

## MULTI-MEDIA SUSTAINABILITY MODULES- NEW PEDAGOGICAL METHODOLOGY FOR INTERNATIONAL EXPERIENTIAL LEARNING\*

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### ABSTRACT

A problem in educating students, professionals, and the public in “Green Textiles, Slow Fashion” is the constant change in the technologies of the global textile supply chain (fiber/fabric production; product design, manufacturing, distribution, retail sales, consumer usage/care/disposal; and regulations of government agencies). Increasing numbers of professionals are needed with integrative, research-based knowledge of sustainability issues/practices in fashion fields, who can utilize this knowledge to critically analyze/evaluate changing product information/claims, make decisions, and design new types of sustainable products. A new pedagogical methodology needs to be developed to teach sustainability, as indicated by pre- and post-test research conducted with fashion students which showed technical concepts needed explanatory diagrams and graphic materials too complicated for brief classroom instruction. Multi-Media Sustainability Modules were conceptualized-short, digital videos instructing and reinforcing sustainability knowledge; these can be easily updated. Modules include rapidly evolving technical information and/or experiential learning experiences such as on-site laboratory/design experiments, field trips, speakers, new product development problem-solving, etc. Modules can be produced locally and distributed via cyberinfrastructure (i.e., internet2) online, distance learning, through libraries, and You Tube. As IT upgrades diffuse internationally, information could be accessed by consumers. An international consortium could coordinate Sustainability Modules efforts to promote sharing and avoid duplication.

**Keywords:** Slow fashion, Sustainability, Green textiles, Textile Supply Chain, Pedagogy.

## SÜRDÜRÜLEBİLİR MULTİ-MEDYA MODÜLLER- ULUSLARARASI DENEYİMSEL ÖĞRENİM İÇİN YENİ PEDAGOJİK YÖNTEM

### ÖZET

“Yeşil Tekstil, Yavaş Moda” öğrencilerin, çalışanların ve toplumun eğitilmesinde küresel tekstil tedarik zinciri teknolojilerinde değişmez bir sorundur (elyaf/ kumaş üretimi, ürün tasarımı, üretim, dağıtım, perakende satış, tüketici kullanımı/ bakımı / bertarafı ve devlet kurumları düzenlemeleri). Sürdürülebilir moda uygulamalarında araştırmaya dayalı bütünleştirici bilgiyi eleştirel bir biçimde analiz eden/ değerlendiren, ürün bilgilerinin kararını veren ve sürdürülebilir ürün için yeni tip tasarım yaparak faydalı hale getiren çok sayıda çalışana gereksinim duyulur. Geliştirilmiş sürdürülebilir öğretim için önerilen yeni bir pedagojik metodoloji, moda öğrencilerinin yürüttüğü test araştırmasının işaret ettiği gibi, teknik temaları açıklayıcı diyagramlarla ve grafik malzemelerle gösteren tamamlanmış sınıfa gereksinim duyar. Dijital videoların kurulması ve sürdürülebilir bilginin sağlamlştırılması yoluyla kavramsallaştırılan multi medya sürdürülebilir modüller, kolayca güncelleştirilebilir. Modüller, hızlıca evrim geçiren teknik bilgiyi ve/ veya yerinde laboratuvar/ tasarım deneyimleri, alan ziyaretleri, konuşmacılar, problem çözerek yeni ürün geliştirme gibi deneysel eğitim tecrübeleri vb.ni kapsar. Modüller bölgesel üretilmeli ve cyberaltyapı (i.e., internet2) yoluyla online, uzaktan öğrenim, kütüphaneler ve you tube aracılığıyla dağıtılmalıdır. Bilgi teknolojilerinin yeni sürümleri uluslararası olarak yaygınlaştıkça tüketiciler tarafından bu bilgiye erişilebilir. Sürdürülebilir modül çabalarını paylaşarak ilerletmek ve tekrarından uzak durmak için uluslar arası bir konsorsiyum koordine edilebilir.

