"This Time It's Sticking Because of How Immersive It Was": Apparel Students' Deep Learning about the U.S. Cotton Supply Chain and Sustainability

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Background. Understanding the intricacies of a robust and responsible supply chain is critical for future apparel industry professionals (Karpova et al., 2021). Yet, the multidimensional complexity of building a supply chain is challenging for students, as several competing priorities must be considered (Fantini van Ditmar et al., 2024). At the same time, apparel programs often fail to update curricula or incorporate effective learning strategies for teaching about sustainable supply chains (Jaiswal et al., 2023). Therefore, the **purpose of this study** was to develop a project to facilitate a deep understanding of a complex and critically important industry concept, the cotton supply chain, with a focus on sustainability. The objective was to create an immersive opportunity for students to experience the abstract concept of a supply chain.

Experiential learning was selected for a "here-and-now concrete" experience as the focal point of learning (Kolb, 1984, p. 21). Among various experiential learning strategies, field trips have been successfully used to teach complex topics like sustainability and supply chains (Munkácsi & Kazai-Ónodi; 2018; Putz et al., 2018). Prior studies indicate that field trips lead to substantial gains in knowledge (Salinas-Navarro et al., 2024); better understanding of complex business operations (Brymer & Newman, 2016); and increased enthusiasm (Asgarpoor, 2020). Field trips are a "transformative pedagogy" approach that can be used to educate apparel students (Fantini van Ditmar et al., 2024, p.1).

Project Description. An immersive learning experience was developed and implemented in a junior-level sourcing course in an **apparel program at a U.S. university**. The project focused on building a supply chain to produce a high-performance, sustainable, all-American cotton clothing line. The project consisted of:

a) ***Research report*:** CottonWorks™ resources were used to map a regional cotton supply chain from yarn production to fabric, finishing, apparel assembly, and finally, recycling.
b) ***Three-day field trip*** to visit manufacturers across the Southeast region to gain firsthand insights into domestic sourcing of cotton-rich products.
c) ***Educational videos*:** students created short videos promoting U.S.-made cotton products using research and field trip data.
d) ***Reflective Essays*:** Students completed pre- and post-project essays to describe their learning experiences, as described next.

Method. Following IRB approval, the data were collected in a global sourcing course. To understand students' learning processes and outcomes, reflective essays were used for data collection, which is a common approach in qualitative research for exploring

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personal experiences and insights (Gardner, 2023). Students provided responses in the form of a reflective essay at the beginning (pre-test) and at the end (post-test) of the project. Several open-ended questions guided the essay, for example: (1) describe the U.S. cotton supply chain from fiber to final products; and (2) explain the pros and cons of cotton products in terms of their impact on the environment from fiber to product care and disposal. The researchers open-coded the data collaboratively, discussing categories of meaning through an iterative process until consensus was reached (Cascio et al., 2019). A total of 33 students completed reflective essays and provided detailed and thoughtful responses, ranging from 400 to 1,500 words in both pre- and post-tests. The average age was 20.3, and 76% were women. Most students identified as White (51%) or Black (27%), followed by Hispanic (21%). The sample included juniors (62%), seniors (17%), and sophomores (21%). Students were in either design (70%) or retail (30%) concentrations.

Results. Four themes emerged that, when combined, provide critical insights into the students' understanding of the U.S. cotton supply chain and why this immersive learning experience was beneficial for them, both as consumers and future industry professionals.

"Deepening My Understanding of the Industry." This theme highlights how "firsthand" experiences helped students better "grasp the complexities" (P7) and connect various components of the supply chain to "fully understand the industry" (P22). Post-test essays demonstrated significant improvements in articulating technical processes and genuine comprehension of the "behind-the-scenes" activities (P20). After the project, all participants had an enhanced "grasp of the cotton supply chain" (P25) because of "in person" exposure to "the entire process of cotton growing, harvesting, and processing from raw material to a finished product" (P17).

Equipped and Responsible Professionals. This theme describes how newly gained knowledge led to a sense of belonging to the industry, "You feel like you are part of the system" (P4), and the confidence needed to be successful, "Now, I am able to confidently walk into any fashion company and understand what they are talking about" (P5). About half of the participants expressed a strong sense of "responsibility" in the post-test essays, "I now know I can provide knowledge and guide my future employer in a more ethical and sustainable direction" (P20).

