THE JOURNEY TOWARD THE INTEGRATION OF SUSTAINABILITY IN APPAREL AND TEXTILES EDUCATION: A CASE STUDY

by

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B.S., Middle Tennessee State University, 1999
M.S., Kansas State University, 2009

AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY

Department of Apparel, Textiles, and Interior Design
College of Human Ecology

KANSAS STATE UNIVERSITY
Manhattan, Kansas

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Abstract

The UN has challenged higher education to integrate sustainability across all disciplines, declaring 2005-2014 the Decade for Educational for Sustainable Development (DESD) (UNESCO, 2003). Education for sustainable development (ESD), a UNESCO initiative, advocates for reorienting education away from the industrial model of education, and has significant pedagogical implications for cultivating knowledge, skills, and values thought to support sustainable development (Rode & Michelsen, 2008; Sterling, 2004). Responsive action to this call has been sluggish (Everett, 2008; Rode & Michelsen, 2008). Concurrently, product development and design protocol is becoming more progressive in an effort to limit the impact of products on people and the planet, and there is an urgent need to evolve apparel and textile (AT) curriculum to better prepare undergraduates for this evolution. ESD may provide a way forward, but little is known about how it may succeed current educational practice or how such practice may impact learners in AT.

The purpose of this study was to examine the learning and development experience of students enrolled in an apparel product development (APD) course that has been redeveloped according to the ESD framework. A qualitative case study was conducted during one semester to examine how students experienced the course. Data collection included student reflective writings, focus group interviews, and a researcher reflexive journal. Also, a survey was utilized to determine how students perceived their progress in the development of skills related to ESD. Both theory-driven and inductive coding procedures were used to identify themes across the qualitative data. A repeated measures ANOVA was used to analyze the quantitative survey data. Results of the study indicate that students yielded a positive, though challenging, learning and development experience in the course, and one that was considered exceptional in comparison to other courses in the same program. Among the learning and development outcomes experienced in the course considered most important, according to students, were sustainability literacy and the development of change agent skills. Further, the pedagogical perspectives of ESD which influenced the course redevelopment were perceived to be highly impactful. The study has identified pedagogical and curriculum design approaches which may be used to integrate

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Dedication

For Shayla & Chloe

May your schooling never interfere with your education (Mark Twain).

CHAPTER 1 - **Introduction**

> "In the end we will conserve only what we love. We will love only what we understand. We will understand only what we are taught" (Baba Dioum).

Responsive action to the United Nation's challenge to higher education for the years 2005-2014 to be the decade for the integration of sustainability across all disciplines (UNESCO, 2003) has been sluggish, especially in the US (Everett, 2008; Rode & Michelsen, 2008). The most notable progress toward this end has been made in the areas of campus greening and research. However, the development of curriculum strategy and teaching methods for education for sustainable development (ESD), a UNESCO initiative, has been the slowest to develop (Landorf, Doscher, & Rocco, 2008; Sterling & Scott, 2008). ESD calls for a new paradigm, a reorientation of education (McKeown, 2006). This reorientation includes a dramatic reconceptualization of *how* students should learn, *what* should be learned as well as *how* proficiency should be defined and assessed. It is a holistic approach to education emphasizing the interrelationships between social, economic, environmental, political, and cultural components, and ultimately, a shift in what we deem valuable in education (Haigh, 2005; Kenan, 2009; UNESCO, 2005). In this light, education's purpose is to prepare citizens and stewards with knowledge, skills, and values that promote sustainable behavior and encourage learners to foster a relationship with and participate in their local and global community (Egan, 2004; Kevany, 2007) as well as better prepare for employment (UNESCO, 2005).

On the apparel and textiles (AT) front, exploration and application of ESD specifically is currently absent from the literature. However, some authors have articulated educational needs related to themes mentioned above. Dickson and Eckman (2006) surveyed members of the International Textiles and Apparel Association (ITAA), the professional organization for AT educators, to explore a definition of social responsibility, illuminate major concerns on the topic, and determine how many educators incorporated the topic in instruction. The authors found that the majority of the sample was most concerned about working conditions in the industry (87%). Approximately half of the

sample believed that child labor, consumerism, and the environment were also important, and 40% included these topics in their research. About three quarters of the sample indicated they included these topics in instruction, but mostly in upper division courses only. From the study, Dickson and Eckman (2006) posit a three-way interrelationship between an orientation of protecting people and the environment, a profitable and ethical business philosophy, and a focus on outcomes that do not cause injury to the world or the people in it. These authors recommend from their findings a need for interdisciplinary studies, in research as well as teaching, urging the redevelopment of the AT curriculum and further research on the interaction among sustainability related variables. Finally, the authors are also proponents for the development of values to guide practice. The authors posit:

> Are we teaching only about the orientation or issues associated with social responsibility, or are we also teaching what philosophy and values should guide apparel/textile businesses and the activities and strategies needed to ensure our businesses are socially responsible? (p. 189)

O'Neal (2007) emphasized the need to prepare future AT professionals to confront major trends like diminishing oil production, increasing global warming, economic and social tensions of a developing world with invisible borders, a less predictable future, and the intense demand for leadership in innovation. This author presumes that students must increasingly learn to think in a non-linear way and embrace uncertainty, staying current on emerging trends and being able to participate in productive debate. Likewise, Lehew and Meyer (2005) described the need to create global citizens among AT students. Global citizens understand the interdependence between the world and human beings as well as a concern for the rest of the world above the interests of self. Consequently, the authors submit that this citizenship will require the development of knowledge, skills, and attitudes needed to analyze and resolve complex problems.

Most recently, the ITAA (2008) published Meta-goals for four-year baccalaureate programs that acknowledge the need for inclusion of sustainability in undergraduate curriculum, but not necessarily sustainable development (SD). Following are four learning outcomes described in the Meta goals that directly relate to sustainability; the first two address knowledge competences for global interdependence, while the latter two address

skills and attitudes related to ethics, social responsibility and sustainability (ITAA, 2008, p. 2-3):

- Understand how dynamic and diverse political, cultural, and economic systems impact industry processes
- Understand how theoretical perspectives on markets, trade, and economic development can be applied to historical and current data on production, consumption, and disposal of products
- Identify and evaluate issues of social responsibility, professional behavior, and ethics related to the impact of individual, organizational, and corporate decision- making
- Analyze and evaluate issues related to environmental sustainability and environmental impact as they relate to industry activities and processes

Notably, the concept of interrelationship is absent from these descriptions. For example, the Meta goals separate the analysis of environmental and social issues instead of emphasizing their interaction, a contradiction to what AT academicians have advocated. This may be related to ITAA's focus on sustainability, rather than SD, and how the organization defines sustainability: "keeping something in existence or maintaining it without destroying or depleting it." The definition neglects the delicate balance between environmental health and human behavior and the imperative responsibility for future generations, elements characteristic of the historical definition of SD by the World Commission on Environmental and Development (WCED, 1987). It is, in fact, the latter that aligns with the aforementioned comments by AT academicians Dickson and Eckman (2006), O'Neal (2007), and Lehew and Meyer (2005). This indicates confusion about the purpose of AT education. Moreover, recent articles in the organization's newsletter admit that the struggle lies in the *practical application* of these goals (Cheek, 2009; Wuest & McDonald, 2009).

Further, it is reasonable to surmise that the apparel industry is complicit in the current ecological crises. Since the Industrial Revolution, the industry's impact has expanded dramatically, and there are now social, environmental, and economic consequences that must be tackled (Howarth & Madfield, 2003; Weenan, 1995). The

problem of industrialization is not new. Some of the seminal works from the early 1970's criticize industry's scale as chief culprit. Authors like Schumacher (1973) in *Small is Beautiful* describes and Ivan Illich (1973) in *Tools for Conviviality* both characterize industrialization as an endless hunger for growth and expansion for which the ecosystem could never reasonably accommodate. Central in this industrial system is an approach to accounting where nature is considered income, not capital. Therefore, costs of environmental goods and services are never expressed in the bottom line; meanwhile, natural capital continuously evaporates. Few businesses could survive in this model. Both authors argue that the limits of the natural world must be recognized in a reconceptualization of future industry.

This denial of limits is integrally embodied by the concept of fashion. Apparel products which rely heavily on the concept of fashion are at odds with sustainability, which raises challenges for designers (Walker, 2006). Apparel today rarely wears out, but is instead created with a built-in obsolescence, a considerable threat to the environment (Lewis, Gertsakis, Grant, Morelli, & Sweatman, 2001; Walker, 2006). At the same time, Walker (2006) argues that designers who appreciate the principles of sustainability may be fundamental to attracting attention toward environmentally friendly and socially responsible production and consumption.

Moreover, consumers are increasingly aware of issues surrounding the industrialized system and are a frequent antecedent for business leaders and legislators to surface solutions (Mowbray, 2007). Subsequently, some members of the apparel manufacturing and retail sectors are taking steps toward a more sustainable model, inspired by growing consumer interest, marketing initiatives, and operational efficiency (Borneman, 2008; Clark, 2007; Tran, 2007). These efforts emphasize new product development and design protocol, as these are the inception points for a product's impact (Fabrycky, 1987; Fiksel, 1996; Graedal & Allenby, 1995; Ljungberg, 2007). These factors indicate the likelihood that adoption of new methods that limit negative environmental, social, and economic impacts are likely to become increasingly more progressive and therefore, require knowledge, skills, and values befitting this task. Indeed, a demand is currently being created in the industry for which education must respond.

Statement of the Problem

First, there is evident confusion among AT academicians regarding the purpose of education, and specifically, the role sustainability should play in it. Currently, a gap exists between the proscribed learning outcomes by ITAA and the *practical application* needed to support and realize them. Secondly, there is a need to equip future professionals for progressive evolution in the apparel industry. Advancements towards these ends in the AT literature are limited. Most recently, *Sustainable Fashion: A Handbook for Educators* was published offering supplemental teaching materials for educators for both environmental and social justice themes (Parker & Dickson, 2009). Nevertheless, pedagogy for the advancement of knowledge, skills, and values that support SD as well as progressive industry evolution in the AT field are lacking. Further, as the ecosystem continues to impose its limits, it is easily argued that the journey toward these ends is largely inevitable. Most importantly, the use of ESD may provide a way forward on this journey. But, little is known about how the framework could be implemented in the AT curriculum or its subsequent effectiveness in this context.

Purpose Statement

Since we know little about the integration or effectiveness of ESD in an AT context, an explorative study was in order. The purpose of this study was *to examine the learning and development experience of students enrolled in a course that has been redeveloped using the ESD framework. A description of major outcomes and how they occur would allow implications to be made about how AT education might be enhanced by the use of the framework, better preparing students for SD.* This insight is needed to begin to answer questions about integration and effectiveness. In this study, an apparel product development course has been redeveloped according to the ESD framework using a curriculum development approach (see Chapter 4 for description of process). The redeveloped course was implemented during one semester for the purpose of examining it's the impact of the course on the student's learning and development experience. Students enrolled in the course were studied using qualitative case study methodology. For clarity, *course redevelopment* is defined in this study as an entire redesign of a course for

the purpose of integrating sustainability. Likewise, *implementation* connotes the content, delivery, and assessment of the course.

Theoretical Framework

The current study has been shaped by two theoretical frameworks, including ESD and constructivism, considered here as symbiotic in nature. Both have been instrumental in guiding the redevelopment and implementation of the course in question as well as contributed to the study's plan for inquiry and interpretation.

Education for sustainable development

The constructs of the ESD framework are most easily described through the movement's educational philosophy (the purpose of education) and educational psychology (how people learn best). The educational philosophy of ESD is that which prepares citizens and stewards for life on local and global plains; at home, at work, and in the community. Citizenship implies rights and responsibilities inherent in community engagement and interests beyond the self. Similarly, stewardship connotes responsibility for present and future generations as well as the environment. The personal values emphasized in this philosophy are interconnectedness and responsibility; interconnectedness with and responsibility for nature and people.

Educational psychology is composed of a set of conditions necessary for learning. ESD considers the optimal conditions for learning to be a high level of engagement through problem solving, social interaction, application, and reflection; all of which are assumptions mostly highly correlated with a constructivist epistemology, especially slanted toward a dialectical perspective of constructivism. Several research questions were proposed to guide inquiry into how students experienced the course reflective of ESD. The ESD framework is discussed further in Chapter 2.

Constructivism

Many pedagogical theories have been associated with ESD, most of which, it could be easily argued, are indicative of embodying a constructivist epistemology. These theories, are characterized by high levels of learner engagement (active, applied, problem-based,

inquiry-based, service and experiential learning), social interaction (interdisciplinary, multidisciplinary, and participatory learning), and a metamorphosis of the learner's beliefs (deep and transformational learning, emancipator and critical pedagogy). Constructivism extends cognitive learning theories, including contextual issues, like social interaction and previous experience, in the construction of knowledge. It is predicated on the presumption of "situated cognition," the idea that knowledge does not reside only in the mind, but is situated in the context of an individual's past experience, beliefs, and values, their cognitive process, and their environment (Schunk, 2008, p. 289). Therefore, learning is not uniform, but unique to each individual. The core assumption of constructivism is that the learner creates their own knowledge, versus acquiring it, and truth is an evolving premise (Fox, 2001; Schunk, 2008; Simpson, 2002).

There are many perspectives on constructivism, primarily differing in the timing and amount of assistance given to the learner and the type of knowledge that is constructed. Moshman (1982) presents three perspectives: Exogenous, endogenous, and dialectical. He describes these three positions in terms of root metaphor, pointing to where the knowledge is constructed: Organism (endogenous or an internal construction), mechanism (exogenous or an external construction), and contextual (dialectical or an interaction between the organism and mechanism). An endogenous perspective focuses on cognitive development, what happens internally. An exogenous perspective emphasizes the environment's role in learning, a preoccupation with behavior. While, a dialectical perspective is perched between these two, evidencing a highly interactive, reciprocal interaction and reflection that yields learning. It is argued here that this latter perspective best aligns with the pedagogical proclivities of ESD, discussed later in Chapter 2. A research question related to constructivism was included to guide inquiry.

Research Questions

The primary purpose of the study was: *To examine the learning and development experience of students enrolled in a course that has been redeveloped using the ESD framework. A description of major outcomes and how they occur would allow implications to be made about how AT education might be enhanced by the use of the ESD, better preparing students for sustainable development.* Elliot Eisner (1998), an advocate of studying how

learners *experience* education, in which the use of qualitative inquiry is considered essential, was highly influential in the articulation of the following research questions (discussed further in Chapter 4). Primary research questions:

- How do students experience a course that uses the ESD framework?
    - What are the learning and development outcomes that students experience in the course implementation?
    - What aspects of the course are perceived to have the most and least impact on learning and development outcomes?
    - How do students experience the process that leads to learning and development outcomes?
    - How do students compare their experience in the course to other courses in the AT program?
- How does the use of ESD enhance the student learning and development experience?
    - How does constructivism manifest in the learning and development experience of students in the course?
    - How does the ESD framework manifest in the learning and development experience of students in the course?

Research Methodology

A qualitative instrumental case study methodology was used in the current study, for which an interpretive approach was taken (Merriam, 1998). Thus, interpreting the experience of students enrolled in the course reflective of ESD for one semester was pivotal to better understanding how the framework might be used by other practitioners in AT education. Eisner (1998) advocates for qualitative inquiry in education, as studying what happens in a classroom and all the idiosyncrasies that its context embodies is what is most useful to other practitioners, where scientific measures may lack the intimacy necessary to describe and evaluate the learner's experience.

Qualitative research is the study of how others construct the meaning of their lived experience. This emic perspective emphasizes the study of the perception of others, not the researcher's perception (Merriam, 1998; Stake, 1995), although the researcher has their

own etic issues that are often at the heart of the study's purpose (Stake, 1995). Qualitative research typically involves field work in the setting for which the participants are being studied (Creswell, 2007; Eisner, 1998; Merriam, 1998) and is distinct in that samples are rarely random and most always small with specific purposes, especially in education (Merriam, 1998).

The researcher is often a practitioner in qualitative educational research, commonly used to improve the practice of teaching. Such was the case in the current study. Practitioners as researchers employ a systematic approach to observation and reflection on their experience in the classroom. Advantageous to the practitioner is the natural development of empathy toward the study's subjects, establishing rapport through strong communication and listening skills to better understand the learner's world (Bogdan & Biklen, 1998; Eisner, 1998; Merriam, 1998).

Case studies are used primarily to generate a deep description and understanding of a real-life situation as perceived by those who are involved (Merriam, 1998; Stake, 1995; Yin, 1989), best suited for describing an account of a contemporary issue in a real life context (Merriam, 1998; Yin, 1989). Cases are, therefore, ideal for applied fields like education as they lend themselves to solving practical problems and are especially useful in offering insight about an area of education that has received little research, like an innovative program or practice (Merriam, 1998), such as ESD. Case studies in education often focus on people and programs (Stake, 1995) and account for a large portion of thesis and dissertation work in the social sciences (Yin, 1989).

There are no specific data collection or analysis techniques associated with case study research, though data collection is often characterized by observations and personal experience by the researcher that offer an up-close-and-personal relationship with the participants for the purpose of gaining subjective perspectives (Merriam, 1998). Most characteristic of case studies is the use of multiple data types as evidence to support conclusions (Yin, 1989). Most importantly, methods should be selected by the researcher for their capacity to capture the deepest level of understanding and accurate representation of the case (Stake, 1995).

In the current case, student reflective writings, focus group interviews, and a reflexive researcher journal were used to discern answers to the study's aforementioned

research questions. Artifacts, such as work completed in class activities and course assignments were also retained, not for data analysis, but to describe the context of the case. Additionally, a quantitative survey using a retrospective pre-post design was administered related to six change agent skills integrated into the newly developed course. The survey was used to determine if participants perceived their ability for these skills to change significantly during the course and if there was a difference in amount of change among the six skills. A repeated ANOVA was used to analyze this data. See Table 3-1 for a summary of research questions connected to data collection and data analysis methods.

Limitations

In qualitative research the emphasis is on rich data and a validated representation of a specific case. By design, cases are often small and include a specific boundary. This particular case was one course section taught during one semester. Additionally, the case only included 14 participants, a limited sample. Though the findings of this study are admittedly valuable to practitioners, the small sample used in the case makes generalizing beyond this specific context challenging. A related limitation is that ESD integration should ideally be considered *across the entire curriculum*, rather than a single course. On the other hand, the small class size allowed the researcher (instructor of the course) to interact with participants and receive feedback to a much greater extent.

Further, during data collection there was potential for a halo effect, as participants in the study could have been influenced by their desire to be viewed positively by the instructor of the course. Additionally, during the focus group interviews in the study, participants were grouped by their semester assigned groups and seemed to be less inclined to discuss what they were learning and how they were developing in the group with their peers present.

Delimitations

Merriam (1998) defines a case as a unit or system that has specific boundaries and may include an individual, a class, a program, an event, a group, a teacher, a policy, a community, etc. The case is simply defined by parameters that box in the thing to be studied and distinguish what will not be studied (Merriam, 1998; Stake, 1995; Yin, 1989).

Only if there is a boundary or limit on how many can be included in the sample or how much data can be collected can a study be described as a case (Merriam, 1998).

The current study sought to surmise how students experienced an AT course reflective of ESD, namely the outcomes students felt were the most and least important, the process or experience by which those outcomes came about, and how their experience in the course diverged from their experience in related AT courses. The study was designed to ascertain the ways in which ESD contributed to the most important outcomes and how the use of these approaches succeeds current pedagogy in AT.

What was not under study was the general assessment of student competences surrounding sustainability. It was considered far more important at this time to explore ESD methods in an AT context in an effort to describe what it was like, what was successful, what was not, and why. Currently, sustainability has not been cohesively integrated across the AT curricula, so it would have been naïve to make assessment a priority, measuring competences for which students would most likely be unfamiliar and ill-equipped. Nevertheless, assessment for ESD-related outcomes remains a substantial area of opportunity, a key challenge for which has been the measurement of things like behavior, values, attitudes, and perceptions; arguably qualitative in nature. Though this is an area in need of development, to be fair, the current study has excluded this component until sustainability has made more headway in the AT curricula.

Summary

In the preceding chapter the problem has been introduced and the current study, the related research questions, the theoretical frameworks, and the delimitations of the study have been outlined. In the next chapter, *un*-sustainability in the apparel industry is discussed, outlining the challenges for educators in the apparel field. This discussion is followed by a description of the ESD framework and a discussion of constructivism, both of which were used to guide practical action in the study.

CHAPTER 2 - **Literature Review**

***Un*-sustainability in the Apparel Industry: Symptoms of Global Crisis**

> "Fashion … suggests a passing trend or fad – something transient, superficial and often rather wasteful. It represents the opposite of longevity and, as such, would appear to be an impediment to sustainability" (Stuart Walker, *Sustainable by Design*).

The global apparel and textiles (AT) industry accounts for approximately $2 trillion in global revenue, 70% of which originates from the sale of apparel, accessories and luxury goods, while the remainder is from textiles and footwear (Datamonitor, 2009b). Of that, global retail sales account for about $1,025 billion (Datamonitor, 2009a), for which the US alone generates over $300 billion annually (Datamonitor, 2009c), accounting for about 30% of the global retail industry's value, following only the EU, which accounts for 41% (Datamonitor, 2009). The industry employs over 32 million in hundreds of countries in the production sector alone (Braungart, 2007), while the majority of sales that result from those production efforts are most heavily concentrated in the West.

The apparel industry is a substantial source of livelihood for many residing on this globe. For many developing countries, especially China and India, the industry has been a particularly fruitful avenue to economic development. But, the industry has also been complicit in the current ecological crises, now representing a substantial threat to sustainability on a seemingly insurmountable scale. Some argue that the apparel industry has been delinquent in responding to a myriad of unintended social, environmental, and economic consequences (Betts, 2007). These consequences are, in part, a result of growing demand for apparel and textiles in step with a burgeoning global population. But, undoubtedly, the present scenario is exacerbated by rampant consumerism in only a small part of the globe, mostly Western countries, the aftermath of which is felt like an aftershock across planet (Brosdahl, 2007). Moreover, the subsequent social, environmental, and economic impacts in the industry are reciprocal, reinforcing each other. For instance, it is impossible to address only environmental impacts without scrutinizing the social priorities and economic policies that provoke those (Hethorn & Ulasewicz, 2008).

Responsive to this complexity, it is commonly stated in the sustainability literature that repairing or abating these impacts will likely require a different kind of thinking and action, unlike the variety that instigated the current crisis. A revolution may very well be in order. The possibility of revolution has urgent educational implications for future apparel industry professionals, particularly for those residing in the West. The proceeding discussion highlights some of the primary issues of sustainability facing the apparel industry today as well as the progress that has been made thus far.

Social and environmental externalities of un-sustainability

As global borders dissolve, the dilemmas of fair trade and human rights are expanding as cost-driven business agendas demand low-wage labor and resources. Sweatshops are assuredly not a thing of the past (Cheek & Moore, 2003; Clark, 2007; Gould, 2003; Pollin, Burns, & Heintz, 2004; Schor, 2005; Shanahan & Carisson-Kanyama, 2005). Many workers are still required to work undocumented overtime under dangerous conditions. These workers often include learners (Forum for the Future, 2007), but women are especially vulnerable to exploitative conditions, as the feminization of the manufacturing sector is well underway (Schor, 2005). Additionally, few countries support a living wage, a contention for which some argue could be easily remedied by as little as a 7% increase in the retail price of a garment, as labor is only a small portion of a garment's overall cost (Miller & Williams, 2009). Unions, which in many cases aid workers in resolving some of these issues, are often heavily resisted in developing countries (Forum for the Future, 2007). There is also a disparity between trade agreements and labor practices; unfortunately, one does not beget the other (Rudell, 2006).

Advances in technology and communication as well as student interest in the matter have exposed this underbelly in apparel and textile production for which consumers are increasingly uncomfortable (Forum for the Future, 2007; Pollin et al., 2004; Quinn, 2008). In some cases, but not all, that exposure has forced the hand of industry players to seek solutions or experience ostracism. Nike, for example, after years of embarrassing exposure for their use of cheap labor, recently published the names and locations of all its factories in the spirit of transparency (Forum for the Future, 2007). So, as some progress has been made, a complete resolution to working conditions remains to be seen (Gould, 2003). More

troubling, many apparel companies, desiring to choose a more sustainable path, are hard pressed to identify ethical supply chains, a chief barrier to the eradication of this abuse (Betts, 2007).

Since the Industrial Revolution, industry in general has significantly altered the land we live on and has grossly increased the rate of air and water pollution, a trend that is not slowing down with an increasing global population (Harle, Howden, Hunt, & Dunlop, 2007; Vitousek, Mooney, Lubchenco, & Melillo, 1997; Wackernagel, et al., 2002). Moreover, these alterations to soil, air, and water have created major changes in climate and biological diversity (Harle et al., 2007; Vitousek, et al., 1997). The apparel industry is no exception. Beyond social inequities, the impact of the apparel industry on the environment is extreme at best. The apparel industry's penchant for resource consumption and chemical use tops the list of the remarkable irritations to sustainability. The industry's use of fresh water and energy, second to few industries, peaks in nearly every phase of a garment's life: agriculture, processing and finishing, distribution, and especially care and maintenance (Ulasewicz, 2008). It is estimated that nearly 80% of a garment's ecological footprint unfolds in consumer use phase, accounting for laundering, drying, and ironing (Easter, 2007; Forum for the Future, 2007). The industry relies heavily on timber and non-renewables like fossil fuels as well, particularly for the manufacturing of synthetics like polyester or man-made fibers like rayon (Baugh, 2008). The use of fossil fuels is also fundamental to the industry's expansive distribution system. As fashion consumption is far displaced from production, the distribution system required to transport fashion products is elaborate . . . and not without its impact on air, land, and water (Forum for the Future, 2007).

The industry's use of toxic chemicals is extensive, from pesticides and fertilizers in agriculture, to its dyes, prints and finishes in production, to the use of chemicals in the aforementioned use phase (Forum for the Future, 2007; Heine, 2007; Orzada & Morre, 2008). Chemical use poses a tremendous risk to consumer and ecosystem health. Some organizations are responding. The American Apparel and Footwear Association recently updated their Restricted Substances List (2009) for the industry, though it is largely geared to the most basic consumer safety issues rather than the environment (Waeber & Engel, 2007). The cotton industry, in an effort to eclipse pesticide use, has expanded its use of

genetically modified (GM) crops. However, though GM crops may reduce dependency on pesticides, these crops come with a host of other environmental consequences (Forum for the Future, 2007).

Finally, the industry has substantially contributed to Earth's insurmountable waste load. This issue is compounded by accelerating consumption and impetuous materialism (Chyzy, 2007; Davis, 2008; Gould, 2003; Schor, 2005; Young, Jirousek, & Ashdown, 2004). A high rate of consumption due to cheap labor and subsequently irresistibly low prices is a growing concern as a certain detriment to environmental health (Chyzy, 2007; Davis, 2008; Gould, 2003; Hawley, 2006; Shanahan & Carisson-Kanyama, 2005). Each year in the US exclusively, nearly 12 billion tons of textile waste is generated (about 78 pounds per person) (EPA, 2006; Young et al., 2004). This is a combination of the consequences of consumption, post-consumer waste (discarded by consumers), mixed with the consequences of the production process, pre-consumer waste (discarded by the industry) (Hawley, 2007; Matusow, 2007). About 84% of discarded textiles go directly into landfills, accounting for about 5% of total landfill waste. The remaining 15% of textile waste is recovered for recycling or reuse (EPA, 2006; Young et al., 2004).

But, nearly 100% of all textiles are recyclable; however, the textiles recycling industry, one of the oldest recycling industries, is still ill-equipped to handle the current scale of waste (Hawley, 2007). The second-hand clothing market is well established also, but has now reached epic saturation (Hawley, 2006; Schor, 2003; Shanahan & Carisson-Kanyama, 2005; Council for Recycled Textiles, 2007). Finally, discarded textiles are only a fraction of the other types of untreated and unregulated waste that is commonly disseminated out beyond factory walls, such as chemical effluent that may contaminate air and water (Forum for the Future, 2007; Orzada & Moore, 2008).

Precisely how the industry has affected the globe remains an area of grand supposition, though it is widely accepted that these changes to air, land, and water affect our supply of water and have resulted in an increase in evaporation, drought, and other El NÍno effects (Harle et al., 2007). At present, it is most feasible to track changes to land use over time and measure gas emissions, but few other metrics exist. Gas emissions are currently the only measure taken universally as a planet to measure our impact on the environment (Parris, 2003). Wackernagel, et al. (2002) measured nature's resources in

terms of land use compared to human demand, called the ecological footprint. The authors documented what they term an ecological overshoot, detailing an excess strain on nature to continually provide for human life. By measuring alterations in land use, the authors determined that the *productive* space needed to grow crops, graze animals, harvest timber, fish, develop housing, transportation, and industry, and burn fossil fuel are reaching or have already exceeded capacity, possibly by 20% in some areas. The authors posit that the world relinquished the possibility of sustainability sometime in the 1980's.

Whatever the case, there is no way to know exactly what we have used so far or what we have damaged beyond repair. Even if this was known, a greater complication is linking use to economic metrics to the market system. For instance, the market price of many natural resources, such as coal or water, is very inexpensive; a price which does not reflect its diminishing supply or the impact of its excessive use on the environment. Surmising a realistic value on natural resources might inspire industry players to seek greater efficiency, but efforts to do so have been terribly complicated (Carpenter et al., 2009; Walsh & Brown, 1995). Further, even if there was a common metric to assign monetary values to natural resources, infrastructure is lacking to facilitate feedback loops to monitor use (Benyus, 1997).

Reciprocal externalities and the shaky economic bottom line

There is an interrelationship between cheap exploitative labor and a lack of environmental health and safety. Environmental standards are not globally universal (Swedberg, 2006). Therefore, the use of cheap labor in developing countries is essentially creating greater stress on the ecosystem in places that enjoy systematic evasion of environmental standards (Schor, 2005; Rodie, 2003). For instance, nearly all U.S. tanneries, an inherently toxic business, have moved their operations overseas to avoid domestic environmental regulations (Richards, Gabrielle, & Shepp, 2007). Authors Shanahan and Carisson-Kanyama (2005) posit that the introduction of environmental policies pose a threat to economic interests "because the problems they seek to solve are rooted in traditional patterns of production and consumption" (p. 299).

Common metrics used by the global economic system to define progress assist little in the detection of the social and environmental externalities. For example, the Gross

Domestic Product (GDP), *the* standard measure of progress and prosperity, appreciates only from a spike in economic activity, even if the activity is spawned by catastrophe, like war or rebuilding after a natural disaster. Authors McDonough and Braungart (2002) use the example of the Exxon oil spill in 1991 in Alaska. This cataclysm raised the GDP in the country during the clean-up phase. Obviously, living in a system that only rewards activity may involve a characteristic ignorance of other matters like environmental health or social well-being.

Therefore, the exploitation of cheap labor, the subsequent consumption, and the hole in the ozone may only be *symptoms* of a broken global economy (Huckle, 2010; Jacob, 2007; Shanahan & Carisson-Kanyama, 2005; Schor, 2005). Standards, regulations, and monetary policies are at the root of every economy's nature (Wackernagel, White, & Moran, 1999). A prominent regulatory mechanism used in the apparel industry has been the quota system, an arrangement the US created in the 1970's to monitor and control the flow of goods between developing and developed countries. But, Gill (2008) found that the system was completely ineffective in slowing down a burgeoning flow of goods from China. Instead, prices for fashion fell lower and lower, contributing to a perception of disposability. In 2005, the quota system was dissolved, and many economies collapsed while making their last failing attempts to compete with China, now the largest exporter of fashion products to the US.

Another dimension complicating the production of apparel internationally is the structure of economic assistance offered to developing countries by firms like the International Monetary Fund and the World Bank. Loans are made to developing countries to stimulate struggling economies on a short-term basis to stabilize the economic system. Meanwhile, these firms impose ever-tightening financial constraints like interest rates, sometimes dictating policy, forcing the country's hand to over produce to keep exports flowing in an un-winnable race (Weisbrot, 2009). A similar issue exists with subsidies (Forum for the Future, 2007).

Such economic mechanisms contribute to an anti-ecological economy that is based, not on use value, but exchange value, which is heavily manipulated (Jacob, 2007; Shanahan & Carisson-Kanyama, 2005). For example, the value-added tax that China *voluntarily* imposes on its exports is eligible for a rebate, a privilege that US-based companies who

wish to export cannot partake. This system complicates global trade when the values of items are artificially pushed up for exportation from developing countries like China, and pushed down for consumption in developed countries like the US (Buchanan, 2008; Schor, 2005). Similarly, agricultural subsidies, paid to cotton farmers, superficially lower the price of cotton for retail, irrespective of the actual costs of growing cotton (Forum for the Future, 2007). Subsidy and quota systems are put in place to protect developing countries from the rigors of the free market; however, these manipulations drive down prices, ignoring the real cost of the ensuing impacts on people and the planet (Forum for the Future, 2007). Economies around the globe, particularly those reliant on the apparel and textile business, have recently collapsed under these conditions (Buchanan, 2008; Jacob, 2007).

This anti-ecological economy is consequently laden with debt, racked up by consumers, industry, and government. Materialism has skyrocketed consumer debt into an illusory dimension where the only viable avenue for economic sustainability is more credit (Weller, 2007). Notably, the apparel industry has an historical penchant for lines of credit as a standard business model; most seasonal collections are financed by credit until the goods are sold, and the debt is repaid (in theory). At the onset of the financial crises, the pages of fashion-related trade publications were littered with stories of rescinding lines of credit. Likewise, the US is now heavily indebted to China. It is reasonable to presume this will likely cloud the judgment needed to create or dissolve various policies needed to restructure the entire system (Buchanan, 2008; Jacob, 2007).

Recently, a severe global recession has commenced. Responsively, the apparel industry's scale has begun to contract. It is easily surmised that the aforementioned global economic policies and manipulations coalesced with the transgressions of players in the U.S. financial market are complicit (Huckle, 2010). In 2008, 60,000 apparel and textile workers in the US became unemployed and 44 textiles manufacturers closed their doors, casualties of *un*-sustainability. In turn, China's booming growth has been eclipsed, along with many other economies that rely on the exportation of goods to the US (Adendorff, 2009). Although governments have recently taken greater interest in green incentives and initiatives, for example creating green jobs, Huckle (2010) affirms that until the capitalistic mechanisms of the global economy are eradicated, recovery will remain *un*-sustainable.

Sustainable fashion?

There are glimpses of progress in the fashion industry suggesting that sustainability is a growing consideration on the product development, manufacturing, retail development, and strategic planning fronts. Growing consumer interest, marketing initiatives and operational efficiency have most often inspired these efforts (Borneman, 2008; Chyzy, 2007; Clark, 2007; Tran, 2007; Rodie, 2003). Consumers have acted as important catalysts, voting with their dollars for companies that are using a sustainable business platform (Gagnon & Gagnon, 2007; Ulasewicz, 2008). Many fashion designers have responded, incorporating recycled materials and materials from renewable resources into their lines, although many are priced out of accessibility to the average consumer (Tran, 2007).

The manufacturing sector has made the most marked progress toward limiting its energy consumption, particularly in industrial textile production ("How green is . . . ," 2007; "Learning the golden rule," 1999; Swedberg, 2006). For example, some cotton may now be grown in colors, eliminating the need for dyeing and finishing (Fox, 2007; Vreeland, 2007). Natural dyes have also experienced greater use, even though availability and feasibility for large scale production wanes (Kolander, 2007). Additionally, the textile industry is now able to recycle nearly all of the waste created in the production process without producing new waste (Secondary Materials and Recycled Textile Association, 2007). McDonough and Braungart's (2002) *Cradle to Cradle* design protocol and Wimmer, Züst, and Lee's (2004) *Ecodesign Implementation* are now being used by many textile manufacturers as environmental guidelines for product development, determining a fiber's lifecycle prior to the creation of fabric and garments. Durability, limiting replacement, has also become a prominent consideration (Rodie, 2003; "How green is becoming the new black," 2007).

More companies are seeking to become transparent in many of their practices (Gould, 2003; "Translucent green," 2007), an emerging focus for creating competitive advantage. Companies are more frequently evaluating the viability of their business in economic, environmental, and social terms (Clark, 2007; Elkington, 1998; Lloyd, 2005; Waeber & Engel, 2007). Unfortunately, some retailers are simply adopting *aspects* of sustainability (such as environmental efficacy) while systematically ignoring others (social

impact). For example, Wal-mart is currently making immense strides in reducing waste and energy use, an environmental focus with economic advantages. But, in addressing the social component of sustainability, the company merely established a self-run program for employees to improve their own lives, called Personal Sustainability Practice (Wal-mart, 2007). It is beyond the scope of this discussion to review the countless, widely publicized, incidents of employee abuse among the company's own workers and other social assaults. A propensity also exists to use sustainability as marketing puffery, sometimes called "green washing" (Borneman, 2008; Chen & Burns, 2006; "How green is becoming the new black," 2007).

Braungart (2007) posits that just reducing impact is naïve and lacks ambition. The term sustainability may very well one day find extinction, transformed instead by *regeneration*, an effort to put back into the social, environmental, and economic bank through innovative business platforms. Moreover, the paradigm of sustainable fashion demonstrates the potential for such a model. In a paradoxical way, the concept of fashion could certainly be used to promote a more sustainable way of life, as it is already a powerful conduit for change (Fletcher, 2007; Harlow, 2007; Hethorn, 2008).