**Anahtar Sözcükler:** Yavaş Moda, Sürdürülebilirlik, Yeşil Tekstiller, Tekstil Tedarik Zinciri, Pedagoji.

**Introduction:** One problem in educating students, professionals, and the public in “Green Textiles, Slow Fashion” is the constant change in the technologies of the global textile supply chain (fiber production on farms/in factories; product design; manufacturing; distribution; retail sales; consumer usage/care/disposal; government agencies). Designers, other professionals, and consumers need an understanding and interest in all aspects of sustainability, including technology. Currently, increasing technological and behavioral interest is being show regarding green textiles, slow fashion, sustainability, and related areas, i.e., fair trade- including by small entrepreneurs. Students who understand basic concepts; how to research, find, and evaluate information; and design products will be in demand in the job market. Slow/sustainable fashion includes the entire textiles and apparel/interiors international supply chain- including fiber production (natural/synthetic), product design, manufacturing, distribution, retail sales, consumption/maintenance, and disposal of a wide variety of textile materials and end products--plus various governmental regulatory practices. Hundreds of millions of people are moving into the middle classes, aspiring to the consumption patterns widely advertised to convince them they must adhere to what is expected of them or to entice them,

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saying they will make life meaningful. Using fashion to change attitudes towards consumption into a slow fashion paradigm is one method to break the pattern. Many of these issues have been examined during this conference. However, changing people's behavior at the consumption and care stages won't be effective if changes in sustainability practices are not integrated into the textile materials international supply chain. Textile materials production ranges from naturally grown- but not necessarily ecologically friendly--to highly complex production with unproven nano-particles and other finishes. The knowledge base for these products and technologies is expanding rapidly, necessitating a new method for teaching students, professionals, consumers, and regulators the most current, technically correct information possible. The fibers-to-end-products supply chain has been integrated and international in scope since the 1980s. This long, complex international supply chain means that it is difficult to control in relation to sustainability (See Figure 1). Just having an eco-friendly fiber, i.e., organic cotton or recycled polyester is not enough to assure that the end product is eco-friendly.

Even when regulated it is not easy to force or monitor compliance as fibers are grown/produced; dyes and finishes applied; fabrics made; end-products (apparel, interiors, medical, industrial) designed and manufactured- often in multiple countries or regions in one country; transported around the world; inspected; wholesaled; retailed; used; cared for; sometimes recycled; and eventually disposed of. Some textile goods, such as disposable diapers, carpets, and tires, have long been mentioned as having negative environmental impacts- the same problems exist to a greater or lesser degree with all textile products. These impacts- which are well documented- are related to water and air pollution; high uses of water and energy; and use of strong chemicals, including even bleach (which has had some research activity around product development to be more eco-friendly), (Blackburn, 2009, Lacasse and Baumann, 2004). Sustainable products can only be made when they start with sustainable textiles and trims.



**Figure 1.** Textile Products Supply Chain. **Figure 2.** L to R: L- Pellets for producing recycled fiber, C- cleaned and chipped PET bottle, R-fiber scraps for recycling. **Figure 3.** Erin Jones, a University of Arkansas, Pine Bluff, pre-freshman summer intern wears her T-shirt made from recycled Coke™ bottles while examining an Anvil T-shirt produced from cotton grown in the USA and product literature and kits containing Repreve™.

Sustainability as related to fibers, textile materials, and end products produced from textiles has become a major issue. This paper focuses on how the rapidly increasing and changing textile technical information knowledge base; aspects of product development; and consumer behavior including selection, use, and care, can be quickly and inexpensively disseminated to academics, students, industry professionals, consumers, and regulators. This is accomplished using Sustainability Modules which can be transmitted using cyberinfrastructure (i.e., internet2).

**Textiles and Sustainability:** Sustainability is considered by many to be the most important change in the textile products industries since the industrial revolution. Sustainability issues are quickly gaining momentum along the supply chain as new fibers, textiles, and finishing/dyeing technologies are being introduced. Changes in best manufacturing practices to reduce pollution and toxic chemicals are being developed to produce more sustainable products throughout the entire textile products global supply chain. Since this supply chain is long and complex, even when a manufacturer or retailer puts in place stringent quality controls and specifications for sustainable products/processes, there are very many points where a planned-for, environmentally sound product might go awry and become less eco-friendly. Sustainability concerns in some countries have promoted changes in the growth patterns of natural fibers. For example, in the USA, flax is now being grown commercially processed, and textiles produced in the Carolinas--with market entry by K-Mart already. High quality alpacas are now

