

Assessing Sustainability, Slow Fashion, and Quality Analysis Through Denim Education

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Introduction of Innovation

Textile and Apparel programs over the past decade have worked to integrate important concepts of sustainable practice into curriculum. As the industry and consumer market become more responsible and invested in sustainability, apparel curriculum experts have developed course components and, where available, entire courses to ethical and sustainable practices of the textile and apparel industry. In this teaching summary, innovative educators have worked to interweave concepts of sustainable practice, slow fashion, and quality production from within the multi billion dollar denim industry offering a fresh take on Textile Quality Assurance (TQA) curriculum. Although denim is a long-standing staple of the textile and apparel industry, it is not well known for its sustainable practice, specifically around water conservation. With a market value of 90 billion U.S. dollars in 2019, and expectations to increase to 105 billion U.S. dollars by 2024, denim is by far the most valuable natural fiber product in the apparel industry (Shahbandeh, 2020) and is ideal for focused case study in both TQA and sustainable practice. Additionally, given the trends toward resale, recycling and upcycling of apparel, denim is a relatable product for today's students and has potential sustainable impacts across every trend and classic apparel classification from children's to menswear, and womenswear to outerwear. For college students, an intensified study of the denim market offers opportunities to understand, evaluate and assess components of historic apparel production as it has transitioned across decades of growth in production and dyeing practices, fiber growth and textile processing, and improvements in sustainable practice. As denim production has migrated from the US to countries around the world, its sustainable footprint is globally impactful and demands that our future industry leaders understand this potential of significant change. Thus, an upper-level undergraduate course was designed to refocus on evaluating the process of design, production, and quality assurance of denim products within a sustainable lens and assessed by brand.

Purpose and Objectives

The denim TQA course is designed to be significantly content-rich and terminology-intensive, preparing undergraduate students for global apparel and textile related careers. As part of the undergraduate class offered to junior and senior design and merchandising majors, students focus on learning textile quality assessment components with testing and evaluation in the specified denim area. In addition to gaining insight regarding TQA across denim brands, students are presented with an overview of challenging sustainability practices of the denim industry. The course developers added content from innovative research on sustainable denim textile dyeing and finishing techniques for denim apparel categories. As students progress through the course, they are asked to gather sustainability insights on the brand and any sustainable values of the customer. They then conduct textile product testing, create a comprehensive jean technical package, prepare a denim research notebook featuring a series of denim-specific quality tests on comparative denim brands, and create a summative poster presentation of comparative findings on both quality and sustainable practice. Lab activities, conducted by teams, are submitted as lab

reports, with hard copies of the data printed and added to the notebooks. Textbooks by Kadolph (2007) and Myers-McDevitt (2011) are used textile tests, related standards for test procedures, and product development and tech pack guidelines.

Course Design and Implementation

The course had been taught with the denim focus for six semesters and growing focus on sustainable practice since the second semester. Students are taught using a collaborative learning approach in teams of three or four, with most of the lab work conducted in these teams. Assigned teams also work together on a final presentation of their results and present in class as a team at the end of the semester. This approach is designed to build professional networks among members of the class and improve collaboration and negotiation skills as well as to improve learning. The semester introduction presents students with the history of denim in French and American culture including denim terminology, an overview of cotton production and importance in the US market, a review of textile regulatory agencies and testing guidelines, an overview of common challenges to sustainable practice, and a discussion of the importance of teamwork.

Denim Technical Package. The tech pack includes the design and completion of three parts, a) flats, cover design sheet, and illustration, b) component/trim sheet, label/packing sheet, measurement/spec sheet, and consumer fit evaluation sheet, and c) detail/construction call out sheet, and a detail/construction assembly sheet. A fit model is used for all fit evaluations.

Research Notebook. Throughout the semester, students build a research notebook containing five sections; annotated denim terminology with images, weave examples, elements of the technical package, lab tests and samples, and research comparisons. Standard ASTM and AATCC tests included fabric count, fabric weight, weave, yarn twist, fabric thickness, burn behavior, Elmendorf tear test, colorfastness to crocking, abrasion resistance, and random pilling.

Final Poster and Presentation. Each team was assigned a brand and each student had their own product to evaluate as part of the team. The teams assessed quality and sustainability claims of the denim brand and compared these across all brands assigned to the class. Final posters featured project purpose, comparison charts, quality tests and product photos, flats, data charts or graphs of test results, and team conclusions and recommendations regarding both product and practice of the brand. Teams provided a verbal explanation of the purpose of the project, a brief description of garments in the study, an overview of tests conducted, and any notable results including summations on innovations in sustainability or lack thereof.

Plan Effectiveness and Revision

The success of the approach has been noted through improved course evaluations and student feedback. The focus on the denim market has sparked and maintained interest in TQA concepts and textile testing, and has initiated substantial thought and conversation in global industry



challenges of textile dying and processing, water consumption, and fast versus slow fashion that students may not have previously considered. As the industry continues to enhance sustainable practice, the authors will continue to revise curricular elements to introduce these innovations in the course.

References

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