What Does it Take to Build a Domestic Fiber-to-Clothing Cotton Supply Chain? Equipping Students with Real World Knowledge Through an Immersive Learning Experience

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Background and Purpose: To prepare students for careers in the global industry, many apparel programs at U.S. universities require a sourcing or supply chain course (Apple & Cheramie, 2018). These courses tend to focus on the global nature of the supply chain (e.g., Ha-Brookshire, 2017), given that only three percent of apparel sold in the U.S. market is produced domestically (Karpova et al., 2021). However, due to the significant supply chain disruptions experienced by the industry during the COVID-19 pandemic, many textile and apparel companies are rethinking where they make their products (Haukkala et al., 2023). In addition, U.S. consumers, the media, and the government are placing increased pressure on companies to ensure transparency of their supply chain operations (Chen, 2022). To address these concerns, companies are exploring ways to limit inventory, produce goods closer to the selling season, and build shorter supply chains, (Chen et al., 2022; Kucera & de Mattos, 2019; Miguel et al., 2024).
In the face of this evolving landscape, understanding the dynamics of the domestic supply chain is essential for apparel students to innovate and adapt. Equipping students with this knowledge prepares them to utilize resilient and transparent supply chain strategies in their future careers (Freeman et al, 2022; Orlando et al., 2022). Specifically, students in apparel and retail programs need to be knowledgeable about the opportunities that exist for domestic manufacturing of cotton and cotton-rich products, particularly given the fact that the US is the third major cotton producer in the world (Karpova et al., 2021). Therefore, the **purpose of this study** was to develop a multi-assignment project to enhance students' knowledge of the U.S. cotton supply chain from fiber to finished apparel product. A special focus of the project was on understanding sustainability in the cotton supply chain and innovative performance technologies to produce high-value cotton and cotton-rich products.

Theoretical Framework. Challenge-based learning (CBL) and experiential learning (EL) pedagogical frameworks were employed to develop the project. CBL leverages a problem or an issue as a core component of learning, integrating real-world applications and collaborative efforts (Gallagher & Savage, 2023). This method facilitates deeper material comprehension, fosters creative thinking and problem-solving, and provides industry networking opportunities for students (Ma, 2022). EL is another instructional strategy that emphasizes the active engagement of students in the learning process involving real-world applications (Kolb, 1984). The central idea of EL is to engage students through direct experience, reflection on the experience, deriving new insights, and applying these insights in new contexts (Kolb, 1984). EL has been reported to improve student learning and engagement (Hakeem, 2001). In addition to gaining knowledge, EL activities such as collaborating with industry professionals on a project

facilitate development of soft skills, including communication, critical thinking, and self-awareness (Jones et al, 2020).

Project Description: Drawing on the challenge-based learning and experiential learning frameworks, an immersive learning experience was developed and implemented in a junior-level sourcing course that is required for all students enrolled in an apparel program at a US university. The goal, or challenge, of the project was to develop a production plan for a high-performance, sustainable, all-American clothing line made of cotton or cotton-rich materials. For the project, student teams completed the following assignments for a selected apparel product category:

a) **Research report** was conducted utilizing the CottonWorks™ website resources to map out a cotton supply chain consisting of regional producers of yarn, knit and woven fabrics, and various finishings through cut-and-sew cotton apparel products.
b) A **three-day field trip** to visit manufacturers of cotton-rich products across the Southeast region. During the trip, students collected data (i.e., photos, videos, Q&A with industry professionals, field notes) to finalize their production plans, while learning first-hand about the opportunities and challenges of sourcing cotton products domestically.
c) Short **educational videos** to promote US-made cotton and cotton-rich products. The videos were developed by student teams based on the research report and included the materials and data collected during the field trip.
d) To assess **learning outcomes**, students completed **two individual essays,** one before and another after the project, as described below.

Learning Outcomes: Following the experiential learning framework (Kolb, 1984), students reflected on their knowledge about the domestic cotton supply chain, cotton sustainability, and cotton performance. For this purpose, a learning outcome assessment instrument was developed in the form of structured essay questions to measure student knowledge. Students answered the questions in an exam-like setting, without consulting any resources: (a) describe the U.S. cotton supply chain from fiber to final consumer products; (b) provide examples of performance cotton in apparel; and (c) explain cotton sustainability. The essays were graded by the instructor, and later students were asked to compare both of their essays and reflect on their learning, which was done as a class discussion. Presentations of created videos were debriefed by an industry professional, who is an expert in cotton supply chain operations, to provide feedback on demonstrated students' learning outcomes.