In the book, *Future Fashion: White Papers* (2007) various authors from both academia as well as the apparel industry raise some interesting questions about the industry's future viability like: If the planet's population continues to explode, how will the industry cope with dwindling natural resources and energy scarcity as well as diminishing space for waste? (Kininmonth, 2007); How might industry players be inspired to consider beneficial trade-offs where there are no easy answers? (Betts, 2007; Gagnon & Gagnon, 2007); How can purchasing habits, like quantity over quality, be reversed? Are consumers willing to vote for quality with their dollars, paying a premium for sustainability? (Brosdahl, 2007; Gagnon & Gagnon, 2007); How might sustainable fashion succeed conventional products (Waeber & Engel, 2007) as well as improve well-being? (Rechelbacher, 2007); How will consumers know if their purchases are authentically sustainable and what will insure authenticity? (Gagnon & Gagnon, 2007); and, How do we make sustainable fashion accessible to everyone? (Oakes, 2007). These questions represent some of the fundamental matters that must be confronted to re-conceptualize fashion for a more sustainable context.

Author of *Sustainable Fashion: Design Journeys*, Kate Fletcher (2008) makes clear that there are a diverse number of answers to these questions:

> As an analogy, the world of sustainable textiles and fashion is a place of mountains, valleys, plateaus, and swampy ground. The mountains rise up like beacons or navigation points and show us ideals, values and direction (where do we want to head?). The valleys in between represent where we are now – at the beginnings of our journey, in the rich, fertile and enthusiastic soil of ideas and possibilities, and still perhaps a little unsure of how the landscape will unfold. The swamps and plateaus represent the difficult terrain where progress is slow. Perhaps it is uncharted territory, a dead end or the start of a potentially exciting new area of investigation. Yet no matter how bogged down we become or whichever vantage point we climb to, we have a sense that no part of this world exists in isolation from the rest. The landscape is a whole and it unfolds before us, changing, eroding and rising up over time (p. xii).

Undoubtedly, our most recent apparel and textile graduates will be required to travel this ground. A recently published collection of papers by AT academics, *Sustainable Fashion: Why Now?,* discusses some of the educational implications. Hethorn (2008) suggests that the new generation of fashion designers must be more attune to consumers' needs rather than wants, with well-being, not short-term sales, as the central aim. Thus, qualitative research skills will be at a premium. Loker (2008) submits that technology will play a pivotal role in creating a sustainable fashion system with necessary feedback loops from design inception to disposal, creating greater efficiency and lower impact. Implicit is the need for technicians and designers of such technology. Quinn (2008) posits that knowledge of supply chain dynamics will be crucial to designers for sustainable sourcing methods, as the product development team will become more multi-disciplinary in nature, requiring partnerships across many functions.

Are we preparing our students for the *difficult terrain* and *uncharted territory* that sustainability in the apparel industry represents? Are graduates equipped with the investigative skills and unbridled imagination that sustainability commands? Can we be sure that AT undergraduates perceive their future profession through the preceding lens? Most importantly, will our graduates be able to envision a sustainable future? As discussed in Chapter 1, there is indecision regarding educational priorities among AT educators

which may slow a move to action. Nevertheless, a sense of urgency cannot be discounted. Education for sustainable development (ESD) may provide a way forward.

Education for Sustainable Development

> "The disorder of ecosystems reflects a prior disorder of mind, making it a central concern to those institutions that purport to improve minds. In other words, the ecological crisis is in every way a crisis *of* education" (David Orr, *Ecological Literacy*).

Education has been identified as the critical conduit for sustainability initiatives (Fien, 2002; McKeown, 2006; Svanström, Lozano-Garcia, & Rowe, 2008). But, a disconnection exists between heightened awareness and responsible action (Jucker, 2002). Some of the most educated cultures in the world have wreaked the greatest havoc on the planet (Cortese, 2003; McKeown, 2006; Orr, 2004), a fact that brings into question the viability of the dominant cultural paradigm (O'Sullivan, 2004). This conflict has led to criticism about the *type* of higher education that currently prevails, a mocking resemblance of the political and economic system in which it operates, an *un*-sustainable system (Foster, 2002; Haigh, 2008; Orr, 2003). Rees (2003) posits that the current educational system does not have to teach *un*-sustainability*;* the doctrine is naturally inseminated throughout, rooted in corporate globalization and the traditional production-to-consumption model. In this light, the resulting hierarchy of value is heavily focused on a fragmented, positivist, reductionist transmission of knowledge rather than the interaction of systems (Foster, 2002; Haigh, 2005; Kenan, 2009; Wals & Jickling, 2002; Sterling & Scott, 2008), a dichotomy of facts and values (Bosselmann, 2001; Kenan, 2009). It is apparent that a transition to ESD will most likely require the relinquishment of an economic model fashioned for exponential growth in a closed system (Bosselmann, 2001; Jucker, 2002; Schlottman, 2008).

ESD is an emerging field, a movement advocating for a new paradigm, a reorientation of education (Rode & Michelsen, 2008; UNESCO, 2005). Set in motion in the in the 1970's, but being revived in the early 2000's by the UN's declaration for the decade of education for sustainable development (DESD, 2005-2014), although it is difficult to determine what proportion of effort to integrate sustainability into the curricula stems

directly from this call to action (Wals, 2009). ESD is underpinned by the definition for sustainable development (SD) by the World Commission on Environmental and Development (WCED, 1987) in a report called *Our Common Future,* commonly referred to as The Brundtland Report. The report makes apparent that environmental degradation cannot be viewed in a vacuum, but is an issue uniquely connected to human behavior. SD is defined as meeting present needs without prohibiting future generations from meeting their own needs. The definition was left broad and open by design. But, questions remain about what should be sustained and what should be developed (Landorf, Doscher, & Rocco, 2008). Consequently, an undisputed definition of ESD is continuing to evolve (Calder & Clugston, 2003; Jucker, 2002; Landorf et al., 2008; Reid, 2002; Sterling & Scott, 2008).

The ESD movement finds its roots as far back as 1972 in the *Stockholm Declaration on Human Environment*, the document resulting from a UN conference, which primarily championed for the inclusion of environmental education, the pre-ESD era (Haigh, 2005; Jickling & Wals, 2008). ESD evolved to fill the gaps that environmental education had neglected; primarily, tensions between consumption patterns, poverty and the health of the ecosystem, expanding the complexity of problems to be resolved (Dale & Newman, 2005). Several documents in the movement for SD, *Agenda 21*, the resulting declaration of the United Nations Conference on the Environment and Development (UNCED) in Rio de Janeiro in 1992 (Robinson, 1993), the report *Education for Sustainability: An Agenda for Action* by the President's Council on Sustainable Development (1994), and the *Earth Charter*, another UNCED document, are the most frequently cited declarations calling for heightened public awareness and the reorientation of education. This reorientation calls for quality education defined by the development of knowledge, skills, and values that support sustainable behavior. This reorientation is thought to require some significant reconceptualization of *how* and *what* learners should learn. Taking a life skills approach, this reorientation is thought to better prepare learners for civic engagement, the work force, and ultimately, a better quality of life. Key in this approach is preparing learners for lifelong learning, an adaptive quality that makes the learner more malleable in a time when most societies are experiencing dramatic social, environmental, and economic transitions (UNESCO, 2005).

Recently, ESD has been connected to the development of 21st century skills, a skill set commanded by employer needs. Company transparency is more often including the tenets of sustainability, and future graduates will need to bring to the table knowledge, skills, and values related to sustainability to assist employers in grappling with complex social, economic, and environmental challenges (Forum for the Future, 2004; Haigh, 2005). This effort can also not ignore the demand for green collar jobs (Konopnicki, 2009). Maclean and Ordonez (2007) argue that ESD is well poised to prepare students for employability by developing lifelong learning attitudes, a breadth of knowledge, and general life skills. In the transition from *Industrial Era* to the *Information Era*, the current workplace requires what the authors call the *knowledge worker,* an employee that continuously expands their knowledge base to adjust to changes brought about by rapid technological advancement. Maclean and Ordonez (2007) and Tilbury (2004) both agree that the current system is not preparing students for this end. Maclean and Ordonez (2007) affirm that the current system emphasizes credentialing rather than competence, which inevitably drives down the value of credentials. The authors posit that, often, the most successful college graduates are not necessarily the valedictorians, but the class clowns, school paper editors, and athletes, students who were involved in activities that commanded understanding of people, truth seeking, and personal determination.

Arguably, integration of ESD has been slow, especially in higher education (Bossellmann, 2001; Everett, 2008; Rode & Michelsen, 2008). The most notable progress made has been in the areas of campus greening and research, while curriculum development, the topic of this research, has been slower to develop (Cotton, Bailey, Warren, & Bissell, 2009; de le Harpe & Thomas, 2009; Sterling & Scott, 2008). But, Haigh (2005) makes clear that the movement's tracks, spanning nearly 30 years, has not been dogged for lack of expansive numbers of organizations, international caucuses and summits, and declarative documents in its name, but by confusion about 1) *how* to respond to the charge and 2) institutional barriers within the university and government (Wals & Jickling, 2002).

First, integrating ESD is best described as an invitation to the ambiguous complexity that the concept of sustainability embodies (Landorf et al., 2008; Schlottman, 2008; Sterling & Scott, 2008). Largely absent from the literature are specific, practical ways to implement

pedagogy toward this end (Everett, 2008; Landorf et al., 2008; Reid, 2002). Though learning outcomes have been described with eloquence and detail, the literature still lacks specific, practical direction for implementation as well as assessment (Forum for the Future, 2004; Landorf et al., 2008; Reid, 2002; Rode & Michelsen, 2008; Svanström et al., 2008).

Most recently, Cotton et al. (2009) found that the primary barriers to the implementation of sustainability education were class size, management support, perceived irrelevance to some disciplines, and conflict with dominant university pedagogies. The authors found that correspondingly to professors' diverse conceptions of sustainability, so were their approaches to the integration in similar content areas, and often that integration were left entirely up to the individual's proclivities. Most perceived sustainability to not necessarily be relevant to all disciplines, but did feel some moral obligation to the new paradigm. There was debate among who should be responsible for initiating integration; some feeling they would be more comfortable with a mandate, while others despised such an imposition. There was also clear tension between large class size and didactic teaching methods and those reflected in sustainability education, largely a constructivist approach, which takes longer, requires greater interaction, and invites emerging outcomes rather than predictive ones. Most preferred small, reasonable changes to large-scale undertakings. Likewise, professors found it easiest to model "good" behaviors like recycling. There remains a remarkable gap between the proposed ideal and reality in practice.

Reid (2002) posits that the implementation challenge is complicated by ESD's lack of a fixed, concrete prescription; however, the possibilities of adopting time-honored educational practices for this purpose as well as allowing ESD to extend educational practice is compelling. Similarly, Sterling (2004) warns that SD should not be treated as an add-on topic to an already bulging curriculum, but reflect a core epistemological foundation. Several authors suggest that educators will be much better served by adopting an attitude of sustainability. This attitude would include learning along the journey and utilizing cognitive as well as affective, moral, and imaginative aptitudes, rather than chasing a prescriptive notion of sustainability or SD (Bonnett, 2003; Foster, 2001; Foster, 2002; Gough & Scott, 2001). This effort may be compassed by a more systemic approach to the

human-and-nature relationship (Bonnett, 2003; Sterling, 2004). Further, it is thought that each discipline must make SD relevant to their specific course of study (Haigh, 2005), chiefly problematizing the concept of SD, offering the specific discipline's interpretation of the relationship between humans and nature (Bonnett, 2003; Stables & Scott, 2002). This is indeed a daunting, but not impossible, task. Educators are urged in the literature to not allow the, sometimes, nebulous nature of initiatives to slow progress (Filho, Manolas, & Pace, 2009; Jucker, 2002; Wals & Jickling, 2002). Instead, they are urged to trudge on, continuing to evolve methodologies to this end and use the complexity as a framework for conversation to evolve ideas (Reid, 2002; Wals & Jickling, 2002).

Secondly, institutional barriers play a substantial role in slowing the integration of ESD. Funding, ivory-tower traditions, and narrow discipline and research specializations are just a few of the institutional obstacles the ESD movement has found difficult to navigate (Everett, 2008; Calder & Clugston, 2003; Haigh, 2005; Jucker, 2002; Moore, 2005; Warburton, 2003). As the larger governmental system often structures the university system, policy alone can curb progress; this has especially been the case in the US where the ESD platform has been a tough sell (Calder & Clugston, 2003). Sterling (2004) presents a three-phase learning model by Bateson (1972) illustrating the needed transition from basic learning (learning, thinking, and knowing), which is demonstrated by "doing things better," to Meta learning (learning about learning, thinking about thinking, etc.) which is demonstrated by "doing better things," to epistemic learning (learning about learning about learning, etc.) which evidences a transformative paradigm shift, "seeing things differently" (p. 56). Sterling (2004) compares this learning model to a model he proposes, a four-stage model of responsiveness to sustainability in higher education: No response (no change), accommodation (green gloss), reformation (serious reform), and transformation (whole system redesign) (p. 57). Sterling (2004) posits that most will remain locked behind the third phase (reformation), resisting a new belief system.

Further, the very environment in which we have traditionally educated is often incongruent with what we seek to instruct. Teaching sustainability in an institutional context where sustainability is not supported unconsciously conveys to students that there is a wide gap between ideal and reality (Dale & Newman, 2005; Haigh, 2008; Kevany 2007). David Orr (2004), author of *Earth in Mind*, offers a poignant example of this phenomenon

when discussing what he considers the ridiculous act of teaching students about natural science *indoors*. Consequently, when we attempt to alter the current paradigm in the classroom, a range of symptoms of student discomfort is probable (Warburton, 2003). In sum, educators committed to making sustainability a functioning thread in their discipline should be prepared to encounter resistance inside and outside of the classroom (Everett, 2008).

Wals (2009) recently conducted a global progress review for the UN's decade of education for sustainable development (DESD). Among the key findings, the author found the most notable progress in national policy, particularly in documents addressing participation in ESD and integration into the curricula. Currently, ESD is most often evident in formal education, particularly primary and secondary; although, the reorientation of curriculum and innovations in teaching and learning for ESD remain in the earliest stages of fruition. Moreover, materials and resources for teaching ESD remain an area of opportunity. Likewise, there is also a need for professional development opportunities for teachers related to ESD. Further, though some progress has been made in vocational schools, preparing future industry professionals for sustainability remains a paramount priority. There is also a dire need for research and other development for which there are few, if any, funding opportunities devoted.

Pedagogical theory

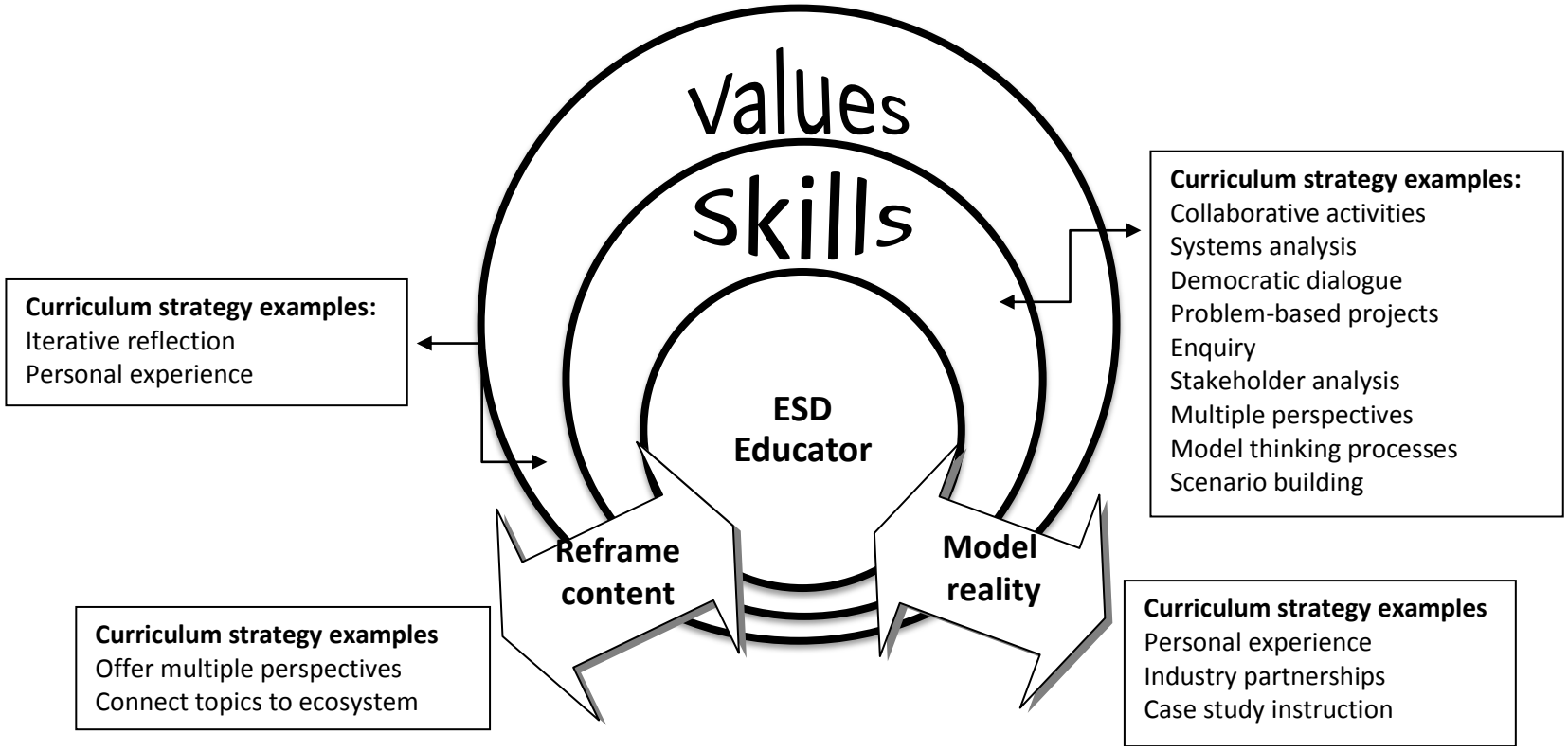
Orr (2004) posits that graduates today lack a value for land and community, something difficult to transmit through course content alone. Instead, altering *how* we teach, whatever we teach, *can* develop those values. Consistent with this philosophy, pedagogical theories associated with ESD emphasize the development of values supportive of sustainable development. Concepts such as deep learning (Warburton, 2003), problem-based learning (Dale & Newman, 2005), transformational learning (Kevany, 2007), experiential learning (Ellis & Weekes, 2008; Jucker, 2002; Sipos, Battisi, & Grimm, 2008), active learning (Ellis & Weekes, 2008; Svanström et al., 2008), action learning (Sipos et al., 2008), participatory learning (Jucker, 2002; Malhadas, 2003; Rode & Michelsen, 2008;), applied learning (Kevany, 2007) inquiry-based learning (Ellis & Weekes, 2008; Murray & Murray, 2007), critical pedagogy (Welsh & Murray, 2003), service learning, and critical

emancipatory pedagogy (Sipos et al., 2008) have all been included in pedagogical discussions about ESD. Further, many authors have associated ESD with interdisciplinary (Calder & Clugston, 2003; Bartlett & Chase, 2004; Dale & Newman, 2005; Everett, 2008; Rode & Michelsen, 2008; Malhadas, 2003; Sherren, 2008; Reid & Petocz, 2006, Wright, 2002), multidisciplinary educational experiences (Dale & Newman, 2005; Everett, 2008; Jucker, 2002; Malhadas, 2003). Jucker (2002) has even argued for a transdisciplinary approach (Sipos et al., 2008) for ESD where the principles of sustainability are adopted holistically by all disciplines. Indeed, authors conceptualize *how* to go about ESD in a variety of ways (Reid, 2002). But, all seem to connote some fundamental similarities: meaningful social interaction, personal reflection, real life problem-solving, and a broad view of knowledge. These pedagogical approaches are also undoubtedly underscored by their penchant for bringing the learner to terms with themselves and the world they live in, shifting attitudes and values. Practically speaking, a coordination of these pedagogies is likely necessary to design curriculum strategies and accomplish learning outcomes for ESD.

Learning outcomes and curriculum strategy

Like the pedagogical options for ESD, learning outcomes and curriculum strategies in the literature are expansive. In an effort to inform curriculum strategy in a practical way, they are organized here by primary themes: skills for sustainable development, values for sustainable development, reframing knowledge, reality modeling, and the ESD educator. Learning outcomes and their related curriculum strategies are discussed together under each theme. Figure 2-1 illustrates the relationship between these themes.

Figure 2-1 The ESD Framework



Skills for sustainable development

ESD should prepare students to foster a relationship with and participate in their local as well as global community (Egan, 2004) as well as prepare for gainful employment (UNESCO, 2005). Skills for both are associated with citizenship (rights) and stewardship (responsibility) (Kevany, 2007; Stables & Scott, 2002). The primary learning outcomes for citizenship and stewardship are a set of skills, which can be modeled by the student in the classroom and beyond. These skills include collaboration and cooperation, conflict resolution, creative, imaginative, and real-world problem-solving (Dale & Newman, 2005; Egan, 2004; Filho et al., 2009; Jucker, 2002; Svanström et al., 2008), future-mindedness (Rowe, 2000; UNESCO, 2005), knowledge transfer, meaningful communication and civic engagement, social sophistication (Eagan, Cook, & Joeres, 2002; Everett, 2008; Kelly & Fetherston, 2008; Kevany, 2007; Svanström et al., 2008), social action (ACPA, 2008; Haigh, 2008), negotiation (Kevany, 2007), interdisciplinary and transdisciplinary research skills, adaptive learning, contextualization of issues (Dale & Newman, 2005) , personal introspection (Schlottman, 2008), creating a vision and gaining buy-in (Egan, 2004), the ability to identify and adapt to change (Filho et al., 2009), systems thinking (Dale & Newman, 2005; McKeown, 2006; Filho et al., 2009; Herremans & Reid, 2002; Sipos et al., 2008), and values-focused thinking (Sipos et al., 2008; Keeney, 1992). Admittedly, learning outcomes for ESD emphasize process as much as facts-based learning (Dale & Newman, 2005).

According to ESD authors, the aforementioned pedagogical models should be used to create curriculum strategies related to course content that target the development of these skills. Common curriculum strategies for these skills include collaborative activities, systems thinking instruction, reflection (Schlottman, 2008; Warburton, 2003), multigenerational analysis (Haigh, 2008), democratic dialogue (Landorf et al., 2008), problem-based assignments, enquiry, action research (Warburton, 2003) stakeholder analysis (Collins & Kearins, 2007), role-play (Colucci-Gray, Camino, Barbiero, & Gray, 2006) modeling thought processes, offering multiple perspectives on topics, backcasting, and

scenario building (Dale & Newman, 2005). Following are a few examples of curriculum strategy for ESD that holistically address the development of these skills.

Herremans and Reid (2002) suggest a framework for student analysis; a sustainability triad encompassing economic, environmental, and social components. Using the triad, students develop a case study. For this experiment, a state park grappling with issues of *un*-sustainability was utilized. The park has a vested interest in ecological sustainability (environmental), but is host to many ranchers or visitors who use the space for recreation (social). A conflict exists between these two components of sustainability. Students are asked to position issues along three continuums: 1) self-interest – community interest, 2) only humans have value – all life (flora and fauna) has value, and 3) short-term vision – long-term vision. Within the overarching conflicts, students can perceive additional tensions such as, whether the social interests are advocated for the individual or the community, as community is an important component of sustainability. Throughout the activity, students begin to see causes of *un*-sustainability and embrace the complexity of creating viable solutions.

Colucci-Gray et al., (2006) extend this systems scenario analysis by adding role-playing and non-violent conflict resolution. Similar to Herreman and Reid's concept of holistic application, Colucci-Gray, et al. affirm that tensions exist where the three components of sustainability overlap. Students must learn to navigate these tensions, creating solutions through free expression and democratic discussion. The authors use the Ghandian principles of non-violence, where conflicts are resolved through discussion and creativity rather than fighting to achieve a win. A series of role-play situations were organized, placing groups of students in different roles in a controversial situation. This particular study focused on prawn production in aquaculture ponds, a program developed to provide a diet of high protein in addition to economic growth to those living in developing countries. The expansion of the prawn program has led to coastal damage to valuable ecosystems, leading to economic vulnerability. Groups of students conducted research according to their assigned roles in the situation, being transported in the classroom to the Indian state of Tamilnadu, where the community in upheaval must reach a solution. The students presented their cases from the perspective of their roles. Students

were required to model healthy dialogue, active listening, reflection of others' arguments, and then make decisions creatively by considering common needs.

Values for sustainable development

Also related to citizenship and stewardship are the values which underlie the *way* the above skills are developed. Murray and Murray (2007) stress that education must go beyond knowledge and skills to include the promotion of values that support sustainability, as there is a relationship between values and behavior. The ultimate learning outcome is thought and action that support sustainability. Values supportive of SD that are most frequently cited in the literature include care, respect, charity, social and economic justice, commitment, cooperation, compassion, self-determination, and self-reliance (Filho et al., 2009; Murray and Murray, 2007), self-restraint (Haigh, 2005), and empathy (Kevany, 2007; Haigh, 2008). The College Student Educators International (ACPA, 2008) describes a set of attributes that change agents should possess that may also be considered in the discussion of values, as the attributes are influenced by personal values: "resilient, optimistic, tenacious, committed, passionate, patient, emotionally intelligent, assertive, persuasive, empathetic, authentic, ethical, self-aware, competent, curious" (p. 1).

But, ESD is not about changing values as much as it is about articulating them; making them explicit. When values are made explicit by the student, they can be called out and challenged (Dale & Newman, 2005; Forum for the Future, 2005; Murray & Murray, 2007; Warburton, 2003). Similar to Orr's (2004) position on *how* we teach values, the author cautions that persuasive appeals to students about values supportive of SD are likely to be ineffective. Instead, iterative reflection and critical thinking should be used to encourage the development of authentic personal values (ACPA, 2008; Forum for the Future, 2005; Jucker, 2002; Orr, 2004). Arbuthnott (2009) adds that instruction should include topics focused on behavioral change, including feedback about behavior, specific ways to take alternative action, and incentives, rewards, and support for behavioral change.

Reframing knowledge

Stables and Scott (2002) warn that ESD should not be treated as a set of predictive truths and meanings to be adopted in the classroom, or worse, treated as a discipline itself.

According to the authors, the concept is left intentionally ambiguous and is best left reframed by the specific discipline (Haigh, 2005). This perspective better aligns with how educational programs are organized and administrated as well as how teachers are professionally developed (Stables & Scott, 2002). In a review of the literature regarding changes to the knowledge content in courses supportive of ESD, two major thought streams emerge to accomplish the learning outcome, holistic thinking. One is to infuse SD throughout the curriculum, the content reframed entirely to support SD; the second, is to create a sustainability lens, situated to precede traditional content. The former strategy describes a curriculum redesigned for breadth (Calder & Clugston, 2003), embodying multiple perspectives (Stables & Scott, 2002; Rode & Michelsen, 2008) as well as frequently demonstrating the connection between the discipline and the ecosystem, with an emphasis on interrelationships (Jucker, 2004; Stables & Scott, 2002). Inherent in this perspective is the embrace of interdisciplinarity or multidisciplinarity, which Bossellmann (2001) suggests is made more plausible when the curriculum is focused on problems, rather than subject matter. Indeed, no single discipline will be able to adequately educate for the multifarious issue of sustainability, defying disciplinary boundaries (Bossellmann, 2001).

General infusion of curriculum should emphasize the interrelationships between social, economic, and environmental aspects on local and global levels (Filho et al., 2009; Stables & Scott, 2002). The Forum for the Future (2005) refers to this as the "at the same time rule," where students learn to analyze social, economic, and environmental issues at the same time rather than perceiving each issue in a vacuum (p. 18). Content should also include instruction for sustainability literacy (Forum for the Future, 2005; Murray & Murray, 2007), cultural literacy (Everett, 2008), eco-literacy (Haigh, 2008; Jucker, 2002; Wright, 2002) as well as political, social, and historical literacy (Jucker, 2002), urban ecology (Calder & Clugston, 2003) and traditional ecological knowledge (Sipos et al., 2008). This may be achieved by analyzing course content for the purpose of identifying the critical linkages between the field and impacts on sustainability. By emphasizing literacy and interrelationships, students become more aware of the issues and the role their behavior and their field play in the impacts. They are also able to identify the underlying values that

drive those impacts and resolve tensions that exist between economic, social, and environmental priorities (Forum for the Future, 2005).

The latter thought stream has been suggested by McKeown (2006) who stresses that curricula can be altered to create a lens through which all course topics can be perceived. In other words, when curriculum strategy is in place for the development of skills and values, discipline specific content can then be filtered through the lens of citizenship and stewardship. Also, when students understand the guiding principles of sustainability, this framework can be used to perceive *all* content (Jucker, 2002; Svanström et al., 2008). It is certainly not a case of adding *more* content, but *reframing* it in a new light.

To this discussion, Bowers (2001) adds that educators must be aware and root out language, namely the taken-for-granted root metaphors that perpetuate unsustainable cultural patterns, in their delivery of subject matter. These root metaphors like anthropocentrism, progress, patriarchy, and individualism dominate disciplines and largely diminish the ability to identify and adopt new, more ecologically sound understanding. Crucial in this approach is helping students understand traditions, emphasized by the study of community and place and how ideas and practices are passed down -- some of which should not have been passed down. Strategies to accomplish this end include intergenerational emphases, understanding the principles of voluntary simplicity and ecological design as well as the study of cultural patterns.

Reality modeling

Clear in the discussion about *how* to integrate ESD is that curriculum should support thought and action about reality, a melding of formal and informal education, to aid students in problem solving (Forum for the Future, 2005; Hopkinson, Hughes, & Layer, 2008). Curriculum strategies for this alteration include the use of language for and inclusion of personal experience (Howard, 2008; Rode & Michelsen, 2008; Warburton, 2003 Camill, 2002; Hulbert, Schaefer, Wacey, & Wheeler,1997; Jucker, 2004; Welsh & Murray, 2003), involvement of local and global industry partners (Forum for the Future, 2005; Welsh & Murray, 2003), case study instruction (Camill, 2002) campus participation as a practice community (Everett, 2008; Hopkinson et al., 2008; Calder & Clugston, 2003; Svanström et al., 2008), and contact with nature (Jucker, 2004; Orr, 2004). Focusing on

reality acknowledges that we are the problem and empowers students to direct their own learning, understand the impact of their lifestyle, and know how to take practical action to support sustainability (Filho et al., 2009; Jucker, 2002; Jucker 2004; Rode & Michelsen, 2008; Svanström et al., 2008). Following are several examples of how educators have married course content with reality.

Lessor, Reeves, and Andrade (1997) created an interdisciplinary field course emphasizing the interrelationship between biological and social science. Students from varying disciplines spent a semester traveling in Costa Rica, gaining in-class instruction of basic theories and concepts, then conducting on-site experiments and research. Research was shared and discussed in groups, and collaboration was utilized to prepare research assignments. Students lived with native families, allowing them to hone their Spanish and absorb the culture. Systematic discovery was used when students went to the field, a real situation in which they could apply learned theories and concepts. Investigations were conducted from ecological, sociological, political, and economical angles, completing multiple assignments from different perspectives. One project took students to a rural area of the region where several women had created a business to grow medicinal plants. Among the group of women issues of poverty, financial indebtedness, land ownership, soil contamination from a nearby banana plantation's pesticide use, and gender-based economics offered students ample material for working through the challenges to sustainability.

The Biosphere II was an enormous glass-enclosed environment built during 1984 and 1991 in Oracle, Arizona. The glass building was sealed off from the outside environment, and inside, an atmosphere was created complete with ecosystems and conditions such as rain forest, ocean, desert, and agriculture. The experiment placed eight adults in the Biosphere II to determine what conditions were necessary for sustaining life. The author used the example of the Biosphere II experiment to teach students how to determine an ecological footprint of those living in the experiment as well as their own. Students compiled a list of conditions that would be necessary to sustain the lives of its occupants as well as the environment they depended on. Then, Camill (2002) had students track their own consumption patterns. Finally, a class discussion was held to draw

connections between those living in the Biosphere II and the students' own lifestyles. Students were forced to articulate what aspects of their lifestyles contribute most to their own footprint.

Welsh and Murray (2003) designed a class called the Ecollaborative. The class combined students from industrial design, environmental studies, and business to design or re-design a product for a corporate client. Set in a studio environment, students learned sustainable solutions to discipline-specific problems, while developing an appreciation for other disciplines and the inner-workings of a professional work environment modeled in the experience.

One of the most radical models of sustainability education is found in the teaching of Morris Mitchell at the Putney Graduate School of Teacher Education during 1950-1964 (Rodgers, 2006). Mitchell primarily focused his teachings on social justice, but there was a dominant thread tied to protecting the environment as well. Classes, by design, were comprised of a diverse mix of sex and race, rural and urban, high- and low-income students. The program presented contemporary social issues and then subsequently, planted students amidst them, commanding accountability for their own learning through various required activities. The civil rights movement offered students an ample foray of social problems that needed solving. Seminar style programs were used to cover urban, environmental, and civil rights issues of that time. These seminars were supplemented with trips, short and long, that placed students in the middle of current issues. For example, shortly after the Supreme Court ruled in *Brown v. Board of Education,* a group of Mitchell's students loaded into a van and headed south to see how the decision was impacting those communities. Study tours were also organized to visit communities perplexed by social issues or to visit the Highlander Research Center, the organization responsible for creating Citizenship Schools where students, particularly blacks, could learn to read in order to, one day, vote. Students not only came to grips with themselves at their destinations, but in the experiences interacting as a group along the way. Apprenticeships in the community also played a vital role in student development, placing students in progressive or non-traditional schools, social agencies, and other places where social change could be felt through education.

The ESD educator

It is evident across the literature that curriculum transformation for ESD is not complete without the educator themselves committing to a new paradigm. This point is less about strategy and more a cautionary tale. Themes that emanate from the literature indicate that the ESD educator is a facilitator, collaborator, and fellow learner on the journey toward sustainability, student in tow. The ESD educator is more prone to allow the student to direct their own learning and guide course content, although this should not necessarily indicate relinquished control or authority. Additionally, the ESD educator must practice what they preach, encouraging values development by example, a position more compelling to the student (Jucker, 2002; Jucker, 2004; Kevany, 2007; Mulder, 2009; Wals & Jickling, 2002; Welsh & Murray, 2003).

Scott (2009) clarifies that the effectiveness of ESD in schools can only be measured by what learners learn, rather than what they evidence partisan support for. Meaning, educators would be wise to focus their efforts on *ESD as learning*, rather than *ESD as an indoctrination* of canned behaviors. For example, fostering the ability to think and solve complex problems should trump the promotion of recycling. Mulder (2009) agrees and submits that this may very well require professors, whose research roles demand clearly supported arguments, to develop new competences that encourage students to make build their own contentions, honing their ability for discernment in the learning process.

Assessment

Admittedly, the development of assessment methods for the aforementioned expansive, obviously experiential, inventory of learning outcomes for ESD is a major area of opportunity (Forum for the Future, 2005; Rode & Michelsen, 2008; Svanström et al., 2008; Venkataraman, 2008). UNESCO (2005) makes audible the need for assessments that not only look at knowledge competencies but skills, perceptions, behaviors, and values. The organization dissuades a priority of standardized testing, and invites methods that speak to a holistic view of a quality of education. Thus, the ESD literature confirms a propensity for authentic assessments. In a review of assessment methods used in case studies implementing a sustainable teaching methodology, current methods being used were iterative instructor-student assessment (Landorf et al., 2008), reflective surveys, peer

review (Eagan, et al., 2002), reflective portfolios (Kelly & Fetherston, 2008), reflective journals (Gulwadi, 2009), cognitive maps (Lourdel, Gondra, Laforest, Debray, & Broadhag, 2007; Segalàs, Ferrer-Balas, & Mulder, 2008), in-depth interviews (Ellis & Weekes, 2008; de Eyto, Mahon, Hadfield, & Hutchings, 2008), exams and discussions (Cervantes, 2007), and pre-post tests (Segalàs et al., 2008). In the case of the Putney Graduate School of Teacher Education, no grades were given. Instead, students left with a collective file of autobiographies, short- and long- range plans, seminar papers, and reflective journals.

Most recently, Rode & Michelsen (2008) published a set of indicators for ESD citing the need to assess changes in attitude and motivation, understanding of the principles of sustainable development, skills and competencies, and overall performance enhancement. The authors suggest using standardized methods to gauge attitude and motivation, while using student feedback and mutual observation of classroom practice to assess the other indicators. It should be noted however, with this exception, that quantitative, standardized methods of assessment are conspicuously absent from the ESD literature. But, Rode & Michelsen (2008) argue that, ideally, the addition of quantitative measurement coupled with qualitative assessment should be the goal. Nevertheless, what is pronounced in this discussion is that *what* we define and measure as excellence in education will be redefined in the transition to ESD (Jucker, 2002).