being bred and raised in the USA; their fiber is eco-friendly because the animals' foot prints don't damage soil--which prevents soil erosion. This is made into small quantities of yarn for hand knitters and weavers. Kenaf, considered an ecofriendly fiber which can grow in hot weather conditions--including Arkansas--is being used in automobile textiles (i.e., trunk, door, and ceiling liners) in Texas, near automobile production sites. Kenaf is light weight, which helps automobile manufacturers get a better EPA (Environmental Protection Agency) rating by reducing fuel consumption. It is also easy to recycle. Hemp textiles and end products are sold in the USA. Hemp, another sustainable fiber, remains illegal to grow in the U.S. with most coming from Canada and China. Triexta, a new generic group, uses a percentage of renewable-sourced content in manufacturing which reduces the amount of virgin petrochemicals used in fiber production. In the USA, Unifi produces recycled polyester fiber from recycled polymer content, including plastic bottle polymer and fiber scraps (See Figure 2). A T-shirt made from bottles is modeled by a student (See Figure 3). Some of Patagonia's synthetic fibers are recycled in Japan, which requires shipping--not green neutral. All aspects of sustainability need to be considered--including the carbon footprint. Sustainability problems do not stop with manufacturing but also relate to the product consumption phase. For instance, chemicals from dyeing and finishing and nanoparticles (from anti-microbial finishes) can enter the waterways after production and, because of their small size, may enter the body via the skin. Some azo dyes and formaldehyde, used in durable press finishes as well as other chemicals, have been shown to be carcinogenic. Apparel choices also have an impact on the environment (Crippen, 2011). Consumers select, use, care, repair, recycle, and/or dispose of textiles--many end up in landfills. Strategies for making home care more environmentally friendly are needed. For instance, where hot water is the major energy used for the consumer care of textile products, reducing water temperature is the first thing consumers can do to help reduce energy usage. However, specially formulated cold water detergents have not gained widespread consumer acceptance in the USA. Consumers who choose to commercially dry clean clothing negatively affect the environment due to the perchlorethylene fumes released from most processes. There is active research in this area and a few more expensive alternatives are available but not widely used due to cost.

Even when consumers know the importance of environmental impacts and attempt to be responsible there are many misconceptions, i.e., cotton is "greener" because it is "natural." In addition, it is very expensive to educate consumers and difficult to change consumer behavior (i.e., using cold water to wash clothes). Many consumers do not understand the link between apparel and textile products and the environment. Those who do often think about selection first--i.e., I'll buy an organic cotton top and then I've done my bit for the environment. Those who are the greenest of green consumers have an interest in learning more but, in general, industry has done little to truly educate the consumer. Some companies exaggerate their green claims. Thus, increasing numbers of professionals are needed with integrative, research-based knowledge of sustainability issues/practices in fashion fields, who can utilize this knowledge to critically analyze/evaluate changing product information/claims, make decisions, and design and manufacture new types of sustainable products. Due to the long, complex global textile products supply chain, it is difficult to know if a textile is really eco-friendly, so increasingly standards and certifications will be used to help design professionals and/or consumers in selecting textiles which are eco-friendly. There are an increasing number of certification programs and standards related to producing "green" textile products--but which ones are legitimate?

Which products are really eco-friendly or sustainable? Can the consumer understand any of this? Does the consumer even care? The entire area of certifications, standards, and compliance is a complex issue in and of itself which is now mainly handled by the industries. Consumers have little awareness of what these certifications actually mean. The organizations involved are trying to secure industry support before marketing their efforts to the consumer (for the most part). For example, Unifi, Inc., is promoting their Repreve™ recycled polymers of nylon or polyester as being traceable, transparent, and certified as sustainable (Turner, 2011). The industries themselves have a tremendous amount of misinformation on the science of sustainability. Information and product claims intended for consumers in the popular press--and advertisements--are often also incorrect. In the USA, the Federal Trade Commission (FTC) has responsibility for monitoring false product claims in relation to sustainability; these false or misleading claims are termed "greenwashing." Companies will be held accountable for claims. Other federal and state agencies also monitor safety and "green" claims. The Environmental Protection Agency (EPA) monitors toxic chemicals and air and water pollution. The Consumer Products Safety Commission (CPSC) is involved with the safety of consumer products. The European Union (EU) has a different set of agencies, as do individual countries. Since these are international industries, it is very difficult to understand all of the interlocking laws and concerns (Crippen, et al., 2012).

