Digital laser dyed textiles: A collaborative and interdisciplinary study

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**Abstract**

This research explored a ‘Digital Laser Dye™’ (DLD) patterning process as an alternative coloration method within a textile design practice context. An interdisciplinary framework employed Optical Engineering, Dyeing Chemistry, Textile Design and Industry Interaction through collaboration between Loughborough University and the Society of Dyers and Colourists (SDC). In doing so, combined creative, scientific and technical methods facilitated design innovation. Experimental outcomes, including sportswear and intimate apparel prototypes suggest suitable textile markets for processing polyester garments in this way. Textile design practice was approached as a ‘T-shaped’ practitioner to facilitate crossing over from one distinct specialist area – textile design, into other disciplines. A combined interdisciplinary/collaborative approach was necessary in order to interact effectively with multiple disciplines. Collaboration with industry organisation, SDC, facilitated considerations for commercial potential of the digital laser-dye process in terms of repeatable effects and reliable results leading to transferrable knowledge beyond the scope of the study.

**Methodology**

**Technological Innovation**

**Design Innovation**

**PRACTICE-LED Textile Design Perspective**

**Mixed Method Approach**

**Scientific**

**Data Collection**

**Interdisciplinary**

**Textile Design**

**Optical Engineering**

**Dyeing Chemistry**

**Industry Interactions**

**Conclusion**

The research considered the aesthetic possibilities, production opportunities and environmental potential of the DLD process compared to traditional and existing surface design techniques. Central to the investigation was the consideration of the laser beam spot as a dots-per-inch tool, drawing on the principles used in digital printing processes. It was therefore possible to utilise the beam as an image making instrument for modifying textile fibres with controlled laser energy using a computer aided design approach. An interdisciplinary approach supported the acquisition of diverse knowledge and enabled different areas of learning to be opened up. Problems and solutions were investigated and developed holistically in varied environments with people who had different viewpoints, expertise, skills, expectations and field specific language in relation to their unique training. This collaboration between university departments together with industrial partner, SDC, provided a mutual exchange of knowledge, abilities and know-how, attained through various modes of interaction for the advancement of the laser-dye process studied.

**Acknowledgements**

**References**

**Cross-reference**

**Digital Laser Dyed™ Textiles**

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