To there from here?

Clear in the preceding outline of the ESD proposition is a requirement for transformational changes to the explicit as well as the implicit curriculum. It will be largely impossible to make strategic changes to a curriculum's content without addressing to a significant degree how the curriculum will be implemented and under what conditions (Haigh, 2005; Forum for the Future, 2005; Jucker, 2002), for which the willingness and malleability of faculty is a chief factor (de le Harpe & Thomas, 2009). It will be equally implausible without also contemplating the influence of organizational and cultural institutions in which that curriculum resides. This will likely require academicians to widen their scope beyond their specialization to find more universal educational solutions (Bosselmann, 2001; Jucker, 2002).

Gough and Scott (2001) make clear that on the topic of curriculum development for SD, the process will more likely be learned along the journey, rather than prescribed and acted upon, with a clear vision of the target. The journey to a superior curriculum is one in which, inside the local context, the management and interaction of organizational institutions, cultural institutions, practice, and literacy priorities are openly contemplated to expose the methods by which they constrain educational change. The importance of action taken in the local context, responsive to the region and culture, cannot be underestimated (Gough & Scott, 2001; Hopkins & McKeown, 2005; UNESCO, 2005). Wals (2009) adds that taking that action prior to the development of policy is prudent, as practice is often the antecedent to new policy.

In the current study, it is argued that the ESD framework may provide a way forward for the AT curriculum. But, Stables and Scott (2002) debate the use of frameworks for the purpose of integrating sustainability into disciplines, as they often convey a superficial monolith about what SD means:

> [Frameworks] . . . are useful in helping teachers and others to think through what amounts to the reinterpretation of their disciplines in light of a sustainable development agenda. Here, a teacher development priority must be the generation of means whereby teachers can begin to engage with ideas which will very likely lie beyond their experiences of working within their disciplines (p. 59).

The authors contend that it is unlikely that teachers would engage with frameworks from outside their discipline, unless gripped by an uncommon motivation. This provides a powerful argument for the current study. Indeed, if one were to demonstrate how ESD ideas may be integrated into the AT discipline, the purpose of this study, an important start will have been made for problematizing SD in AT education. Next, ESD will be compared to progressive education, which is underpinned by a constructivist epistemology. This discussion will guide practical action for ESD in the classroom.

ESD, John Dewey, & Constructivism Walk into a Bar . . . The Progressive Era of Education 2.0?

Historically, there have been three primary focal points in curriculum: subject-centered, society-centered, and individual-centered. Traditionalists in education advocate

for a subject-centered curriculum in which the subject matter largely dictates its content. Central in this approach is efficiency, subject mastery, and a view of students as future subject experts. It is fair to say that this view, with few exceptions, has dominated the American educational system. But, this preoccupation in education was called into question after the 1929 stock market crash and the subsequent economic crises. The Progressive Era of education emerged with a new paradigm for curriculum, with democracy as its tradition. Non-traditional proponents of both society-centered and individual-centered curricula camps, a tenuous marriage, advocated for greater influence in education for improving overall quality of life and a healthy democracy. As such, the individual's needs and society's needs trumped subject matter. Chiefly, the movement emphasized concern for personal health and community life, pedagogy that embraced the findings from emerging psychological and social science studies of the time, and greater individualization in the curriculum, responsive to the burgeoning variety of types and classes of students (Ellis, Cogan, & Howey, 1986; Marsh & Willis, 2007; Pinar, Reynolds, Slattery, & Taubman, 1995). Sound familiar?

Championing the Progressive Era was John Dewey, who was actually an individual-centered curriculum enthusiast; although he did invite both a greater inclusion of all three focal points as well as balance among them (Marsh & Willis, 2007). Dewey recognized a distinct shift in societal progress at the turn of the twentieth century. Advancements in industry had catapulted society on many levels, inspiring what Dewey felt was an undue emphasis on manual training in education. He was increasingly uncomfortable with industrialization as the mark of social progress and the influence it was having on educational priorities. Accordingly, this signaled a need for education to better serve social progress, progress marked by quality of life. He largely felt that education should model democratic society, reflective of the world in which students actually lived. Dewey called out superfluous activities in education which, in isolation, offered the learner an unrealistic environment that was not entirely useful to the learner's real life experiences. In sum, the subject matter at hand, the needs of the society, and the personal growth of the individual should rather be brought into concert in the classroom (Dewey, 1913).

Accordingly, the tenets of progressive education included individual- and activity-centered curriculum emphasizing problem solving that was guided, not directed, by a teacher as well as the student's own self-discipline. At its center was real world problem-solving. Education was perceived *as* life itself, rather than an anticipation of it. A highly interactive and cooperative learning environment with an open exchange of ideas characterized the classroom, as would any democracy. Unsurprisingly, the social sciences curriculum dominated with a particularly interdisciplinary flare. Admittedly, this type of learning environment commands a high level of patience, ingenuity, and aptitude of teachers compared to other pedagogies (Ellis et al., 1986).

The progressive era thrived chiefly in the 1930's, advocating for democracy and social reform as well as a greater focus on the individual. Dewey was joined by George Counts, united in their advocacy for the preservation of democracy, though the difference in their platforms largely led to the demise of the movement. Though both authors agreed on many points, they sharply departed in method, the argument revolving around indoctrination. Counts criticized Dewey's individual-centered approach as too weak to adequately portray a vision of democracy for which student *should be pressed to adopt* during their education. This social reconstructionist slant received nervous criticism from the movement about its seeming Marxist or communist influence. Dewey, on the other hand, did not agree with Counts' contention that education should stimulate social change as much as it should foster understanding, values, and capacities among students that could ignite a passion to partake in such change (Pinar et al., 1995).

The movement eventually retreated on this division, but not before the Eight-Year Study and a reemergence in the 1960's during the Reconceptualization (Pinar et al., 1995). The Eight-Year Study was a comprehensive experiment in progressive education in secondary schools. A partnership with over 300 universities to waive entrance requirements for college entrance supported the experiment that followed students of nearly 30 secondary schools through high school and into colleges. Progressive curricula like that described by Dewey was carefully planned and implemented. The major findings of the study discovered that students of these schools were far from disadvantaged when it came to college entrance requirements. The study also demonstrated that students fared

better both academically in college as well as in life in general (Marsh & Willis, 2007; Pinar et al., 1995). Most importantly, the students of lower socio-economic status were among those with high achievements. Notably, the study was an exciting venture for teachers who derived great pleasure from teaching in progressive environments (Pinar et al., 1995). The findings of the study were short-lived and soon gathered dust in the face of World War II and then the Soviet launch of Sputnik satellite into space in 1957. These developments spurred the return of subject-centered curriculum, chiefly that of science and technology (Marsh & Willis, 2007; Pinar et al., 1995). The tenets of progressive education would be revisited in the 1960's in which the bureaucracy and subject-centered nature of education once again came under fire during the civil rights movement and opposition to the Vietnam War (Pinar et al., 1995).

Arguably, the déjà vu one experiences while recounting the current financial crises and the subsequent criticism of the economic nature of education today and demand for reorientation by ESD proponents against the backdrop of the Progressive Era following the stock market crash is uncanny. The ESD movement could easily be characterized as another chapter in the Progressive Era of education. A central philosophy to both movements is a healthy democracy. Likewise, both bristle at the industrial model of education. Both favor decentralization and greater responsiveness to local and cultural contexts. Pedagogically, both take an education-as-life approach to school, preparing the learner for a quality life in the community, at home, and at work. Both have taken a process over product approach to education, emphasizing the *how* as much as the *what*. Other commonalities include multiple perspectives, cooperation, interdisciplinarity, and real world problem-solving over subject mastery. And, both share the belief that the teacher is a facilitator and advisor, more than the authority, of the self-directed student. It could be argued that ESD even extends some of the Progressive Era's ideas with concepts related to sustainable development, like systems thinking and future-mindedness. Since the two movements evidence great kinship, the pedagogical predilections of ESD may be better understood by exploring the constructivist underpinnings of progressive education. Understanding these epistemological roots may better inform practical implementation of ESD.

Constructivism: An epistemology for ESD

> "The path of least resistance and least trouble is a mental rut already made. It requires troublesome work to undertake the alteration of old beliefs" (John Dewey, *How We Think*).

Many pedagogical theories have been associated with ESD, most of which, it could be easily argued are indicative of a revival of progressive education, embodying a constructivist epistemology. These theories, discussed earlier in this chapter, are characterized by high levels of learner engagement (active, applied, problem-based, inquiry-based, service & experiential learning), social interaction (interdisciplinary, multidisciplinary, & participatory learning), and most importantly, a metamorphosis of the learner's beliefs (deep learning, transformational learning, emancipatory & critical pedagogy). As such, constructivism, a supposition about the nature of knowledge and how individuals arrive at that knowledge (Simpson, 2002), has shaped the current study significantly.

It is small wonder that John Dewey is often associated with constructivist pedagogy. Countering traditional education, marked by passive absorption of knowledge, he advocated a new pedagogical approach in which the child could actively work out his own interests with careful direction from a teacher. The classroom would mimic both nature and society, offering the learner *real* experiences, from which knowledge could be gleaned that would prove useful inside and outside the school. A classroom environment characteristic of Dewey's pedagogical recommendations is both active and interactive. Learners are allowed to pursue their curiosities, acting on their environment with a teacher's guidance, learning the conditions and constraints involved in certain activities, like cooking. Learners are permitted to explore their interests, using a variety of mediums. Students are also encouraged to dialogue with others about what they are learning, important to honing language and other social skills. Interaction with peers acts as an antecedent to social feedback, a powerful mechanism for learning (Dewey, 1913).

It is no accident that the popularity of constructivism followed the Progressive Era of education in the 1960's, as constructivist teaching methodologies are a signature of that movement (Terhart, 2003). Constructivism emerged in the 1970's and was popularized in

education in 1980's and 1990's (Liu & Mathews, 2005). In the 1950's and 1960's a behavioral paradigm persisted, an idea that complex learning could be reduced to a stimulus-response function in the learning environment. In the 1960's and 1970's, behavioral ideas about learning gave way to cognitive theories that emphasized the learner's internalization of their experience in the environment (Tobias, 2009). Extending both behavioral and cognitive learning theories, constructivism includes contextual issues, like social interaction as well as previous knowledge and experience, in the construction of knowledge, underscored by social cognitive theory. It is predicated on the presumption of "situated cognition," the idea that knowledge does not reside only in the mind, but is situated in the context of an individual's past experience, beliefs, and values, their cognitive process, and their environment (Schunk, 2008, p. 289).

The popularity of constructivism in the educational milieu has been largely driven by a growing awareness of the unintended consequences of didactic methods of teaching (Schwartz, Lindgren, & Lewis, 2009). Chiefly, there is inherently less risk and uncertainty involved in direct instruction, which may abate the use of higher order thinking skills of learners. Similarly, as the learner's suppositions are rarely called out in direct instruction, acute misconceptions may go undetected (Confrey, 1990). There is also a need for the learner to have enough previous knowledge to learn in a direct instruction situation, which may be debatable in some situations. Direct instruction's penchant for control has been opposed by constructivists who emphasize self-determination (Schwartz, Lindren, & Lewis, 2009). In a constructivist setting, learning is not uniform, but unique to each individual. The responsibility for learning is thus placed on the learner (Fosnot, 1996). The core assumption of constructivism is that the learner actively creates their own knowledge, versus acquiring it, and truth is an evolving premise (Confrey, 1990; Fox, 2001; Schunk, 2008; Simpson, 2002). Consequently, the learner leaves the educational experience with a deeper understanding and thus is in a better position to generalize what has been learned to new and different situations (Fosnot, 1996; Pressley, Harris, & Marks, 1992; Schwartz, Lindgren, & Lewis, 2009; Tobias, 2009).

There are innumerable theoretical positions which underpin constructivism (Bickhard, 1997; Geelan, 1997; Phillips, 1995). One especially comprehensive illustration is

that of Phillips' (1995) work in which three continuums are suggested along which constructivist authors can be found: 1) individual psychology versus public discipline, 2) humans the creators versus nature the instructor, and 3) organic versus deliberate construction. On the first continuum, contributions are chiefly made by Jean Piaget (cognitive development theory, late 19th century) and Lev Vygotsky (socio-cultural development theory, late 19th century), both authors with their own theories about how humans go about constructing knowledge, by themselves or in their environment. This continuum is one of the most popular debated in the literature (Cobb, 1996; Geelan, 1997), although Noddings (1990) suggests that it is not the debate over one or the other having primacy that is most compelling, but the discernment of their reciprocity. On the second continuum, positions range from whether the constructed knowledge is really actively constructed or passively discovered. Ernst Von Glasersfeld (radical constructivism, early 20th century) who was significantly influenced by Jean Piaget is a proponent for the former, while John Locke (theory of the mind, liberalism, 17th century) finds a place on the latter end, with Karl Popper (critical rationalism, early 20th century) positioned in the reflective of human propositions and nature's constraints to them. Phillips (1995) submits that though most "true blue" constructivists are actually dispersed widely across this particular continuum with more authors than not on the discovery end (p. 7). On the third continuum, Locke is a proponent of the organic nature of the discovery of knowledge, while Piaget and Von Glasersfeld theories both connote high levels of activity. John Dewey (pragmatism, progressive education, child-centered curriculum, mid-1800s) and William James (pragmatic theory of truth) also championed active construction of knowledge. With the exception of Locke whose work began in the 17th century and Glasersfeld and Popper who began work in the 20th century, the other authors rose to prominence in the mid to late 19th century and early 20th century, their ideas not fully embraced in educational contexts until the late 20th century. Notably, however, it is the work of Piaget and Vygotsky that are the two most cited authors associated with constructivism.

Geelan (1997) submits that debate among these is futile as most of them share on more points than they find divergence. Subsequently, as the dissection of the many theoretical underpinnings of constructivism is beyond the ambit of this study's purpose,

the researcher has chosen to instead focus on three common perspectives of constructivism, most closely akin to Phillips' (1995) first continuum, individual psychology versus public discipline, and the contributions of key theorists to those perspectives. The following perspectives are considerably instructive in regards to the learning process and implications for educational practice.

Constructivism: A continuum of perspectives

As identified earlier, constructivism is best described as a continuum, evidencing several perspectives: exogenous, endogenous, and dialectical. Moshman (1982) describes these three positions in terms of root metaphor, pointing to where the knowledge is constructed: organism (endogenous or an internal construction), mechanism (exogenous or an external construction), and contextual (dialectical or an interaction between the organism and mechanism).

Endogenous constructivism

Endogenous constructivism emphasizes internal cognitive processes. The construction of knowledge is, therefore, dependent on previously developed mental structures and is not necessarily shaped by the environment itself, but by what has been learned in the individual's experience in the environment (Moshman, 1982; Piaget, 1970; Phillips, 1995; Schunk, 2008). This perspective has been shaped by Jean Piaget's theory of cognitive development, which pre-dates that of the previously mentioned information-processing theories (Tuckman, 1992). Piaget, born in the late 1800's, was trained in both biology and philosophy, but it was his fascination with psychology, primarily his interest in how learners develop intelligence, for which he is today most known (Tuckman, 1992). Piaget believed that knowledge is constructed using cognitive structures, meaning, new knowledge is constructed using cognitive structures previously developed, with little or no assistance from the environment (Brooks & Brooks, 1999; Moshman, 1982). This development is constrained by both genetics as well as structure in the environment, the structure of their experience. Knowledge creation is, therefore, closely associated to actions and operations taken by the individual in the situations encountered (Piaget, 1970). Piaget (1970) was critical of learning theories that reduced learning to a copy of the environment,

positing that human thought goes above and beyond the reality in which it resides. In sum, "learning is no more than a sector of cognitive development, which is facilitated or accelerated by experience" (p. 714).

Central to Piaget's theory was the development of schemata, the conduit of which are assimilation and accommodation, two poles toggled between during the process of adaptation to constraints experienced in the environment (Piaget, 1970). In short, humans encounter situations in their environment that cause them to construct contradictions to what they do and think, throwing them off balance (Fosnot, 1996). To these contradictions, they may assimilate by using previously developed schemata to handle a problem for which they are already familiar or accommodate by creating new schemata to handle new and unfamiliar situations (Piaget, 1970; Phillips, 1969; Tuckman, 1992). Humans seek to maintain equilibrium between assimilation and accommodation as well as themselves and their environment, a function of self-regulation, a means of survival. This compulsion to maintain balance, termed by Piaget (1970) equilibration, is reconciled in unpredictable, non-linear ways. But, this process, in fact, is what keeps humans well poised for continual development. Fosnot (1996) explains:

> Equilibration is not a sequential process of assimilation, then conflict, then accommodation. Instead it is a dynamic 'dance' of progressive equilibria, adaptation and organization, growth and change. As we assert ourselves and our logical constructs on new experience and information, we exhibit one pole of behavior; our reflective, integrative, accommodative nature is the other pole. These two poles provide a dynamic interplay that by its own intrinsic, self-organizing nature serves to keep the system in an open, flexible, growth-producing state (p. 14).

In sum, disequilibrium is a chief motivator for the development of breadth and complexity of schemata, what Piaget defines as intelligence (Brooks & Brooks, 1999; Piaget, 1970; Phillips, 1969; Tuckman, 1992), termed genetic epistemology (Piaget, 1970). Taken from the world of biology and the relationship between species and the environment, the author posits that the knowledge constructed by humans is substantiated through their interaction with the constraints of the world about them. Meaning, knowledge constructed by humans is not a representation of reality, but a configuration of mental processes and actions (schemata), which have proven viable in their experience (von Glasersfeld, 1996).

Notably, though few educators would deny their hope that students leave their constructivist classrooms with conceivably more viable conceptions, students may very well accommodate instead by escaping the contradiction altogether, holding tightly instead to their preconceived notions, or they may teeter between a dichotomy and apply the old and new constructions to different situations (Fosnot, 1996).

What this perspective implies for the learning environment is that it is a highly active one in which learners are able to explore and experiment through a variety of activities that motivate them to assimilate and accommodate (Piaget, 1970; Tuckman, 1992; Wadsworth, 1978). As Piaget had a penchant for classification and categorization, learning activities reflecting his theory are thought to feature those that require some type of organization (Piaget, 1970; Tuckman, 1992). The teacher is there to guide the discovery the learner makes, allowing them to invent the knowledge on their own (Piaget, 1970; Pressley et al., 1992; Wadworth, 1978). Piaget (1970) argued that teachers must not interject outcomes to the learner before they are able to invent on their own. Rather than explicitly teaching, the teacher's role is to create an environment suitable for such discoveries, one rich in dimension that entices the learner to inquire and explore, using previous knowledge to discover the new. The classroom is active with problem-solving experiments, rather than one dominated by instruction (Pressley, 1992; Tuckman, 1992; Wadsworth, 1978). Lastly, depending on the type of knowledge being learned, peer interaction may also be fundamental, an important mechanism for moving the child away from egocentrism (Wadsworth, 1978).

Exogenous constructivism

Exogenous constructivism emphasizes the influence of the external world on the construction of knowledge, such as instruction, experience, and the use of models in the learning environment (Moshman, 1982; Phillips, 1995; Schunk, 2008). In this light, the construction of knowledge is guided by the structure provided in the environment (Moshman, 1982), so resulting knowledge mirrors an external reality (Moshman, 1982; Schunk, 2008). Ultimately, the learner continuously adapts to, not copies, the structure in the environment for which the path of this accommodation is largely unpredictable as each individual adapts responsively to their own contextual issues.

This perspective has been primarily influenced by Albert Bandura's social cognitive theory and information-processing theories (Moshman, 1982; Schunk, 2008). Born in the early 1900's, Bandura was trained as a clinical psychologist. His work on socialization and learning became prominent in the 1960's and 1970's, his work in later years centering more on health psychology. He was primarily interested by what influenced social behavior. Of significant influence was his colleague Robert Sears whose work sought to extend Freud's psychoanalytic work on the development of personality with that of stimulus-response. Sears studied the function of imitation in learning, but lacked an articulation of the mechanism, and largely overlooked the importance of observation. Bandura departed Sears on the notion of conditioning and instead focused on information processing, specifically preoccupied with the interrelationships between social experience and personal thought processes contributing to behavior. He sought to extend learning theories of his time, going beyond studies that used only limited numbers of learning principles and single-person experiments, to explain the missing mechanisms in Sears' theory, answering questions about *how* individuals go about internalizing values, attitudes, and behaviors in their social culture. He sought to explain the ways in which people attempt to control events in their lives with their thoughts and actions (Bandura, 1977; Grusec, 1992).

The theory has several assumptions. One, interactions between the learner's cognition and other personal factors (like biology, self-efficacy, or self-regulation), their environment, and their behavior are reciprocal, termed triadic reciprocal determinism or reciprocal causation (Bandura, 1977; Bandura, 1989; Grusec, 1992; Schunk, 1991). This concept sees "social factors as influencing *and* being influenced by personal and behavioral determinants" (Tudge, 1993, p. 69), a bidirectional interaction (Bandura, 1977; Bandura, 1989). At times during learning, the social environment is especially impressionistic, while at others, the learner's personal processes take the lead. Ultimately, the person and the environment are determined by each other. The conduit in this symbiotic relationship is cognition and other mediating factors, like the ability to mentally transform input by forming representations and organizing information into useful schemes, then using that to

form the next action (Bandura, 1977; Bandura, 1989; Tudge, 1993; Schunk, 1991). Grusec (1992) explains:

> Individuals are believed to abstract and integrate information that is encountered in a variety of social experiences, such as exposure to models, verbal discussions, and discipline encounters. Through this abstraction and integration, they mentally represent their environments and themselves in terms of certain crucial classes of cognitions that include response-outcome expectancies, perceptions of self-efficacy, and standards for evaluative self-reactions. These cognitions are believed to affect not only how they respond to environmental stimuli but also the sorts of environments they seek out for themselves (p. 781).

For example, in a personal-on-behavior reciprocal causation, the nature of human's thought processes, beliefs, feelings, goals, and intentions as well as biological factors like their physicality or neural systems mediate how a person will behave. Conversely, behavior may also function to modify a person's thoughts, beliefs, etc. Likewise, in an environment-on-personal reciprocal causation, a human's beliefs, thoughts, feelings, etc. may be transformed by the social influences that transmit information through modeling, instruction, and persuasion. Conversely, when a person's physical demeanor or behavior communicates a role or status, for example, this may stimulate reactions from the social world. Another type of reciprocal causation is that of behavior-on-environment, in which the human takes some action, thereby altering the posture of the environment. Conversely, until the environment is acted upon by the individual, only then does it commence to meaningfully influence the individual. In this light, humans may also seek out or create their own environments based on their predilections. In turn, the environments sought out or created will constrain what is developmentally and behaviorally possible. In sum, there is nothing concrete about human development (Bandura, 1977; Bandura, 1989).

Clear in Bandura's theory is that the social environment is, at the very least, the ignition switch; specifically, its modeling processes are highly influential (Bandura, 1977). But, whether information is learned through observation or through taking action yielding feedback does not entirely insure learning. A number of other factors mediate learning, such as developmental status, the perceived authority and competence of models by the learner, consequences of the models, what the learner's outcome expectations are, their goals, and their self-efficacy (Schunk, 1992). Piaget's preoccupation with clearly defined

stages of cognitive development was passed up by Bandura for the study of cognitive capabilities that change over time with both maturity and experience. These cognitive abilities include attention, memory or retention, motor reproductions (transforming conceptions into action), an ability to regulate between observed action and consequences and those experienced, and reasoning skills in which rules are developed internally that guide behavior. Where Piaget perceived cognitive conflict to be the primary mechanism for learning, Bandura includes maturation, experience, and chiefly, the contribution of models in the social environment (Bandura, 1989; Grusec, 1992; Tudge, 1993).

Motivation processes are also highly influential to learning. Motivation may take the form of directly observed costs or benefits to certain behavior, be vicariously observed through others' experiences, or be a product of their own personal standards of conduct (Bandura, 1989). Bandura was particularly interested in self-efficacy and self-regulation, as they often mediate cognitive processes as well as their social experiences. Self-efficacy is the idea that people develop beliefs about their abilities in particular domains, like math, which largely influence the types of things they attempt to accomplish and the effort they apply to certain activities. It is thought to be a cardinal mediator of human activity. Self-regulation is, in short, self control, for which individuals are able to exert some control over their thoughts, feelings, and behavior, directing their behavior to standards they set for themselves (Bandura, 1989; Grusec, 1992).

A second assumption of Bandura's theory is that learning may occur enactively or vicariously, meaning, learning may occur through performing behaviors or through observing models, which can be live or take the form of text or audiovisuals. Enactive learning allows the learner to perform, then receive feedback, learning from the consequences of their behavior. Consequences become a source of information as well as motivation. Vicarious learning, on the other hand, takes place in the absence of personal performance, for example, watching a film or listening to the radio. These models convey both thinking and behavioral information about a wide variety of experiences, some that may be outside the learner's possible range of experience. This information serves a similar function, allowing the learner to understand what is possible in the range of behavior and

thinking as well as possibly avoid potential negative consequences of certain behaviors (Bandura, 1977; Bandura, 1989; Schunk, 1991).

In other words, Bandura opened the possibility of observational learning in which the learner did not have to act on her environment in order to receive feedback or experience consequences leading to new learning and modified behavior. Instead, observational learning through various types of modeling could be used, saving the learner from having to experience consequences firsthand, a far more powerful mechanism of learning (Bandura, 1989; Grusec, 1992). Bandura did not believe that this was a passive process of mindless imitation of models, but a cognitive process that comes alive during observation (Bandura, 1989; Tudge, 1993). It is especially this aspect of Bandura's theory that has contributed to an exogenous perspective of constructivism, emphasizing the social influences in the learning process.

A third assumption is that learning and performance are not the same. It is possible for an individual to learn some piece of information, but not demonstrate that learning through a performance at the time of learning. Sometimes the environment takes the lead, sometimes the internal factors of the individual take the lead. More often, the environment, the personal factors and their performances are interactive in a learning situation. In sum, learning and performance do not have a linear relationship in that one comes before the other (Schunk, 1991). Also, behaviors are not necessarily evident when learning occurs; this may happen sometime later (Schunk, 1991).

To summarize, Bandura was most concerned with cognitive influences on behavior. And, though Bandura's feedback loops like reinforcement, reasoning, and punishment were considerations in his theory, his central focus was on that of modeling. Grusec (1992) summarizes: "[Bandura]'s descriptions of how human beings select and transform information and how they generate rules to guide their own behavior was a major achievement in understanding social developmental processes" (p. 784).

Lastly, information processing theories have also made contributions to an exogenous view of constructivism, for their concern with the intervening variables of the internal processes between stimulus from the environment and the generation of a response. There are many, many information processing models that presume to explain

the course in which humans process information in a variety of different domains. Some of these models relate to learning. However, across a diverse collection of models, some common conjectures are found. One is that humans are a lot like computers in that they receive information, commit it to memory, and retrieve it as needed. Some theorists differ on the degree to which a computer is an ideal metaphor. Secondly, processing of information occurs in stages, couched in between receiving information and generating a response as a result of it. These stages contrast qualitatively. Third is that no cognitive activities (such as perceiving, remembering, or imaging) are safe from the process. Learning theories of information processing center on cognitive functions such as sensory reception, encoding, and memory (Schunk, 1991). Most theories set forth some idea about a sequence of processes the individual experiences on their way to a response, after being introduced with new information. Though these theories have been associated with constructivism, the sum of this discussion will evidence that the idea of discerning a predictive sequence of internal processes may be counterintuitive to the epistemology.

What an exogenous perspective implies for the learning environment is that considerable modeling and explanation by the teacher are more common. The learner does not duplicate these models or explanations, but adapts to them using their own context, a deeper understanding that is given a personal slant. Nevertheless, the role of the teacher and her expert strategies impact the learner greatly (Pressley et al., 1992). Bandura (1989) advocated for highly knowledgeable and efficacious teachers who are able to motivate while also developing important cognitive abilities of students. He also championed individualized instruction responsive to students' developmental needs. Additionally, Bandura sought to dissuade environments in which students might be encouraged to rank themselves alongside other students, rather than holding themselves to their own personal standards. He highly guarded motivational factors like self-efficacy and its impact on a student's future activities. Though Bandura was far less preoccupied with whether models should be experts or peers, he does distinguish that as learners get older, the role of an expert model is more and more influential, as domains of interest becomes more specialized (Bandura, 1989).

To summarize so far, an endogenous perspective of constructivism seeks to explain cognition, the learning environment considered a place for discovery thought fundamental to developing cognitive structures to aid future learning; while an exogenous perspective seeks to explain behavior, the learning environment considered to emphasize the use of impressionistic models that the learner may adapt to and make their own.

Dialectical constructivism

Dialectical constructivism, on the other hand, is positioned in the middle between these two polar perspectives, emphasizing the contextual nature of the construction of knowledge. Here, the two polar perspectives, endogenous and exogenous, do not command control of the wheel, but act in a symbiotic and reciprocal way (Moshman, 1982). Knowledge is actually transformed through interactions between the two polar ends, the result of which is considered greater than what the individual could have constructed internally on their own (Liu & Mathews, 2005; Moshman, 1982). In these interactions, mental contradictions occur, and knowledge is constructed to quiet the disequilibrium created by those contradictions. Though the new knowledge is often a betterment of what was conceptualized before, the newly constructed knowledge is context-laden and never fixed, always vulnerable to more contradictions (Cobb, 1996; Moshman, 1982). In sum, the differences among student constructions are tied to the communities in which they interact rather than their own cognitive structures alone (Cobb, 1996), social influences are not *outside* the individual (Tudge, 1993). This departs slightly from Bandura's reciprocal determinism.

A foremost influence underpinning this perspective is that of Lev Vygotsky's socio-cultural theory of higher mental processes. Born in Russia, Vygotsky, like Jean Piaget, was born in the 1800's, and though trained in many subject areas including psychology, philosophy, literature, and even law, his work in psychology is most recognized today. Vygotsky died at 37 of tuberculosis (Hodson & Hodson, 1998), but his work would become widely known in Russia for his rejection of the dominating theory of reflexology at the time in Soviet psychology, such as Ivan Pavlov's studies with dogs or Wolfgang Khöler's studies with chimps; his chief disagreement being the short-sidedness of explaining consciousness with consciousness and behavior with behavior.

Conversely, Vygotsky's theory de-bunked the idea that humans are like animals in that their reflexes are relatively engrained, demonstrated by Pavlov's work with dogs. Vygotsky argued that humans, on the other hand, had the agency to alter their environment (Schunk, 2008). He introduced an idea, which for many years remained controversial under Stalin rule: the idea that the interaction between social activity and internal processes best explained consciousness, a theory influenced by Vygotsky's Marxist beliefs (Kozulin, 1986; Schunk, 2008). His work, most of which was completed in the 1930's, was banned for many years for its political incorrectness and did not begin to be translated and published extensively in the West until the 1960's. His work countered that of Piaget and his endogenous leanings, so some wonder if Piaget's influence in the West might have been eclipsed had Vygotsky's work been disseminated earlier (Tobias, 2009; Hodson & Hodson, 1998).

Vygotsky conceptualized consciousness as the ability to perceive in a meaningful way, developed intuitively through social interaction. Higher mental processes, therefore, are developed by greater and greater honed perceptions, which are most always shifting and are concerned more with the ability to see beyond the current horizon and less concerned about knowing absolute truth. Vygotsky saw the two polar ends as inseparable, the mind being part of the social group itself, knowledge being created collectively rather than through individual mental functioning alone. Thus, one person's development influences the other; one person's development depends on the other (Liu & Mathews, 2005; Tudge, 1993). Kozulin (1986) posits, "Vygotsky perceived psychological development as a dynamic process full of upheavals, sudden changes, and reversals," which "ultimately leads to the formation of cultural, higher mental functions" (p. 266).

Vygotsky placed particular emphasis on cultural transmission of language in social activity, particularly dialogue (Fosnot, 1996; Hodson & Hodson, 1998; Kozulin, 1986; Schunk, 2008); language being the mediator, contributing to higher mental processes (Moshman, 1982). Knowledge is mediated by an individual's language, which, in turn, is determined by their cultural development or history (Lui & Mathews, 2005). He particularly emphasized the internal speech of the individual, a mechanism for development after interaction. In sum, the language used in social interaction is later used

in an internal dialogue, contributing to the organization of thought (Vygotsky, 1978, p. 89). Vygotsky (1978) posited that the more complicated the problem, the more important language becomes. Most importantly, the individual's cultural development is thought to begin first through social interaction, and then internally (Liu & Mathews, 2005; Kozulin, 1986). In other words, development lags behind learning, where Piaget argued development came first.

Liu & Matthews (2005) refer to Vygotsky's theory as a historical-dialectical-monist philosophy; historical in that one's development of language and mental functioning are a product of their cultural development; dialectic in that the development is non-linear and few hard, fast rules apply to it; and monist in that humans are interdependent, the byproduct of their reciprocal relationship being highly authentic. The authors explain, "The monist view enables one to go beyond the boundaries set by dualism [seeing the polar ends as separate], and to see how man and world, mind and reality can become the source of growth for each other" (p. 397). Put simply, Tudge and Winterhoff (1993) say:

> New understanding, gained through collaboration, is a product of the child's original understanding, the partner's different understanding, the child's difficulties with the task and the ways they are expressed in the course of the interaction, the partner's responses to those difficulties, and so on (p. 76).

A fundamental contribution to the constructivist epistemology was Vygotsky's (1978) zone of proximal development (ZPD) (p. 84), which is the difference between where the learner is developmentally, and where the learner could be developmentally with the aid of a guide or collaboration with peers. The implication for education is the imperative to design experiences that encourage the learner to pursue activities that go slightly beyond their capabilities through interaction with the environment. Accordingly, learning experiences must be matched complementarily to the development of the learner. This may be discerned through a battery of problem solving tasks which may include a series of hints to determine the level upon which a learner may resolve a problem alone and with help. Even if the learner is only able to solve a problem with assistance, this also speaks to his/her developmental state, indicating the point at which the learner remains in the

development process. So, what they cannot do without assistance today should be what they can do on their own tomorrow (Vygotsky, 1978).

Vygotsky proposed two types of concepts that learners construct, spontaneous or psuedoconcepts (everyday concepts naturally developed by the learner) and scientific concepts (originating from instruction). The psuedoconcepts constructed by the learner must have developed enough to be able to absorb the scientific concept that is being introduced. Fosnot (1996) explains that as the scientific concepts are impressed onto the learner, the learner's psuedoconcepts evolve upward toward the scientific concept. The ZPD is where the two meet. This reciprocity generates a more culturally acceptable conception. Meanings derived are inherently cultural and when these new meanings are subjected once again to the cultural environment of the learner, they may again be transformed upon reflection (Fosnot, 1996).

The ZPD is a pivotal consideration from a dialectical perspective in the classroom, which may include reciprocal teaching strategies. The teacher is a skillful guide in which the learning experience is crafted to lead the student's misconceptions or preconceptions to firm principles or other alternatives. Rather than being consistently forthright with feedback, the teacher acts in symbioses with the student's response, providing feedback as needed (Pressley, 1992).

Dialectical constructivism and ESD

As previously argued, the pedagogical proclivities of ESD are considerably oriented to a constructivist epistemology. This orientation is particularly slanted toward exogenous, and especially a dialectical perspective of constructivism, rather than an endogenous one. From both exogenous and dialectical perspectives, attention paid to learner interaction with the *social* environment is prominent in the ESD literature, a less emphasized aspect of an endogenous perspective. The intonation of lived experience, community, active engagement and collaboration in the ESD literature, evidence an assertion that there is magic in social interaction, with peers, with the instructor, with industry partners. Indeed, the preference for the ESD educator to play the role of facilitator and collaborator rather than authoritarian is indicative of a priority set for interactions between the learners and instructor. Likewise, the emphasis by ESD authors on interdisciplinary or multidisciplinary

educational experiences also indicate that there is something distinct brought about by exposing the learner to different social configurations. Additionally, sustainability itself is well poised for the approaches of these perspectives. The complexity, uncertainty, and values-laden nature of the concept (Bonnett, 2003) make it ripe for both experiential opportunities and dialogue in the educational context, with an ability to exhibit mismatches between the learner's preconceived notions and a more appropriate worldview, rooting out the absolute truth being of less consequence. Nevertheless, it will be argued here that it is the dialectical perspective which best reflects ESD's pedagogical inclinations.

From an exogenous point of view, the influence of the social environment dominates, a position not entirely advocated by ESD. For example, in Bandura's social cognitive theory, though the reciprocity of interactions between personal factors, behavior, and the environment are likely facts of any learning scenario today and are undeniably akin to Vygotsky's reciprocal interactions, the theorist places emphasis on observational learning rather than experiential, a key point of departure from ESD. Pedagogies like service learning, participatory learning, and experiential learning are characterized by collective inquiry and problem solving that require learners to dialogue with others around them, discovering new meanings collectively in flight. Wals (2010) argues that learning strategies that emphasize dialogue and cooperative experiences are useful for ESD as they promote pluralism and the marriage of prior perceptions and new meaning making. Though models may very well be utilized, ESD clearly places a premium on permitting the learner to experience first-hand contradictions and consequences. Indeed, the transformation of knowledge through interactions between the learner's internal processes and those about her, yielding an outcome far superior to what the individual could have constructed on their own, aligns with ESD, and especially a dialectical perspective.