Informed and Empowered Consumers. The theme summarizes the impact of the experience on participants as apparel consumers who can "make better decisions about which companies to support" (P5). After the project, participants showed deeper awareness of how clothing consumption impacts the environment. This realization translated into strong intentions to modify their acquisition, care, and disposal of clothing, "I am much more aware of what I am buying and how much I am buying" (P30). After "witnessing the amount of work that goes into cotton production" (P21), participants expressed a new appreciation for cotton clothing.

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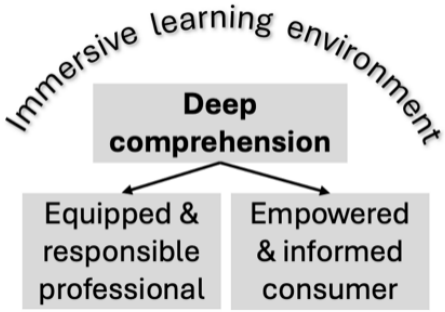
Immersive Learning. This theme deconstructs student experiences to make sense of deep learning. It unpacks how various sensory dimensions of the immersive experience enabled "grasping the entire process [of supply chain] at once" (P15). Participants explained how multisensory inputs—visual, auditory, and kinesthetic—significantly enhanced their learning, "go out into the field and gather my knowledge firsthand" (P18). They highly valued hearing "extraordinary stories" that shared "so much wisdom that has stayed with me since" (P19). Students reflected on how these experiences made them "the most engaged" (P1).



Conclusions and Implications. This study demonstrates how immersive learning, particularly a three-day field trip, was successfully applied as an instructional strategy to facilitate holistic comprehension of inherently complex and challenging topics such as supply chain and sustainability among apparel students. The findings illustrate that in an immersive environment, learning reaches a deep and meaningful level allowing students to "grasp" complex phenomena, thereby helping them contextualize abstract concepts and develop a true understanding of interconnected processes. Consequently, acquiring this deep knowledge effectively prepares students to be competent professionals and empowers them to make informed and responsible choices as consumers. The study advocates for the integration of immersive learning in apparel curricula. Future studies can explore whether immersive learning experiences result in a higher rate of knowledge retention.

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References:

Asgarpoor, J. S. (2020). An integrated platform of active learning techniques in a supply chain management program. *2020 ASEE Virtual Annual Conference Content Access*.

Brymer, R. A., & Newman, W. (2016). An experiential supply chain management field study: Effectively bridging the gap between classroom and practice. *Journal of Higher Education Theory and Practice*, *16*(6), Article 6. https://articlearchives.co/index.php/JHETP/article/view/2027

Cascio, M. A., Lee, E., Vaudrin, N., & Freedman, D. A. (2019). A team-based approach to open coding: Considerations for creating intercoder consensus. *Field Methods, 31*(2), 116-130. https://doi.org/10.1177/1525822X19838237

Fantini van Ditmar, D., Broach, Z., & Farias Zurita, G. (2024). Entanglements of wastelands of fashion: A curricula re-vision. In C. May (Ed.), *Proceedings of Relating Systems Thinking and Design*. Systemic Design Association. https://rsdsymposium.org

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Gardner, P. R. (2023). The reflective essays in social research methods education: An analysis of student assessment experiences. *College Teaching, 72*(4), 339-345, https://doi.org/10.1080/87567555.2023.2205629

Jaiswal, G., Hopfer, E. N., & Dixon, D. L. (2023). Sowing the seeds of change: Educating emerging textile and apparel professionals on sustainability from cotton industry perspective. *International Journal of Sustainability in Higher Education*, *25*(3), 649–668. https://doi.org/10.1108/IJSHE-08-2022-0282

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 the source of learning and development*. FT Press.

Kovač, V. B., Nome, D. Ø., Jensen, A. R., & Skreland, L. Lj. (2023). The why, what and how of deep learning: Critical analysis and additional concerns. *Education Inquiry*, 1–17. https://doi.org/10.1080/20004508.2023.2194502

Munkácsi, A., & Kazai-Ónodi, A. (2018). *Challenges and methods of the 21st century in logistics education*. https://doi.org/10.18427/iri-2018-0073

Putz, L.-M., Treiblmaier, H., & Pfoser, S. (2018). Field trips for sustainable transport education: Impact on knowledge, attitude and behavioral intention. *The International Journal of Logistics Management*, *29*(4), 1424–1450. https://doi.org/10.1108/IJLM-05-2017-0138

Salinas-Navarro, D. E., Arias-Portela, C. Y., González de la Cruz, J. R., & Vilalta-Perdomo, E. (2024). Experiential learning for circular operations management in higher education. *Sustainability*, *16*(2), Article 2. https://doi.org/10.3390/su16020798

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