



Circular Design Challenge:
An interdisciplinary approach to sustainable development
in STEAD disciplines.

Barbara Trippeer, Assistant Professor, University of North Texas
MaryAnn Cairns, Assistant Professor, Southern Methodist University
Myles Ethan Lascity, Assistant Professor, Southern Methodist University
Eric Godat, Assistant Professor, Southern Methodist University
Guillermo Vasquez, Assistant Professor, Southern Methodist University

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As part of a partnership between two U.S.-based academic institutions, this study interrogates some misconceptions regarding sustainable product development through an interdisciplinary STEAD-based project with students in fashion design, engineering, and environmental anthropology. Students who participated in this study, entitled the Circular Design Challenge, were tasked with participating in a collaborative learning project that explores various modes of critical making, public engagement, and sustainable development through the circular design processes. This project design tested the hypothesis that participation in creating sustainable clothing encourages students to consider political, social, and interpretive sustainability expectations, regardless of background or discipline.

The United Nations' Fashion Industry Charter for Climate Action, initially launched in 2018, called for integrated, multi-disciplinary approaches to generate creative, multi-stakeholder solutions to reduce the fashion industry's negative environmental impacts. In response to this call, a cross-institutional faculty team initiated a STEAD-based (Science, Technology, Engineering, Arts, and Design) collaborative learning project connecting pedagogical approaches in fashion, design, environmental anthropology, engineering, and data science.

Regarding its sustainable education and public outreach agenda, this Circular Design Challenge (Foundation, Circular Design for Fashion 2021) project aims to increase education regarding the negative externalities generated from apparel development and consumption while encouraging personal habits geared toward sustainable living. Earlier research gathered through literature review indicated that although some college-age students desired to incorporate sustainable products and approaches to their lifestyles, the general student population was unaware of the fashion industry's environmental impact. Likewise, students reported difficulty connecting how apparel and textiles relate to sustainability. This research provided a springboard for asking students to consider these realities when designing new products.

As part of this Circular Design Challenge, students worked in cross-institutional teams to develop sustainable products and accessories through research and prototyping based on studies

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of emerging material science, supply chain logistics, and ethnographic research. Student teams produced finished prototypes and visual representations of their research processes. The study also utilized reflexive diaries and narrative journey mapping as part of its research data. Formats to document milestones and track project development, like those used in traditional apparel product life cycles, were used to align student coursework with apparel industry professional practice methodologies.

The faculty researchers used a mixed-method approach to track student outcomes, triangulating data from interviews, workshops, classroom exercises, and participant observation. The findings from these strategies prompted discussion and a deeper understanding of consumer attitudes and apparel industry practices related to sustainable living. Additionally, it identified conflicting pressures between equitable development, the environment, and climate change.

This project explored how interdisciplinary collaborations at the university level can a) support general awareness regarding waste and environmental impacts of the apparel and textile industry and b) encourage thoughtful and in-depth approaches to circular design and other sustainable strategies.

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