From a dialectical perspective, ESD prefers these socially laden strategies as the preferred medium for precipitating a personal transformation in the learner, pushing the learning beyond their comfortable conceptions, similar to the ZPD. Particularly, ESD champions for iterative reflection which may very well reinforce cognitive development and learning that happens post-interaction. For instance, Vygotsky contends that social

interaction precedes internal reflective processes, where new knowledge is later internalized. Further, the educator as skillful guide toward better alternatives is also complimentary to ESD.

Implications for the classroom

As many theoretical positions underpin constructivism, so are there instructional strategies (Schwartz, Lindgren, & Lewis, 2009). It is important to reiterate that constructivism is an epistemology, an idea about the nature of knowledge and how it is constructed. It does not necessarily translate as a theory about teaching. Instead, the ideas about the nature of learning, characteristic of constructivism, have *implications* for teaching (Fosnot, 1996). These implications are largely an emphasis on real experience, the exploration of multiple perspectives, holistic instruction of broad concepts, and social interaction in educational experiences with special attention paid to the learner (Schunk, 2008). Brooks and Brooks (1999, p. ix-x) outline five characteristics of constructivist classrooms:

1) Teachers pose problems of emerging relevance
2) Teachers build lessons around primary concepts and "big" ideas
3) Teachers seek and value their students' points of view
4) Classroom activities challenge students' suppositions
5) Teachers assess students learning in the context of daily teaching

These characteristics imply that subject matter must be made personally relevant to the student. Therefore, a constructivist teacher will design educational experiences that give the learner an opportunity to create meaning that is personal to them. Similarly, rather than present subject matter in a fragmented, isolated fashion that demands memorization and regurgitation, constructivist learning experiences emphasize the presentation to students of an over-arching problem and the major concepts that punctuate it, the teacher acting as mediator between the topic and the interests of the students (Brooks & Brooks, 1999, Terhart, 2003). The content in constructivist classroom is, consequently, rarely concrete (Terhart, 2003). For example, a constructivist teacher may present one major question to students and then expose them to a collection of resources to help them answer it, allowing time for students to explore what they think, share their propositions with

others, and allow their hypotheses to be criticized (Brooks & Brooks, 1999; Hodson & Hodson, 1999).

Here, the constraints of facts are cast off, and students are uninhibited to follow their own inclinations, reconstruct what they know, and arrive at an uncommon knowing that is inclusive of many different perspectives about the truth. This exploration, of course, takes time, more time than traditional didactic methods (Brooks & Brooks, 1999; Millar, 1989); something the constructivist teacher must be cognizant of, resisting the temptation to cover a broad range of material rather than honor the human process necessary to reach a depth of understanding about one primary concept, a level of understanding necessary for transfer to other contexts. Likewise, students must be allotted time for reflection (Confreys, 1990; Fosnot, 1996), making them more aware of their own thinking and learning process (Terhart, 2003). Thus, efficiency may, in fact be postponed, as a teacher who allows students the time to explore and invent on the front end may very well learn more efficient ways of going about activities as a result. While efficiency promoted on the front end may allow the learner to prematurely adopt rote mechanisms to working through issues (Schwartz, Lindgren, & Lewis, 2009).

Educational experiences are designed to emphasize multiple perspectives, relying less on a prescribed set of information to disseminate uniformly to students and more on the use of various perspectives of students, considered invaluable (Brooks & Brooks, 1999). Evidencing variability in a topic is important to assisting learners in understanding how their learning may apply to new and different situations. By emphasizing multiple perspectives, the suppositions of students are challenged, presenting a learning opportunity in the confirmation or contradiction of those beliefs (Brooks & Brooks, 1999; Fosnot, 1996) and an opportunity to learn discernment (Schartz, Lindgren, & Lewis, 2009). Students must also be given license to raise their own questions and test hypotheses (Fosnot, 1996).

But, the teacher must be interested, receptive, and responsive to unforeseen responses and *how* those ideas are constructed (Confreys, 1990). The teacher will find any meaningful shift in suppositions impossible until they understand the student's experience and conceptual processes that contribute to their current conceptions (von Glasersfeld,

1996). Likewise, suppositions can only be challenged if the curriculum is complementarily matched to the student's current abilities, abilities only known through interactive experience such as those described above (Brooks & Brooks, 1999; Confreys, 1990). Another notable component of this method is the resources used to assist students on their journey. These are less likely to be textbooks and more likely to be primary data or supplemental materials (Brooks & Brooks, 1999).

Finally, in a constructivist light, assessment is viewed as something uniquely married to the educational experience, rather than a measurement separated from that experience. Instead of a measure of effectiveness or accountability, it is seen as another learning opportunity for the student (Brooks & Brooks, 1999; Schwartz et al., 2009). Assessment is more likely to be mediated by the teacher and may include observations of reciprocal interaction with the student or the student with their peers, or authentic assessment like creative projects, such as exhibits or portfolios (Brooks & Brooks, 1999). Schwartz et al. (2009) term these types of assessment as Preparation for Future Learning (PFL) assessments, measuring authentic constructivist outcomes, which prepare the learner for more learning (the ESD camp may call this outcome lifelong learning). Evaluating students only for the correctness of their answers is counterintuitive to a constructivist approach; assessment is rather about demonstrating progress. Key in this discussion is that the evaluation *serves the learner* in some way and does not simply measure what is known by them (Brooks and Brooks, 1999; Schwartz et al., 2009; Terhart, 2003). This idea goes beyond retention, emphasizing transfer (Schwartz et al., 2009).

Brooks and Brooks (1999) describe the constructivist teacher as "a weaver, an explorer, and an analyst" (p. 98) and one "who helps search rather than follow" (p. 102). All require the ability to intuit flexibly through the learning process with students, a highly challenging, but rewarding endeavor (Schunk, 2008; Confreys, 1990). Here, the teacher is not the keeper and disseminator of finite truths. Instead, social interaction plays a pivotal role in constructing the truth, interaction between teachers and students, and students and their peers (Schunk, 2008; Terhart, 2003).

Dialectical constructivism in the classroom

Discussed so far are some of the most basic tenets of constructivist teaching. But, there are varying emphases that lie on a continuum; varying chiefly both in type and degree of assistance given to the learner and the type of knowledge constructed (Moshman, 1982). For example, from an endogenous perspective, the teacher is there to guide the discovery the learner makes through activities. In an exogenous perspective, the teacher is more apt to model, discuss, and explain. In a dialectical classroom, on the other hand, a reciprocal teaching style is more common, always mindful of the ZPD of learners. Instruction emphasizes social engagement that requires students utilize frameworks from an expert (Cobb, 1996). Hodson & Hodson (1998) contend this is a most challenging task for the teacher, described as *educational enculturation*:

> Vygotskian theory gives teachers a central role: leading learners and students to new levels of conceptual understanding by interacting and talking with them. Thus, teaching comprises the activities associated with enabling the learner to participate effectively in the activities of the more expert, and learning is seen as *enculturation* via guided and modeled participation. Expert performance is modeled and learners are instructed and supported in their effort to replicate expert practice . . . over time, through assisted performance, the novices master all the component parts and gradually become capable of full and autonomous participation . . . responsibility is gradually transferred from expert to (the former) novice until such time as the student is intellectually independent and no longer needs the teacher (p. 37).

Vygotsky (1978) did not perceive education as society's passive impression onto the learner. Rather, education should thrust the learner beyond their own history and culture. Most importantly, he emphasized that learning is by virtue not uniform, never to be reduced to a set of skills and habits, but is a highly complex intellectual order that makes transfer to other situations possible. In this environment, action is prominent for the teacher, the student, and the environment. Though he did place emphasis on the role of experts, he also paid particular attention to peer collaboration. Indeed, all influence the development of the other.

Pressley et al. (1992) compare dialectical constructivism to strategy instruction, an idea about teaching strategies to students that are outcome-based and include cognitive operations that help the student perform with sensitivity to contextual issues. It is a process, similarly described by Vygotsky, which includes a knowledgeable expert and the

gradual adoption of the expert's strategies by the student. Exact replication of the expert's methods is not realistic. Instead, the learner makes the expert's methods her own, evidencing a deep understanding and the ability to generalize to other situations. The authors offer eight ingredients of strategy instruction thought to align with dialectical constructivist teaching:

1. Strategies are introduced in a graduated fashion, typically evidencing an interrelationship with other strategies
2. Strategies are practiced across a variety of tasks
3. Teachers model strategies coordinated with verbal explanations in collaboration with students
4. Teachers justify the values of strategies or rationale and draw the learner's attention to how they might affect their own performance or achievement
5. Considerable feedback and discussion are offered throughout strategy practice, responsive to arising challenges in the student's experience
6. Opportunities for transfer to new and different situations are acknowledged by both students and teacher
7. Motivation is maintained by the teacher, empowering students to take control of their own development
8. Reflection and planning is valued in problem solving, rather than the simple completion of tasks

The primary distinction made by Pressley et al. (1992) between strategy instruction and dialectical instruction is that of the explicitness of feedback, which is far more intensive in strategy instruction. While, a dialectical constructivist teacher is more prone to give feedback proportional to what keeps them in the ZPD. In other words, the teacher is keenly attuned to where the learner is and feedback is given just beyond the student's current level of knowledge, motivating them to construct more. This is thought to keep the internal dialogue and reflection inside the learner afloat. Feedback given too early may cause boredom. Given too late, the learner may become overwhelmed and frustrated. Essential to this approach is the use of scaffolding. Pressley et al. (1992) offer six guiding principles of scaffolding by Rogoff (1990):

1. The learner's interests are ignited in the task
2. Sensitive to the amount of knowledge a learner can manage at once, the teacher aids the student in reducing the number of measures they must take to solve a problem
3. Motivation and direction is offered, with the goal in clear sight
4. Contradictions between the learner's constructions and the expert's methods are called out
5. Frustration and risk are carefully managed
6. How a strategy may be performed is ideally demonstrated

The use of scaffolding is employed with the learner as compass. Teaching strategies may not be concretely and finitely determined. Dialogue between students and teacher invites emergence. Group work is the cornerstone of this effort. In sum, dialectical constructivist teachers promote the path of discovery via careful guidance in learning, asserting that deep learning and a greater ability to transfer that learning to other scenarios results.

Criticism

Though there may be wide agreement that knowledge is indeed constructed and our experiences in the environment play a pivotal role in construction, some criticisms of the epistemology merit consideration. The first regards the threat of relativism (Simpson, 2002; Liu & Mathews, 2005), and the second challenges the relationship between the epistemology and teaching practice (Simpson, 2002; Geelan, 1997).

A chief argument is about the extent to which humans can ever be certain that what they conceptualize as reality is an accurate depiction (Bickhard, 1997; Confreys, 1990). The potential for relativism, the acceptance of the absence of any truth at all or for a constructed truth to evidence no superiority to another's, is admittedly counter intuitive to the purposes of teaching (Liu & Mathews, 2005). Fox (2001) argues that considering the reality we hold in our heads to be all that exists is implausible. In fact the external, non-human world plays a pivotal role in our conceptions as it provides a feedback loop, evidencing constraints against our thinking. Indeed, our conceptions of reality are largely adapted to how the world responds when we try to act on or investigate it. The author

posits, “Indeed, much of our learning consists in coming to terms with the constraints of our own physical and biological make-up as well as the physical and biological constraints of the wider environment” (p. 28). In a teaching context, the learner must experience some feedback from the world during knowledge construction to avoid solipsism.

Authors of ESD are not exempt from this concern. Wals (2010) posits that there is wide agreement that sustainability is not a prescriptive issue. In fact, a sustainable lifestyle today may easily become unsustainable over time. It is, indeed, difficult to know what exactly is sustainable just as what is not. Wals (2010) contends:

> The plea for pluralism might lead to this kind of relativism when in the end it is accepted that any perspective or position on sustainability or sustainable development is as good as any other one, that your view on sustainability is as true as mine and that I would be wrong to critique yours, and while it might be wrong from my perspective, it might be right from yours (p. 145).

Bickhard (1997) agrees, submitting that this acceptance of solipsism could even been categorized as a type of pathology. The author suggests the idea of an evolutionary epistemology of constructivism: All that is known today is not known because it was *previously* known and therefore endorsed by an external source (empiricism) or an internal one (rationalism). At some point, a representation emerges. And, in the system for which it emerged, constructivism may play a role in that representation’s evolution. Thus, those constructions or representations are then only retained if proven viable in the system. Bickhard (1997) advocates for strategies such as scaffolding in the teaching scenario that allows evolution in problem solving for the learner, and self-scaffolding, which impart the learner with skills that provide them structures that root out relativism. Similarly, Wals (2010) suggests a heuristic relativism in which the learner is required to venture beyond their current position, acting creatively and innovatively for sustainability with their new meanings. This implies a careful marriage of dialogue and action as well as some criteria related to sustainable principles during the educational experience. In other words, knowing the process by which learner’s construct their own knowledge is useful in the teaching context, in that educators can assist learners in *evolving* their constructions to more viable conceptions.

The most audible contention about the potential for relativism comes from science (Simpson, 2002; Fox, 2001; Millar, 1989) and mathematics education (Noddings, 1990; von Glasersfeld, 1990), fields in which there are thought to be some truths that exist outside human experience or conceptual abstraction. A central component of constructivist teaching methodology is calling out student ideas, paying attention to them, and reconstructing them. But in science education there is already some common agreement on universal truths. An instructional feature that promotes the development of personal theories may be inappropriate (Millar, 1989; Simpson, 2002). Hodson & Hodson (1998) contend that the meaning the learner constructs cannot be equated with scientific understanding. In other words, scientific understanding must be more than simply the individual making sense of the world, juried by the individual only. Conversely, it is equally ridiculous to expect the learner to construct their own scientific abstractions without the aid of one with expertise to guide ways of knowing conventional to the discipline. For instance, experimentation, discovery, and testing are common practices in field of science. However, the best way to learn science may not align with the prescribed practices of the science community. There is a need, prior to discovery-type activities to firmly understand the domain in which the investigation is to take place, and bear in mind that learners are not "experts practicing something, but rather novices learning about something" (Kirschner, 2009, p. 152).

On the other hand, von Glasersfeld (1990) argues that little damage is done by talking about some bodies of knowledge as having subjective status, as this is not foreign to real life social situations. But, he warns that when these ideas are accepted as irrefutable belief, that humans run into problems. Conversely, knowledge does not have to be true with a capital T to be useful; instead, a hypothetical framework may instead be favored. Certainly, constructivism largely disregards more passive forms of knowledge absorption, but subjectivity does not entirely overrule objectivity (Liu & Matthews, 2005).

A related criticism of constructivism is that the epistemology does not by virtue of itself a sound pedagogy make. Ideas about how learners *learn* do not necessarily inform what teachers should *do* (Kirschner, 2009; Liu & Matthews, 2005; Millar, 1989). For example, constructivist teaching often advocates for an active classroom because the

construction of knowledge is thought to be active, but, all that is behaviorally active is not necessarily fundamental to learning. Active learning does not translate to active instruction, just as more passive methods of instruction do not necessarily equal passive learning (Mayer, 2009). Indeed, passive absorption is part of contextual learning. Moreover, humans also learn by reacting to what is done to them as much as what they do themselves (Fox, 2001). So, there is a disconnection between the plausible idea that learners very well construct meanings internally and on their own volition, and the teaching methods that may or may not have anything to do with that (Millar, 1989).

Noddings (1990) disagrees with constructivism as an epistemology altogether. As the major advances in constructivism have been primarily focused on the cognitive development's role in the construction of knowledge, few advances have been made about the nature of knowledge. The major tenet of constructivism is that knowledge is constructed. But, Noddings (1990) says this conclusion does not itself answer epistemological questions about the status of the knowledge that is constructed or how we know when the learner really *knows*. In other words, if knowledge is constructed, how do we decide if this knowledge is considered viable? Or, if a student recites an answer, are they guilty of not really *knowing*? In sum, describing the inner workings of the mind is not entirely instructive in an epistemological sense.

Rather, Noddings (1990) suggests that questions that inform teaching strategy have more to do with the learner's activities, like: "How firm a grasp do they have on the material? What can they do with it? What misconceptions do they entertain?" (p. 14). None of these questions are related to the nature of knowledge. The author advocates for careful selection of teaching strategies responsive to content and the individual needs of learners. We should not categorically throw out didactic methods, but think instead about methods that may inspire powerful constructions, largely underpinned by motivation and engagement. Likewise, Terhart (2003) argues that didactics and constructivism are but two sides of the same coin, converging and diverging on many points, but always sharing the construction of knowledge. He suggests a constructivist didactics in which a moderate position is taken and the central ambition is to promote student learning with construction in mind. Wide agreement is found in the literature for both contentions (Fox, 2001; Mayer,

2009; Tobias, 1992). Further, Fox (2001) argues that the functions of things like subliminal learning or memory should not necessarily be cast out in a view of constructivism. Ultimately, if you cannot remember what you understand, what good is it? The implication in the construction of knowledge either subjectively or socially, is that the teacher should not ignore the previously inherited knowledge and values of learners, the teacher being obligated to find ways to make the subject interesting to the learner.

There is broad acknowledgement that constructivist teaching should be selected based on the domain and desired outcomes (Geelan, 1997; Millar, 1989; Noddings, 1990; Simpson, 2002). Schwartz, Lindgen, and Lewis (2009) contend that the use of constructivism should be proportional to the extent to which a constructivist outcome is desired. Meaning, constructivist methods of instruction are best when future learning is the desired outcome as opposed to sequential problem-solving. There are certainly topics and situations in which it may be important for students to set out on an exploration rather than receive guidance up front, while other situations may require the opposite. As teaching constructively often discloses variability of a topic or situation, this may or may not be appropriate. For example, when students are learning in a context that is thoroughly stable, such as typing, teaching for variability is not ideal, unlike a subject such as sustainability in which there is high variability and the need for exploration (Spiro & Deschryver, 2009). But, chiefly, the more important issue is engagement rather than a prescriptive teaching method (Mayer, 2009; Tobias, 1992; Millar, 1989; Noddings, 1990).

Noddings (1990) posits, "The great strength of constructivism is that it leads us to think critically and imaginatively about the teaching-learning process. Believing the premise of constructivism, we no longer look for simple solutions, and we have a powerful set of criteria which to judge our possible choices of teaching methods" (p. 18). Noddings (1990) posits that constructivism is a post epistemology, one that cannot ask or answer the traditional epistemological questions, but by exploring its cognitive and strategic merits, can inform practice. Von Glasersfeld (1990) agrees, saying: ". . . One cannot adopt the constructivist principles as an absolute truth, but only as a working hypothesis that may or may not turn out to be viable" (p. 23).

Clear in this latter discussion of how constructivism can influence highly effective teaching strategy, is that the topic of sustainability is likely well poised for this approach. Further is that if one holds a constructivist epistemology, there may be a greater likelihood of allowing learners to find their own path to new knowledge, an important function of reaching deeper meaning; meaning that will affect behavior and transfer to other situations. This argument is particularly audible in the ESD literature.

Discussion and implications for research

First, let us review the continuum of constructivist epistemological perspectives. Using Moshman's (1982) root metaphors, this continuum might be reduced to an argument about the chicken (mechanism) and the egg (organism) and the order in which they are thought to hatch (learning) in a narrative about poultry. Piaget argued that cognitive development is the antecedent to learning (organism: the egg hatches on its own volition, then the new chicken, now having the experience of hatching may innately lay more eggs with its newly developed schemata with little assistance from the environment); while Bandura might contend that structure of the environment is the antecedent to learning, the result of which is an imitation to the structure of the environment (mechanism: the chicken lays the egg as learned from the other chickens in its environment). Vygotsky (1978), on the other hand, did not perceive the chicken and the egg to have a linear relationship at all, but a reciprocal one. Thus, cognitive development and learning occur simultaneously in the interaction between the environment (mechanism) and the learner's internal cognitive processes (organism) which are set in motion during the interaction. This is particularly the case when, for the sake of argument, the chicken has amassed some expertise about hatching eggs for which it may now aid the egg in its developmental process. Both the chicken and the egg emerge in the poultry narrative at the same time in unpredictable configurations (an omelet of sorts); the egg's development having benefited from the chicken's timely contributions in the ZPD.

Phillips (1995) explains that there are contentions regarding which position on the continuum best explains how people come to know, whether knowledge is really constructed or simply discovered, and how active the process of either actually is. Subsequently, there is a propensity in the literature to separate and categorize simply these

three perspectives and their contributing theorists. Tudge and Winterhoff (1993) argue that this compulsion can be explained by a need to categorize worldviews on the nature of development as well as a tendency in research to focus too narrowly on some theory particulars, resisting the complexity of the entire theories. Zimmerman (1993) agrees with these two justifications, but adds that theories evolve over time and sometimes the details of that evolution are lost. The work of Piaget, Vygotsky, and Bandura has evolved greatly from its inception until now. Over time researchers have become confused and misinterpretations have flourished. For example, over the years Bandura became less interested in the concept of imitation and began to focus more on self-regulatory processes and self-efficacy. He later changed the original title of his book from Social Learning Theory to Social Cognitive Theory, now far more fixated on the influence of internal thought processes. Piaget once considered cognitive conflict the only source of disequilibrium, a mechanism for learning. Later, he embraced other sources. Likewise, Vygotsky's theory has continued to evolve, though he did not live to be a part of it. The theorist's idea that adult language was a mechanism for cultural transmission, while private speech was a mechanism used for internalizing and self-regulating was de-bunked during the 1970's when it was discovered that learners display private speech in public domains. Few authors now emphasize this position, focusing more on the contributions of the ZPD or self-regulation.

Tudge and Winterhoff (1993) argue that the perspectives of these theorists are far more similar than they are different. The theorists, though separated by oceans, did not evolve their ideas in confinement. They were indeed influenced by each other's ideas as well as some of the same authors of their time. All three were aligned in their contention that cognitive activity was in fact the mechanism of development, on which the social world was a pinnacle influence. All three took issue with a stimulus-response model. For example, Vygotsky was the only theorist of the three arguing that development was a result of reciprocity between a myriad of social factors. Thus, Vygotsky's focus of analysis went beyond the individual, while both Piaget and Bandura looked at the individual's development to formulate their theories. Likewise, only Piaget argued that it was peer

collaboration that was more exceptional to cognitive growth, while Bandura and Vygotsky both focused on adult collaboration or interaction with the child.

Nevertheless, Phillips (1995) submits that, indeed, some constructivists are partial to one position on the continuum over the other. However, many others are instead spread widely across it (Phillips, 1995). Moshman (1982) argues that the three perspectives could be used in a more integrated way to better understand the individual: "The best answer, I think, is that the individual does not necessarily have these radically different types of knowledge but rather that we have chosen to use these several metaphors in order to understand the individual's construction of knowledge" (p. 381). In other words, these perspectives extend the study of how knowledge is constructed via learning, development, and interaction of those two, as it is implausible to understand individuals using only one perspective. More than one perspective may indeed explain certain knowledge depending on the situation. One of the root metaphors may very well apply in one situation while another metaphor better explains another. It helps us understand how knowledge may be constructed under different conditions. But, clear in Moshman's (1982) argument is that all perspectives play a role in learning.

Schunk (2008) argues that studies about constructivism should not necessarily accentuate the truth or falsehood of constructivist assumptions, but aim to describe the process by which the construction of knowledge happens for the learner and what the social, developmental, and instructional elements are that most affect that construction. Vygotsky (1978) contends that research of cognitive development in education should seek to study internal processes, like an x-ray, to determine how the educational experience has stimulated those intellectual processes (p. 91). Research should focus inward. And, each subject has its own contribution to the child's development, the formula for each very different, focusing on what is happening in the ZPD. Research should aim to "discover the means and methods that subjects use to organize their own behavior" (p. 74). The study becomes the process by which the learner accomplishes the task, a component of inquiry in the current study (see Research Questions in Chapter 1).

Most recently, Tobias (2009) submitted that though there is a resounding popularity for constructivist teaching methods, there is little research available to support

them. Research has focused primarily on primary processes used by learners rather than testing overarching theories of learning. The author contends that some of the most fundamental cornerstones of constructivism have been neglected by educational research. For example, one such principle of constructivism is that learners are far more motivated in the constructivist learning environment, though this contention has received little empirical scrutiny. Other areas in need of analysis are the time it takes to teach constructively and the value of the subsequent benefits, the level of knowledgeability and skill constructivist teaching requires, and the types of outcomes that constructivist teaching might be most successful in delivering. Tobias (2009) concludes that many of the principles of constructivism have evolved from intuitive discoveries rather than empirical investigation.

Summary

To conclude, von Glasersfeld (1990), the chief proponent of radical constructivism, believes that one can never know the extent to which their personal constructions correspond to ontological truth with a capital T, a truth independent of lived experience. But, the author tells a cautionary tale to educators about this view:

> Throughout the two thousand five hundred years of Western epistemology, the accepted view has been a realist view. According to it, the human knower can attain some knowledge of a really existing world and can use this knowledge to modify it. People tended to think of the world as governed by a God who would not let it go under. Then, faith shifted from God to science. The world that science was mapping was called "Nature" and was believed to be ultimately understandable and controllable. Yet, it was also believed to be so immense that mankind could do no significant harm to it. Today, one does not have to look far to see that this attitude has endangered the world we are actually experiencing (p. 27).

This argument is particularly poignant to that of ESD. In this light, if what we know about the world around us can only be conceptualized by us, then it can be argued that we, in fact, are responsible for it. The author submits that it is an opportune time to suggest a theory about knowing that emphasizes the learner's responsibility for what they construct. This idea aligns with authors from the ESD literature as well as the pioneers of progressive education who advocate for the use of pedagogy that may mediate learners' assumptions

that run counter to SD, encouraging citizenship and stewardship among students; in other words, holding students responsible for the way they construct their world, as those constructions have important consequences.

Chapter 2 has introduced the primary issues related to the *un*-sustainability of the apparel industry, demonstrating the challenges for which AT education (AT) must be responsive. Next, ESD was presented as a possible framework that may provide AT education with an effective approach to the integration of sustainability into the curriculum. Lastly, the relationship between ESD and progressive education was illustrated, marrying the movement's constructivist epistemology to ESD. More specifically, the dialectical perspective was argued to be most complimentary to the framework. Implications for both the classroom and research were established, further shaping the current study. In the following chapter, the methodology to be used for the study is outlined.

CHAPTER 3 - **Research Methodology**

> "Qualitative research skills can play a part in helping people to live in a world more compatible with their hopes by providing tangible information on what it is like now" (Bogdan & Biklen, 1998, p. 234).

In the previous chapter, the *un*-sustainability of the apparel industry was examined demonstrating the challenges for which AT must be responsive. Education for Sustainable Development (ESD) was presented as a possible framework that may provide AT education with a way forward on the journey to integrate sustainability into the curriculum. Lastly, the relationship between ESD and progressive education was illustrated, and a constructivist epistemology, specifically using a dialectical perspective, was proposed as a guide for practical action for ESD. This chapter will discuss how the implementation of an apparel product development course, reflective of ESD, was studied. In the current study, an apparel course was redesigned according to the ESD framework using a curriculum development approach (discussed in Chapter 4) and was implemented by the researcher during one semester. The students' learning and development experience in the course was studied. In this chapter the study's methodology is detailed in the following order: 1) research questions; 2) research design; 3) setting and participants; 4) data collection; 5) data analysis; 4) role of the researcher; and, 5) trustworthiness.

Research Questions

The primary objective of this study was: *To examine the learning and development experience of students enrolled in a course that has been redeveloped using the ESD framework. A description of major outcomes and how they occur will allow implications to be made about how AT education might be enhanced by the use of the ESD, better preparing students for sustainable development.* Elliot Eisner (1998), an advocate of studying how learners *experience* education (discussed further in Chapter 4), for which the use of qualitative inquiry is considered essential, was highly influential in the articulation of the following research questions. Two primary research questions and several sub-questions were asked:

- How do students experience a course that uses the ESD framework?

    - What are the learning and development outcomes that students experience in the course implementation?
    - What aspects of the course are perceived to have the most and least impact on learning and development outcomes?
    - How do students experience the process that leads to learning and development outcomes?
    - How do students compare their experience in the course to other courses in the AT program?
- How does the use of ESD enhance the student learning and development experience?
    - How does constructivism manifest in the learning and development experience of students in the course?
    - How does the ESD framework manifest in the learning and development experience of students in the course?

Research Design

Qualitative practitioner research in education

Merriam (1998) defines three philosophical approaches to research in education. The first is a positivist approach in which education is perceived as a stable, observable object and may be used to test a specific hypothesis. The second approach is interpretive in which the researcher seeks to understand how subjects experience education. Lastly, a critical approach to research perceives education as a social and cultural hub that may be criticized through the lens of theories about power or privilege. It was the interpretive approach that was used in the current study. Thus, interpreting the experience of students enrolled in the course reflective of ESD was considered pivotal to better understanding how the framework impacts student learning and development and how ESD may succeed current pedagogy in AT education.

Eisner (1998) advocates for the use of qualitative inquiry in education, as studying what happens in a classroom and all the idiosyncrasies that its context embodies is what is most useful to other practitioners; where scientific measures may lack the intimacy

necessary to describe and evaluate the learner's experience. Qualitative research is the study of how others construct the meaning of their lived reality. This emic perspective emphasizes the study of the perception of *others*, not the researcher's perception (Merriam, 1998; Stake, 1995), although the researcher has their own etic issues that are often at the heart of the study's purpose (Stake, 1995). Qualitative research typically involves field work in the setting for which the participants are being studied (Creswell, 2007; Eisner, 1998; Merriam, 1998) and is distinct in that samples are rarely random and most always small with specific purposes, especially in education (Merriam, 1998).

In qualitative research, the researcher is the instrument for data collection as well as analysis (Creswell, 2007; Eisner, 1998; Merriam, 1998; Stake, 1995). Eisner (1998) contends, ". . . the features that count in a setting do not wear their labels on their sleeves: they do not announce themselves" (p. 33). The researcher, typically armed with a theoretical framework or research intent, must be able to see "what counts." Further, they must be able to intuit how their own experience comes to bear on what is seen. Alvesson and Sköldberg (2009) and Etherington (2004) both argue that the researcher must develop reflexivity, the ability to systematically reflect about the research at hand throughout the process, then be reflexive about and make transparent the assumptions and biases that color the interpretations that emerge.

Additionally, Eisner (1998) contends, "A preformulated plan of procedure indifferent to emerging conditions is the surest path to disaster" (p. 170). Paramount in qualitative research is the researcher's ability to handle the uncertainty that characterizes it. The researcher must be able to manage the unstructured nature of qualitative inquiry and be able to intuitively alter the planned path when meaning may be better discovered down a new one. Consequently, qualitative research is much more about the story than the findings, and as such, research designs are characterized by a flexible framework for study and ample space for evolution and emergent issues that happen as the story unfolds (Merriam 1998; Stake, 1995).

The researcher is often a practitioner in qualitative educational research, commonly used to improve the practice of teaching. Practitioners as researchers employ a systematic approach to observation and reflection on their experience in the classroom. Advantageous

to the practitioner is the natural development of empathy toward the study's subjects, establishing rapport through strong communication and listening skills to better understand the learner's world (Bogdan & Biklen, 1998; Eisner, 1998; Merriam, 1998). This also makes the practitioner-researcher a subject in their own study (Bogdan & Biklen, 1998). Further, practitioners are important change agents, as their inquiry is often pivotal in educational change (Bogdan & Biklen, 1998; Marsh & Willis, 2007).

Lastly, interpretation of qualitative data is inductive rather than deductive, building theories, concepts or hypothesis with the data, rather than testing them. Often the intent is to define a theory that describes the data, rather than the other way around (Creswell, 2007; Merriam, 1998). The researcher is ultimately offering their personal interpretation of the emergent patterns of the study, using a constructivist approach to knowledge (Stake, 1995). In the end, the final product of a qualitative research study is a rich description or holistic perspective (Creswell, 2007; Merriam, 1998; Stake, 1995), using data more characterized by words, pictures or other artifacts rather than numbers (Creswell, 2007; Merriam, 1998).

Responsive to these characteristics, the current study was conducted in the field, a college classroom where the participants were enrolled in the course, a requirement of their AT program. The study was implemented for the intent purpose of studying student responses to the redeveloped course. Though portions of the course were tested in an eight-week pilot, the course was largely implemented in the study for the first time. Thus, a flexible plan was outlined at the study's conception, allowing the researcher room to make adjustments to the research plan as well as the implementation plan as needed. Likewise, a loose plan for data analysis was developed, but was later made more definitive as data collection commenced. Additionally, the researcher was also the practitioner who redeveloped and implemented the course reflective of ESD and was, consequently, a subject in her own study. The researcher sought to identify and describe the emic perspectives of her participants about their experience in the course. These emic perspectives were most useful in answering research questions related to student experience. However, as the researcher was the key instrument used in the study, her etic issues, largely colored by ESD and constructivism, were central to identifying and

describing the ways in which ESD had influenced student experience. Further, as a subject in her own study, the researcher documented her own experience as the practitioner redeveloping and implementing the course, an invaluable source of enlightenment for other practitioners.

Instrumental case study research

Case studies are used primarily to generate a deep description and understanding of a real-life situation as perceived by those who are involved (Merriam, 1998; Stake, 1995; Yin, 1989). Merriam (1998) states that, consequently, process trumps outcomes, context trumps variables, and discovery trumps confirmation. Case studies are best suited for describing an account of a contemporary issue in a real life context (Merriam, 1998; Yin, 1989). Cases are, therefore, ideal for applied fields like education as they lend themselves to solving practical problems. Case studies are especially useful in offering insight about an area of education that has received little research, like an innovative program or practice (Merriam, 1998), such as ESD. Understanding gained in educational case study research has often been used to enlighten practice (Merriam, 1998).

Case studies in education often focus on people and programs (Stake, 1995) and account for a large portion of thesis and dissertation work in the social sciences (Yin, 1989). They are not necessarily used to generate hypotheses or build theory, but simply aim to offer a descriptive account (Merriam, 1998), though most are supported by a theoretical framework or concept (Merriam, 1998; Yin, 1989), such as ESD. This design is particularly useful when "how" and "why" questions need to be answered (Merriam, 1998; Yin, 1989). Lastly, cases are selected, not on their typicality, but on their accessibility and their potential to answer the research questions in a meaningful way (Stake, 1995).

Merriam (1998) defines a case as a unit or system that has specific boundaries and may include an individual, a class, a program, an event, a group, a teacher, a policy, a community, etc. The case is simply defined by parameters that box in the thing to be studied and distinguish what will not be studied (Merriam, 1998; Stake, 1995; Yin, 1989). Only if there is a boundary or limit on how many can be included in the sample or how much data can be collected can a study be described as a case (Merriam, 1998).

Though there are many ways to go about conducting case study research (Stake, 1995), there is some contention about the level of manipulation or control that the researcher should have. Merriam (1998) supports case studies in education where an innovation is introduced and participants' reactions are studied, as in the current study. However, Stake (1995) and Yin (1989) submit that researchers should ideally try not to interrupt the normal activity of the case with some kind of intervention if the research questions can be answered without doing that. The concern is that the multiple, and sometimes contradicting, perceptions of the subjects under study is what should be emphasized and represented, not the treatment (Stake, 1995). There are, however, many educational case studies in the literature that include a manipulation or treatment of some sort initiated by the researcher, such as an innovative teaching methodology (Kuo, 2009), a unique course design related to sustainability (Cohen, 2010), a study of a socio-ecological approach to teaching environmental education (Kyburz-Graber, Hofer, & Wolfensberger, 2006), the incorporation of sustainability into course content (Dale & Newman, 2005), and the development and study of sustainability-related student workshops (Murray & Murray, 2007); many of which resemble the current study's design. It may also be argued here that few alternative research models exist to retrieve the type of information being sought in the current study, hence justifying the researcher's involvement in the treatment. Indeed, the researcher's knowledgeability of sustainability as well as ESD made her quintessential to the treatment's implementation. Further, it may also be argued that the study of the redevelopment and implementation of the course is an invaluable piece of data itself and merits emphasis in addition to findings derived from participants.

Case study research may involve one case or multiple cases (Merriam, 1998; Stake, 1995; Yin, 1989). There are several rationales for studying only a single case, like the current study. Yin (1989) argues that single-case studies are best when testing a well formulated theory for the purpose of challenging, extending, or confirming it, the theory has a clear set of propositions, when the characteristics of the case are rare and thus represent an extreme or unique situation, or when the case is one that has previously been inaccessible for study. It is the second rationale, the unique case, which was used in the

current study. The course was redeveloped and implemented reflective of ESD for the express purpose of studying responses to this special situation.

Setting and Participants

The current study was conducted at Kansas State University, a large land-grant university, in the Department of Apparel, Textiles, and Interior Design. Approximately 250 undergraduate students as well as 50 graduate students (resident and distance) are currently enrolled in the AT program. The majority of undergraduate students (90%) in the AT program are female, enrolled full-time, and are residents of Kansas. The sample for the current study included fourteen undergraduate AT seniors. This sample was comprised of thirteen Caucasian females and one Caucasian male. Three of the participants were AT design undergraduates, while the other eleven were AT marketing undergraduates.

