College Students' Sustainability Awareness towards Apparel and Cotton Industries

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Introduction and Background. The demand of natural fibers has been drastically increased because of rising consumers' awareness of environmental issues (Cotton Analytics, 2018). Cotton is one of the most popular natural fibers with apparel products; 82% of consumers prefer cotton for their outfits and 86% consider cotton is safe for the environment (Cotton Incorporated Lifestyle Monitor, 2019). Though textiles and apparel industry in U.S. shifted from manufacturing to retailing, U.S. is still one of the major cotton producing countries in the globe with 3.9 million metric tons of production in 2019 (Statista, 2020). Moreover, U.S. cotton industry has paid much attention on sustainable practices (e.g., reducing soil erosion, applying rainwater for irrigation, reducing insecticides application) when growing cotton and demonstrated the improvement in the cotton farming process by implementing sustainability practices (U.S. Sustainability, 2020).

Herein, as future professionals in apparel industry, are college students in textiles and clothing programs located in the major cotton producing states in U.S. well aware of cotton industry and its sustainability practices? Although social responsibility, sustainability, and ethics are topics that have prominently emerged in courses within textiles and clothing curricula over the past two decades in direct response to industry best practices, limited research has been done on students' sustainability awareness in various apparel industry sectors (e.g., Ha-Brookshire & Norum, 2011). Thus, in this study, we aimed to assess students' level of sustainability awareness towards apparel and cotton industries by examining their knowledge, skills, and attitude following Rands' (2009) principles-attributes matrix (PAM). According to Rands, three principles – sustainable development, organizational responsibility, and personal responsibility – are essential contents for educational courses that cover the subject matter of sustainability. Students' learning outcome of these courses can be measured by assessing the three attributes (knowledge, skills, and attitudes) towards the three principles, which this study adopts for assessing students' sustainability awareness.

Methods. An online survey was conducted with a convenience sample of college students at one of the U.S. south-eastern universities. The survey consisted of (a) student demographics, (b) two open-ended questions on participants' level of understanding on sustainability in apparel and cotton industries, and (c) 46 close-ended questions on their sustainability awareness in both industries. The level of students' sustainability awareness for each industry was assessed based on their learning outcome, which is the combinations of three attributes with three principles (Rands, 2009). This resulted to the 9 sets of sustainability awareness scales for each industry we focused in this study. The 5-point Likert-type scale, ranging from "strongly disagree" (1) to "strongly agree" (5), was used to measure the level of

students' sustainability awareness. Data from the open-ended questions were analyzed using content analysis approach. The quantitative data were analyzed using SPSS 26 to run basic descriptive statistics, frequencies, and paired *t*-tests. The mean value was used to examine the 9 sustainability awareness scales; the mean value greater or less than 3 indicates higher or lower level of their sustainability awareness in its respective industry. The significant mean differences of these 9 scales between both industries were examined using paired *t*-tests.

Results. A total of 170 students' ages ranged from 19 to 50 years old with a mean age of 21. Ninety-five percent of the participants were females and 5% were males. The majority was White/European American (88.2%), followed by Asian (5.3%), African American (3.5%), and Hispanic American/Latino (3%). Of the participants, 38% were belonged to sophomore, followed by junior (29.4%), freshman (15.9%), senior (14.7%), doctoral (1.8%), and master (0.6%). Most of them were affiliated with textiles and clothing studies (63.53%), followed by human development and family studies, hospitality management (10.59%), nutrition science (7.65%), and others (7.64%). Sixty-four percent of the participants did not have any prior experiences with sustainability activities, though they generally connected the word "sustainability" with 'recycle' (18.82%), 'environmentally friendly' (17.06%), and 'green' (11.18%) and the word "cotton sustainability" with 'clothing and fabric made of cotton' (30.59%), 'environmentally friendly' (25.88%), and 'recycle' (14.12%). This finding conveys that the participants perceive both words, sustainability and cotton sustainability, to have the common characteristics of making products with reusable or recycled materials which cause no harm to the nature.

The results of paired *t*-tests revealed significant mean differences between two industries for certain sustainability awareness dimensions. In attitude attribute, the participants exhibited higher sustainability awareness in both industries though their attitude showed higher awareness in apparel industry than cotton industry under the principles of sustainable development ($M_{apparel}$ = 3.56, M_{cotton} = 3.35, p = .002), organizational responsibility ($M_{apparel}$ = 3.74, M_{cotton} = 3.55, p = .008), and personal responsibility ($M_{apparel}$ = 3.66, M_{cotton} = 3.47, p = .001). In knowledge attribute, the participants showed higher level of sustainability awareness in apparel industry than cotton industry under the principles of sustainable development ($M_{apparel}$ = 3.02, M_{cotton} = 2.48, p = .000), organizational responsibility ($M_{apparel}$ = 2.93, M_{cotton} = 2.43, p = .000), and personal responsibility ($M_{apparel}$ = 3.27, M_{cotton} = 2.71, p = .000). In skills attribute, students showed comparatively higher sustainability awareness in apparel industry than cotton industry under the principles of sustainable development ($M_{apparel}$ = 3.21, M_{cotton} = 2.81, p = .000), organizational responsibility ($M_{apparel}$ = 2.98, M_{cotton} = 2.67, p = .000), and personal responsibility ($M_{apparel}$ = 3.24, M_{cotton} = 3.06, p = .019). Only students' attitude attribute had higher sustainability awareness in all three principles for both industries. In apparel industry, students' knowledge showed higher sustainability awareness in two principles, sustainable development and personal responsibility. Their knowledge attribute exhibited lower sustainability awareness in all three principles for cotton industry. Regarding skills attribute, their level of sustainability awareness was higher in sustainable development and personal responsibility principles for

apparel industry. In contrast, for cotton industry, only personal responsibility principle achieved higher sustainability awareness with their skills attribute.

Conclusion. The findings of this study reveal that the level of students' knowledge, skills, and attitude towards sustainability are comparatively greater in apparel industry than cotton industry, which is supported by Ha-Brookshire and Norum's (2011) findings that the higher education in a textiles and clothing discipline mainly focuses on sustainability education for certain aspects such as consumer behavior, product development, merchandising, global supply chain management, and retailing. It reveals that the current textiles and clothing curriculum does not inclusively cover sustainability topics throughout the entire pipeline of textiles and apparel industry. We often neglect to cover topics for raw material development process (e.g., cotton growing) and its processing (e.g., cotton fibers). This study also found that students have higher attitude than knowledge and skills towards sustainability. College education may fulfill this gap by offering a comprehensive curriculum to enhance their knowledge and skills on sustainability. If students are truly prepared to influence and be part of textiles and clothing industry changes, the academic curriculum needs to holistically reflect values and vision of sustainability, which will allow them to become the change agents.

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