

## Mathmadness

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As one of the sustainable design practices, fashion designers have been exploring new ways of reusing and upcycling post-consumer garments. Fashion designers also have found inspiration from various resources, from artwork to culture, to enhance overall quality and originality of their designs. Some design scholars have combined these two different design practices to create one design work. For example, Chen (2016) designed a culturally inspired feminine dress with ornamental detail from secondhand men's suits and neckties. XXXX and XXXX (2016 & 2018) developed two design works through the use of re-purposed and post-consumer materials (khaki pants) inspired by an Op-art artist. Another example of combining sustainable design practice and cultural artwork was done by XXXX and XXXX (2018). They developed a sustainably designed garment through reusing secondhand men's dress shirts, while also creating an origami flower-inspired outfit with innovative surface designs. These works have been successful creations by design scholars who have invented original surface designs by using the lens of sustainability and cultural inspiration.

Using the sustainable design practice of upcycling post-consumer materials, combined with a triaxial pattern weaving technique and digital textile print, the purpose of this design was to develop an innovative surface for a garment through re-using secondhand men's dress shirts and digital textile printing, while also creating an ethnomathematical artifact-inspired outfit with innovative surface designs. This particular design, *Mathmadness* was developed by exploring both a new way of using post-consumer materials as well as the inspiration and adoption of surface weaving techniques from ethnomathematical artifacts. Ethnomathematics refers to a field of research that study the relationship between mathematics and culture (Mohamad, Aisikin, & Embong, 2010). Mohamad et.al. (2010) investigated ethnomathematical study on weaving among the Malay weavers and focused on mathematical ideas that are relevant to their weaving techniques, called triaxial or hexagonal weaving, where the strands are woven from three different directions. This specific weaving technique has been also originated in Indonesia, called 'mad weave', (anyam gila) as a type of basketry, which has triaxial structures suitable for the construction of baskets (Gailiunas, 2017). Digital textile printing technology is used in partnership with this 'mad weave' technique. Using this technology, the designers created part of

the textile surface design by making parallel gradations of two contrasting colors, black and red, to develop optical illusions of depth and volume. White men's dress shirts were used as the third strip of the weave.

This is the second time one of the designers has used triaxial weaving, where three different strips are intertwined to create the illusion of a three-dimensional cube pattern after the weaving has completed. However, this is the first time the designers have created a surface pattern more complex than the basic cube using triaxial weaving by studying 'mad weave'. First, different colored gradient 1" strips were developed with Photoshop and printed on cotton fabric. Men's dress shirts were cut into 1" bias strips. Digitally printed cotton strips and 1" cut strips from men's dress shirt were first placed in an order vertically as a warp and then the strips were woven in another order at a 30-degree diagonal angle. strips and men dress shirt strips were then woven from the opposite direction of the first 30 degree diagonal angle to create the mad weave pattern.

The strips for all sides were proportional in a 2:4 ratio, 2 white strips from men's shirts for every 4 digitally printed strips. The designers then, through the triaxial design are able to create two patterns. Close up you can see the appearance of three-dimensional cubes while further away a more abstract repeat pattern is visible. The dress was made using a flat pattern method, then above described triaxial weaving was applied. The uncut digitally printed fabric was used for the ruffle hem of the dress. This garment is singular in its design due to the use of both digital textile printing, applying sustainable design practice and adopting surface weaving techniques from ethnomathematical artifacts.

This design project was able to integrate technology, handcraft weaving techniques, and sustainable design practice creating a sophisticated outfit. This project was created to inspire others to think about using hand craft techniques that has been practiced by various cultural groups for many years. Furthermore, as the most significant trends of contemporary fashion trends are in technology and sustainability, this design project was developed to demonstrate creative and innovative ways to change how we view the current existing fashion paradigm from where consumers demand for fast, low priced, trend fashion products to a more humanistic, sustainable, and craft culture. The designer will continue to explore different handcraft techniques combined with technology and sustainable design practices in an attempt to inspire others to help shift the current fashion paradigm.

#### References

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