The course that was redeveloped for the purpose of the study was entitled *Private Label Apparel Product Development*, a senior-level capstone course, and a program requirement for both AT design and marketing specializations. The course was also optional for graduate students, although no graduate students were enrolled in the course during the study. Thus, participants were selected through enrollment. In addition to senior standing, enrollment in the course is contingent on the completion of a number of prerequisites including *Apparel and Textiles Evaluation* and possibly *Computer Technologies for Merchandising*, *Principles of Forecasting*, *Computer-Aided Design of Apparel*, or *Apparel Pattern Development*, depending on the student's specialization in design or marketing.

Senior-level undergraduates were considered a particularly attractive sample for the current study as they were nearing the end of their program and were in the best position to contrast their experience in the redeveloped course to that of other courses in their program. The course was also a model scenario for the integration of collaborative and thinking skills that support sustainable development, as the course had been characterized by low enrollment and collaborative work, offering students a platform to apply skills in a collaborative setting and then reflect on that experience. Further, the course was an ideal candidate for redevelopment in light of the industry issues that span

the product development cycle from materials selection to consumer use to disposal. These attributes made the course ripe for redevelopment.

For the current study, the redeveloped version of the course was the only section of the course offered during the semester of the study. An enrollment cap of twenty was placed on the course to insure an ideal setting for high levels of interaction and collaboration, fundamental to the new course's design. In the redeveloped course, students worked in groups to prepare an apparel product development proposal, which unfolded through a series of assignments, culminating in a final exhibit at the course's end. The assignments included a consumer profile, a product category survey, a theme and inspiration board, design concept boards and a design brief, a marketing dossier, and a specification package.

A key concept that was used in the course was future-proofing, in which students used potential future scenarios from *Fashion Futures 2025*, a report by Forum for the Future (2010), to create a sustainable apparel product line proposal. The report offered four hypothetical scenarios for 2025, based on key variables such as decreasing availability and escalating cost of natural resources and climate change initiatives. Students role-played a hypothetical industry scenario in which a sustainable apparel marketer, Green Sweat, Inc. had gone belly up after attempting to enter the market using a sustainable strategic platform. The hypothetical company for which the students were *employed* had requested their help in setting the brand on a new, sustainable and viable path. Members of the student groups carried management titles such as Marketing Director, Merchandise Coordinator, Head Designer, and Director of Sustainability and were expected to play these roles during the completion of the course assignments. Likewise, the instructor (the researcher) played the role of Director of Product Development and acted as advisor, facilitator and collaborator on course assignments.

Skills supporting sustainable development, related both to critical thinking as well as collaboration, were incorporated into the course design (see Chapter 4). These skills were presented to students as *company training* considered fundamental for collaborative teams who must work through sustainability-related challenges together. Students also learned about and applied a number of sustainable design paradigms to their work, like

Biomimicry, Design for Well-being, Design for Environment, and Cradle to Cradle. The major learning outcomes targeted in the course included understanding the technical as well as conceptual process of apparel product development, the application of sustainable design paradigms to apparel, and the demonstration of collaborative and critical thinking skills supportive of sustainable development (see Chapter 4 for a complete discussion regarding the course redevelopment).

Data Collection

There are no specific data collection or analysis techniques associated with case study research, though data collection is often characterized by observations and personal experience by the researcher that offer an up-close-and-personal relationship with the participants for the purpose of gaining subjective perspectives (Merriam, 1998). Though no specific data collection methods are associated with case studies, researchers using this design often cast a wide net (Merriam, 1998; Yin, 1989). Most characteristic of case studies is the use of multiple data types as evidence to support conclusions (Yin, 1989). Case studies most often utilize interviews and observations as well as documents or artifacts (Merriam, 1998; Yin, 1989). Most importantly, methods should be selected by the researcher for their capacity to capture the deepest level of understanding and accurate representation of the case (Stake, 1995). See Table 3-1 for a summary of research questions connected to data collection and data analysis methods.

Table 3-1 Overview of Data Collection and Analysis

Primary Objective: *To examine the learning and development experience of students enrolled in a course that has been redeveloped using the ESD framework. A description of major outcomes and how they occur will allow implications to be made about how AT education might be enhanced by the use of the ESD, better preparing students for sustainable development.*			
Research questions	Research sub-questions	Data collection [1]	Data analysis
Q1 How do students experience a course that uses the ESD framework?	What are the learning and development outcomes that students experience in the course implementation?	1) Student reflections 2) Focus group interviews 3) Field notes/Observations 4) Researcher reflexive journal 5) Final Skills Survey	Theory-driven, then Inductive coding & repeated measures ANOVA
	What aspects of the course are perceived to have the most and least impact on learning and development outcomes?	1) Student reflections 2) Focus group interviews 3) Field notes/Observations 4) Researcher reflexive journal	Theory-driven, then Inductive coding
	How do students experience the process that leads to learning and development outcomes?	1) Student reflections 2) Focus group interviews 3) Field notes/Observations 4) Researcher reflexive journal	Theory-driven, then Inductive coding
	How do students compare their experience in the course to other courses in the apparel and textiles program?	1) Focus group interviews	Theory-driven, then Inductive coding
Q2 How does the use of ESD enhance the student learning and development experience?	How does constructivism manifest in the learning and development experience of students in the course?	1) Student reflections 2) Focus group interviews 3) Field notes/Observations 4) Researcher reflexive journal	Theory-driven coding
	How does the ESD framework manifest in the learning and development experience of students in the course?	1) Student reflections 2) Focus group interviews 3) Field notes/Observations 4) Researcher reflexive journal	Theory-driven coding
[1] Artifacts, namely course activities and projects were collected for the purpose of describing the context of the case but were not be a part of the formal data analysis.			

Focus group interviews

Stake (1995) submits that, "The interview is the main road to multiple realities" (p. 64). Thus, interviews are typically a primary piece of case study data (Yin, 1989). Focus group interviews, introduced by marketing and business research, are now in use in areas like education when the need to gain insight into the perspectives of students, for example, is important (Vaughn, Schumm, & Sinagub, 1996). These types of interviews are ideal for exploratory research (Stewart & Shamdasani, 1990; Vaughn et al., 1996), typically used in conjunction with other forms of data collection, and can be used to elicit perceptions of participants who have been involved in a research study (Vaughn et al., 1996). The purpose of the focus group interview is to gain a deeper understanding by creating an informal and conversational dialogue about the research interest at hand. Characteristic of this type of interview is the byproduct of interactive group discussion; a more holistic discernment through the inevitable expansion of ideas that result from group interaction. Participants often feel more relaxed and open to sharing their ideas in a group setting. Unlike other forms of data collection, participants have the opportunity to clarify their ideas or extend them as the interview continues (Berg, 2001; Stewart & Shamdasani, 1990; Vaughn et al., 1996).

Merriam (1998) argues that the use of excessively structured interview questions in qualitative research, though convenient for gathering basic socio-economic and demographic information, may limit the researcher's ability to allow the participants to completely divulge their experience and perspectives, prohibiting deeper meaning in the study. It also presumes that interviewees will uniformly understand the questions and answer accordingly. Thus, qualitative interview questions are best left loose enough to explore various perspectives that may emerge in the interview (McCracken, 1988; Merriam, 1998; Stake, 1995). The semi-structured interview is that which offers a mix of structured questions and more open-ended questions. There may be a structured portion, covering questions that must be answered in the study, accompanied by a list of questions or issues to be covered, for which the wording and exact order may not be predetermined. This format gives the researcher the flexibility to delve into dialogue that emerges in the moment to reach a better understanding (Merriam, 1998). McCracken (1988) suggests

creating a series of "grand tour" questions that each contain specific prompts, things that, if not brought up by the participant, should be brought up by the interviewer (p. 35).

Likewise, Stewart and Shamdasani (1990) encourage researchers to limit the number of focus group interview questions to less than twelve to allow room for the moderator to probe and add questions when necessary. Finally, the use of the longer interviews is advantageous in exploratory research, allowing time to explore participant stories at depth. Even participants who may have time limitations, such as students, nevertheless, find the in-depth interview interesting and worth the time (Berg, 2001; McCracken, 1988). Accordingly, a semi-structured focus group interview protocol was developed using a series of "grand tour" questions including key prompts to be used by the moderator to expand on participant responses (Appendix A). Table 2 connects the research questions with the question used during the interviews. Focus group interviews were organized to utilize up to two hours, though interviews typically only utilized an hour and a half.

Table 3-2 Focus Group Questions Addressing Research Questions

Research questions	Research sub-questions	Focus group question
How do students experience a course that uses the ESD framework?	What are the learning and development outcomes that students experience in the course implementation?	Q1, Q2, Q3, Q4, Q9
	What aspects of the course are perceived to have the most and least impact on learning and development outcomes?	Q1, Q3, Q4, Q5, Q6
	How do students experience the process that leads to learning and development outcomes?	Q1, Q4
	How do students compare their experience in the course to other courses in the apparel and textiles program?	Q7, Q8

Stewart and Shamdasani (1990) and Vaughn et al. (1996) both recommend focus groups should include 6-12 participants, while Berg (2001) recommends a maximum of seven. Focus groups are also typically conducted until participant responses begin to

repeat and become predictable, typically between two and four groups (Vaughn et al., 1996). Participants were recruited by collaborative group to insure that group members who were participating in the focus groups were not absent from their group's work time in the course. This would also insure approximately 3-8 participants for each focus group. The interviews were conducted outside of class but were held during the class period time to allow everyone the opportunity to participate. Students were recruited to volunteer for participation in the tenth week of the course and were offered a $20 financial incentive for their time. Ten of the fourteen students enrolled in the course volunteered to participate. Two focus groups were conducted, one with seven participants during the thirteenth week of the course and a second with three participants during the fourteenth week of the course. Each interview lasted approximately one hour and a half.

Vaughn et al. (1996) submit that when a researcher may contaminate the focus group environment, such as being too close to the participants, an outside moderator is recommended. As the researcher was the participant's instructor in the current study, it was unlikely that the two could be objectively separated. Realistically, it was likely that participants may have felt prohibited in giving honest answers and feared their grade may be have been impacted by their responses. Therefore, interviews for the current study were conducted by a trained moderator, the researcher's major professor. The moderator was considered ideal as she had experience conducting focus group interviews and was intimately acquainted with the study's theoretical influences as well as the research intent, but did not necessarily have a vested personal interest in the study's outcomes (Vaughn et al., 1996). Using the chapter from Vaughn et al. (1996), *The Role of the Moderator*, the researcher prepared the major professor for the assignment. The researcher discussed with the moderator the research questions and the theoretical underpinnings of the interview questions. Training also included a discussion about the moderator's role and conduct, exploration of potential responses and appropriate prompts to elicit elaboration, the key research interests that should be targeted, and the time that should be allotted for each question. A moderator's guide was assembled for the study (Appendix A), according to Berg (2001) and Vaughn et al. (1996), containing a detailed script for the moderator about

the study's purpose, the purpose of each segment of interview questions, as well as relevant probes that could be used.

The interviews were digitally recorded and transcribed by a third party to insure participant confidentiality. After transcription, the audio recordings were destroyed (Vaughn et al., 1996). Group participants signed a consent form at the beginning of the interview which explained the study's purpose and the anticipated benefits of their contribution to the study. Additionally, both participants and the moderator were required to sign a confidentiality agreement, recommended by Berg (2001), restricting public disclosure of participant identities and their comments, insuring anonymity. This allowed participants the opportunity to consider their ability to not disclose publicly what would transpire during the interview (Berg, 2001), but also insure the moderator would not disclose details of the interviews to the researcher during data collection prior to final grade submission. Further, to insure disassociation of participation in the interviews with course grades, student names were replaced by a participant number during transcription and the transcribed data was delivered to the researcher until the final grades for the course were submitted.

Student reflections

Reflection has been identified in the ESD literature as an important skill for students to develop (Forum for the Future, 2005; Howard, 2008; Keeney, 1992). More importantly, student reflections are considered to not only enhance the learning process but also provide a valuable evaluation tool about how students experience their learning environment and how learning takes place (Kuznic & Finley, 1993; MacGregor, 1993). As such, a template was developed by the researcher to assess student learning (Appendix D) and derive data related to the study's research questions. Students completing these reflective assignments were required to answer a series of questions, six items of which were directly targeted to understand the students' learning (first three questions) and development (latter three questions) experience in the course:

1) What have been the major learning epiphanies or outcomes you have experienced in this course so far?
2) What were the most important ingredients contributing to these epiphanies or outcomes?

3) Select an epiphany or outcome that you feel was one of the most important. Trace the process that led up to that learning epiphany.
4) In terms of the change agent skills included in the course, what has been the most important developmental progress you have made so far?
5) What were the most important ingredients contributing to this progress?
6) Trace the process that led up to the most important developmental progress you described above.

Students completed reflections twice during the semester, once at mid-term and during the final week of the course. Students were asked in the second week of the course for permission to utilize the reflections as data at the beginning of the semester, requesting a signed a consent form which explained how the reflections would be used as well as stored. Students were advised that their permission or denial of permission would in no way impact their final grade or their treatment by their instructor. Subsequently, students were offered a second chance during the thirteenth week of the course to withdraw from the study, as participants were recruited long before they may have entirely understood the implication of their participation.

Quantitative survey

To better understand findings found among the other qualitative data, a quantitative survey was administered on the second to last day of the course. The purpose of the survey was to determine, 1) if students perceived a significant change in their skills development as the result of completing this course, and 2) if there were differences in the amount of change among the six skills. The survey was designed to measure both the participant's perception of their knowledgeability about the six skills emphasized in the course (collaboration and cooperation, effective communication, conflict resolution, values-focused thinking, systems thinking, and reflection) and their perceived level of confidence to use these skills in their future work. The survey was termed the Change Agent Skills Final Survey (Appendix E). As it was unlikely that participants would understand the skills enough at the beginning of the course to evaluate themselves, a retrospective survey design was optimal. The survey prompted students to think back to when they first began the course and compare where they were in the beginning compared to where they perceived

they were at the end of the course. A 7-point Likert Scale was used. The survey was included in the original consent form.

Field notes and observations

Field notes and observations are another common form of qualitative data used in case studies (Merriam, 1998; Stake, 1995; Yin, 1989). Often used in a visit to the field, these notes taken by the researcher are most useful for providing additional information to enrich the study (Merriam, 1998; Yin, 1989). Key in these notes is a systematic approach to describing what is taking place and the subsequent implications that might be made for the study's research intent. What is noted is typically structured around the study's research questions or problem, and thus, certain aspects of the field receive a narrower focus than others (Merriam, 1998).

Field notes generally contain descriptions of the setting, the participants, and what is happening in the setting and may include direct quotes from participants or notes from informal conversations as well as commentary from the observer about what is happening. The volume of notes made is largely dependent upon how active a role the researcher is playing in the activity (Merriam, 1998). In the current study, the researcher is the instructor of the course; therefore, the ability to observe was significantly diminished by the plural nature of the researcher's responsibilities. As such, several measures were taken to contract and intensify the focus of the researcher's observations while in the classroom.

The researcher utilized a field note template (Appendix B), centering the researcher's attention on observable behavior that speaks to how the students were experiencing the course as well as descriptive note taking about what happened in each class period, including conversations with participants relevant to understanding student experience of the course. Merriam (1998) recommends that the researcher should follow all observations immediately with more extensive, reflective notes, before discussing with others the details of the observation. As such, after each class period, the researcher used the field notes to springboard an entry to a researcher's reflexive journal, discussed next.

Researcher reflexive journal

The practice of reflection is supported for both the researcher as well as the teaching practitioner. Stake (1995) regards reflective practice as critical to a researcher's development and improvement, while Hatton and Smith (1995) acknowledge reflection as good teaching practice as it is now a staple in teacher education. But most recently, authors have begun to champion for reflexivity in qualitative research, which is, put simply, an expansive type of reflection about reflection. Underpinned by the idea that reality is socially constructed, reflexivity is the exploration of multiple layers of interpretation from various, sometimes conflicting, contexts or theoretical lenses that the researcher investigates during the research process, offering a more sound discernment of the research conclusions (Alvesson & Sköldberg, 2009; Etherington, 2004). Etherington (2004) submits that it is reflexivity that brings the researcher and what is being researched into a more harmonious relationship by consistently exploring the researcher's feelings, thought processes, and personal experience in cultural, environmental, and social contexts throughout data collection and analysis. Further, making these explorations transparent in the presentation of the study aids in explaining how certain assumptions were made.

Etherington (2004) and Janesick (1999) submit that journal writing can be used as a qualitative research technique, considered an additional set of data. A journal can be used to document the history of the study as well as help the researcher better understand their own conceptual process (Etherington, 2004), like member checking with oneself (Janesick, 1999). The technique of journal writing can clarify the researcher's role in the study, leading to better understanding of the subjects in the study, and can be used to triangulate between the researcher and the subject's reflections (Etherington, 2004; Janesick, 1999). Most recently, Ortlipp (2008) used a journal during a qualitative doctoral study to make public her personal history, values, and assumptions during the final write-up as a vehicle to offer transparency of the research process, demonstrating the idiosyncrasies of the interpretive lens being used.

In the current study, the researcher maintained a reflexive researcher journal throughout the study, beginning when the course commenced and ending upon the completion of data analysis. The field note and observation template, discussed previously,

was used to springboard the reflexive journal entries related to what transpired during each class period throughout the study. The researcher completed a journal entry following each class period during both sections of the course, which consumed approximately 1.5 to 3 hours time, twice per week. The reflexive journal template was also used to document and reflect on issues related to research methodology, particularly during the inception of data collection and analysis tasks. For instance, the researcher spent several weeks at the beginning of study exploring a number of readings related to ethics in educational research. Other entries were made during the peak of data analysis, when the researcher needed to reflect and explore the viability of preliminary findings. In sum, the reflexive journal was used in this study to 1) document the research process by describing what the researcher was *doing* and what was happening among participants as a consequence, as perceived by the researcher, and 2) to make transparent the researcher's conceptual process in the systematic exploration of interpretations.

A template was created (Appendix C) to guide this reflexive process. The design of the template was responsive to the discussion above from both Alvesson and Sköldberg (2009) and Etherington (2004) about reflexive methodology. Both authors make clear that taking a reflexive approach to the research process must include a description of what is happening, an account of the researcher's feelings and thoughts about what is happening, and a systematic exploration of multiple interpretations during analysis. Therefore, the primary probes in the template prompt a narrative about what was happening, thoughts and feelings about what was happening, an exploration of possible interpretations, and implications for the study.

Artifacts

Physical artifacts and documents are often part of case study data collection (Merriam, 1998; Stake, 1995; Yin, 2009). In the current study, all course assignments/projects were collected, not for analysis, but for the purpose of describing the context of the case. The apparel product development course is characterized by many design-related projects and activities that demonstrate the personal expression as well as aesthetic inclinations of the students under study. These artifacts provided considerable context, offering a unique illustration of the kind of work students created during the

course. Students were asked to sign a consent form at the beginning of the course describing how the artifacts will be used and stored. Participants were also given a second chance at the end of the semester to withdraw this permission, as participants were recruited long before they may have entirely understood the implication of their participation, and specifically, the use of their intellectual property in potential publications.

Storage

Yin (1989) suggests creating a case study database, a logical chain of evidence from the research problem to the interpretations or conclusions. This is especially important as many different types of data will need to be collected and organized in a way that an external observer may see a logical trail leading to the conclusions. In the current case, data collected, including contextual artifacts and documents, student and researcher reflections, and interview transcripts were organized in digital files chronologically in a shared access file with the researcher's major professor. All physical copies of data were kept under lock and key during the course of the study. As mentioned previously, audio recordings of the focus groups interviews were destroyed after transcription was complete. All data was stored in the shared file until the researcher's exit from the university, after which the data became the sole property of the researcher, the continued confidentiality of participants insured under lock and key by her. Table 3-2 illustrates a by-week timeline of data collection activity associated with the portion of data being used for data analysis.

Table 3-2 Data Collection Timeline by Week

W 1	*W 2*	*W3–W7*	*W 8*	*W 9*	*W10*	*W11-W12*	*W13*	*W14*	*W15*
	Consent forms collected		Reflection 1 collected		Participants recruited for focus group interviews		Consent forms revisited Focus group 1 conducted: Seven participants	Focus group 2 conducted: three participants	Reflection 2 collected
Researcher reflexive journal entries: Twice per week →									

Data Analysis

Stake (1995) posits that analysis is the process of extracting the data most important to the study, taking those data apart, giving meanings to each of the parts, and identifying relationships between the parts. A deliberate procedure for data analysis is uncharacteristic of qualitative research (Merriam, 1998). Unlike quantitative research, data collection and analysis most often happen together in qualitative research (Merriam, 1998; Stake, 1995), and there is indeed no specific time at which data analysis may commence (Stake, 1995). As data collection begins, important insights and hunches begin to emerge, questions are refined, and as a result, the remaining phases of data collection may be pulled in a more specific direction (Merriam, 1998).

Coding is often used to categorize the various types of data to aid in retrieval later during synthesis (Stake, 1995). There is a wide array of coding strategies available in the

literature, most of which are not necessarily helpful for triangulating case study data. Stake (1995) submits that case study data analysis may be achieved through one of two strategies; direct interpretations of instances in the case or interpretations contributed to by a conglomeration of instances, but also argues that, ultimately, the purpose and length of the study often determine the depth and complexity of the analysis technique.

Boyatzis (1998) offers three basic types of codes most commonly used for qualitative data: theory-driven codes, codes used in prior research, and data driven or inductive codes. Though codes from prior research were considered inappropriate in the current study, as it was exploratory, both inductive and theory-driven coding proved useful. Inductive coding is essentially going into the data with no preconceived codes and looking for emergent themes related to research questions. While theory-driven coding is based on the constructs of a theoretical framework important to the study.

Both Yin (1989) and Stake (1995) suggest using theory-driven codes derived from the researcher's etic issues to categorize data first, a way to extrapolate relevant data and disregard other data before inductively coding. Further, Merriam (1998) submits that, specific to case studies, the goal of data analysis is to provide a good understanding of what happened. Having multiple types of data is a special challenge in case study analysis, making the need for organization fundamental. Case study data may be organized by topic or chronologically, and should be organized for easy retrieval during analysis.

Accordingly, the researcher prepared for data analysis by, first, organizing the study's research questions more distinctly to aid in categorization of the data. As some research questions were intended to be answered by different data sources, the research questions were first broken into manageable categories and assigned a letter-number code, illustrated in Table 3-3. Other specificity was also necessary at this time; principally, as the researcher's field notes and observations were used to springboard the researcher reflexive journal, it was no longer necessary to treat this as a separate source of data, as the information from the former was documented in the latter. Lastly, the researcher created a data analysis database, creating folders related to each research question for three primary levels of analysis for which the researcher intended to travel: categorization, code development, and application of codes.

Table 3-3 Categorization of Research Questions for Data Analysis

Primary Objective: *To examine the learning and development experience of students enrolled in a course that has been redeveloped using the ESD framework. A description of major outcomes and how they occur will allow implications to be made about how AT education might be enhanced by the use of the ESD, better preparing students for sustainable development*			
Research questions	Research sub-questions	Data collection [1]	Data analysis
Q1 How do students experience a course that uses the ESD framework?	Q1A What are the learning outcomes that students experience in the course implementation?	1) Student reflections 2) Focus group interviews 3) Researcher reflexive journal	Theory-driven, then Inductive coding
	Q1B What are the development outcomes that students experience in the course implementation?	1) Student reflections 2) Focus group interviews 3) Researcher reflexive journal 4) Final Skills Survey	Theory-driven, then Inductive coding & repeated measures ANOVA
	Q1C What aspects of the course are perceived to have the most impact on learning and development outcomes?	1) Student reflections 2) Focus group interviews 3) Researcher reflexive journal	Theory-driven, then Inductive coding
	Q1D What aspects of the course are perceived to have the least impact on learning and development outcomes?	1) Focus group interviews	Theory-driven, then Inductive coding
	Q1E How do students experience the process that leads to learning and development outcomes?	1) Student reflections 2) Focus group interviews 3) Researcher reflexive journal	Theory-driven, then Inductive coding
	Q1F How do students compare their experience in the course to other courses in the apparel and textiles program?	1) Focus group interviews	Theory-driven, then Inductive coding
Q2 How does the use of ESD enhance the student learning and development experience?	Q2A How does constructivism manifest in the learning and development experience of students in the course?	1) Student reflections 2) Focus group interviews 3) Researcher reflexive journal	Theory-driven coding
	Q2B How does the ESD framework manifest in the learning and development experience of students in the course?	1) Student reflections 2) Focus group interviews 3) Researcher reflexive journal	Theory-driven coding
[1] Artifacts, namely course activities and projects were collected for the purpose of describing the context of the case but were not be a part of the formal data analysis.			

Coding

Phase I: Categorization

Data analysis commenced when the first student reflection was collected, during the mid-term. Merriam (1998) suggests first identifying information in the data to make for easy retrieval later during theme development. Additionally, Boyatzis (1998) suggests reducing the data in some way, to better manage the development of themes. Thus, the researcher began first by reading through the fourteen reflections collected to get a general sense of what had occurred according to the student. Then, the researcher began to categorize the reflections according to researcher questions, identifying the locations of the answers to the research questions. Each time a category of data was identified, the researcher added a short summary, paraphrasing the description by the student. For example, for research question Q1A, the researcher used track changes in Word and began to identify all the locations in the data where a participant discussed something that they had learned by taking the course. Likewise, for research question Q1B, the researcher began to identify all the locations where a participant discussed their use of or some progress made toward collaborative or thinking skills by taking the course.

While categorizing this initial pass through the data, the researcher also began to generate rules about this categorization. For example, for research question Q1A, a rule for identifying a learning outcome was articulated as: "Any time a participant describes things that they feel they have learned or most learned from taking the course." Likewise, a rule for research question Q1B was: "Any time a participant describes the use of and/or progress made toward collaborative or thinking skills by taking the course. Statements related to skills use and development in student reflections may include terms from the course rubric used by students, such as 'interaction' or 'expression.' Statements should only be identified when the participant is referring to themselves and not their entire group." Concurrently, the researcher began to extract specific examples from the data to further assist in categorization. These rules and examples aided the researcher in consistently identifying categories of data fundamental to answering the study's research questions,

and also held the researcher accountable to categorizing the data according to student perception.

After the second student reflection was collected, at the course's end, the researcher repeated this procedure. When all of the student reflection data was categorized, the researcher involved a peer debriefer. Creswell (2007) recommends the use of peer debriefing to strengthen the credibility and validity of qualitative research by allowing an external party, unattached to the outcomes of the study, to review the researcher's inquiry practices and process. The peer debriefer may ask questions about the methods and interpretations made by the researcher that "keeps the researcher honest" (p. 208). In the current study, a professor of psychology at the researcher's institution was willing to provide such support. The researcher explained to the peer debriefer the procedure that was being used in the study thus far, making transparent the researcher's conceptual process. Each research question, the rules for identifying categories in the data, and the examples were reviewed by the peer debriefer. Additionally, the researcher and the peer debriefer read through two randomly selected student reflections together. This process revealed ways in which the researcher's role as the instructor may have, in some instances, colored the identification and categorization of relevant data. With these insights, the student reflections were reviewed once more by the researcher to insure categorization had been conducted consistently. Summarily, approximately three passes through the student reflections were necessary to comprehensively categorize this portion of the data.

The categorization continued when the focus group transcripts were delivered to the researcher upon final grade submission. The researcher read through the focus group data to survey the findings. Then, another pass was made through this data to categorize it, using the rules developed in the previous categorization of the student reflection data. Similarly, the researcher labeled each location with a short summary in the margin. Travel through the interview transcripts was much easier after having categorized the student reflection data with the peer debriefer's support.

Once the student reflections and focus group data were entirely categorized, the researcher created a table for each research question (excluding Q1E, discussed later) to aid theme development across the two types of data. The researcher then began to compile

all the paraphrased summaries from the categorization into these tables, making the potential answers to each research question from the two reflections and the two focus groups visible in one place. This allowed the researcher to identify where the summaries were beginning to aggregate. The researcher aggregated answers across the data by topic.

An exceptional process for Q1E

During categorization, it became apparent that students had especially struggled to describe their learning and development process and their experience living that process, the topic of research question Q1E. To insure the richest description possible for analysis, the researcher began to extract excerpts from the student reflections using the following rule: "When a participant describes any chronological process that led to the development of collaborative or thinking skills or the chronological process that led to learning a new concept(s) while taking the course. Descriptive statements describing what the experience was like going through that chronological process should also be included. This may be found in the reflective writing where the participant is prompted to explain such but may also be found in other locations in the data." These excerpts were copied and pasted into a table for each participant; meaning, a profile was created for each participant with all the excerpts related to that student's learning and development process and experience from both of their reflections. Consolidating these excerpts into one location for each student allowed the researcher to better understand the answer to the research question.

Then, the researcher read through each excerpt and paraphrased a short summary of the student's description. Then, the paraphrased summaries were used to form a narrative of each student's learning and development process and experience. Then, the narratives for each student were compiled into two tables related to the research question, one related to learning and one related to development. Related excerpts from the focus group data were compiled in a similar way. The researcher extracted relevant excerpts about the learning and development process and experience from the transcripts *by conversation*, compiled them into a table related to learning and a table related to development, then paraphrased each conversation. Subsequently, each paraphrased summary was then added to the previously developed tables which included the student reflection data. Then, the researcher read through the summaries in each table, applying

theory-driven codes where relevant and developing inductive codes that diverged from the theory. These were eventually merged into the final coding rubric, discussed next.

Phase II: Code development

Next, it was time to develop themes among the data more specifically. First, the researcher began with her own etic issues, derived from the theoretical underpinnings of the study, a recommendation of Yin (1989) and Stake (1995). Theory-driven codes are typically created using the researcher's personal understanding of the theory involved, crafted with the researcher's personal language, which is most often reflective of their own discipline (Boyatzis, 1998). Boyatzis (1998) suggests creating a coding rubric which contains the label or name given to each theme, the definition of the theme, rules for when to apply each theme, and examples of the each theme.

The researcher began by using the literature review in Chapter 2 to create a rough draft of a theoretical coding rubric to apply to the data. Boyatzis (1998) argues that the more rigidly the code is described, the less valid it becomes when attempting to reach agreements with external debriefers. Thus, the researcher began with a comprehensive laundry list of broad constructs related to ESD, constructivism, and dialectical constructivism, and then attempted to reduce and narrow the codes using the raw data to insure fit. Though the purpose of the study was centered on ESD, many of the specific *pedagogical approaches* used in the new course were highly influenced by constructivism and dialectical constructivism, thus, this portion of the coding rubric was developed first. The constructs of constructivism were held constant and given a superscript label$^{(C)}$, while codes related to dialectical constructivism, specifically those related to keeping the student in the ZPD, were added when they extended the constructivist codes and given a superscript label$^{(ZPD)}$. For example, in the context of constructivism *social interaction* and *collaboration* are both considered fundamental, but from a dialectical perspective of constructivism *interaction with an expert* specifically takes precedent over interaction with peers. The researcher repeated this process in developing codes related to ESD, labeling them with superscript label$^{(ESD)}$. In instances where constructivism was significantly correlated with themes in the ESD literature, a superscript label was placed on constructivist codes $^{(ESD+C)}$. For example, constructivist constructs such as *personal*

relevance and *challenging suppositions* are shared by both constructivism and ESD. Similarly, in instances where ESD extended a constructivist construct, an ESD code superscript label was placed by the ESD code$^{(ESD+C)}$, indicating its correlation with constructivism. For example, the constructivist construct *holistic instruction of broad concepts* is extended in the context of ESD to mean *holistic infusion of sustainability*.

Boyatzis (1998) recommends refining these codes to insure consistency among the data once a draft is in place. Accordingly, the previously developed tables were used to refine codes and their definitions. The researcher selected random portions of the data to use to confirm the codes and develop rules for application. The researcher selected even-numbered student reflections and the second focus group interview transcript. With this selection of data, the researcher read through the student reflections and interview transcripts once more, trying to identify the previously developed codes, concurrently correcting and clarifying codes to better fit the data. Specifically, rules of when to apply the codes were clarified at this time.

Once the researcher was satisfied that the codes best represented the data, the researcher met with the peer debriefer once more. The researcher explained her conceptual process to the debriefer, explained the codes and rules for application. First, the peer debriefer reviewed the developed codes, scrutinizing repetitive codes and problematic nuances. Then, the researcher and the peer debriefer applied the codes to one student reflection together and refined the coding system once more.

After meeting with the peer debriefer, the researcher began to apply the theory-driven codes to larger and larger portions of the raw data to insure fit. Through this exercise, the researcher discovered that in many cases the theory-driven codes were broad, covering large segments of the data in many cases, but within those segments of data were many different inductive themes, which put skin on the theory-driven codes from the students' perspective. For example, a prominent theory-driven code related to learning outcomes of the study was Sustainability Literacy, which is defined in the rubric as: "Understand sustainability, its implications and the need for change; additionally, literacy includes knowledge and skills needed to empower individuals to make change and move others to make change." The researcher could have simply left the data as is, but what was

a far more interesting strategy was to break out the various ways in which the student characterized this learning outcome, using *sustainability literacy* as an umbrella. Some of the themes most discussed in the data related to s*ustainability literacy* were s*ustainability knowledge* (gaining greater depth of), a*wareness of sustainability* (of sustainability issues in the apparel industry and the world), r*ecognizing sustainability's importance and the need for change* (sustainability's importance and accepting the change movement), and *personal consumption change* (habits that changed due to the course experience).

As such, rather than treating the theory-driven and inductive coding processes as two separate events, the researcher began to refine the coding rubric, merging the inductive themes with the theory-driven. This offered a less redundant coding scheme as well as a unique way to illustrate student perspectives of the theory which underpinned the course they experienced. During this process, portions of the data were selected randomly to practice application. Code names were clarified, definitions were refined, and examples were extracted. The researcher organized the comprehensive coding rubric by issues related to the study's research question: Outcomes of the course (Q1A & Q1B: Appendix G), impacts of the course design (Q1C & Q1D: Appendix H), process/experience (Q1E: Appendix I) and comparison to other courses (Q1F: Appendix J).

Phase III: Applying the codes

Once the coding rubric was refined and the researcher was confident that the best fit had been achieved, portions of the data that were not used during the rubric development were selected for a coding exercise between the researcher and the peer debriefer. The researcher applied the codes to ten pages of the first focus group interview transcript as well as two randomly selected student reflections, one from the mid-term batch, and one from the final batch. The researcher 1) attempted to apply codes to the largest portion of data possible, avoiding only in a few cases, coding part of a sentence only, and 2) limited herself to applying a maximum of three codes to any one excerpt of data to achieve the greatest clarity among themes. The coding rubric, the selections of coded dated, and the rules used by the researcher to apply codes were then given to the peer debriefer for review. The peer debriefer reviewed the coded data selection, comparing it to the rules of application above and the coding rubric. Upon this review, the peer debriefer

recommended several changes, some related to the elimination of weak codes and the refinement of others. Accordingly, the researcher made the recommended changes and resubmitted the coding rubric to the peer debrief who then agreed that the best fit had been achieved.

After the coding rubric was validated by the peer debriefer, the codes were then applied to the remainder of the data. Concurrently, examples of the themes were extracted at this time for the final narrative.

Analysis of the researcher reflexive journal

Since the current study was not necessarily about the researcher's perception of the student experience, the researcher reflexive journal was largely used to reinforce or extend themes articulated by participants. Thus, after the major themes of the study related to the research questions were developed and validated by the peer debriefer, the 30 journal entries were reviewed by the researcher and relevant excerpts were extracted. In many cases, excerpts were helpful in fleshing out themes discussed by participants, offering a theoretical perspective for which the student could not have had. In other cases, excerpts were extracted to simply corroborate the students' perspectives, reinforcing the study's themes with observations made by the researcher.

Quantitative survey

Twelve scales were developed to measure each of the six skills (collaboration and cooperation, effective communication, conflict resolution, values-focused thinking, systems thinking, and reflection); two scales each to account for 1) a self-score representing where the student perceived they were at the beginning of the course (a retrospective pre-test) and 2) a self-score representing where the students perceived they were at the course's end (post test). The scales were developed averaging all items included under each rubric item in the inventory. A repeated measures analysis of variance (ANOVA) was conducted with the two factors being Scale (6: Communication/Collaboration and Cooperation/Conflict Resolution/Systems Thinking/Values-Focused Thinking/Reflection) and Time (2: Pre/Post) as the two factors.

Role of the Researcher

As the researcher is the primary instrument in qualitative research, it is important to explore, like the validity and reliability of a quantitative instrument, the fitness of the researcher to the type of research being conducted. The researcher's personality and skill set can potentially hinder their ability to appropriately portray their participants' stories. A fundamental characteristic of qualitative research is the description of others multiple perspectives of reality; but, these perspectives must be filtered through the researcher's constructed reality. Therefore, personal biases that may impact the researcher's interpretation must be made transparent (Merriam, 1998). In sum, Yin (1989) describes this issue as the degree of openness the researcher has to contradictory findings.