Prospective employees for certain positions will be required to have base content knowledge and the abilities to apply knowledge and problem solve in the field. Today, students with this knowledge and abilities have a competitive advantage in obtaining entry-level positions and advancing in their careers. There is a need for students to learn to do research on sustainable textiles and product design and to communicate this information both to industry professionals as well as consumers, both traditional roles of Human Sciences. This represents an opportunity for a university to dialogue with consumers and to share their research findings and knowledge in sustainability. The Merchandising, Textiles, and Design (MTD) program at UAPB--and other types of fashion and design programs--teach various types of courses with some stressing one area more than another. Other majors teach related content, i.e., textile and/or product design are found in art departments. Students who major in other related areas (i.e., marketing, journalism, engineering, and science/chemistry) can contribute as eventual professionals in developing, manufacturing, marketing, analyzing, buying, retailing, merchandising, and disposing green textile products, including apparel and interior products (drapes, mattresses, carpets, etc.). In addition to academic training, they are already consumers themselves, so they can use their personal responses to learning about textile products sustainability to better communicate new information with other consumers via a variety of venues, including television, internet, magazines, extension service, and other communication techniques. In the future, most design professionals and others in the greater fashion and

textile industries will need to understand sustainability issues and use this information to make important decisions. This need for knowledgeable professionals is predicted to rise quickly and continue for the foreseeable future. A new pedagogical methodology needed to be developed to teach sustainability, as indicated by pre- and post-test research with fashion students. This research also indicated technical concepts needed explanatory diagrams and graphic materials too complicated for brief classroom instruction. How do we adequately educate students to become these professionals who are able to integrate new sustainability knowledge and technologies from throughout the global textile products supply chain (including working in inspection, quality control, etc.)? And how do we use such platforms as scholarly conferences, extension educational services, and general or specialized media to inform professionals and consumers about these same issues? In a time of less financial resources- how do we teach students, industry professionals, and the general public in the most economically responsible way possible that delivers the maximum impact? The need for professionals with accurate, complex information who can apply this information to make decisions and evaluate new fiber/product claims is rapidly increasing. Since information and technology is rapidly changing, students must not just be informed on the facts as they now are- but must be educated to be able to critically analyze and evaluate new product information and, for example, integrate it in designing sustainable products. Simply combining two eco-friendly textiles may not result in a garment which is sustainable, i.e., a reversible jacket made of organic cotton on one side and recycled polyester on the other requires garment deconstruction before recycling can occur. What happens to the cutting room scraps? Even though there are available technologies for shredding and reusing scraps, recycling doesn't always occur. Sustainability Modules were conceptualized by Crippen at UAPB as short, digital videos instructing and reinforcing sustainability knowledge; these can be easily updated. Modules include rapidly evolving technical information (i.e., how to recycle PET bottles into fiber) and/or experiential learning experiences such as on-site laboratory/design experiments, field trips, speakers, new product development problem-solving, case studies (Crippen, et al., 2012), and student reports/projects. Modules can be produced locally and distributed via cyberinfrastructure (i.e., internet2)- online, distance learning, through libraries, YouTube, Apple iTunes, Khan Academy (and similar), etc. Some information could be accessed by consumers. An international consortium could coordinate Sustainability Modules efforts to promote sharing, avoid duplication, and maximize usage. Since this industry is global in nature, a global solution is necessary.