Conclusion and Implications: This study developed an experiential project to equip apparel students with a comprehensive understanding of the U.S. cotton supply chain. The project provided diverse learning opportunities for students to gain in-depth knowledge about cotton production in the US from fiber to final product, focusing on sustainability in the domestic supply chain and innovative performance clothing. The project resulted in the increased employability of students, as they gained first-hand knowledge of a network of U.S. producers located across the supply chain of cotton-rich apparel that they can draw upon when making product-based decisions as future industry professionals. Further, based on the direct experiences

with local businesses—from yarn and fabric production to finishing and clothing manufacturing—students may be inspired to start their own cotton-focused businesses at some point in their careers.

Experiential learning is critical for the post-COVID generation of college students (Ma, 2023). By actively engaging students in realistic scenarios, this learning enhances knowledge acquisition and retention. Through direct involvement in activities such as visiting manufacturing facilities and collaborating with industry professionals, students gain firsthand exposure to the intricacies of the cotton supply chain. This hands-on engagement allows for a deep understanding of complex learning materials and fosters the ability to apply it within different contexts.

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References:

Apple, L., M. & Cheramie, L. (2018). Globalization of apparel technology in university apparel programs. *Journal of Textile Science & Fashion Technology*, *1*(3). https://doi.org/10.33552/JTSFT.2018.01.000514

Chen, J. Y. (2022). Responsible sourcing and supply chain traceability. *International Journal of Production Economics*, *248*, 108462.

Chen, H., Hsu, C. W., Shih, Y. Y., & Caskey, D. A. (2022). The reshoring decision under uncertainty in the post-COVID-19 era. *Journal of Business & Industrial Marketing*, *37*(10), 2064-2074. https://doi.org/10.1108/JBIM-01-2021-0066

CottonWorks. (n.d.). Cotton Incorporated. https://cottonworks.com/en/

Freeman, C., Orzada, B., Cobb, K., & Talukder, A. (2023). Being part of a winning team: a problem-based approach to teach sustainability adoption in collegiate athletic uniforms. *International Journal of Fashion Design, Technology and Education*, *16*(1), 14-21. https://doi.org/10.1080/17543266.2022.2089240

Gallagher, S. E., & Savage, T. (2023). Challenge-based learning in higher education: An exploratory literature review. *Teaching in Higher Education*, *28*(6), 1135-1157. https://doi.org/10.1080/13562517.2020.1863354

Hakeem, S. A. (2001). Effect of experiential learning in business statistics. *Journal of Education for Business, 77,* 95-98. https://doi.org/10.1080/08832320109599056

Haukkala, T., Niinimäki, K., & Turunen, L. L. M. (2023). Fashion in turmoil: Impact of the COVID-19 pandemic on Finland's textile and fashion industry. *Sustainability: Science, Practice and Policy, 19*(1), 2173424. https://doi.org/10.1080/15487733.2023.2173424

Jones, D., Childs, M., Frankel, S., & Loveday, M. (2021). Experience-based learning: Exploring meaningful outcomes for students in retail and fashion. *International Journal of Fashion Design, Technology and Education*, *14*(1), 58-68. https://doi.org/10.1080/17543266.2020.1859625

Karpova, E., Kunz, G., & Garner, M. (2021). *Going Global: The Textile and Apparel Industry.* Fairchild Books, New-York, NY.

Kolb, D. A. (1984). *Experiential learning: Experience as a source of learning and development.* Englewood Cliffs, NJ: Prentice Hall

Ma, J. J. (2023). Development of education for sustainable fashion design using a challenge-based learning approach. *International Journal of Fashion Design, Technology and Education*, *16*(2), 164-174. https://doi.org/10.1080/17543266.2022.2137249

Miguel, A. F., Riccardi, M. P., García-Muiña, F. E., Fernández del Hoyo, A. P., Veglio, V., & Settembre-Blundo, D. (2024). From global to glocal: Digital transformation for reshoring more agile, resilient, and sustainable supply chains. *Sustainability*, *16*(3), 1196. https://doi.org/10.3390/su16031196

Orlando, B., Tortora, D., Pezzi, A., & Bitbol-Saba, N. (2022). The disruption of the international supply chain: Firm resilience and knowledge preparedness to tackle the COVID-19 outbreak. *Journal of International Management*, *28*(1), 100876. https://doi.org/10.1016/j.intman.2021.100876