It is, therefore, imperative to fully divulge the researcher's background and personal motives for the research at hand. First, the researcher grew up on an organic farm in a rural homeschooling community in which sustainable subsistence and community engagement were prized. The researcher left that community to study fashion merchandising in college and later worked in the apparel industry for 15 years prior to entering graduate study. The researcher experienced firsthand the barriers to sustainability in the apparel industry and the inherent conflict between the concept of fashion and sustainability. The decision to leave the industry largely centered on the interference of the apparel industry's *un*-sustainability with the researcher's personal values. Being a change agent became an ambition, with future industry professionals the target. Secondly, responsive to the researcher's concerns about the apparel industry, the researcher spent several years in graduate study, not only developing the course for the present study, but ascertaining a course of action appropriate for teaching sustainability to AT students. After commencing graduate study, the researcher began teaching undergraduate courses related to product development. During completion of a Master's practicum, a series of projects related to the integration of ESD in apparel and textiles (AT) education were completed, including a student survey of knowledge, attitudes, and interest about sustainability (Armstrong & Meyer-Brosdahl, 2009), a content analysis of one AT curriculum (Armstrong, 2009a), and an implementation study of an apparel manufacturing course (Armstrong & Rudd, 2009; Armstrong, 2009b). Additionally, in the course of doctoral work, the researcher conducted

studies to evaluate systems thinking skills among AT undergraduates (Armstrong & Hiller-Connell, 2010) and developed a rubric for collaborative work using the ESD skill set (Armstrong, 2010), used in the current study (Chapter 4). Insight gained in these projects has greatly colored the researcher's approach, not only to research, but to teaching, and therefore, has better focused the proposed study. At the same time, the researcher's interpretive lens is admittedly biased, as she is personally passionate and interested in sustainability. Nevertheless, the researcher has experience studying and teaching AT students as well as living sustainably. All may be considered as important preparedness for the task at hand. More specifically, the researcher's philosophical approach to research and teaching is underpinned by constructivism, an important lens for qualitative research, as it appreciates the social construction of reality of participants and leaves room for multiple truths (Yin, 1989; Stake, 1995).

Trustworthiness

Merriam (1998) submits that "the applied nature of educational inquiry thus makes it imperative that researchers and others have confidence in the conduct of the investigation and in the results of any particular study" (p. 199). Further, the inferences made from qualitative research are reasonably questionable as it is merely one story about what reality is; reality being "holistic, multidimensional, and ever-changing," both unfixed and un-measurable (p. 203). Both factors complicate the credibility of qualitative research (Merriam, 1998). The ethical risks are considerable in qualitative research. The potential to misunderstand what is being found in a study begs the need for strategies that will root out those misinterpretations, although the methods for going about validation are not generally agreed upon (Stake, 1995). On the other hand, strength may be found in qualitative data as the closeness of the researcher-as-instrument to the reality of the participants is more ideal (Merriam, 1998; Stake, 1995), as opposed to the use of a quantitative instrument separating researcher from participant (Merriam, 1998). Anfara, Brown, and Mangione (2002) oppose the language associated with experiments (e.g. validity, reliability) and suggest the use of tenets such as credibility, transferability, dependability, and confirmability. Thus, the following discussion is framed in this context.

One common technique to increase confirmability is the use of multiple sources or types of data, commonly termed triangulation (Merriam, 1998; Stake, 1995). In the current study, multiple data types were used: student reflections, focus group interviews, a quantitative survey and a researcher reflexive journal. A method used to increase credibility is the use of long term observation, particularly when data is collected throughout (Merriam, 1998). In the current case, the researcher remained in the field over an entire semester collecting data across a four-month period (Merriam, 1998). The use of a prolonged period in the field also heightened the transferability of the study's findings, by allowing for a rich description of the case. Another measure taken to raise credibility of the case was the use of a peer debriefer throughout data analysis (Creswell, 2007; Merriam, 1998). A measure taken to separate the researcher from her subjects during data collection, increasing the dependability of the research, was the use of a trained moderator during the focus group interviews (Vaughn et al., 1996). The use of peer debriefing as well as an outside moderator offered a second pair of eyes to scrutinize the researcher's practice and conceptual process, strengthening both the credibility and transferability of the study.

Summary

In the preceding, the research intent and its methodology were described. The current study used a qualitative case study research design to study the experience of AT marketing and design students during one semester were enrolled in *Private Label Apparel Product Development,* a course that has been redeveloped according to the ESD framework. Implications from the study were used to derive insight into how ESD might transfer to AT education (discussed in Chapter 6). The particulars of the study's methodology, including the data collection and analysis methods, and the elements of trustworthiness have been outlined. In the following chapter, the redevelopment of the course used for this study is described, including the curriculum development approach employed and a discussion of the lessons learned from an eight-week pilot.

CHAPTER 4 - **Course Redevelopment**

In the previous chapter, the methodology for the current study was described. As the purpose of this study was to examine the learning and development experience of students enrolled in a course that has been redeveloped according to the ESD framework., the redevelopment of an apparel and textiles (AT) course for this purpose was imperative. A model for the course redevelopment was created to guide this exercise. In this chapter, the philosophies of influential curriculum theorists and their role in the course redevelopment model are outlined, and a model is introduced. Then, the course redevelopment process is explained step by step. Finally, lessons learned from an eight-week pilot are discussed.

As previously mentioned, UNESCO's decade for education for sustainable development, now more than half over, has yielded the least progress in the areas of pedagogical innovation and curriculum redevelopment for sustainability (Cotton, Bailey, Warren, & Bissell, 2009; de le Harpe & Thomas, 2009; Sterling & Scott, 2008). A primary impediment in the redevelopment of curriculum for sustainability is the highly specialized nature of academic disciplines (Everett, 2008; Calder & Clugston, 2003; Haigh, 2005; Jucker, 2002; Moore, 2005; Warburton, 2003). For instance, in the AT field, faculty develop a wide purview of specializations (i.e. anthropology, psychology, history, natural sciences). More challenging, the AT curricula is commonly segmented between textile science, merchandising, and design domains, widely varied in curricular priorities. This kaleidoscopic milieu constrains consensus about educational priorities. Nevertheless, faculty are increasingly under pressure to integrate sustainability into their courses.

In recent years, the typical approach for the integration of sustainability in AT curriculum has been to treat the concept as an added topic, adding a separate module or course to the curriculum. Sterling (2004) argues that this strategy lacks an epistemological foundation oriented to sustainable development, such as that described by the ESD framework (Chapter 2). In other words, the nature of the knowledge at hand becomes muddied when sustainability is incorporated into curricula in a fragmented fashion rather than systemically. Likewise, a consequence of such a strategy is the dualism created by

situating sustainability-related content adjacent to traditional course content, which Bowers (2001) argues may contain language, such as taken-for-granted root metaphors, that perpetuate unsustainable cultural patterns. Root metaphors like anthropocentrism, progress, patriarchy, and individualism dominate many disciplines and largely diminish the ability to identify and adopt new, more ecologically sound understanding. Similarly, Jucker (2004) argues, ". . . it is impossible to look at educational issues before we develop a clear understanding of the dominant ideologies that currently perpetuate *un*-sustainability. Only if we appreciate the pervasiveness and the fallacies of such concepts as 'development,' 'growth,' and 'progress' within a limited biosphere can we start to see what ecojustice might mean: equitable sharing between all human beings, the natural world, and future generations" (p. 10). Conflicts such as these may cause the learner to feel as though they are being pulled in two very different directions. Consequently, an observation made by the researcher in her teaching experience, is that AT students largely perceive sustainability as an option or special trend that in *some instances* relates to AT, rather than perceiving sustainability holistically.

As such, there was a need in the current study to develop a process which would insure the course's holistic application of sustainable development, a mechanism for *reframing knowledge* (Chapter 2) according to the ESD framework. Thus, a model was created, designed to root out potential conflicts between the priorities that support sustainable development and the predilections of AT which may perpetuate *un*-sustainability. Further, the requisite alterations required to transform an educational experience reflective of the ESD framework, discussed in Chapter 2, are expansive. Accordingly, a curriculum development approach was taken to the course redevelopment, considered an optimal method for organizing such a complex process.

Here, two approaches to curriculum development, the Tyler Rationale (1949) presented in the *Basic Principles of Curriculum and Instruction* and Elliot Eisner's (2002) approach presented in *The Educational Imagination*, were highly influential in the course redevelopment model created for this study. The Tyler Rationale, one of the most widely recognized curriculum development approaches in American curriculum, was used chiefly for its structure, providing an important skeleton for the course redevelopment model.

Notably, Tyler's approach has been heavily criticized among curriculum theorists for its linear and systematic nature and the model's many unintended consequences that have manifested in the American educational system (Marsh & Willis, 2007). Thus, the inclusion of Eisner's (2002) approach was pivotal for its congruence with the educational philosophy and psychology of ESD and its responsiveness to the shortcomings of the Tyler Rationale. Subsequently, Eisner's (2002) approach, in contrast to Tyler's, allowed for greater flexibility and creativity in the course redevelopment process. The resulting model provided a framework to redevelop the AT course, insuring symbioses between the AT discipline objectives and those of ESD. Notably, this model may prove useful to faculty desiring to redevelop individual courses for sustainability, when the option to redevelop an *entire* curriculum may not yet be possible.

Curriculum Development Approaches: Ralph Tyler Meets Elliot Eisner

Although curriculum development is thought to have begun as early as the 18th century, many curriculum development models emerged in the early 1900's to guide educational planning and evaluation in response to dramatic societal changes. Historically, faculty psychology theory dominated curriculum paradigms; the idea that the purpose of education is to exercise the brain like a muscle through memorization and recitation. The Tyler Rationale countered this paradigm, offering a structured, mostly linear framework for developing curriculum to achieve the student's developmental needs as well as societal needs (Pinar et al., 1995; Tyler, 1949). Eisner's (2002) approach came later in the 1960's during the Reconceptualization of education, a movement which questioned the viability of structure and systematic process in educational design altogether; advocating instead for flexibility, variety, and most importantly, imagination.

Marsh and Willis (2007) categorize curriculum development approaches into four groups: procedural (describe steps of process), descriptive (describe plan for events & decision making), conceptual (discuss general levels of planning), and critical (emancipation or critical reflection) (p. 71). The approach of Tyler (1949), commonly termed the Tyler Rationale, falls into the first category, while the approach of Eisner (2002) falls into the last category. Respectively, on a continuum, the two authors occupy polar

positions; Tyler (1949) emphasizing the planned curriculum with a preoccupation with *outcomes*, Eisner (2002) emphasizing the enacted and experienced curriculum with a preoccupation with *process*. In the current study, these distinctive strengths are both used to generate a new model for course redevelopment reflective of ESD.

The Tyler Rationale

Ralph Tyler's (1949) curriculum development approach is one of the most recognized (Oliva, 2009; Marsh & Willis, 2007; Pinar et al., 1995). Interestingly, Tyler rose to prominence during his leadership role in the Eight-Year Study conducted during the Progressive Era of education, discussed earlier in Chapter 2. He supervised the evaluation for the study, work that later would become a chapter in his book describing his curriculum approach. Tyler was heavily influenced by George Counts, for his penchant for scientific method in curriculum development. Tyler's approach in the Eight-Year study systematically linked learning objectives to measureable outcomes, and in the end, this aspect has far greater influence over American curriculum than the Eight-Year study ever did (Pinar et al., 1995).

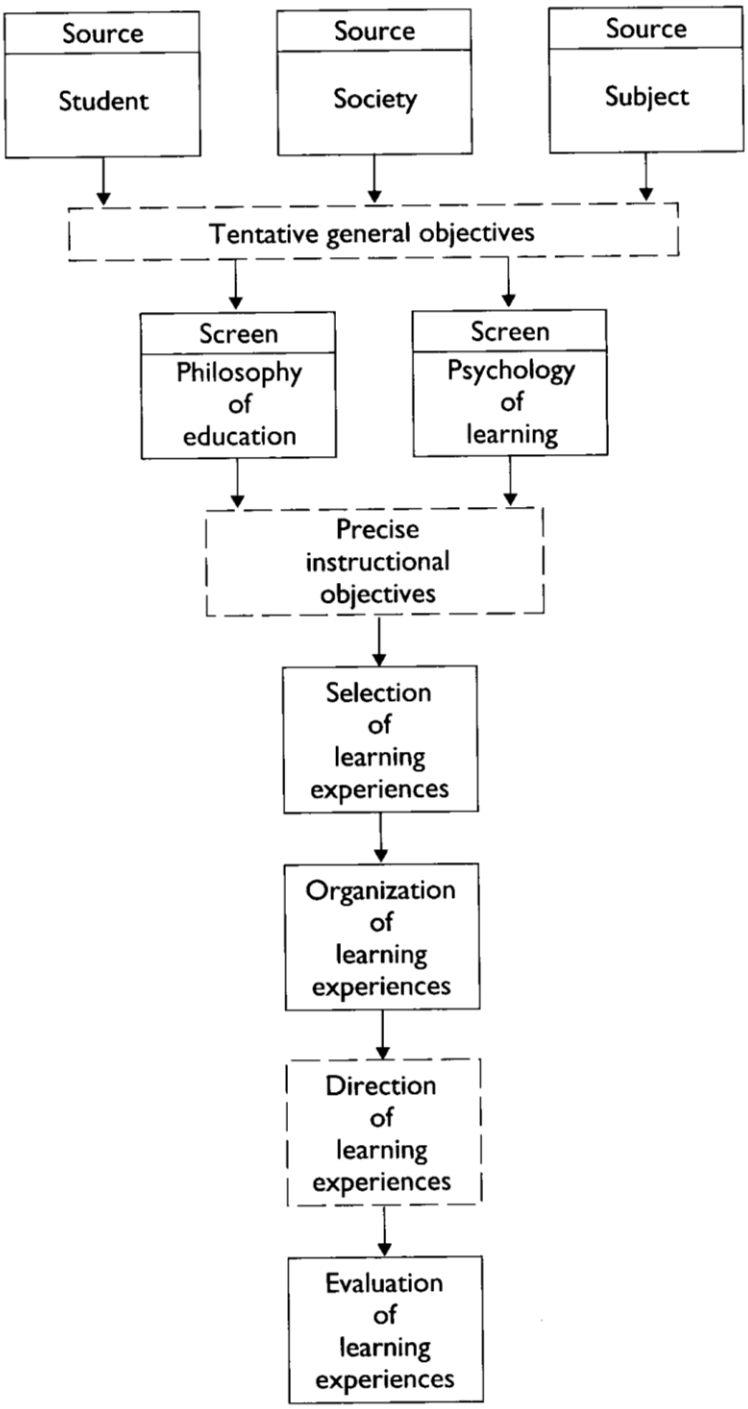
Centrally focused on the delivery of outcomes, American curriculum developers once flocked to the Tyler Rationale, as most reform movements in the US have promoted an outcomes-based educational system (Marsh & Willis, 2007). The model consists of four primary questions Tyler felt all curriculum planners must answer:

1. What *educational purposes* should the school seek to attain?
2. How can *learning experiences* be selected which are likely to be useful in attaining these objectives?
3. How can learning experiences be *organized* for effective instruction?
4. How can the effectiveness of learning experiences be *evaluated*?

Tyler's (1949) model, illustrated in Figure 4-1 by Oliva (2009), emphasizes planning: *planning* the purpose of education, *planning* educational experiences to support that purpose, and *planning* for the evaluation of the outcomes of that plan. The dashed boxes indicate additions made by Oliva (2009) to clarify steps in the process. The process begins with the articulation of general objectives from three primary sources: the students, society, and the subject matter. Meaning, Tyler (1949) suggests curriculum developers

assess the needs and interests of the learner, the objectives of the local community and society, and the instructional objectives of the specific subject matter. When developing a comprehensive curriculum, Tyler advocates for the use of primary data and analysis to begin the process of identifying these objectives. For example, data collection may include interviews with students about their perceived educational needs or experiments in the school setting to better understand individual needs (student source), studies of contemporary life, such as those studying the movements of learners in the community in which they live to discern direct implications for educational objectives (society source), and consultation with discipline specialists about the educational priorities in the subject matter (subject matter source). In the development of these objectives, Tyler emphasizes the need to find implications in the data for educational objectives and make explicit what, in fact, can be reasonably developed through education and what should be developed at home or in the community.

Figure 4-1 Tyler Rationale (Oliva, 2005, p. 133)



Tyler recommends that the accumulated objectives from this vast array of data collection should then be perceived through two filters, a philosophical screen (the purpose of education) and a psychological screen (how people learn). The philosophical screen is a statement by educators about the values that underpin the purpose of the education. In this statement, Tyler (1949) recommends educators define what constitutes "a good life and a good society" (p. 34); meaning, the quality of life and society education will be expected to deliver. These values may include promoting desired behavior, values, or ideals. The definition may also include a perspective on material value and success. Tyler advocates for a clearly stated philosophy with specific implications for educational objectives, as the statement is used to determine which educational objectives best align with this philosophy and which are incongruent and are thus, best removed.

Likewise, the psychological screen is designed to make explicit the preferred learning process or theory associated with the curriculum developed; in sum, the articulation of a dominant learning theory that colors how and under what conditions learning best takes place. This screen is used to determine the feasibility of learning objectives for the time period and age group of the learner involved, time period required to obtain an objective, the sequence of objectives, and the conditions necessary to obtain them. Similar to the philosophical screen, Tyler (1949) recommends a clear statement about the critical components of the psychology of learning be used in the situation, indicating implications for educational objectives. According to Tyler, the process of submitting educational objectives through these two screens should result in a reduced, concise, and more focused set of instructional goals, reflective of the educational philosophy and psychology of the curriculum developers.

In the latter portion of the Tyler Rationale, the theorist recommends the development of learning experiences in accordance with the precisely defined set of learning objectives created in the previous steps, for which these experiences should be designed for the intent purpose of delivering the *predicted* objective. Though Tyler (1949) contends that each student may have a different experience in the same classroom, the goal is clearly, nevertheless, to bring each student to the same outcome.

These learning experiences should then be organized using three primary criteria: continuity, sequence, and integration. Meaning, the learning experiences should be positioned to be revisited throughout a learner's curriculum experience, should graduate sequentially and successively, and should be integrated to relate to other levels of the same content area as well as other content areas. Tyler (1949) also suggests these experiences be organized around primary elements; for example, in the current study these elements are knowledge, skills, and values that support sustainable development. Other organizing principles may include chronology or breadth; in other words, placing objectives in some kind of order or describing the depth at which the concept may be explored. Once a general scaffold is in place, Tyler (1949) recommends planning specific lessons, topics, or units and the time period for which they will be implemented.

On the topic of evaluation, Tyler (1949) does not waiver from his penchant for organization, precision, and measurement. The theorist argues that evaluation serves two purposes: one, to learn of a program's effectiveness, and two, to identify areas in need of improvement. Accordingly, the curriculum developer should return to the originally stated objectives to guide selection of appropriate evaluation methods. Tyler (1949) posits that this process may require the restatement of objectives when a reasonable plan for evaluation is not explicit. Meaning, the learning objective must be stated in a way that is indicative of how it will be measured. Once a method is identified, the situations in which they may be used are planned. Tyler (1949) offers many suggestions for evaluation methods such as interviews, observations, questionnaires, written work, artifacts, or records. However, the author devotes much of his chapter on the topic of the "devices" (p. 107) or "instruments" (p. 114) or "paper and pencil tests" (p. 107) and the objectivity, reliability, and validity of such measurements, an audible preference for quantitative methods for evaluation. Tyler (1949) argues at the end of his book that the four questions he sets forth are not necessarily to be taken in any particular order (p. 128), although arguably, the questions evidence thoughtful scaffolding that lends to linearity.

Eisner's approach: The educational imagination

Elliot Eisner was chiefly influenced by John Dewey and the predilections of the Progressive Era of Education, discussed in Chapter 2. Pronounced in Eisner's work (1967, 1998, 2001, 2002) is his opposition to the standardization and operationalization for efficiency in education, chief features of educational reform movements like the Progressive Era of Education in the 1930's and the Reconceptualization of education in the 1960's (Pinar et al., 1995) as well as the ESD movement. Rather, Eisner (1998, 2000) advocates for the study of how students *experience* education in local contexts, as much can be learned by paying close attention to the values and context at play in specific educational situations. When the idiosyncrasies of the context are called out in the educational experience, pathways to meaningful changes for the curriculum may be identified that are sensitive and responsive to specific learners. In other words, whatever changes made to the curriculum must be forthcoming to the characteristics of the specific students for which it is targeted: who they are, where they are, what resources are available to them, etc. When changes are made that are insensitive to these factors in the name of efficiency, certain students are marginalized and education is compromised. As such, Eisner (2002) submits that educators and administrators must continually scrutinize the ideologies that dominate their decision making. These ideologies are sometimes explicit but mostly implicit, and to the degree that they go unnoticed is practical action to make change impossible.

Eisner (2002) argues that the potential design and implementation of one curriculum for all students, everywhere is implausible, once saying, "Standardized teaching, from an educational perspective, is an oxymoron" (p. 7). He warns educators and administrators to be weary of educational solutions that appear wholly fixed, that solutions ignorant of local values and context are at the heart of the decline in education. Instead, Eisner (2002) challenges curriculum developers to embrace the intrinsic uncertainty and complexity of the process, remaining flexible enough to allow for continual evolution. Categorized as a critical approach to curriculum development (Marsh & Willis, 2007), Eisner (2002) approaches the task artistically. As an artist carefully selects a multitude of different elements to portray their vision of reality, so does the curriculum developer. In

Table 4-1 the primary elements to be used on the educational palette in Eisner's (2002) approach are contrasted with the Tyler Rationale.

Table 4-1 Approaches to Curriculum (Marsh & Willis, 2007, p. 73, 83)

Tyler (1949)	Eisner (2002)
Decide on the education purpose What educational purposes should the school seek to attain? **Select learning experiences** How can learning experiences be selected that are likely to be useful in attaining these objectives? **Organize learning experiences** How can learning experiences be organized for effective instruction? **Plan for Evaluation** How can the effectiveness of learning experiences be evaluated?	**Goals and priorities** Explicit & less rigidly defined Allow ample time for deliberation **Content of the curriculum** Explore content options Scrutinize explicit, implicit, & null curriculum **Types of learning opportunities** Seek transformative goals meaningful to students **Organization of learning opportunities** Nonlinear approach Expansion and extension of outcomes welcomed **Organization of content areas** Emphasis placed on entire curriculum **Mode of presentation & mode of response** Variety of modes extend opportunities for students **Types of evaluation procedures** Broad range of methods administered at multiple stages

Eisner (2002) disparaged Tyler's (1949) approach for trying to make simple something so inherently complex, his central contention being with Tyler's conjecture that the most compelling educational outcomes are *always* followed by precisely stated objectives. According to Eisner (2002), explicit outcomes should be joined by other more expressive outcomes that are not as rigidly defined. Further, he believed that educational outcomes or activities may, and sometimes should, change the goals. In other words, the performances of students should not be planned to a predictive degree, but allow ample room for emergent outcomes, unexpected outcomes, outcomes that may expand the educational goals. As such, instead of offering a specific framework for setting goals and priorities for a curriculum, Eisner (2002) encourages the malleability of curriculum developers when embarking on the tenuous endeavor of balancing the educational ambitions of stakeholders and the constraints of the local contexts, taking time to deliberate critical trade-offs in decision-making:

> "There are always trade-offs in time, expected outcomes, human and fiscal resources, community support, and the like. To neglect the big picture is to court disaster, yet to regard the context only as a set of constraints rather than a set of opportunities is to embrace a maintenance model of educational management" (p. 136).

Eisner (2002) makes apparent that values, intentions, and future-mindedness should be central in planning educational aims. Likewise, as the goals and priorities rarely designate specific content areas that might deliver them, Eisner (2002) advocates for a variety of content options to select from for the curriculum. Though there may be a variety of concepts considered important in a subject area, there may be a variety of different content considered equally sufficient in helping the learner understand them. Again, the context, specifically the student and their experiences, should be considered.

Just as Eisner (2002) advocated for the transparency of explicit and implicit ideologies that influence curriculum developers, so did he call for an effort to make transparent the explicit, implicit, and null curriculum (what is not taught at all), as what is learned is not always what is taught. According to Eisner (2002), both the implicit and the null curriculum should be called out in the development process in effort to make more

holistic curriculum decisions, a far more complex task. Eisner (2002) devotes an entire chapter of his book to these three types of curriculum, unearthing a variety of considerations educators may make, recommending that at times, the implicit curriculum may need to become more explicit.

While Tyler emphasizes learning experiences as the chief platform to deliver precise learning objectives, Eisner (2002) describes learning opportunities as the vehicle of transformation for goals and content. According to Eisner (2002), the crafting of such events requires the greatest imagination and artistry of *teachers*, another critical departure from Tyler (1949), who was partial to subject specialists, who were often far removed from the classroom. Eisner (2002) believed that an understanding of the learners who would experience such events is best discerned by the practitioner, for which the expertise of the subject specialist is considerably more limited. Noticeable in Eisner's (2002) explanation of these events is partiality to high levels of student engagement, crafting learning opportunities that are interesting to students as well as those that prompt student to think, act, and learn from the outcomes of that experience, rather than subject knowledgebility as the only important end. For clarity, Eisner (2002) believes that the desired outcomes consistent with a specific field are important, but the *process* of getting there holds equal priority.

Eisner (2002) recommends a spider web approach to organization for learning opportunities. He opposes the traditional staircase model of organization, akin to the Tyler Rationale (1949), building the curriculum in a more linear fashion, each course building on the next, designed for efficiency, leaving little room for exploration or accidental discoveries. Rather, Eisner (2002) felt curriculum organization should take the form of projects, activities, or materials designed to solicit engagement and action. This offers the student the opportunity to develop ideas and skills that differ from their peers, while the teacher facilitates the interests and goals of the student while they weave their own authentic web. Eisner (2002) admits that this type of organization commands the most from teachers, as they must intuit through emergent responses, getting to know the student and understanding and providing the resources they need for their journey. Another primary challenge with this type of organization is that most disciplines embody a

structure set by tradition, for which Eisner (2002) warns is often implausible to abandon in traditional subject areas. At best, he recommends that content areas show a strong relationship to each other across the entire curriculum, but may not evidence a precise scaffold as in Tyler's model.

It is Eisner's (2002) elements, the mode of presentation and mode of response, which evidence the greatest extension of the Tyler Rationale (1949). The consideration of how learning opportunities are presented to the learner and how students are permitted to respond to them, explaining what they have learned, is virtually absent from Tyler's (1949) approach. Eisner (2002) argues that these factors often receive only minimal attention, if any at all, by curriculum developers. Traditionally, modes of presentation and response have been verbal and written only, modes that Eisner (2002) considers to constrict what is possible for the learner. Instead, Eisner (2002) defends variety in modes of communication from the teacher as well as from the student, a more sensitive approach to the unique expressive predilections of the learner. Again, Eisner (2002) warns that the signature modes used in a discipline, to which the learner are more likely accustomed, should be considered first, but should not be entirely limited to these only.

Finally, Eisner (2002) posits that evaluation should be diffused throughout all the previously discussed elements. Therefore, decisions about evaluation should be made throughout the curriculum decision-making process, not as a separate function at the end, as implied by Tyler (1949). In the most recent edition of his book, *The Educational Imagination*, Eisner (2002) revises his formerly used term *evaluation*, a term connoting the search for knowledge about something, to *assessment*, a term associated with the function of decision making. Not a fan of scientific measurement, Eisner (2002) encourages greater use of authentic forms of assessment, types of assessment that speak more to *how* a student arrived at an outcome, rather than simply measuring the outcome. Similar to the discussion in Chapter 2 regarding such assessment, these types of appraisal should also serve the student in some way, extending their learning further. Eisner (2002) offers eight principles for such assessments paraphrased here (p. 203- 209). Methods should:

- Reflect those encountered in the real world, not just in school

- Reveal how the student solved the problem, not just the solution arrived at
- Reflect the values of the field from which they are derived
- Require group effort, not just a lone act
- Offer more than one possible answer or solution
- Have relevance to the content, but encourage transfer to other settings
- Be sensitive to the whole, not isolated pieces
- Allow the learner options of how to present what has been learned

Generally, authentic methods of assessment are designed to better prepare the learner for life outside school, increase lifelong learning attitudes, promote retention and understanding, and expand collaborative skills (Eisner, 2002). Admittedly, these methods also require far more exertion on the part of teachers; however, Eisner (2002) argues that the use of them signals to the learner what is most valuable in their development.

Tyler and Eisner: Criticisms

Arguably, the Tyler Rationale (1949) resembles directions to a puzzle in contrast with the design of a dynamic educational journey described by Eisner (2002). Though Tyler (1949) pays homage to techniques reflective of the Progressive Era of Education in his approach, it is incontrovertible that the theorist favors linearity, prediction, pedagogical control, and quantitative evaluation, while Eisner (2002) is a proponent of the antithesis. Notably, though Tyler (1949) has argued that his approach is not entirely linear (p. 128), it is difficult to discern how each element in his model *could* be taken out of order. Eisner (2002), on the other hand, openly contends that curriculum development is anything but a concrete set of specifics. Instead, his elements are tools to be utilized, rather than a prescription to be followed. Considerations should be made iteratively and in any order. Divergence from Eisner (2002) on a number of points has yielded Tyler (1949) ample criticism.

First, Tyler's preoccupation with structure may not fully reflect the iterative nature of curriculum development in reality (Marsh & Willis, 2007; Oliva, 2009; Pinar et al., 1995).

Eisner (2002), on the other hand, embraces this ambiguity and recommends an artistic response to the nature of the process. Second, Tyler's emphasis on the prediction and measurement of outcomes may lead to some unintended consequences (Doll, 1993). Chiefly, Marsh and Willis (2007) argue that learning outcomes may be taken for granted and the list of accepted ideas to cover may become the ideas most easily accomplished. Neither invite innovative or challenging changes in the curriculum, as learning outcomes are most likely chosen for their conceivable achievability and measurability; outcomes falling outside those proscribed may not be fully appreciated or welcome (Doll, 1993; Eisner, 1967; Marsh & Willis, 2007). Third, Tyler's (1949) penchant for the scientific measurement of the chosen outcomes may not adequately capture the qualitative nature of how the curriculum is experienced (Eisner, 1998; Marsh & Willis, 2007), and assuredly may eclipse emergent outcomes (Doll, 1993; Pinar et al., 1995). Eisner (2002), on the other hand, encourages the development of educational goals that invite transformation by the learner and require qualitative tools such as authentic assessment, which enhance the student's learning and make transparent the learning *process* as much as the outcome.

Lastly, Tyler's (1949) preference for the prominent role of subject specialists in curriculum development, specialists often responsible for the authorship of primary textbooks and other course materials but for whom may be far removed from the classroom, has also been a ripe target. These specialists are often criticizes for their tendency to prescribe objectives that are highly technical and designed to deliver the next generation of subject specialists in that area. The considerable power that may be held by such specialists in the curriculum is not entirely desirable (Marsh & Willis, 2007). Eisner (2002), on the other hand, champions for intellect and judgment in curriculum development, particularly the empowerment of *teachers* as imaginative professionals; as the practitioners hold the greatest stake in what transpires in the classroom. As teachers are those who enact the curriculum, they are in the most unique position to observe it, and therefore, are in the most opportune position to artistically and creatively alter the curriculum through practical experience. Table 4-2 summarizes the key points at which the two curriculum theorists diverge.

Eisner (2002) has not been immune to criticism either; the theorist's lack of specificity, chiefly. Some have speculated that the model's openness and flexibility are *too* akin to artistry for curriculum developers looking for specific guidance (Marsh & Willis, 2007). But, it is this malleability that has been most useful in synthesizing the two, seemingly disparate, approaches for the purpose of the current study. The Tyler Rationale (1949) provided a useful scaffold to structure the course redevelopment process, while the philosophy and creativity of Eisner (2002), considered most akin to ESD, enhanced the model.

Table 4-2 Divergence Between Tyler and Eisner

Author	**Tyler (1949)**	**Eisner (2002)**
Curriculum development process	Linear, structured, systematic	Uncertain, complex, flexible, iterative, artistic
Curriculum developer	Subject specialist	Teacher
Learning outcomes or objectives	Precise, predictable; designed for measurement	Some explicit, some expressive; designed for transformation
Goal of learning experiences	Outcome delivery	Emergent outcomes
Organization of learning experiences	Linear	Spider web
Nature of evaluation or assessment methods	Quantitative	Qualitative
Purpose of evaluation or assessment	Measurement of quality of education & areas of deficiency	Description of student experience
Nature of curriculum	Prescriptive	Responsive to local context

On the surface, both approaches of Tyler (1949) and Eisner (2002) converge on many of the same factors. Both authors agree that decision making must largely center on the articulation of desired educational goals, the planning and organization of experiences that may allow learners to meet or exceed those goals, and an evaluation plan that speaks to the quality of the educational program. From there, the philosophies of Tyler (1949) and Eisner (2002) diverge remarkably. Nevertheless, the opposition of the authors' philosophies was inconsequential in the current study, as it is instead the strengths of both approaches that held promise, making notable contributions to a new model for course redevelopment.

The course redevelopment model

Notwithstanding the previously criticized linear nature of Tyler's (1949) approach, it was, in fact, this feature that proved invaluable to a new course redevelopment model, particularly the portion of the model used to develop the statement of educational objectives. Specifically, the structure offered in the collection and analysis of various types of information (about students, society, and the subject matter) and the systematic screening of those objectives with the relevant educational philosophy and psychology were characteristics well poised to offer the current study a mechanism to arrive at cohesive and clearly stated objectives that would align with the epistemology of ESD. Further, Tyler (1949) offered a systematic way to go about the necessary research across many disparate sources of information, such as apparel product development, AT education, sustainable product development and design, and ESD. It also provided a method for reframing those objectives through the lens of ESD and constructivism. In other words, the structured scaffold provided by Tyler (1949) satisfied a gap where Eisner (2002) is more vague and flexible.

But, Tyler's (1949) influence on the model ended there. The theorist's penchant for precision and predictability, especially over outcomes, was especially incongruent with the philosophy of ESD, in which exploration is emphasized, as well as a dialectical perspective of constructivism, connoted by high levels of social interaction and unpredictable emerging outcomes that result from that interaction. Thus, Eisner's (2002) approach was considered exceptionally compatible with the philosophy of ESD as well as a dialectical perspective of constructivism. Eisner's (2002) opposition to standardization and efficiency in education as well as his scrutiny of dominant ideologies that manifest in curriculum decisions, like an industrial model of education, is shared by ESD authors (Foster, 2002; Haigh, 2008; Orr, 2003; Rees, 2003). His preoccupation with the implicit curriculum as well as the null curriculum (what is not taught at all) aligns with ESD authors like David Orr (2004) who argue that *how* we teach is just as important as *what* we teach, especially when it comes to sustainability. Indeed, to implement sustainability education holistically, the implicit and the null in the system must be made transparent. Undoubtedly, Eisner's (2002) sensitivity to the values-laden nature of curriculum development is responsive to ESD. Eisner (2002)

also embraces ambiguity and complexity in the curriculum development; akin to how ESD authors perceive that nature of holistic integration of sustainability into curricula (Landorf et al., 2008; Schlottman, 2008; Sterling & Scott, 2008).

Further, Eisner's (2002) artistic approach to crafting authentic educational experiences responsive to local contexts (Gough & Scott, 2001; Hopkins & McKeown, 2005; UNESCO, 2005) easily relates to the ESD framework. Eisner's (2002) attention to *how* students experience education and his propensity for individual-centered curriculum strategies also align with many of the pedagogical theories associated with ESD like experiential learning or participatory learning.