**Conceptualization- Sustainability Modules and Other Pedagogical Methodologies:** Crippen (at UAPB) realized that a new pedagogical methodology needed to be developed to teach sustainability- new developments arise almost every day and the knowledge base is expanding rapidly. Concepts often need explanatory diagrams and graphic materials which are too complicated for a brief mention in class- so the concept of Sustainability Modules was developed and then expanded as it became evident they could be used for a variety of instructional situations and needs. Sustainability Modules generally will be short, digital videos streamed over internet2 to both instruct and reinforce sustainability knowledge. Such Sustainability Modules would be available online, on Blackboard™ for distance learning courses, and through computers in libraries and media centers. They can be transmitted via internet2 on a cyberinfrastructure network to other universities/institutions globally- becoming a model for other types of instruction- or through Apple iTunes U, YouTube, Khan Academy-type online instruction, etc. These Sustainability Modules would also include laboratory and design experiments, field trip experiences, guest speakers, new product development problem-solving methods, case study presentations and/or discussions, student discussions, and reports on projects or designs. This format could also allow for more international collaboration. Sustainability knowledge-and how to apply it- first needs to be taught to faculty- video conferencing was determined the best way to have faculty discuss sustainability with experts around the globe. These “Teach the Teach” video conferences are also to be produced as Sustainability Modules, so new faculty can benefit from earlier faculty enrichment; these also can be shared with other universities. There would also be a need for continuous updates since the field is evolving. Crippen (2011) developed and delivered a webinar, which is another format. It is believed this UAPB capacity-building approach to infusing sustainability into the curriculum could be a model for other universities. In particular, Sustainability Modules’ content could be distributed globally to other universities and organizations for training and teaching purposes. New industry and university partnerships can be established and further developed because of this program.

**Teaching Applications:** Fashion programs have not systematically incorporated sustainability into undergraduate courses although some are starting to add course/s, generally at the graduate school level. However, it is better to integrate it fully--introduce it slowly and build upon it- i.e., it takes quite a while for students to understand why all natural fibers are not always sustainable. Since the content is specialized, it can be more easily learned over four years of courses instead of in a senior capstone course. A deeper, richer understanding will give graduates the background and problem-solving skills to enable them to solve new and more complex problems. Due to the technical content, key issues, and breadth of this topic, Sustainability Modules could be developed for all major courses in the curriculum, as well as Orientation and Consumer Economics courses (where energy ratings of appliances, including washing machines, are discussed). Students interested in graduate study in textiles and/or sustainability can be encouraged to take two courses in environmental sciences in addition to chemistry courses.

**Project Conception:** Environmental concerns and global climate change are well established problems as delineated by the United States government and scientists worldwide (including the United Nations). Thus Crippen began introducing sustainability into her courses in 2009 when she came to UAPB. In textiles, a tremendous amount of technical literature must be accessed, analyzed, and condensed to be used when teaching introductory courses. However, when introducing some of the easier sustainability concepts related to the global textile products supply chain to the students in her MTD classes, Crippen realized many students did not have basic scientific or environmental backgrounds or knowledge--including concepts such as there are environmental issues in general and specific to the MTD field. Water, air quality, landfill, chemical pollution, etc., were not recognized as problems. Her students did not know that cotton is not necessarily “green” because of how it is grown

(use of herbicides, pesticides, water run-off, water usage); processed (energy and water usage and pollution from bleaching, dyeing, finishing); waste in the manufacturing process; care (hot water and bleach for whites); and/or disposal into landfills or incinerators. But most frustrating was even after instructing the students they still didn't believe it. Crippen then invited a cotton farmer with a doctorate in agriculture to speak with her class- students slowly began to learn what was involved in growing cotton. Crippen realized a new pedagogical methodology was necessary. It was with this in mind that Crippen and Mulready started to explore introducing the concept of sustainability into the curriculum, initially in textile science- then into all other courses. In the USA, the programs teaching textiles and fashion vary tremendously, as does the content. Some programs are in Family and Consumer Economics, Human Sciences, Environmental Sciences, Art, or Schools of Textiles. Internationally, there is also variation within educational programs. Thus it is important not to develop content for a specific course, but learning activities and content by topics which allow individual programs and professors to choose, use, modify, and add to content and/or learning activities. Our objective is to educate students, faculty, consumers, industry and regulators using an interdisciplinary approach to make good decisions on how to develop, manufacture and accurately describe sustainability aspects of textile products. Our goal was to update courses throughout the entire curriculum to add the sustainability component to all courses- not just a senior level course- and to have an innovative program related to sustainability. The importance of introducing sustainability concepts into introductory classes, building on the concepts in intermediate and advanced classes, and adding new courses became more obvious as we progressed. The reasons it became important included the following: Time for students to reflect on the importance of the topic. Time allowed students to see changes in the field of technology and consumer behavior. Grasp of the terminology. Understanding of positions in industry. With the global nature of the apparel and textile industries, it is important that students examine and understand sustainability in relation to global supply chains. Introductory Textile Science was the first course sustainability was introduced in- this focused on the science side of materials sustainability. Pre-tests/post-tests were developed which will be discussed in more detail later. After studying the five key components of a textile (fiber, yarn, textile structure, dye, and finishes), the students examine all the touch points along this chain where it is necessary to have the correct product to assure that the product is actually sustainable or green. New certifications are being offered that assist with this, but it is vital for the students to understand all of the areas where problems can occur. Just because the fiber is certified organic doesn't mean that the end product is organic or sustainable.

