# Creating a Share-Worthy Experience: The Impact of Experiential Learning Exercises in an Online and On Campus Introductory Textile Science Course

Jennifer Harmon, University of Wyoming

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**Introduction.** Many American universities are in financial peril, with estimated losses experienced during the coronavirus pandemic upwards of 120 billion dollars (Hubler, 2020). Such uncertainty makes a sustained push towards large class sizes, which are highly cost efficient and able to accommodate increases in overall student enrollment, understandable (Benton & Pallett, 2013; Cash et al., 2017). Recent evidence calls into question the assumption that large classes are less desirable in enhancing student learning outcomes as judged by course grades. However, the authors also recognize that as instructors teach classes of 40 students or more, they may be forced to abandon certain quality enhancing writing assignments or time intensive projects (Ake-Little et al., 2020). Such environments yield little benefit to students, who frequently report a preference for small class sizes, especially for major classes (Koenig et al., 2015). Small classes further provide the necessary format for in depth experiential learning exercises in complex subject matter, like textile science (Harmon, 2024). Such exercises are crucial to professional development and enhanced learning gains (Craney et al., 2011).

**Literature Review.** Experiential learning, "…is a hands-on form of learning that begins with a concrete experience," in addition to reflecting on the process of the experience (Association for Experiential Education (2019). The traditional classroom approach, where the instructor defines and explains the topic, in addition to directing the actions of the students, is typical of textile science courses (Farr et al., 2005). However, physical experiences show improvement in student understanding of related scientific concepts (Kontra et al., 2015). Within a textile science course specifically, there exists tension between the appropriate amount of student autonomy and the necessity to impart needed principles and testing standard protocols within students (Harmon, 2024). However, such experiential learning can be difficult to deliver in the online environment. Educators have increasingly extended approaches to enrich online learning. Some approaches previously taken include shorter and more intensive experiences (Lashley & McCleery, 2020) and digital simulations (Koivisto, 2017).

In order to observe the impacts of experiential learning exercises (ELEs) on textile science students, 4 exercises were constructed and administered to on campus and online sections of an introductory textile science course. After the exercises, students completed a reflection from prompts. Additionally, students took a learning and experience assessment.

H1: Both sections of the on campus course will score higher on the learning assessment than the two online sections

H2: The on campus section completing the ELEs will score higher on the learning assessment than the online section not completing the ELEs

H3: The students in the online course with the ELEs will rate the learning experience more highly on the DELES than the students in the online course without the ELEs

**Methodology.** *Course Structure.* The course these activities were implemented in was a junior level, introductory textile science course. This course is a required course for apparel discipline major students and a general science requirement option for other university students. Between the years 2021 and 2022, four sections of the course were taught. These four sections included two sections of the on campus version, one with experiential exercises and one without and two sections of the online version, one with experiential exercises and one without. All sections of the course were taught by the same instructor, using the same lecture notes, exams and assignments. Both on campus sections met 3 days a week for a normal semester of 16 weeks, while the online classes were largely asynchronous, with the section engaging in the activities lasting a semester and the section without, half a semester. *Experiential Learning Exercises.* Four exercises were constructed to emphasize key topics in the course; staining on cellulose fibers, yarns, knit fabrication and coloration. The exercises included staining on cotton versus wood cellulose fibers from different writing inks, yarn spinning with a drop spindle, knitting and fabric dyeing. Activity kits were constructed and mailed to online students a week before class began. These kits cost approximately $18.87 per student, including shipping and had a return rate of 41%. On campus student engaged in the exercises during a class period. Both sections participating in the exercises wrote reflections after the activity was complete. *Survey Measure.* Near the end of each course section, the survey measure was distributed for extra credit. The survey measure consisted of learning objective questions drafted by the course instructor and the Distance Education Learning Environments Survey (DELES) (Walker & Fraser, 2005). There was a total response rate of 76.7%, with 66 completed responses returned across the 4 courses sections, 17 out of 17 for the experiential learning on campus section, 18 out of 27 for the experiential learning online section, 13 out 16 for the on campus control and 18 out of 26 for the online control section. From these responses, those in the experiential learning course sections who did not complete all 4 exercises were excluded, leaving 15 in the on campus section and 14 in the online section. Bootstrap analysis with 1,000 simulated samples revealed the scores for the learning assessment and DELES fell within the 95% confidence interval.

**Results.** *Learning Assessment.* The average across the 40 item learning assessment was 26.95. For the two on campus sections the score was higher (M= 27.71), while the online sections were lower (M=25.28). Further, the on campus ELEs (M= 29.07) was higher than the online ELEs (26.64), while the on campus without ELEs was higher (M= 28.38) than the online without (M= 24.22). When looking at significance, the largest difference can be seen in the on campus class completing the ELEs and the online section which did not ($t(31) = 2.755$, $p = .010$). These results gave support for H1 and H2. *Student Experience.* In the DELES, the online section with the activities rated the course higher on average (176.21) than the course without (162.22), this result was not significant ($p = .28$). While the overall score on the DELES was not significant, average scores from the authentic learning subscale were notably higher for online students completing the ELEs (35.14) compared to the online students who did not (29.61), a difference that was significant ($t(30) = 2.147$, $p = .040$). These results gave partial support for H3. 6 students in the online ELE course mentioned sharing or intending to share the activity with friends or family.

**Conclusion.** Students completing ELEs in this textiles science class displayed learning gains and enhanced learning experience perception. These kits were simple and cost effective to distribute to online students. Expanding the number of exercises and following these additional students through their exercise completion would add strength to these initially observed trends.

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