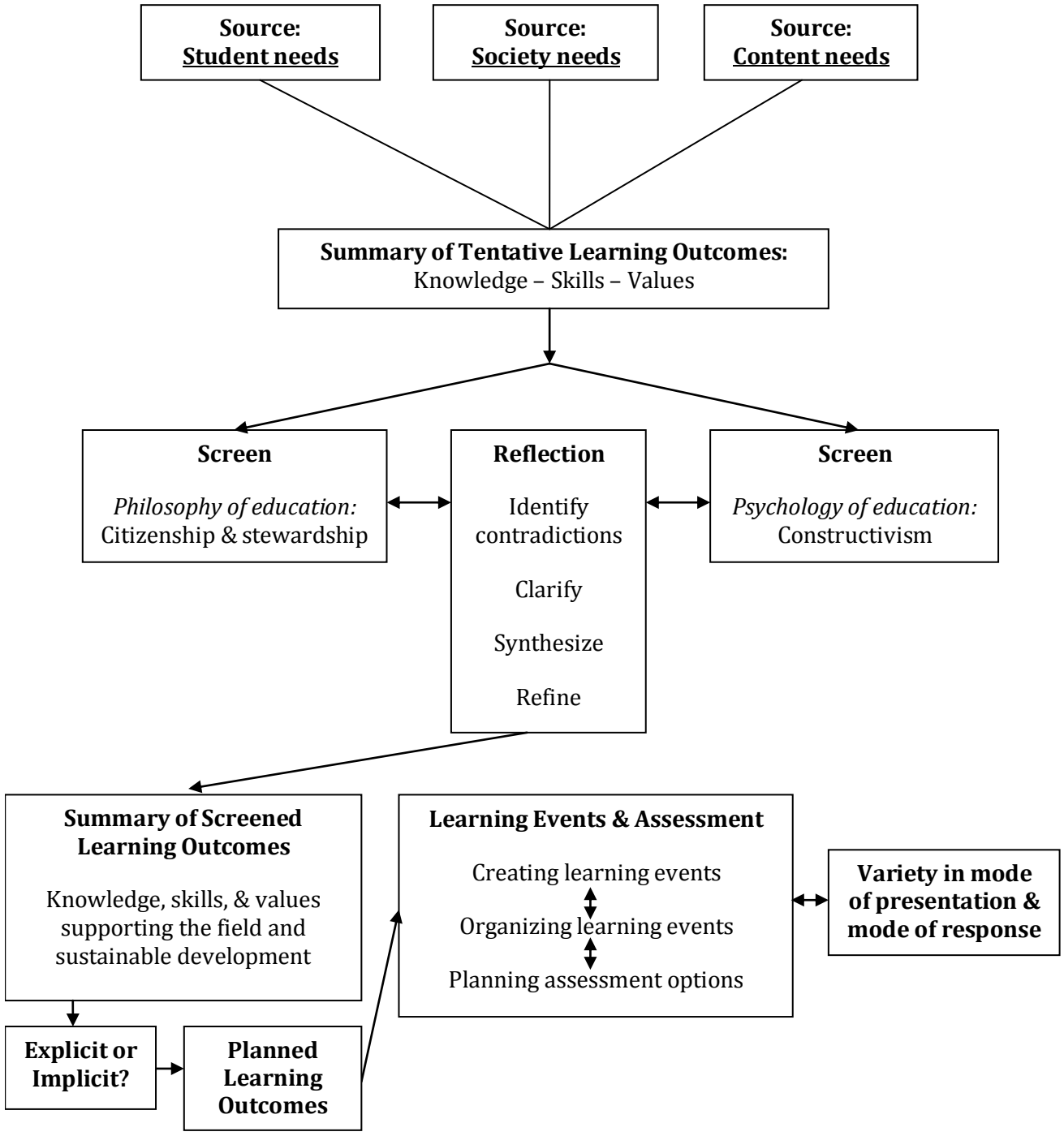
In terms of assessment, commonality is again found between Eisner (2002) and ESD. Both reject scientific measurement as pinnacle. Both embrace authentic forms of assessment that are largely qualitative in nature that allow the student to demonstrate what took place in the *process* of reaching an outcome. Both welcome variety and iteration (UNESCO, 2005). Finally, ESD's attachment to high levels of engagement through problem solving, social interaction, application, reflection, and emergent outcomes is indubitably correlated with both Eisner's (20020) approach as well as a dialectical perspective of constructivism, a learning theory considered symbiotic to ESD (Chapter 2). Assuredly, the attention paid to the *journey* of education by both Eisner (2002) and ESD (Dale & Newman, 2005) is unmistakable.

In summary, the new model would utilize the skeleton of the process provided by the Tyler Rationale for the purpose of arriving at the specific learning outcomes for the redeveloped course, followed by Eisner's (2002) elements for planning and organizing the learning experiences and choosing assessment methods. In the course redevelopment model presented in Figure 4-2, the influence of the Tyler Rationale (1949) is illustrated in the first half of the model; specifically, the process provided for analyzing data related to student, society, and the subject matter needs and the screening of those needs through the educational philosophy (citizenship and stewardship) and psychology (constructivism) of ESD. The remainder of the model, however, was chiefly influenced by Eisner's (2002) elements; specifically, the deliberation and reflection during the selection of educational

objectives or outcomes and the planning and organizing of learning experiences as well as decisions related to assessment.

In addition to these primary features, several pragmatic changes were submitted to the model. One, Tyler (1949) advocates for the collection and analysis of primary data to begin the process of identifying tentative general objectives when developing a comprehensive curriculum. As the current case is focused on the development of a single course for the purpose of an exploratory study, a far less complex undertaking, it was determined that highly credible primary literature could reasonably answer to the needs of student, society, and subject in lieu of primary data collection. Two, following Tyler's (1949) recommendation that elements may be used as an organizational strategy to shape planning, three were imposed from the ESD framework to help organize the tentative learning outcomes: knowledge, skills, and values. Three, a reflective stage was added between Tyler's (1949) prescribed screens (educational philosophy and psychology) to allow for an iterative period to reflect, identify likely contradictions in the nature and language of the tentative learning outcomes across multiple bodies of literature, and then clarify, synthesize, and refine the summary of learning outcome statements. Four, what Tyler (1949) would term "precisely stated learning objectives" were instead titled "planned learning outcomes," reflective of Eisner's (2002) discontent with inflexible outcomes. Meaning, the planned learning outcomes are those that connote the educational aim, however, it should be expected that these may very well be extended or altered in an emergent way during learning events. Five, consistent with Eisner's (2002) assertion about the need to examine the influence of the implicit along with the explicit, this consideration was added to the learning outcomes stage of the model. Meaning, shortly following the summary of screened learning outcomes, a period of categorization was built in to the model to sort those outcomes into those that are to be made explicit to the student (stated in the course syllabus and assessed formally) and those that are to remain implicit (built into the course design and assessed informally). Lastly, some semantic adjustments were made to Tyler's (1949) terms to better align with present day educational jargon; "subject" was termed content, and "objectives" were termed outcomes.

Figure 4-2 Course Redevelopment Model



Implementing the course redevelopment model

Once the general scaffold for action was in place, the process of the course redevelopment commenced. The following discussion outlines the details of each phase of redevelopment followed by lessons learned from an eight-week pilot.

Identifying literature for the needs analysis: Student, society, & subject

As mentioned previously, only one course was being redeveloped in the current study, rather than an entire curriculum. As such, the use of literature would be used to speak for the needs of the student, society, and content, rather than the collection of primary data as Tyler (1949) advocates. Moreover, the research and analysis of this body of literature was focused by imposing three categories of outcomes reflective of the ESD literature (Chapter 2): Knowledge, skills, and values. Therefore, four primary sources of literature were identified for use in the study. First, the Meta goals published by the International Textiles and Apparel Association (ITAA) for four-year baccalaureate programs (mentioned earlier in Chapter 1) were analyzed. ITAA published these goals in 2008 through a collaborative committee-led process in an effort to specify goals for undergraduate academic programs. These goals offer specific objectives about the knowledge, skills, as well as attitudes students should acquire while completing their undergraduate program. These goals were utilized to speak for *student needs* in the *knowledge, skills, and values* categories.

Second, Glock & Kunz (2005) in the book *Apparel Manufacturing: Sewn Product Analysis* offer a precise list of knowledge, skills, and attitudes that students should have to enter the product development profession. This source was ideal as it is narrowly focused on the specific skills related to apparel product development, the subject of the course being redeveloped. This source enriched the ITAA objectives when speaking for *student needs* for *knowledge and values*.

Third, the literature review regarding ESD, discussed in Chapter 2, was utilized as it also makes explicit the knowledge, skills, and values that students should be developing in higher education to support sustainable development. As the primary goal of this study was to meet the needs of society sustainably, this body of work was utilized exclusively when speaking for the *societal needs* in terms of *knowledge, skills, and values*. Lastly, as the

redeveloped course was related to product development and to be consistent with the ESD framework's call to reframe content for sustainability, a comprehensive comparative review of literature of apparel design and product development and sustainable approaches was conducted and used to articulate the *content needs* for *knowledge and skills*. This investigation included, 1) an exhaustive review of the apparel product development and design literature authored by AT academicians and, 2) an extensive review of the literature regarding sustainable product development and design methods authored by a variety of academicians and industry practitioners from diverse disciplines. This literature review was later published by the researcher (see Armstrong & LeHew, 2011). Table 4-1 summarizes the types of literature used in the initial analysis of learning outcomes and for what purposes these sources were used.

Table 4-3 Literature Sources for Learning Outcomes Analysis

Source: Student needs	**Source: Society needs**	**Source: Content needs**
Knowledge, skills, & values (ITAA, 2008)	*Knowledge, skills, & values* (ESD literature, Chapter 2)	*Knowledge & skills* (comprehensive literature comparison of apparel product development and design processes to sustainable approaches (Armstrong & LeHew, 2011)
Knowledge, skills, & values (Glock & Kunz, 2005)		

A note about interpretation of student, society, and subject needs from the literature

As the current study used highly credible literature as opposed to collecting primary data about the needs of student, society, and content, some assumptions were made about the nature of the outcomes found in these sources, differing somewhat from Tyler's (1949) prescriptions. One, when perusing the aforementioned literature for educational outcomes, the researcher focused solely on items related to the categories knowledge, skills, and values pertaining to the course topic and sustainable development, the boundary set in the study for learning outcomes. For example, when surveying literature used to speak for student needs, the researcher did not necessarily center analysis on the psychological needs of students or any other needs falling outside the development of knowledge, skills, and values. Tyler's (1949) work is considerably applicable to primary and secondary education, and therefore, includes concerns of a much wider scope about the needs of learners who are developing into adults; a lesser concern in the current study in higher education. Although some important psychological needs were likely to be met in the redeveloped course, it was categorically beyond the scope of this project to study them formally.

Two, in the review of the ESD literature, used to speak for societal needs, the role of the current ecological crises was front and center as an explanatory maxim regarding contemporary life. Because this course was being redeveloped to better support sustainable development, few other milieus could speak as poignantly to these needs as the planet's *un*-sustainability. Responsively, the future was *the* primary consideration in creating educational objectives. As few can refute the continuing evaporation and escalating cost of natural resources as a realistic picture of the future, objectives to aid

learners in this plight were especially contemplated during the literature review. And, though other categories of contemporary life were not explored, it is difficult to imagine what could be made more relevant beyond the sustainability of the planet and the quality of life of residents confined to it.

Three, outcomes deduced from the literature review for the content needs of the redeveloped course were found to contribute both to the functions of the content, such as understanding how to apply the apparel product development processes in the industry, as well as those of general education, like interdisciplinary collaboration and cooperation.

Summary of tentative learning outcomes: Knowledge, skills, and values

To begin, four sources of literature were reviewed and analyzed to speak for students needs (ITAA, 2008; Glock & Kunz, 2005), society needs (ESD literature review, Chapter 2), and content needs (Armstrong & LeHew, 2011) in an effort to generate a list of tentative learning outcomes. First, these sources were all reviewed and learning outcomes related to *knowledge* for the new course were extracted. Outcomes were analyzed for their relevance to apparel product development and design; meaning, outcomes not directly related to the course topic were edited out. For example, in the ESD literature review (Chapter 2) Calder & Clugston (2003) suggest that urban ecology is an important learning outcome for ESD, however, there is little relevance of urban ecology to the content of the apparel product development course. Table 4-4 summarizes the tentative general outcomes for knowledge found in each source.

Next, the same four sources were reviewed to speak for students needs (ITAA, 2008; Glock & Kunz, 2005), society needs (ESD literature review, Chapter 2), and content needs (Armstrong & LeHew, 2008) to identify tentative learning outcomes related to pertinent *skills* for product development as well as sustainable development. These are summarized in Table 4-5. The skills noted in the ESD literature are best described to support the development of citizenship and stewardship in the learner, and are so noted in the table.

Lastly, three sources were used to speak for students needs (ITAA, 2008; Glock & Kunz, 2005) and society needs (ESD literature review, Chapter 2) for which outcomes related to *values* were extracted. Notable, is the absence of the *articulation* of values to be developed in both AT sources. Instead, ITAA (2008) and Glock and Kunz (2005) offer some

specific attitudes considered important for students to develop. Similarly, the ACPA (2008), a source from the ESD literature, offers a list of personal attributes considered characteristic of change agents in the context of sustainability. Some of these have been included in the generation of tentative learning outcomes for values, as attitudes and personal attributes are directly influenced by personal values. When compiling the summary of values (Table 4-6), the values articulated by the ESD literature (supporting citizenship and stewardship) seemed to fall more cohesively into two primary themes: Interconnectedness (with nature and others) and responsibility (for sustainability). As such, they are represented this way in the table.

Table 4-4 Summary of Tentative Learning Outcomes for Knowledge

	Student needs	Society needs	Content needs
Source	*ITAA (2008); Glock & Kunz (2005)*	*ESD literature review (Chapter 2)*	*Product development comparative analysis*
Tentative outcomes: *Knowledge*	Understand and apply knowledge about the roles and functions of various industry sectors in which products are developed, produced, marketed, sold, and consumed, including construction, sourcing, manufacturing, marketing and merchandising processes Identify and interpret needs and wants of consumers and how industry processes are applied to plan, develop, produce, communicate, and sell profitable product lines Evaluate product quality, serviceability, and regulatory compliance standards Use the design process to create products that meet marketplace needs Understand how aesthetics[1] and the design process can support quality of life, social responsibility, and sustainability Relate the elements and principles of design to product development, use, and evaluation Understand how dynamic and diverse political, cultural, and economic systems impact industry processes (ITAA, 2008, p. 2) Understand the importance of consistency of product image Be able to contribute specialized technical expertise (Glock & Kunz, 2005, p. 112)	Connection between discipline and ecosystem (ACPA, 2008; Jucker, 2004; Stables & Scott, 2002; Wright, 2002) Multiple perspectives and interrelationships in content (Filho et al., 2009; Jucker, 2004; Stables & Scott, 2002; Rode & Michelsen, 2008) Define sustainability (ACPA, 2008) Sustainability literacy[2] (ACPA, 2008; Forum for the Future, 2005; Haigh, 2005) Cultural literacy[2] (ACPA, 2008; Everett, 2008) Political, social , & historical literacy[2] (Jucker, 2002) Environmental literacy[2] (Wright, 2002) or Eco-literacy[2] (Haigh, 2005; Jucker, 2002; Wright, 2002)	Apparel product development & design processes[3] Sustainable product development & design methodologies, guiding principles, & analytic tools [3] Research & analysis of sustainability impacts of product development processes Interdisciplinary collaboration & cooperation Disposal methods Market-ecosystem balance Mass production vs. appreciation of place in design New competitive & supply chain paradigm Stakeholder analysis Sustainability terminology Costing, including ecological impact
	1. Aesthetics is defined as the branch of philosophy concerned with the study of beauty and the psychological responses it evokes, the quality of an object or event, and why it is pleasurable to the senses. 2. Literacy is best defined as understanding these perspectives and how they impact sustainability for individuals, communities, and all fields of study; empowering the learner to better practice sustainable principles. 3. As the product development process comprises a multitude of knowledge areas, this has been condensed for the purpose of this table. Refer to Armstrong & LeHew (2011) for a complete discussion.		

Table 4-5 Summary of Learning Outcomes for Skills

	Student needs	Student needs	Society needs	Content needs
Source	*ITAA (2008; p. 3)*	*Glock & Kunz (2005, p. 112)*	*ESD literature review (Chapter 2)*	*Product development comparative analysis*
Tentative outcomes; *Skills*	Identify and evaluate issues of social responsibility, professional behavior, and ethics related to the impact of individual organizational, and corporate decision making Analyze and evaluate issues related to environmental sustainability and environmental impact as they relate to industry activities and processes Demonstrate critical and creative thinking skills Identify and understand social, cultural, economic, technological, ethical, political, educational, language, and individual influences on industry issues Use appropriate technology to facilitate critical, creative, quantitative, and qualitative thinking within the textile and apparel complex Communicate ideas in written, oral, and visual forms using appropriate technology Function as team members and leaders within professional and culturally diverse environments Demonstrate the ability to critique one self and others constructively	Have a strong teamwork orientation Motivate team members and other associates to consistently do their finest work Communicate in a clear, direct, and persuasive manner to executives, peers, and other associates Focus on accuracy and consistency of details Effectively manage time and other resources Organize and priorities work flow Use computer technology and electronic communications effectively to enhance effectiveness of decision making, presenting, and reporting	*Skills for citizenship & stewardship:* Collaboration & cooperation; gaining buy-in (ACPA; Egan, 2004; Filho et al., 2009; Jucker, 2002; Svanström et al., 2008) Conflict resolution (ACPA; Egan, 2004; Filho et al., 2009; Jucker, 2002; Svanström et al., 2008) & negotiation (Kevany, 2007) Creative and imaginative problem-solving (ACPA; Egan, 2004; Filho et al., 2009; Jucker, 2002; Svanström et al., 2008) Meaningful communication, civic engagement, democratic dialogue (ACPA; Eagan, Cook, & Joeres, 2002; Everett, 2008; Kelly & Fetherston, 2008; Kevany, 2007; Svanström et al., 2008) Social sophistication (Eagan, Cook, & Joeres, 2002; Everett, 2008; Kelly & Fetherston, 2008; Kevany, 2007; Svanström et al., 2008) & social action (ACPA; Haigh, 2008) Reflection & introspection *(*ACPA*; Forum for the Future*, 2005; Jucker, 2002; Schlottman, 2008) Identify & adapt to change (Filho et al., 2009) Systems thinking (ACPA; McKeown, 2002; Filho, et al., 2009; Herremans & Reid, 2002) & contextualize issues (Dale & Newman, 2005) Articulation of values (Warburton, 2003) & values-focused thinking (Sipos et al., 2008; Keeney, 1992) Visioning for the future (ACPA; Egan, 2004) Sustainability research (Wright, 2002)	Interdisciplinary collaboration & cooperation Work concurrently & iteratively Technological competence Forecasting Sustainability problem solving Research & analysis of sustainability impacts of product development processes Selection of viable solutions per impact analysis Backcasting Risk analysis Communication of environmental features

Table 4-6 Summary of Learning Outcomes for Values

	Student needs	Society needs
Source	*ITAA (2008); Glock & Kunz (2005)*	*ESD literature review (Chapter 2)*
Tentative outcomes: *Values*	Ethics Social responsibility Sustainability (ITAA, 2008; p. 3) Have a priority for satisfying customers Have an entrepreneurial spirit Constantly seek new ideas, product, and processes Be proactive rather than reactive in addressing opportunities, issues, and problems (Glock & Kunz, 2005; p. 112)	*Values for citizenship & stewardship:* *INTERCONNECTEDNESS* Empathy (ACPA, 2008; Kevany, 2007; Haigh, 2008) Compassion (Filho et al., 2009; Murray and Murray, 2007) Care (Filho et al., 2009; Murray and Murray, 2007); Care for future generations (Bruntland, 1987); Care for present generations (Bruntland, 1987) Patience (ACPA, 2008) Respect, charity, & cooperation (Filho et al., 2009; Murray and Murray, 2007) Integrity (ACPA, 2008) Emotional intelligence & self-awareness (ACPA, 2008) *RESPONSIBILITY* Ethics (*Forum for the Future*, 2005; Wright, 2002) & moral obligation (Wright, 2002) Social & economic justice (Filho et al., 2009; Murray and Murray, 2007) Courage (ACPA, 2008) Discontent with status quo (ACPA, 2008) Passion (ACPA, 2008) Tenacity & resilience (ACPA, 2008) Commitment (ACPA, 2008; Filho et al., 2009; Murray and Murray, 2007) Self-determination & self-reliance (Filho et al., 2009; Murray and Murray, 2007)

Developing the philosophical and psychological screens

Tyler (1949) submits that it is imperative that the preceding summary of learning outcomes be perceived through the lens of the educational philosophy (the purpose of education) and the educational psychology (how people learn) of the curriculum developers. It is, therefore, necessary to formulate those prior to the analysis of the summary of learning outcomes.

The educational philosophy that emerges from the ESD literature clearly defines education's purpose as that which prepares citizens and stewards for life on local and global plains: at home, at work, and in the community. Citizenship implies rights and responsibilities inherent in community engagement and interest beyond the self. Similarly, stewardship connotes responsibility for present and future generations as well as the environment. In this light, learners should leave the educational experience prepared for thought and action that support sustainable development (SD). Learners should care, respect and have empathy for others. They should be self-determined, armed with the ability to cooperate, collaborate, understand multiple perspectives, and resolve conflict. Tyler (1949) suggests that the educational philosophy used for analysis be reduced to a concise statement, to aid the synthesis of learning outcomes. Therefore, for the purpose of the redevelopment of the course, the researcher prepared a statement to reflect the educational philosophy screen of ESD:

> The purpose of education is to prepare the learner for citizenship and stewardship in their local and global community. Educational objectives designed for this end should emphasize interconnectedness in relationships with others and responsibility for the environmental health and social justice for present and future generations.

Likewise, Tyler (1949) suggests writing a statement about the primary components of the educational psychology, making clear the implications for learning outcomes. The educational psychology for ESD is comprised of a set of conditions the movement believes are necessary for learners to learn. The discussion regarding pedagogical theory in Chapter 2 was useful for this purpose. It is clear in the foray of pedagogical options for ESD that the conditions best poised for learning encourage a high level of engagement through problem

solving experiences that require inquiry, analysis, peer collaboration, and experience applying course concepts. It should also require reflection and introspection about those experiences. Ideal instruction is broad in scope and requires the learner to challenge current paradigms. Also, the educator is considered a facilitator and collaborator in the educational experience, allowing the learner ample freedom to direct their own learning. In sum, these conditions align with a constructivist epistemology (Chapter 2). Specifically, the constructs of *dialectical constructivism* are particularly emphasized in the collaborative nature of the course and are especially complementary of the ESD framework, as the active and experiential classroom is chief. This constructivist perspective emphasizes the idea that learning constructed through interactions between the learner's internal structures and social interaction with their teacher and peers is far superior to what they could have created alone; the constructs being contextual issues, like the individual and the environment, and mental contradictions that occur during interactions (Chapter 2). Therefore, the statement that best reflects the educational psychology screen for ESD is:

> The ideal conditions for learning are best described through a dialectical perspective of constructivism, which emphasizes the construction of knowledge by the learner through social interaction in collaborative groups and with the instructor, consistently challenging the learner's previous stance. Educational outcomes designed for this end should emphasize imaginative problem-solving, collaboration, and reflection.

Applying the screens

To apply the two screens, both the educational philosophy and psychology were written on index cards. The tentative learning outcomes for the knowledge, skills, and values associated with the redeveloped course were reviewed, using the two screens. Most important in this phase was the indispensable role of the researcher's knowledgeability and experience with AT education and the ESD framework as well as intuition. The practice of synthesizing learning outcomes and insuring their alignment with the two screens was highly iterative and heavily relied on the researcher's judgment. As previously discussed, special care was taken to identify and root out language incongruent with sustainable development.

First, in an effort to reduce the volume of learning outcomes, those that seemed duplicative or highly correlated across the four bodies of literature were synthesized into new outcome statements in each category of outcomes. Also, items considered too comprehensive for a semester-long course were also edited down in size. Next, each learning outcome was perceived through the philosophical screen (citizenship & stewardship) and the psychological screen (dialectical constructivism) for education. In some cases, the learning outcomes for AT education and the apparel product development competencies aligned with the ESD learning outcomes such as collaboration, creative thinking, and communication. But, it is important to denote that when perceived through the two screens, the language of these descriptors was, in many cases, extended. For instance, in the tentative learning outcomes for skills, collaboration is an outcome reflected in all three bodies of literature; however, this skill is extended by the educational philosophy and psychology to emphasize cooperative problem solving, connoted by cooperation, conflict resolution, collective buy-in, and negotiation.

Planned learning outcomes: Explicit and implicit

Upon completion of analysis of the outcomes through the educational philosophy and psychology screens, a summary of screened learning outcomes were scrutinized for their appropriateness for the explicit and implicit curriculum, and then reduced to formal statements of planned learning outcomes. When reviewing the summary of screened learning outcomes for knowledge, all appeared appropriate for the explicit curriculum (Table 4-7). However, when analyzing the skills-related outcomes (Table 4-8), outcomes such as working concurrently and iteratively and identifying and adapting to change were both deemed more implicit, qualities important to build into the course design that students should experience, but were not necessarily explicit learning outcomes. Likewise, outcomes related to professional standards such as time management or attention to detail are more implicit expectations, and not necessarily the explicit aims of the product development course. Chiefly, many of the outcomes related to values that support sustainable development as well as those considered to the apparel field in general were left implicit (Table 4-9). As the ESD literature makes clear, it is the articulation of values,

not the indoctrination of them, which is critical when teaching for sustainable development.

Table 4-7 Summary of Screen Learning Outcomes: Knowledge

Sources	*ITAA (2008, p. 2); Glock & Kunz (2005, p. 112); ESD literature review (Chapter 2); Product development comparative analysis (Chapter 5)*
Summary	– Sustainability defined – Apparel product development & design processes – Sustainable product development & design methodologies, guiding principles, & analytic tools – Roles and functions of various industry sectors contributing to apparel product development – New competitive & supply chain paradigm for sustainability – Mass production vs. appreciation of place in design – Industry collaboration and cooperation – Sustainability impact analysis – Stakeholder analysis – Consumer needs vs. wants and implications for quality of life, social responsibility, and sustainability – Mechanisms for developing a profitable, equitable, and ecologically healthy product line – Product quality, serviceability, and regulatory compliance standards and implications for sustainability – The socially constructed nature of beauty and the implications for sustainability – The use of elements and principles of design for sustainable products – Political, cultural, and economic systems and their impact on industry processes and sustainability – Product image – Sustainability terminology – Technology use in apparel product development and design – Costing, including ecological impact

Table 4-8 Summary of Screened Learning Outcomes: Skills

Sources	*ITAA (2008; p. 3; Glock & Kunz (2005, p. 112); ESD literature review (Chapter 2); Product development comparative analysis (Chapter 5)*
Summary	– Interdisciplinary collaboration & cooperation – *Work concurrently & iteratively – Conflict resolution – Creative and imaginative problem-solving for sustainability – Effective and meaningful communication: Clear, direct, & persuasive (oral, written, & visual) – Reflection, introspection, and self-evaluation – *Identify & adapt to change – Systems thinking – Values-focused thinking – Visioning – Forecasting – Research & analysis of sustainability impacts of product development processes to identify solutions – Risk analysis – Communication of environmental features – *Accuracy and consistency of details – *Time & resource management – *Organization and prioritization – *Appropriate use of technology to facilitate critical, creative, quantitative, and qualitative thinking and decision-making as well as communication – Ethical thinking and decision-making *Implicit

Table 4-9 Summary of Screened Learning Outcomes: Values

Sources	*ACPA (2008); ITAA (2008, p. 3); Glock & Kunz (2005, p. 112); ESD literature review (Chapter 2)*
Summary	– Articulation of values *INDUSTRY* – *Customer satisfaction – *Entrepreneurial spirit – *Seek innovation – *Proactive *INTERCONNECTEDNESS* – *Empathy – *Compassion – *Care for present & future generations – *Patience – *Respect, charity, & cooperation – *Integrity – *Emotional intelligence & self-awareness *RESPONSIBILITY* – *Ethics & moral obligation – *Social & economic justice – *Courage – *Discontent with status quo – *Passion Tenacity & resilience – *Commitment – *Commitment to sustainability – *Self-determination & self-reliance *Implicit

At this stage the researcher took pause over the summary of learning outcomes, both explicit and implicit, and began to condense and refine the planned learning outcomes into formal statements. This final list can be found in Table 4-10.

Table 4-10 Final Outcome Statements

Planned Learning outcomes
Explicit
– Define sustainability. – Understand & implement the apparel product development process. – Understand, practice, critique, & innovatively implement sustainable paradigms in this context. – Understand, perform, & critique sustainability impact analyses. Implement responsive plans to such critiques. – Understand & be responsive to the implications of consumer needs versus their wants on sustainability. – Identify, scrutinize & be responsive to the political, cultural, and economic assumptions that inhibit sustainability. – Explore values that underpin sustainability. Then, articulate & critique your own. – Understand, practice, & demonstrate progress toward the development of six fundamental skills important for solving sustainability-related problems: Collaboration/cooperation, conflict resolution, effective/meaningful communication, reflection, systems thinking, & values-focused thinking. – Envision & forecast action for a sustainable future in the apparel industry. – Demonstrate skillful research methods. – Understand & apply industry as well as sustainability related terminology. – Utilize technology effectively & innovatively.
Implicit
– Adapt to industry conditions (iteration & concurrency). – Become a change agent. Develop an ethical compass (interconnectedness & responsibility). – Employ professional industry standards in work ethic: Attention to detail, time management, being proactive, etc.

Planning and organizing learning events and assessment

Once the planned learning outcomes were identified and articulated, both explicit and implicit, planning and organization of learning events and selection of assessment methods could commence. According to Eisner (2002), assessment considerations should be made throughout the curriculum planning process, rather than a separate act in its conclusion. As such, the two were considered concurrently as decisions were made for lesson plans, materials, and activities and the methods by which outcomes could be discerned. At this stage in the course redevelopment, Eisner's (2002) educational philosophy, the ESD literature as well as the tenets of constructivism, particularly dialectical constructivism, were highly influential in designing learning events.

First, Eisner's (2002) philosophy contends that the process of planning for curriculum should be as creative and imaginative as the curriculum being designed. Central to this contention is responsiveness to the specific students and their experience and the inception points that will most likely engage them. According to Eisner (2002), this is achieved through a variety of content options available to assist those learners in understanding important concepts, rather than selection from a preconceived menu. Additionally, Eisner (2002) contributes further dimension to curriculum decisions with considerations for modes of presentation and response; offering both teacher and learner a variety of channels to communicate what is taught and what is learned, far beyond verbal or written expression only. This departure from traditional modes is also reflected in Eisner's (2002) approach to authentic assessment, an approach that includes transparency of the *process* the learner took to realize an outcome. Further, room is made in these experiences for planned learning outcomes to be transformed or extended.

Second, the pedagogical proclivities of the ESD framework are characterized by meaningful social interaction, personal reflection, real life problem-solving, and a broad view of knowledge. Accordingly, learning events are designed with these considerations in mind, created to bring the learner to terms with themselves as well as the world through some type of real and meaningful experience, shifting attitudes and values. Indeed, *how* we go about teaching *what* we are to teach, can be a determining factor for inspiring such shifts (Orr, 2004). Further, as discussed in Chapter 2, the ESD framework theme, *reality*

modeling, was also highly influential when developing learning events. Additionally, and complementary to Eisner's (2002) philosophy about assessment, ESD also advocates for authentic forms of assessment. As such, all these considerations were emphasized during this planning phase.

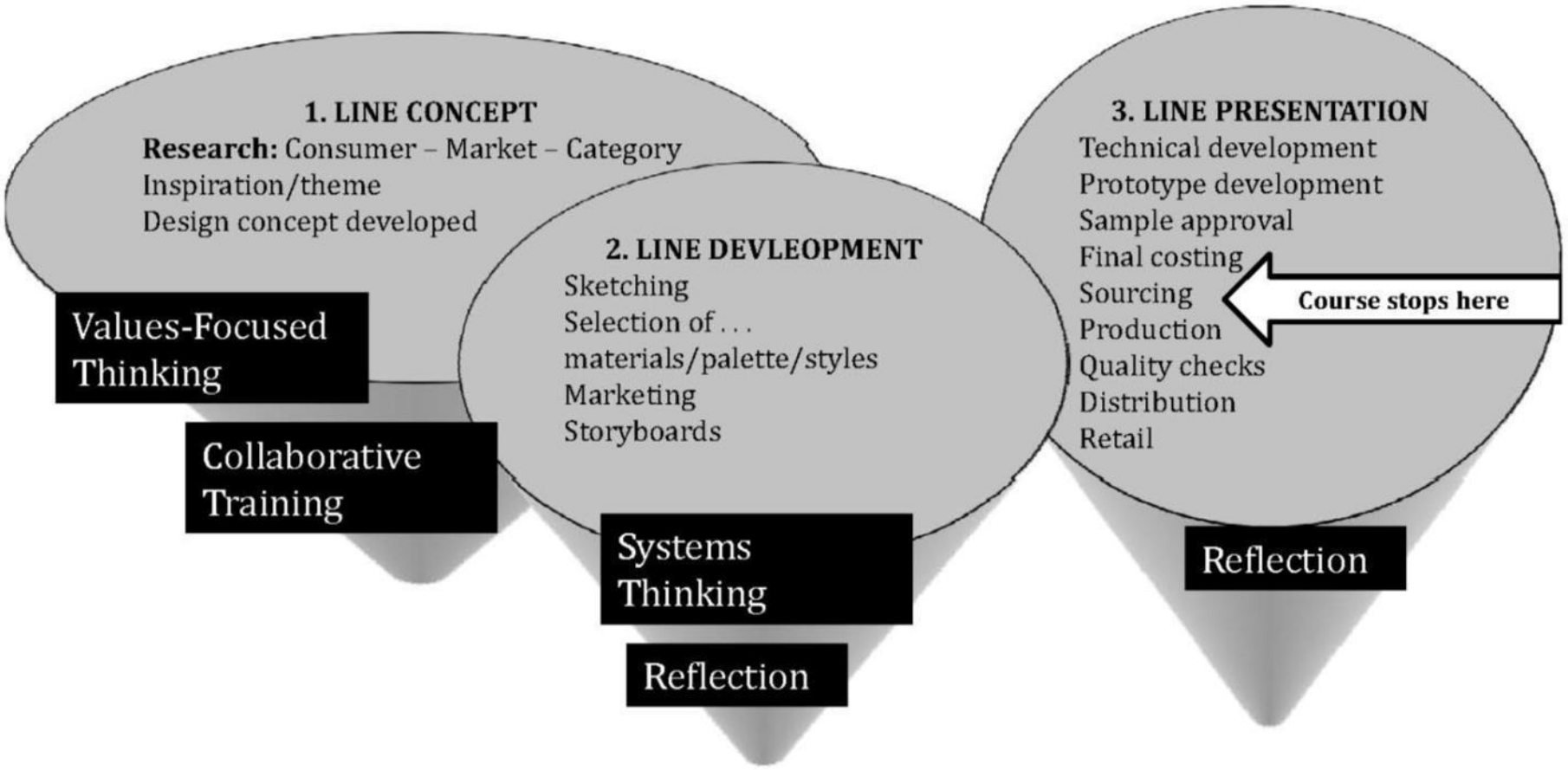
Thirdly, as ESD is largely underpinned by constructivism, particularly dialectical constructivism (discussed in Chapter 2), the planning process was further informed by the tenets of this epistemology. Complimentarily to both Eisner's (2002) philosophy and ESD, the epistemology emphasizes the fundamental role of real experience, the exploration of multiple perspectives, the holistic instruction of broad concepts, and social interaction in educational experiences. Further, dialectical constructivism emphasizes social interaction and the creation of meaningful contradictions that spark in interactions between the learner's cognitive processes and various contextual issues that fuel learning. Additionally, Vygotsky's (1978) concept, the Zone of Proximal Development (ZPD), has important implications for the instructor. In this light, the goal is to keep the learner in the ZPD, where the conditions for learning are optimal, and encourage them to reach just beyond it for more learning. The instructor must be responsiveness to individual learners, frequently interacting with them, sharing their conceptual processes, and gauging when to introduce new information or resources based on the learner's development. This was an important consideration when designing learning events as it required a high level of flexibility in the classroom to allow for this level of interaction and responsiveness.

In sum, these three philosophical approaches were chief considerations in crafting learning events and assessment methods for the new course. First, the comparative literature review between apparel product development and design processes was used to identify the basic chronological skeleton of the product development process, the most logical starting point for organization of learning events about product development. Then a decision was made as to how much of that process could be learned in one semester, as the product development process includes everything from materials selection, consumer and market research, marketing, technical design development to sourcing, distribution and retail strategy. Prior to redevelopment, this course had followed a similar process, breaking up the steps of the process into course assignments, using assignments based on a

product development textbook called *Perry's Department Store: A Product Development Simulation* (Guthrie, & Regni, 2006). The course previously ended on or around sourcing, as dictated by the textbook's assignments. These assignments were significantly helpful in the early planning phase, as they provided a backbone for the course. However, these assignments were entirely re-written to better reflect the language and intent of sustainability and align with the pedagogical philosophies described above.

Then, decisions were required as to when the ESD-related skills would be introduced and how. As the course was historically a collaborative capstone experience, the ESD skills would play a fundamental role in equipping learners for that experience and offer them a way to apply what they learned. As values would underpin, not only project decisions, but also how the groups might navigate conflict, values-focused thinking was positioned to be introduced the earliest. Next, a series of collaborative training sessions were planned for the first two weeks of the course, incorporating the collaboration-related skills (collaboration, communication, conflict resolution). The ESD skill, reflection, was built implicitly into two reflective writings to be completed in the middle and end of the course. This would allow students to reflect on their learning and their use of the ESD skills. The last ESD skill, systems thinking, was planned for introduction mid-semester, at the peak of decision-making, in which learners would be experiencing the most complex assortment of choices. Figure 4-3 illustrates an early course planning map.

Figure 4-3 Initial Course Planning Map



What commenced after the basic skeleton was organized was a challenging, complicated, iterative, exhilarating, and often exhausting process requiring ingenuity, craftsmanship, imagination, and intuition, true to Eisner's (2002) description of the process. Often, plans for the early stages of the course were scrapped when it appeared unrelated to plans for the latter portion, and vice versa. Indeed, balancing the need to integrate ESD with apparel product development content was an iterative process that forced the most important outcomes to the top of the heap. Often, the fundamental guiding question was, "What is the most important thing students *must* learn in this course?" Or, "What is the most important thing students *must* learn in this course that they will be unable to learn in other courses in their program?" The planned learning outcomes for the course, both explicit and implicit, acted as a foundational anchor, a method for compassing tough decisions. Sometimes product development content was removed to accommodate sustainability. At other times, content was added to transform traditional product development paradigms with sustainable ideas. Although it was useful to use the previous course organization and some of its materials, nearly all of the lesson plans, assignments, activities, and assessment methods for the redeveloped course were created from scratch to insure cohesion as well as alignment with the ESD framework. Due to the complicated nature of this portion of the process, *the following is simply a description of the outcomes of this process*, as a description of the actual process would likely be incomprehensible.