Terminology is introduced including all the re-words: recycled, regenerated, renewable. We work with students to get them to use terminology correctly and to be able to write about sustainability. This occurs before the students start to have decision making activities. One of the pre- and post-test questions relates to this concept--whether cotton is eco-friendly? Students always think that cotton is eco-friendly or sustainable. Many also think that polyester isn't eco-friendly. These two fibers are the most widely used in apparel so it is good to get a foundation with these two major apparel fibers. Even after explanations, students think cotton is eco-friendly because they consider it to be natural- we call these the "myths of eco-friendliness." It is important to consider the bases for student beliefs in order to develop learning strategies to overcome them. Initially, the authors thought that the extensive television advertising and now internet promotions by Cotton Incorporated may have influenced students; however extensive in-depth interviews do not show this to be the case. Even after going into considerable detail, including graphic depiction of possible problems regarding the growing and production of cotton which can make it less than eco-friendly, students often still think cotton is sustainable. Thus in the advanced course in textiles, students analyze gains made in cotton production to increase its eco-friendliness. In addition, students study how polyester can be produced from bottle polymers, recycled materials, and how Sorona™ uses bio-based chemicals. This has proven a difficult concept for students to grasp even when they see the steps visually. In terms of product design, we discussed how a garment that starts with eco-friendly materials can result in a not so eco-friendly product. As mentioned above, one example was a reversible jacket which used organic cotton on one side and recycled polyester on the other. This jacket posed a problem in recycling in that there are two different streams for recycling the fabrics which means the materials must be separated. Later students sourced a fabric, developed a textile specification, and designed a garment or other textile end product. Some may prefer to start with this type of exercise to get the students or teams involved. Students enjoy creating products from used textiles or garments. Most standard textbooks treat sustainability as an add-on toward the end (i.e., one popular textile text has only one chapter, towards the end of the book). This doesn't convey urgency in regards to the topic or allow for many opportunities to discuss it. Kadolph (2010) is to be congratulated for introducing sustainability concepts early and continuing to discuss them throughout the text. This makes it easier for students to compare the basics of cotton versus polyester. Technical educational material becomes quickly dated, so students were taught how to retrieve, read, analyze, and report on new technology using internet and database material. Many tried to go to a company web-site to determine the performance. A quick search of commercial web-sites showed students that the properties of concern were not mentioned. Students were taught to evaluate commercially available brochures and information as well as on-line content.

**Innovations- University of Arkansas, Pine Bluff (UAPB) Example:** The major innovation is to develop and produce multi-media video Sustainability Modules which include educational content, i.e., experiential learning activities- such as laboratories, problem-solving activities, interviews, and Sustainability Field Trips-for specific learning objectives and outcomes. These would be available online, on Blackboard™ for distance learning courses, through the university library and department Media Center, YouTube, Apple iTunes U, Khan Academy and similar, etc. They can be transmitted via internet2 networks to other universities/institutions globally- becoming a model for other types of instruction. Another innovation is the Sustainability Field Trips. Each year student scholarships will be awarded which will allow those who normally couldn't afford to participate to do so. The first year Field Trips will be local (in Arkansas), i.e., a cotton farm. Other local field trips could include visits to a landfill, thrift store, vintage store, and/or green retailer. The second year's Field Trip would be to a textile and apparel manufacturing site which incorporates sustainable practices into its production. The third year's Field Trip will be

an international one, i.e., to China (where most of the global textile and apparel production occurs). Field Trip participants will be required to develop and/or participate in an interesting research or design project, essay, or other academic areas of excellence, and share information with other students.

