



## **Inclusive Design as a Strategy to Promote 21st-Century Skills for Product Development Students**

Kristen Morris, Savannah Boyle, Colorado State University, USA

The recent literature shows an uptick of apparel scholars seeking innovative ways to incorporate diversity, equity, and inclusion (DEI) in apparel classrooms. Meyers et al. (2020) wrote, "we have a responsibility to incorporate DEI into the curriculum to not only improve the industry but to have a more just society"(p.1). Christel (2016) and Reddy-Best, Choi, & Park (2018) have called for a need to update the tools we use to teach fashion with more diverse representation regarding body size and race in textbooks. And there is increasing interest in incorporating disability-related content into the classroom as a form of broadening the scope of DEI learning, as evidenced by two consecutive special-topic sessions about teaching adaptive apparel at the 2019 and 2020 International Textile and Apparel Association (ITAA) annual meetings. The authors used the Framework for 21st Century Learning (P21 Framework) to draw insights into how an inclusive design curriculum can foster student professional development, particularly regarding diversity and inclusion (Battelle for Kids, 2019). The P21 framework outlines core 21st-century skills students should master to succeed in modern society (Dede, 2009; Graham, 2015; Cuban, 2015). These include three 1st-order categories: *Information, Media, and Technology Skills*, *Learning and Innovation Skills*, and *Life and Career Skills* (Battelle for Kids, 2019). The framework further drills down into 11 second-order and 20 third-order skills. These skills involve deep learning, analytic reasoning, complex problem-solving, and teamwork (Battelle for Kids, 2019).

### **Methods**

This study implemented an inclusive design curriculum through a semester-long project in the Product Development (PD) capstone course at a large Western university during the Fall 2021 semester. The purpose of the semester-long course project was to provide students with an opportunity to solve apparel-related problems experienced by underserved markets through an inclusive design approach. The students developed a comprehensive project that included developing a collection of five garments based on the primary and secondary market and consumer research. They developed tech packs in Backbone PLM for each product, rendered a minimum of three products in CLO3D, and prototyped one innovative aspect of their line. Throughout the semester, the first author lectured on key theoretical models used in the class to support inclusive design thinking (Keates & Clarkson, 2003; Lamb & Kallal, 1992; Oliver, 2013). These models were used to frame how to think about, communicate ideas, and design for people with disabilities. Students also read anonymized transcripts from over 50 people identifying as having a disability. These transcripts provided the basis of the student research. The students could reach out to the award judges identified as having a disability to help shape their project. Data were collected through a post-survey at the end of the semester consisting of 25 open-ended and Likert-type questions to measure the effectiveness of the inclusive design pedagogy. The authors used descriptive statistics to analyze the quantitative data. The qualitative data analysis progressed with

open coding using *a priori* codes (first-order, second-order, and third-order skills from the P21 framework) (Saldana, 2016).

### Results and Discussion

Seventeen of 22 students enrolled in the course voluntarily participated in the survey. All 17 survey respondents indicated they were of senior standing. Fifteen students were enrolled in the Product Development concentration in the department, one student was an Apparel Design and Production concentration, and one student was in a Merchandising concentration. The average age of the respondents was 23 years, with 21 being the minimum and 31 being the oldest. Gender identity was not required in this survey to protect the participant's anonymity. The student project topics showed a range of DEI interests. They included designs for people with diabetes, people needing an ostomy bag, those having an amputation, people using a wheelchair, and more. Further, one student created gender non-conforming designs, and another focused on designs for Black women.

In coding the qualitative responses for the P21 first-order skills, the inclusive design curriculum effectively solicited skills from all three first-order categories. At the most granular level (third-order skills), the inclusive design curriculum elicited 15 of 20 third-order skills. Applying technology effectively was the most evident third-order skill, applied to 24% of the data set. Apply technology effectively is defined as using "technology as a tool to ... manage, integrate, evaluate and create information to successfully function in a knowledge economy" (Battelle for Kids, 2019, p.6). In this study, the students saw value in applying course technologies to address the inclusive design challenge; as one student noted, "I learned the importance of innovation and using resources already available to the industry. Further, I felt that CLO[3D] was significant, as was physical prototyping. Having to do both put into perspective different ways of sampling and the accuracy of fit and details, especially in inclusive garments." Thinking creatively was the second most coded skill (23%). Think creatively is defined as "creating new and worthwhile ideas (both incremental and radical concepts) and elaborating, refining, analyzing, and evaluating ideas "to improve and maximize creative efforts" (Battelle for Kids, 2019, p.3). In this study, think creatively meant "thinking differently about marginalized groups" as one student said, "It made me think of different ways to include all consumers. Before, I had little knowledge of this consumer group, and doing this project helped me understand them better."

Most students viewed the project as interesting/enjoyable ( $M = 5.62$ ,  $SD = 1.93$ ). It had value or was useful to them in their future careers. ( $M = 6.02$ ,  $SD 1.51$ ). From the survey data, the students engaged with this project topic because they could see that inclusive design is an emerging topic with great opportunity for innovation and growth in the fashion industry.

### Conclusion

The authors understood the effectiveness of the inclusive design curriculum, particularly as it relates to advancing 21st-century skills. This project adds value to the existing curriculum by preparing students for a competitive job landscape that is increasingly focused on providing innovative solutions for diverse consumers and designing for underserved markets. This project provides educators with an example of integrating an inclusive design curriculum into their courses to engage students in discussions about adaptive apparel to ensure that clothing is innovative and meets market demands.

### References

- Battelle for Kids (2019). P21 Partnership for 21st Century Learning Frameworks and Resources. <https://www.battelleforkids.org/networks/p21/frameworks-resources>
- Christel, D.A. (2016). The Efficacy of Problem-Based Learning of Plus-Size Design in the Fashion Curriculum. *International Journal of Fashion Design, Technology, and Education*, 9(1), 1–8. <https://doi.org/10.1080/17543266.2015.1094518>
- Cuban, L. (2015). *Content vs. Skills in High Schools: 21<sup>st</sup> Century Arguments Echo 19<sup>th</sup> Century Conflicts*. Larry Cuban on School Reform and Classroom Practice. <https://larrycuban.wordpress.com/2015/11/03/content-vs-skills-in-high-schools-21st-century-arguments-echo-19th-century-conflicts/>
- Dede, C. (2010). Comparing frameworks for 21st-century skills. *21st-century skills: Rethinking how students learn*, 20(2010), 51-76.
- Graham, S. (2015, April 26). *Preparing for the 21<sup>st</sup> Century: Soft Skills Matter*. Huffington Post. [https://www.huffpost.com/entry/preparing-for-the-21st-ce\\_b\\_6738538](https://www.huffpost.com/entry/preparing-for-the-21st-ce_b_6738538)
- Keates, S., & Clarkson, J. (2003). Countering design exclusion. *Inclusive Design*, 438-453.
- Lamb, J. M., & Kallal, M. J. (1992). A conceptual framework for apparel design. *Clothing and Textiles Research Journal*, 10(2), 42-47.
- Oliver, M. (2013). The social model of disability: Thirty years on. *Disability & society*, 28(7), 1024-1026.
- Reddy-Best, Choi, E., & Park, H. (2018). Race, Colorism, Body Size, Body Position, and Sexiness: Critically Analyzing Women in Fashion Illustration Textbooks. *Clothing and Textiles Research Journal*, 36(4), 281–295. <https://doi.org/10.1177/0887302X18779140>
- Saldaña, J. (2014). Coding and analysis strategies. In *The Oxford handbook of qualitative research*.