then, where is the ultimate destination for these obsolesce machines? The design, *Interweaving E-Waste,* was contextualized in this context to articulate the ambivalence of technology through using CAD, digital Jacquard weaving, and zero-waste approach.

Aesthetic Properties and Visual Impact. Hand-weaving enables to connect the weaver with the materials used for weaving (Piper & Townsend, 2015). The designer in this design interfaced and communicated through the weaved fabrics as they embodied a strong statement of textile patterns, conveying sustainability awareness to the public. Textile fabrication was processed through adapting CAD in Jacquard textiles. Inspired by the chaotic mess of e-waste, fabrics with the intended patterns were created using a hand-weaving digital Jacquard loom. By weaving rows-by-rows, yarns interweaved one another and shaped a robust surface design.

Figure 1. Digital photograph translation

The surface design of this work through digital fabrication was started from the designer's photographs of entangled electronic wires, as shown in Figure 1. CAD with a Jacquard loom allowed articulating the photographs delicately on fabrics. Research by NG and Zhou (2006) supports the digital Jacquard textiles with less color use, allowing "finer details as a black-and-white photograph" (p. 37). The textile design for the jacket was fabricated in a colorless, black-and-white fabric to portray delicate details of wires in

mass. The digital fabric for the skirt using red yarns along with black and white articulates the public alerts on the increase of e-waste. This hand-fabricated design reflects the mutual engagement between the designer and materials to emphasize the garbage pile of e-waste the future generation will confront.

Process, Technique, and Execution. This design involves multiple steps: design ideation from electronic wire experimentation through digital fabrication, textile production using a digital Jacquard loom, patterning, fitting, and assembly. The design research began from hand-crocheting recycled electronic wires to obtain digital photographs to fabricate wires on textiles; more specifically, these wires were deconstructed and draped on the dress form to photograph the mess with e-waste. P hotographic images were then used for Jacquard textile creation, which were first built in the structure of machine language (see Figure 1), portraying pixel-based images coded of grids and squares in 12 satin structures for Jacquard textiles of the jacket. The designer then weaved black and white yarns consisting of 100% cotton, using a digital Jacquard loom connected to a computer, which leads to the final fabric that was utilized for the jacket front (see Figure 2). A total of four fabric pieces were weaved to create this wearable art, including jacket and skirt.

Figure 2. Jacquard weaved fabric

The tangled wires in various angles bring a new perspective to the silhouette of this design, having an unbalanced shape with a puff shoulder jacket and a big volume in skirt. These detailed silhouettes were proposed to depict the world's exploded view of e-waste. After the garment shapes were settled, additional pattern revisions were performed through multiple model fittings. If fabric wastes are generated through the design process, these can ideally use as fabrics for other purposes, which provide a new life for these wastes and extend their lifespan (Rissanen, 2013). The fabric scraps from this design were used to embellish shoes to accomplish the original intent of applying a zero-waste approach (see Figure 3). The leftover textile pieces also were used in the background environment for the photoshoot of this design, *Interweaving E-Waste*, to deliver a powerful sustainability statement.

Figure 3. Usage of fabric scraps for shoes embellishment

Cohesion. This design is the handcrafted wearable art created using CAD and Jacquard weaving technique. Every detail in the digital photographs was manifested on the fabric surface, embodying a factual statement of e-waste danger. The interweaved yarns reflect entangled e-waste we will encounter in the future. This design showcases the unsustainable practices we currently confront in the digital world through the fabric manipulation inspired by e-waste, which promotes environmental awareness to the public.

Significance, rationale, and contribution. The hand-weaved Jacquard textiles in this design well portray the natural disruption we create every day. Using a zero-waste approach, the fabrics of this wearable art were created with Jacquard weaving technique considering minimum yarn wastes. Moreover, this design achieved a zero-waste approach since every fabric scrap was reused for various accessories' embellishments after cutting. The chaotic mess of the design surface depicts a cluster of wastes the future generation will confront, which promotes considerable action moving towards our healthy environment.

Originality and Innovation. The design, *Interweaving E-Waste*, was developed from the creative process of the designer's experiment with electronic wires. This design is original and innovative in terms of (a) assembling the self-taken photographs to the fabric surface through digital fabrication; (b) incorporating both handcraft and digital technology in every design process from Jacquard weaving to garment production; and (c) accomplishing a zero-waste approach through repurposing all fabric wastes.

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