**Procedures for Accomplishing Objectives: An UAPB Example:** The UAPB faculty will infuse sustainability into the entire UAPB MTD curriculum, beginning with required courses. Educational content will include problem-based experiential learning (including Sustainability Field Trips); meaningful laboratory research; new product development; textile, design, and marketing problem solving; and other experiential learning experiences. While not ideal, capstone, research, and independent study courses could also be used to introduce advanced sustainability concepts when full curriculum revamping is not possible. Many universities would be able to do this. Planning meetings are held at UAPB with other universities joining us via Skype™ (or similar technology) during the summer or semester before implementation. The entire Project- including procedures- is discussed; in addition, the team will work on time sensitive outputs and products needed for the fall semester. The time schedule for adding content to courses is discussed. Pre- and post-test planning is begun with a focus on pre-tests for the upcoming semester. In addition, the participants will each “Teach the Teach” -each team member will be assigned a core concept, probably one related to their Sustainability Module or course/s, to learn about and “teach” each other. Anyone attending a conference, event, or presentation related to sustainability will report back to the group. Sustainability Modules would be developed, recorded, and transmitted using internet2. Guest speakers, student projects, and other regional activities would be recorded and transmitted. This integrated, interdisciplinary multi-pronged approach enables changes in the MTD curriculum; prepares faculty to teach the topic; prepares Sustainability Modules for classroom, library, and independent study use; and introduces and shares experiential learning techniques (i.e., specialized laboratory and design experiments, field trips, etc.), including incorporating these experiential learning practices into the Sustainability Modules. Results will be disseminated globally to academic venues/institutions and consumers via cyberinfrastructure internet2 and other venues.

**“Teach the Teach”:** One of the reasons few universities have incorporated sustainability widely across the curriculum is the amount of time it takes for faculty to learn and then remain current in the wide breadth of sustainability information; then to develop content, activities, and experiential learning experiences for their students. Getting an entire program updated is a monumental task. The need to educate oneself and others teaching in the area became evident rather quickly. Sources of education in textiles and apparel include the following conferences/symposiums: Outdoor Retailer (OR) Seminars. Textile Exchange Webinars and Conferences. North Carolina State University - Evolving Textiles: Competition, Innovation, Transformation. Outdoor Retailer Seminars organized by Outdoor Industries Association (OIA) were the first sustainability educational events that Crippen attended. They also organize the Outdoor Retailer (OR) Trade Show held concurrently. Crippen had worked with many active outdoor companies while at DuPont. Industry leaders in sustainability such as Patagonia, The North Face, Adidas, and others exhibited at the OR show. The educational seminars introduced the concept of the Eco-Index (2012) developed by people from competing companies. This index- which has been accepted for use in Europe and Asia, as well as North America- allows people in companies to start anywhere in the index in relation to sustainability; it can even be packaging materials or transportation. The use of this index in courses was discussed. The introductory course could start by examining something visible such as packaging. There are numerous examples of companies such as Brooks and Prana who have successfully reduced packaging. Webinars from Oeko-Tex and Textile Exchange have helped to educate both industry professionals and educators. There is a growing need for continually educating professionals, educators, and students. After teaching technical aspects related to sustainability, Crippen attended the Association for Advancement of Sustainability in Higher Education (AASHE) Leadership Workshop which included other academics teaching concepts related to sustainability. One of the major concepts was to add sustainability to all courses. Another was not to focus so much on the technical aspects but on getting students interested in the concept and buying into it. Another unexpected finding was that students didn't really know very much about environmental problems and some didn't really believe there was a problem. This was a shocker because popular wisdom says that students are more concerned about the environment than their parents. There are many who are and many of them certainly apply to Patagonia for their internships, but many enter our program only because they love fashion and change. Understanding your students is critical Life Cycle Analysis (LCA) is an important concept because even though a garment or product is considered sustainable, if it is not durable or capable of giving a long life through use, care, and wear, it really isn't an eco-friendly product. This also takes into account style aspects which could ensure a long life, i.e., no ruffles on that sweater if you want it to be a classic. A learning experience in textiles was for students to compare research textiles made using the same yarn size, weave structure, and dye with only the fiber varying- one was cotton and one was lyocell. Students did repeated washings to determine durability, color loss, shrinkage, and other changes in physical appearance such as defibrillation which occurred on the lyocell textile. They had to learn standard test procedures, observe and analyze the performance, as well as write and discuss it. The authors developed the model to use for selection, use, and care of products (Crippen, et al., 2011). The selection involves examining how and why we select what we do for our wardrobes, how we can change, and keeping a diary to understand our behavior. Students are asked to make a simple behavior change to illustrate just how difficult making a change can actually be. The students usually pick something like not running the water from a faucet while brushing their teeth. Another exercise is to hold a focus group using students in the class (or others). It is important for students to examine market segments to understand more about the green consumers- who are they and what their demographics are? After teaching sustainability content and adding it to several courses, it became apparent that developing internet2 Sustainability Modules- which could be disseminated more widely--would be valuable in terms of sharing content with other faculty and students. We believe there is a need for an international dialogue with faculty and students.

