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Teaching the Next Generation of Technical Designers About Cotton Performance Technologies Through a Problem-Based Learning Project

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Time and again, consumers report that cotton is their preferred fiber choice for apparel (Cotton Lifestyle Monitor, 2017). Recently, Cotton, Inc. has released a portfolio of innovative finishes and textile technologies that enhance the performance qualities of cotton fiber. Knowledge about these technologies appears to be relatively unknown by students. As the next generation of technical designers, students should be aware of these innovations because cotton technologies can add value to a wide scope of apparel products, including opening up markets like performance apparel and activewear that has traditionally been oversaturated by synthetic fibers. These cotton innovations could be a blind spot for emerging technical designers. Therefore, the purpose of this project was to increase students' awareness of advancements by Cotton, Inc. to enhance the functional properties of cotton. If emerging technical designers have experiences with these innovative new fabrics, then they may consider sourcing these fabrics when seeking innovative textile-based solutions that address users' needs.

Project implementation

In teams of two, students in Technical Design, a required 3000-level course, worked on a semester-long project that involved developing an innovative performance apparel ensemble for an underserved market using technologically enhanced cotton fabrics. Students created technical packages for each garment and submitted a comprehensive report documenting the entire design process and outcomes. Fabric and support was provided by Cotton, Inc.. The class was framed by a Problem-Based Learning (PBL) approach. PBL is an active learning strategy in which students learn about a subject through the experience of solving an open-ended problem (Hung, Jonassen, & Liu, 2008). The open-ended question that guided the project was: How can cotton technologies add value and increase performance apparel end-users? Through this question, the author framed the delivery of technical design concepts (e.g., development of tech packs, fittings, sample development) as they related directly to the student's project. The students were interviewed twice throughout the semester about their learning experiences.During weeks 1-3 of the teams focused on building foundational knowledge about general fiber/fabric innovations, cotton technologies, functional clothing design principles, and user-centered design. The teams conducted exhaustive secondary research about potential markets. The author challenged the students to identify an underserved market, particularly a user group who would benefit from cotton innovations. The teams identified post-natal breastfeeding women, hospital nurses, adults with a sensory processing disorder, burn survivors, and amputees to work with. In weeks 4-6 the teams focused on interviewing and surveying users in their specified markets to identify a problem with their apparel that could be addressed through this project. Students synthesized their research to create an inspiration board and develop technical flats of their initial design concepts using Adobe Illustrator. Each team identified one local user as their fit model who was

3D body scanned. During weeks 7-9, the teams focused on creating patterns for their designs using Optitex. The students produced 1st prototypes and were instructed on how to conduct a fitting. They recorded changes in the tech packs which were developed using Excel. During this period, the author worked with Cotton, Inc. to acquire cotton fabrics in short runs for the students to use in their final projects. In weeks 10-13, the teams continued to iterate prototypes. Simultaneously, the students were instructed on how to complete the style specification and bill of material pages of the tech pack based on the designs they've developed. This included fabric consumption estimates based on markers made in Optitex. By week 14, students were working in their final cotton fabrics and they created 3D visualizations of their final designs on the 3D body scan of their fit model in Optitex 3D. Weeks 15 -16 focused on the final development of the tech packs including colorways, graded specs, point of measure and construction details. Finally, the teams presented their work in at the Spring Undergraduate Design Showcase. Throughout, the students documented their progress through Instagram posts.

Teaching Effectiveness

In the interviews, the students shared an enhanced and broadened knowledge of cotton innovations. One student shared that prior to the project, "I really didn't know that much about cotton. I'm reading every single week and I didn't realize there were all these technologies of course. I think this project really has made us smarter about our cotton knowledge." The author observed improved engagement with the technical design course content because the course learning objectives were addressed holistically through a significant design challenge that gave focus to a design problem that was supported by a globally-recognized brand. Because of this, students felt engaged with the project, as a student explained, "I liked the semester long format a lot better because I think we get to put a lot more effort into it." Another student mentioned, "It felt like a real product we're working towards. It will actually have an impact on people or hopefully so." The positive feedback from students is confirmation of the importance of building a semester-long experience where students can focus on learning and applying course learning objectives while simultaneously creating relevant apparel projects.

Implications

This project added value to the existing design curriculum by providing students with experiences researching innovative cotton materials, applying functional clothing principles, and gaining user insights to create innovative cotton activewear garments – skills that students would not have encountered elsewhere in the curriculum. As Ellington (2016) aptly wrote, "preparing students for the best chances at securing a career in the fashion industry depends on technical designer experiences educators can provide during the student's educational career." Through this model project, pedagogical experiences using a problem-based learning format may be explored to provide technical design experiences for students.

Acknowledgement

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References

Ellington, T. (2016). The Simulated Fit Session: Experiential Learning for Future Technical Designers. *Proceedings of the International Textile and Apparel Association Annual Conference.* Vancouver, British Columbia.

Hung, W., Jonassen, D. H., & Liu, R. (2008). Problem-based learning. *Handbook of Research on Educational Communications and Technology*, *3*, 485-506.

Cotton Lifestyle Monitor. (2017, September 8). Activewear sales: A natural selection. Retrieved from http://lifestylemonitor.cottoninc.com/activewear-sales/