**Conclusion- International Consortium for Fashion System and Textile Science Sustainability Modules:** Fashion is everywhere in the modern world. Mulready (1994: 220) calls it “desired social change.” The interdisciplinary approach to teaching sustainability in fashion is important using science, business, consumer behavior, and cultural, historical, and social-psychological aspects of dress and interiors. Cultural aspects of consumption are especially interesting. For example, French women have long been known for buying fewer items of high quality and lasting classic styles, wearing them multiple times in various combinations until they wear out. This is also done in Asia where housing units are small. Young adults in such cultures starting a career learn to select their career wardrobes wisely. The concept of selecting a few good pieces wisely is not well understood by most USA (and other) students who want instant fast fashion trends at a low price. It is considered anti-growth by economists trying to bring the world economies out of global recession-buy, buy, buy! Yet short term needs should not necessarily negate the long-term prudent-and possibly exciting-paradigm shift to “green textiles-slow fashion.” This paper focused on the basic units of most apparel and interiors products-textiles-which are a huge sector of the global economy. Any movement toward healthier, more sustainable textiles would likely bring healthier workplaces and cleaner environments, as a minimum, with possible rippling effects across the full international textile supply chain. Low tech and high tech approaches can be understood and used throughout the world through the use of Sustainability Modules. These Sustainability Modules can usually be easy and inexpensive to produce-students can be brought into the production process, as well. The Sustainability Modules can range from showing Field Trips to a cotton farm or sericulture facility, producing hand-dyed and hand-woven indigenous one of a kind double ikats, and other “low tech” methods of textile production to the most modern fiber generation, carbon nanotubes. Highly technical information can be placed in such Modules and students and others can revisit it as much as they need to fully understand complicated concepts. While originally conceived as a textile science teaching tool, the opportunities for improving knowledge of historic and social psychological aspects of fashion, dress, and interiors are as great, documenting especially the lesser known aspects of past, present, and future cultures and their relationships to material cultures. We, as fashion educators and producers, can join together to produce and disseminate Sustainability Modules through cyberinfrastructure (i.e., internet2), distance learning, YouTube, Apple iTunes U, Khan Academy and similar, libraries, etc. As infrastructure upgrades diffuse internationally information could also be accessed by consumers. An international consortium could coordinate Sustainability Modules efforts to promote sharing and avoid duplication. This could include suggesting video resources already available online which with little effort could be accessed by many. Companies which are willing to share some part of their research and development could enable students in many places to have more complete understandings of the new finishes, etc., which could then lead to even greater improvements (cynics will point to all the problems and pirating here- but this is “blue sky brainstorming” for a hopefully more cooperative future).

**NOTE:** If you are interested in being a founding member of the Consortium or have suggestions, please contact us at sustainabilitymodules@gmail.com. Thank you.

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