The semester project

A number of lessons were learned during the eight-week pilot of the course, discussed in greater detail later in this chapter. Chiefly, the researcher learned that engaging fashion students about sustainability was complicated for two reasons: 1) fashion students are the product of a silo-like discipline in which there are many specializations and narrow discipline foci, a barrier to the integration of a trans-disciplinary concept like sustainability requiring a holistic perspective, and 2) sustainability is often considered the antithesis of fashion, and a concept that may potentially dampen what fashion students love about their field. Thus, it was imperative for the researcher to create an engaging course design that used what students loved about fashion (the creativity, the costume, the

imagination) to talk about sustainability. Indeed, the topic would have to be reframed as an exciting opportunity to innovate, rather than a topic requiring a staunch moral compass, something students likely had a sense of already and found far less compelling. A new approach would be required; one that was responsive to their need for a holistic perspective, and at the same time, honored and recognized the more desirable aspects of their chosen field. Again, the educational philosophies of Eisner (2002), ESD, and dialectical constructivism were key considerations in crafting the semester project.

During this planning phase, a report was published by Forum for the Future, called *Fashion Futures 2025* (2010), which was the result of expansive research among apparel industry and academic professionals about what the future of fashion might look like in fifteen years. The report was designed as a conceptual tool for apparel companies to strategize for the future, a strategy called "future proofing," used to insure the viability of long-term strategic plans, responsive to certain adversities like climate change, resource shortages and price hikes, and dramatic demographic changes. The report hypothesizes four potential scenarios responsive to these adverse trends, offering a window into potential outcomes for the future. Many of the sustainable design paradigms, already planned for course instruction, were referenced in the various scenarios. Thus, the report provided a powerful mechanism to stimulate imaginative thinking in light of sustainability challenges in the context of fashion.

The researcher decided to center the new course on a hypothetical industry scenario in which a fictitious sustainable apparel marketer called Green Sweat, Inc. had gone belly up after attempting to enter the market using a sustainable platform. Students would play the role of product development employees whose expertise had been tapped to set the defunct brand on a more sustainable and viable path. Literature regarding mis-steps in sustainable strategy in the apparel industry was used to create a company dossier, describing the company's primary mistakes, which included both product-related as well as team-related shortcomings. Thus, students would use the report as a tool to future-proof their product development plan. Members of the student groups would carry titles such as Marketing Director, Merchandise Coordinator, Head Designer, or Director of Sustainability

and would be expected to play these roles in completing the course assignments. Likewise, the instructor (the researcher) would play the role of Director of Product Development and act as advisor, facilitator and collaborator on course projects.

The *Fashion Futures* report offered an opportunity to tweak the series of course assignments one final time to align with the report. Historically, students in this course gathered an immense amount of data to begin their design endeavors, such as consumer and market research. But, since the *Fashion Futures* report illustrated a lot of this information already, students would instead be asked to imagine, for example, a consumer target market and a relevant product category, based on the scenario, rather than re-inventing the wheel with their own research. This allowed for more time to be spent on the design functions of the product development plan, the meat and potatoes of product development. Students would work in groups to complete a series of seven group assignments for a specific future scenario outlined in the report; essentially, putting all the pieces of an apparel product development plan together over a semester period based on one potential vision of the future. The assignments included a consumer profile (demographic and psychographic descriptions), a product category scan (review of existing brand assortments), a theme and inspiration board, design concept and brief (development of actual designs and the explanation of relevant sustainable design paradigms), a marketing dossier, a specification pack (technical design development and costing), and a sourcing plan (determination of manufacturing method and choice between developing a code of conduct or conducting a final analysis of their business model using a triple bottom line or stakeholder analysis). Historically, this course culminated in a group presentation to the class. But, since the focus of the semester project would be on imagining the potential future of fashion from different perspectives, the researcher decided to use this opportunity as an educational tool, not just for students, but the public as well, creating a final exhibit presentation of the student's work from the four scenarios. Exhibits are also considered an authentic assessment method.

Other authentic forms of assessment were used for other group assignments related to the semester project as well; favoring assignments designed to prompt the student to

explain their unique perspectives, justify their proposed solutions, demonstrate a collaborative effort, and require the student to complete assignments with other assignments in mind, encouraging holistic thinking. Each group assignment was created to scaffold back to a previous assignment, insuring cohesion in the completed project, but also helping the student see a far larger picture, the product development process and its impact on the ecosystem. A rubric of qualitative criteria for assessment was created for each group assignment, providing a mechanism for assessment of the planned learning outcomes for the course. Notably, the largest portion of each assignment's grade was consistently weighted in favor of imaginative problem-solving, critical thinking, and authentic concept development, while other criteria such as professional execution and following the directions received far less weight. Further, consistent with Eisner's (2002) penchant for variety in modes of response (how the student communicates what they have learned), many group assignments offered students at least two ways, if not more, to complete assignments.

Explicit in the group assignments, was the incentive for critical and imaginative thinking about apparel product development and sustainability, encouraging students to cast off perceived limits and boundaries and explore, "What if?" Responsively, assignments were written to allow groups to renegotiate assignment requirements based on what they were interested in exploring. For example, for the marketing dossier assignment, students were asked to develop at least one piece of marketing material per group member as part of their marketing plan. But, this may be renegotiated in the event that a unique and innovative marketing strategy may require more labor, and thus make the production of multiple materials less possible. Likewise, in the design concept and brief assignment, ample room was given for groups to create the number of looks that demonstrate the "big idea" of their line, rather than being shackled to a traditional twenty-four piece collection. In sum, assignments were kept structured enough to provide students direction in their conceptual process, but loose enough to prevent being boxed in by a traditional or prescriptive notion.

Company training

As part of the semester role play, the ESD-related skills were incorporated into the course by way of a series of lesson plans at the beginning of the course, designated *company training*. This training would be presented to students, fictitious employees of Green Sweat, Inc., as important preparation for working through sustainability-related problems. Though the researcher had explored many different options and even presented some preliminary lesson plans during the eight week pilot, the pilot study made clear that an emphasis on conflict resolution would be most responsive to student needs, as the role conflict played in the course was prominent. The researcher met with a colleague who supervised a master's certificate program for conflict resolution at the same university who offered a number of valuable resources as well as strategies that might be helpful. From this conversation came a three class-period training program centered on conflict resolution, as such training would likely prove a valuable framework for productive and effective collaboration. The book *The Eight Essential Steps to Conflict Resolution: Preserving Relationships at Work, at Home, and in the Community* (Weeks, 2004) provided the primary skeleton of the program, comprising three full class periods. The tenets used by Weeks aligned with the characteristics of the ESD-related skills, using similar language and approaches, which was invaluable. Additionally, scenarios were developed using real situations that had occurred in the course previously for students to work through together in class, applying the conflict resolution steps to determine approaches that could be used in those situations. Lastly, a final lesson plan surrounding the concept of democracy, considered fundamental to ESD, was used to reinforce and extend the ideas from the conflict resolution training with techniques, such as nominal group process and democratic dialogue and debate.

Lesson plans and participation assignments

Next, the lesson plans and participation assignments related to course content were created. Central in these plans were shared work, discussion, opportunities for application, and critique. Consistent with Eisner's (2002) philosophy of variety in modes of presentation (how ideas are communicated to learners), few lesson plans looked the same. Rather, the most important concept to be learned in the lesson was the spark to fuel the

mode of presentation, with the chief consideration being student engagement. For example, two class periods following the company training were designated as days to explore the future. The first class period was a collective lecture in which groups were assigned an article from the Futurist about general global trends. Groups were asked to read the article, determine the highpoints and relevance to the apparel industry, and then share their findings to the class. Information gathered was posted on a group wiki page, compiling useful information that all the students would utilize later when working on their group assignments. The *Fashion Futures* report was introduced at the end of this lesson plan, as a way to then narrow future trends to the fashion industry. The second class period utilized a workshop available by Forum for the Future about *Fashion Futures 2025*, in which groups could explore a day in the life of each scenario. Students were broken into groups, assigned one of the four scenarios, and asked a series of questions that might describe someone who lived in that scenario, such as: Where do you live? Where do you work? How do you get to work? What kind of apparel do you wear? Where do you shop? This information was later used to develop the consumer profile assignment for the semester project.

Lesson plans related to sustainable design paradigms were created to introduce the concept, allow students to apply it in some creative way related to apparel, and then critique its usefulness to the apparel industry. For example, one lesson plan about Biomimicry introduced the concept and how it might relate to fashion design. Then, students were asked to go out and photograph nature, developing an aesthetic palette they could later use in their design-related assignments. Upon return, they were asked to critique the advantages and limitations of such a concept to apparel design. Another lesson plan, design for environment, introduced the concept of design for X, a list of strategies that could be used to make manufactured products more efficient. Students were given a garment profile, such as a wedding dress or swimsuit, with a list of its material contents and asked to redesign the garment for greater efficiency. Students were asked to sketch out their ideas and share their new concepts with their peers.

A number of lesson plans were designed around analyses fundamental to sustainability, such as triple bottom line, life cycle, and stakeholder analyses. For instance,

to help students learn how to use systems thinking, students were required to read different articles about apparel brands that use sustainable strategies prior to the lesson plan. After the concept of systems thinking was introduced, the triple bottom line was used to analyze the sustainable apparel market as a *system*. Lists were created by students in class for social, environmental, and economic issues reflected in the industry articles. Students were asked to cross reference the triple bottom line with a SWOT (strengths, weaknesses, opportunities, and threats) analysis during the discussion. Thus, students identified SWOT elements under each triple bottom line heading. Upon completion, students could see a conceptual map of this system, seeing where social, environmental, and economic dimensions of the system may conflict or reinforce each other.

A similar lesson plan was created to help students better understand their sourcing decisions, using stakeholder analysis. As China is a chief producer of apparel for the US, this country was used to analyze as a potential location to source the products students were creating. Students were grouped according to a stakeholder role, such as factory worker, manufacturer, environmental watchdog, social auditor, etc. and asked to research what it is like being in that position. In other words, what is it like working in an apparel factory in China? What are the most important environmental issues watchdogs are contending with in China? After their research, students came together in class, and shared what it is like playing that role. During the discussion, a risks and benefits analysis was compiled using the information, thus unfolding a comprehensive list of considerations a product developer may consider when making a choice to source in China.

Generally, lectures of static content were virtually absent. Lesson plans were more often characterized by mechanisms to trigger engagement such as discussion questions, games, group collaboration, creative brainstorming and application; the method chosen based on the concept to be learned. Lesson plans were often enhanced with entertaining video clips, such as lecturers from Ted.com who often discuss abstract and highly innovative concepts related to design or sustainability, or unusual images of creative work related to design; both used to incite discussion and imagination. Implicit in these lesson plans was a high level of instructor-to-student and student-to-student interaction that

made sharing ideas and information as well as labor more possible. This planned level of interaction is supportive of dialectical constructivism, creating opportunities for mental contradictions that facilitate learning, but it also imposed a personal interdependency among the classroom community, supportive of sustainable development.

A major implication from the eight-week pilot was the need to insure engagement and value in the *journey* of learning, rather than only incentivizing the completion of assignments. Thus, the aforementioned group assignments that comprised the product development plan only represented half of the total semester grade. The other half of the student's semester grade was derived from participation, which could be earned via two interrelated components: 1) 30% of the course participation grade was determined by consistent attendance, quality engagement in the classroom, contribution to group work, and a demonstrated learning attitude, and 2) the remaining 20% of the course participation grade would be derived from two reflective writings, discussed next, which prompted students to reflect on their own learning more deeply. As part of the former, a series of formal participation assignments were created to support the lesson plans. For example, one participation assignment required the submission of a power point slideshow of pictures taken for the Biomimicry lesson plan. The collective lecture conducted about the future became a formal participation assignment. Students were given an actual assignment description for these projects, for which they would receive formal feedback on their participation, another mechanism for assessment.

Reflective writings

Reflection has been identified in the ESD literature as an important skill for students to develop (Forum for the Future, 2005; Howard, 2008; Keeney, 1992). More importantly, student reflections are considered to not only enhance the learning process but also provide a valuable evaluation tool about how students experience their learning environment and how learning takes place (Kusnic & Finley, 1993; MacGregor, 1993). As such, two reflective writing assignments were built into the course; one during the mid-term and the other at the close of the course. A template was created to explain each skill

(Appendix D), to aid the student in understanding how these skills were defined, and thus, how they may evaluate themselves and reflect on their performance.

Six skills were identified during the learning outcomes analysis, discussed earlier. These were used to structure the template: collaboration and cooperation, communication, conflict resolution, systems thinking, and values-focused thinking; the sixth skill, reflection, was built implicitly into the reflective assignment itself. A review of the ESD literature as well as additional sources that described the specific skills provided the theoretical background for the development of a template. Descriptive statements from the literature were organized under each category; then, re-worded for student understanding. Initially, each skill had a list of characteristics to describe it and students were asked to write a brief reflection about their use of each skill. This version of the template was tested in two course sections prior to being refined for the launch of this study. Student feedback from these initial tests indicated a need to better describe levels of skill development as well as synthesized definitions for greater understanding. It was also discovered in these preliminary experiences that most AT students were unaccustomed to reflective writing, making it necessary to structure the reflection more, adding questions to prompt their reflection. In the final version of the template, skills were synthesized into statements about how an expert in a particular skill would behave and questions were used to prompt student responses. Further, on the final day of company training, students were asked to identify one or two collaborative skill areas that they would like to work on during that semester, better focusing assessment.

During the reflective writings, students were required to discuss their use of the collaborative and thinking skills as well as general learning epiphanies that may have occurred. They were also prompted in this assignment to identify the process by which they are learning and to discuss what has supported their development so far. An assessment rubric was adapted using Hatton and Smith's (1995) taxonomy. Descriptions of the four levels of reflection (technical, descriptive, dialogic, and critical) proposed by the two authors was used to begin, then other criteria were added, such as demonstrated skills

application and plans for behavioral modification, to hold students accountable for using their collaborative work to learn more about themselves and improve their performance.

Teaching the implicit

As discussed here in the development of lesson plans and course assignments, the explicit planned learning outcomes were given ample room to be changed, exceeded, and transformed by students in their experience taking the course, an important expectation of Eisner (2002), explained earlier. But, central in all course activities was the implicit, and much hoped for, development of potential industry change agents. The course was ultimately designed to empower AT students to make change, asking, "What if?"; arming them with multiple perspectives, their own imaginative skill, their own ethical compass, and the collaborative and cooperative skills to engage others in whatever their mission may be. Other implicit outcomes included the ability to navigate real industry expectations and conditions, such as the iterative, concurrent, interdisciplinary, and collaborative nature of product development. The course design reflected such conditions. One, collaborative interdisciplinary teams were formed, charging students from both marketing and design students to collaborate with each other, while also performing the unique responsibilities that characterized the management roles they played. Second, more than one group assignment was often being completed at the same time, prompting students to toggle between multiple activities, working on multiple issues concurrently. This required two-way communication between managers who were facilitating different pieces of different assignments, which ultimately, supported greater cohesion among assignments. Lastly, students found themselves in a situation commanding them to employ various professional standards, fundamental to the apparel industry, such as time management and attention to detail, even if these were not made explicit in course assignment criteria.

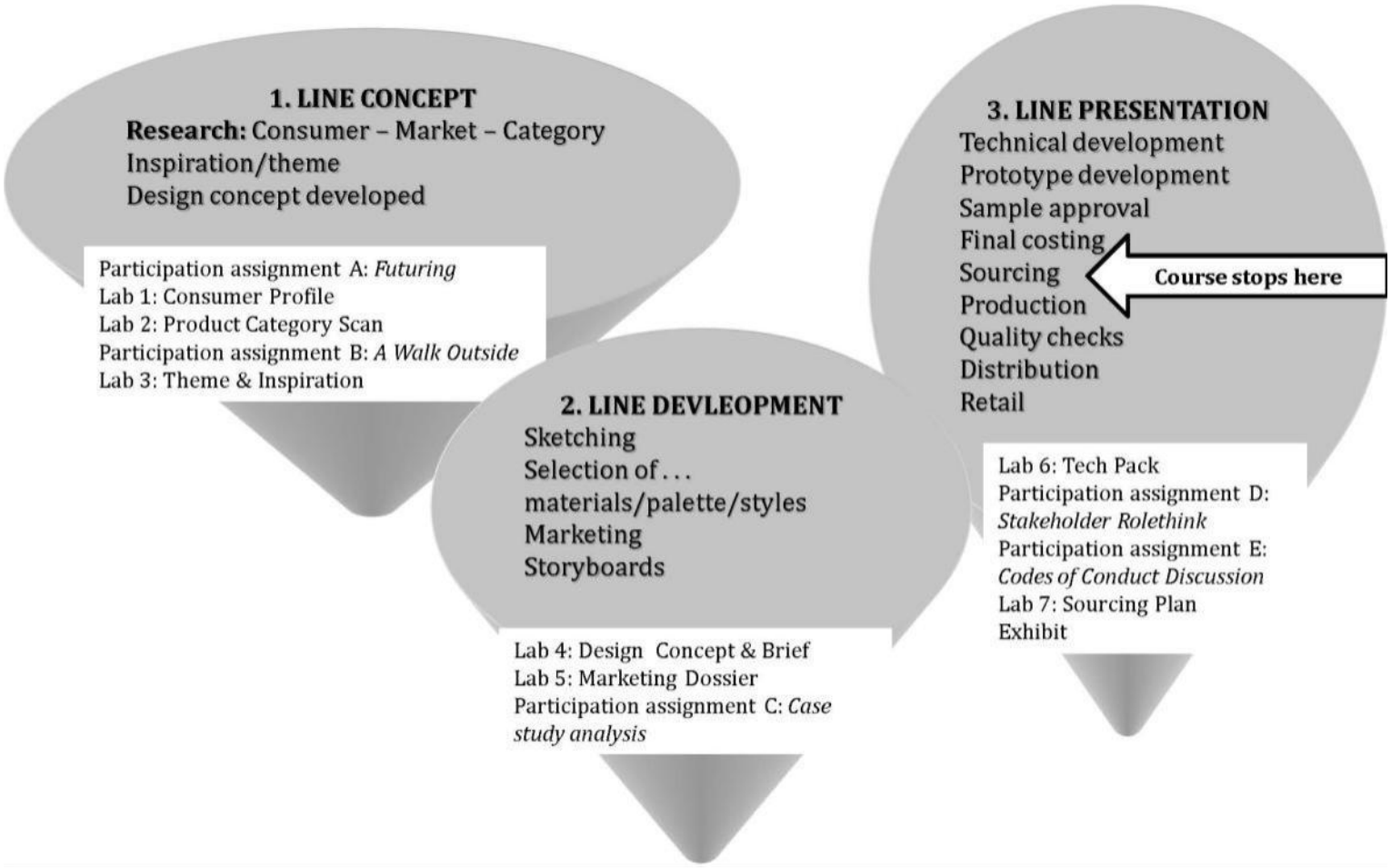
Summary

To conclude, a final map (Figure 4-4) illustrates how the course assignments were organized across the original course skeleton (Figure 4-3), designed to take students through the product development process. Next, the findings from an eight-week pilot are

discussed. As the pilot was conducted concurrently with the final planning phases of the course redevelopment, the lesson plans and assignments discussed above were very much the product of some of the key findings of the trial implementation. Further, a number of course policies were developed in response to these findings, in an effort to better support this experimental pedagogy. These are outlined in the discussion below.

Notable in the experience using the proposed curriculum redevelopment model, was a structured process that held the researcher accountable to the ESD framework and the educational philosophies underpinning the framework. Though curriculum development is, by nature, highly iterative, and in many ways, a trial-and-error endeavor, the model offered a mechanism for making sound decisions supportive of a specific educational philosophy as well as a conduit for producing a cohesive curriculum plan to compliment it. Arguably, the resulting course design used for the current study has many layers, both explicit and implicit. The design also embodies ample room to be transformed by learners over time. Following the course redevelopment model contributed significantly to such complex richness, an effigy to sustainability.

Figure 4-4 Final Course Map with Assignments



The Eight-Week Pilot: Lessons Learned

As the course was being redeveloped through the use of the course redevelopment model, an opportunity surfaced to test portions of the course prior to the official launch of the study. The researcher was invited to co-teach a portion of the course and gather some preliminary data during the first half of the semester. At the time, lesson plans for the sustainable design paradigms were complete as well as several related to thinking and collaboration, so these were incorporated into the course agenda. The *Fashion Futures 2025* report had not been published at the time and was not part of the course theme. As the redeveloped course was, in reality, still being developed, the researcher was confronted with two primary challenges while conducting the pilot:

- Lesson plans were imposed onto the existing course material, a less than ideal scenario, causing the researcher to relinquish a substantial amount of control over the chronology of lesson plans and the time that would be devoted to them. A primary concession included the inability to introduce collaboration and communication lesson plans early in the course. These were, instead, presented weeks apart.
- It was also often necessary to eclipse time devoted to exploring lesson plans to allow time for other course priorities.

Nevertheless, the opportunity to get to know the type of students who would be a part of the official study, better understanding the local context was invaluable. Likewise, observing student experience and responsiveness to the content being tested was immensely useful. Most importantly, student feedback from the pilot affirmed that students perceived they had been exposed to something important and highly relevant, even if the course appeared to lack cohesion in some places. Following is an explanation of the data collection and analysis methods used for the pilot as well as lessons learned.

Data collection and analysis

Three sources of data were collected during the pilot study. First, a rough draft of the reflection template was utilized at the end of the eight weeks to collect reflective

writings from the students. Second, two focus groups were conducted at the end of the semester. Third, the researcher also gathered field notes to capture observations during the time spent in the classroom.

The reflection templates were analyzed using a two-phase process. In the first phase, the researcher developed general themes regarding student perceptions of ESD-related thinking and collaborative skills and how they were used or not used in group work. This offered insight into how students perceived these skills as well as how they were typically used or not used. This allowed the researcher in the later planning phases of the course redevelopment to make important changes to lesson plans related to these skills to increase student engagement as well as impact on student development.

In the second phase of analysis, the researcher read and analyzed student reflections by group membership to better understand what was occurring in each group during their work; what the challenges were, what the successes were. In other words, individual reflections of group members of the same group were read and analyzed consecutively. This second phase of analysis aided the researcher in understanding how student groups currently operate. Knowing the idiosyncrasies of the common strategies used in group work aided the researcher in being responsive to these patterns in the official study, better able to root out ineffective strategies commonly utilized by students. Using concept mapping, the researcher developed a map for each group that reflected their group functioning. This analysis identified what aspects of group functioning were a shared reality for all group members and what remained in the undercurrent only; as disconnection among group members about their shared reality identified collaborative weaknesses with which students were struggling. A coding system was developed to define concepts that students were reflecting upon (Table 4-11) which aligned with themes from the reflection template. The definitions of the codes describe aspects of the lesson plans students received about the skills and were used to identify patterns in student reflective writings. Post analysis, the researcher was also able to create a concept map of an ideal group (Figure 4-5), after a pattern of relationship between these skills emerged during analysis. In other words, based on analysis of the groups that were functioning on a high

level contrasted with those groups that were not, it became clear that some collaborative skills were the gateway to the development of other collaborative skills. The ideal group was mapped, identifying these relationships.

Two focus groups were conducted by a departmental faculty member not involved in the course, an unbiased moderator. One focus group with five undergraduate students and a second group with three graduate students and one undergraduate student were conducted by the moderator. General themes were developed related to learning outcomes and course design. Participants were asked the following questions:

1. Tell me what it was like attending the first half of this course.
2. At one point early in the semester it appeared that some students might be struggling with the course. What can you tell me about that?
3. What did you learn during the first half of the course that was most valuable to you? Why?
4. What was the least valuable? Why?
5. What were your thoughts about the inclusion of collaborative training?
6. How did does your experience in the first half of the course compare to other courses you have taken in your program?
7. Compare the first half of the course to the second half.
8. How did working in groups *help or hinder* your learning? Helped or hindered the development of collaborative skills?
9. If you could have changed anything about this course, what would it be?

Lastly, the field notes were used to note potential changes needed to the course and to corroborate student statements in the reflections and focus group interviews with those observed in the classroom.

Table 4-11 Codes for Concept Mapping Analysis of Student Reflections

Engagement: The willingness & ability to engage in the group (be a part of, participate, communicate, draw others out, etc.)

Expression: The ability to express personal ideas & allow others to express theirs.

Dialogue: The willingness & ability to engage in an active discussion, looking at multiple perspectives

Listening: The ability to listen to others, whether you agree with them or not.

Quality of interaction: Communication/interaction connoted by respect, mutual understanding, tolerance, etc.

Democracy: The ability to, as the result of a open dialogue, reach a conclusion that is not the result of a majority-vote, but an agreement reflective of each group member in some way.

Sharing: Includes sharing the workload and accountability in an equitable way.

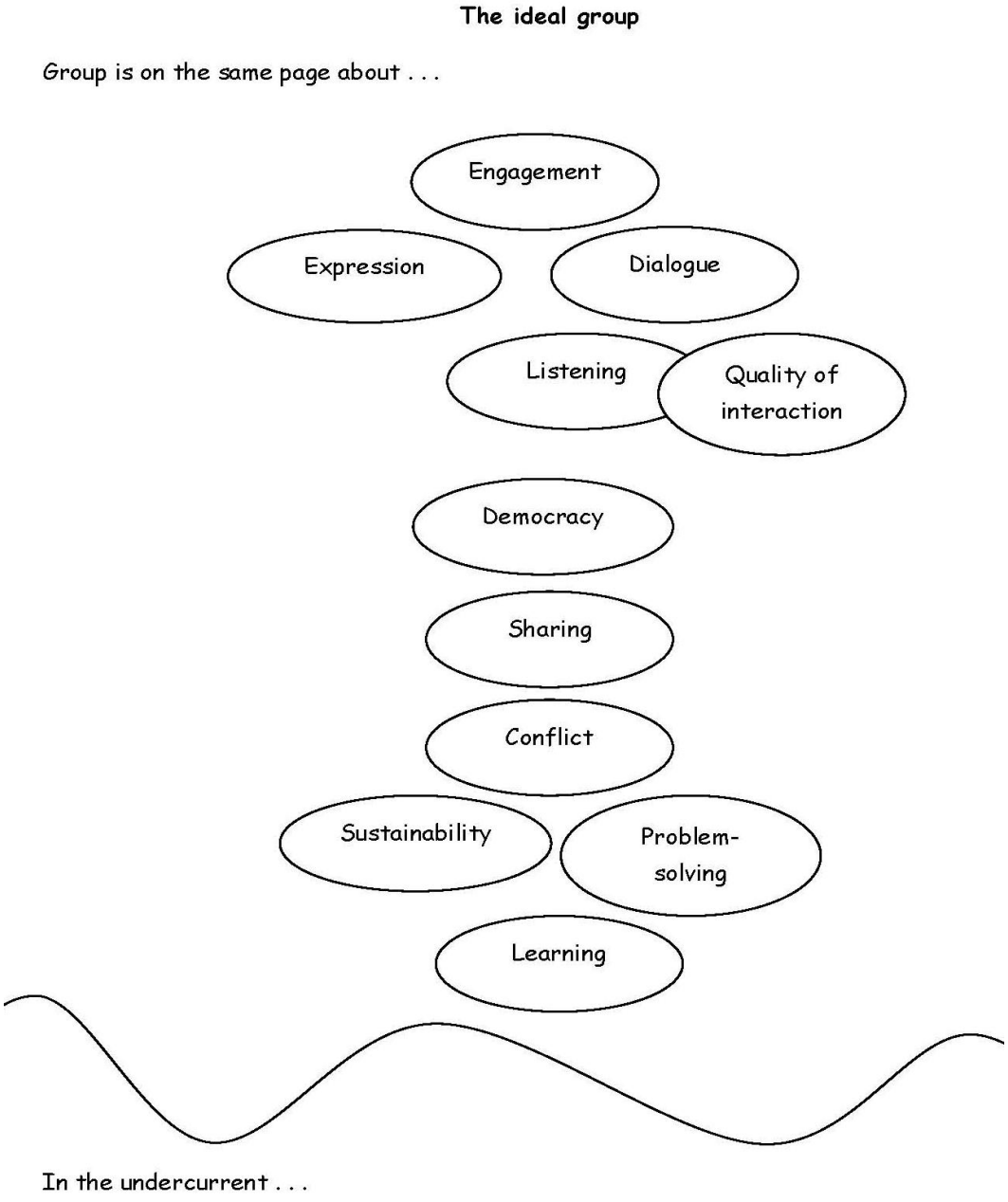
Conflict: May be an acknowledged or unacknowledged disagreement in the group about an idea or plan, but may also include conflict in values, perceptions, ethics, etc.

Sustainability: The interest in achieving a plan that is reflective of an attempt to balance social, environmental, and economic perspectives/plans.

Problem solving: The ability to use frameworks discussed in class like and apply to group problems (systems thinking or values-focused thinking).

Learning: The appreciation or desire to learn from group collaboration.

Figure 4-5 Concept Map of an Ideal Collaborative Group According to ESD Skill Set



The pilot sample included 42 AT undergraduates and 4 graduate students. The 46 students were divided into groups of 3-4, forming 12 collaborative groups. Graduate

students were dispersed among these groups to collaborate with undergraduate students. Students were to complete a series of product development related assignments, creating a comprehensive product development plan by the semester's end.

Lessons learned

The following are the most important lessons learned from the data collection and analysis. Generally, the most hopeful news came from the focus group interviews, which confirmed that students perceived relevance in aspects of the course most reflective of ESD, including the collaborative training as well as the sustainable design paradigms. Though students made comments about the seemingly disjointed nature of the course and their frustration surrounding unclear expectations during the first eight weeks, they clearly articulated an interest in learning more about the topics presented. More perplexing, was an assortment of students perceptions related to sustainability as well as group collaboration that had important implications for how both could be reframed to enhance engagement.

Perception is 9/10 of the law: Sustainability and AT

In regards to sustainability-related content, the researcher's field notes and the focus group interviews identified some important challenges for sustainability education in an AT context. One, as mentioned earlier in this chapter, AT is a highly specialized discipline of distinct, and in some ways, isolated silos. As such, AT undergraduates are very much a product of this environment, a challenge to connecting trans-disciplinary content, like sustainability, to their field. Two, the motivations for seeking a degree in AT may or may not have anything to do with anything altruistic or intellectual, but may instead be an attraction to the creativity, imagination, and expression the concept of fashion embodies. Following are some key examples that support these insights as well as a discussion of responsive changes to the course that came as a result of this insight.

During lessons plans introducing concepts like industrial ecology and Biomimicry, some students commented that these ideas seemed too "biological" or "sciencey," indicating that these concepts seemed more appropriate to the hard sciences than the

design of AT products. In sum, students were challenged to relate broad concepts about sustainability to their specialization. In another lesson plans about design for well-being, students were asked to use the Happiness Barometer developed by Wackernagel to identify ways in which fashion products may enhance or detract from happiness or well-being. As the researcher walked from group to group to monitor the discussion, she stopped at one group that was grappling with ways in which fashion might *detract* from happiness. The researcher asked, "Well, what if you consume too much of it?" A member of the group laughed and replied, "Is that possible?" Another related observation was made during a class activity in which design for environment (DfE) was the topic. Student groups were asked to redesign specific garment profiles using DfE strategies. Students seemed to enjoy the creativity and imagination involved in such work, sharing their design concepts for their new designs enthusiastically at the end of class, for which many had sketched out illustrations. This experience and others indicate that students may find difficulty navigating the antithesis to sustainability that fashion, in many ways, embodies, but may be more responsive to these concepts if their creative and imaginative skills are required. Similarly, during the focus group interviews, students discussed the "heaviness" or complexity of some of the sustainable design paradigms as being a lot to digest on top of learning about apparel product development. Students discussed the need for industry examples of the concepts to better understand the practical application of these ideas to fashion. In sum, although students consistently expressed concern about sustainability and an interest in learning more about it, *how* the concepts were presented was a clear sticking point to engagement.

This sent the researcher back to the drawing board. An altered approach would be required, one that was responsive to the student need for a holistic perspective of sustainability, but honored and recognized the more desirable aspects of their chosen field, like creativity and imagination. Clearly, tackling sustainability from a sobering or intellectual standpoint, used in some lesson plans, was not perceived to be an engaging approach.

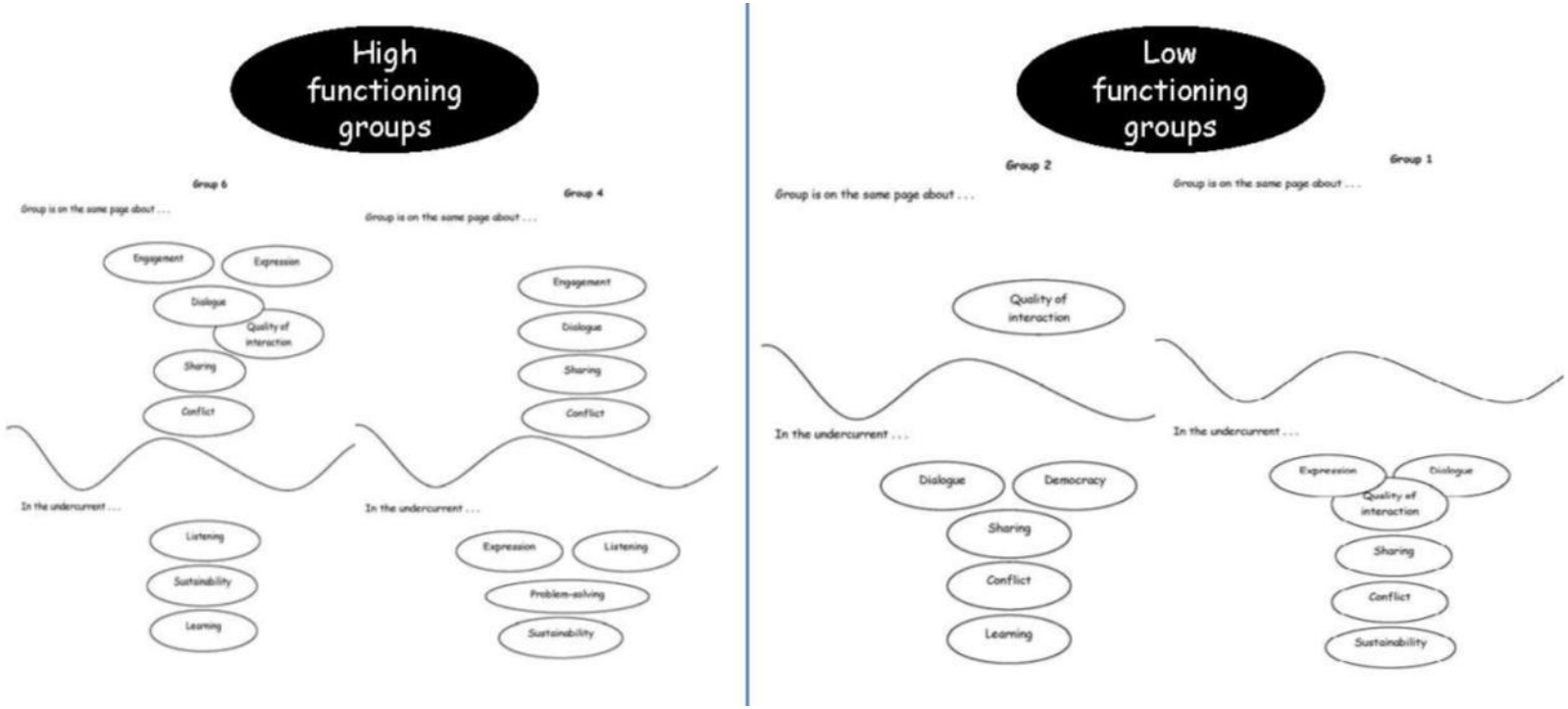
After the close of the pilot, the researcher discovered the *Fashion Futures 2025* report. Using the report, the researcher crafted the aforementioned course role play. This approach provided the cohesion that the pilot lacked, and also better justified the inclusion of sustainability-related content as well as content associated with collaborative and thinking skills related to ESD. Most importantly, the *Fashion Futures 2025* report framed sustainability as an exciting opportunity to innovate in the fashion industry and encouraged the use of creative and imaginative skills around such an opportunity. The report offered real examples of such innovation and better illustrated how sustainable design paradigms from other disciplines related to fashion.

Perception is 9/10 of the law: Collaboration

In regards to the course content related to thinking and collaborative skills, the reflections, focus group interviews, and field notes all identified important assumptions made by students that presented barriers to learning. Many of these assumptions surrounded conflict resolution. The first and most challenging assumption was: *Absence of conflict or 100% agreement indicates successful conflict resolution.* This degree of wishful thinking and naiveté about navigating relationships was trickled heavily throughout nearly every student reflection collected. These assumptions were unsurprising as the researcher noted the commencement of group conflict on the second day of the course, and only two groups indicated in their reflection during the eighth week of the course that a conflict had been successfully resolved. The concept mapping portion of the reflection analysis also supported this assertion. In Figure 4-7, examples of high functioning groups (those denoted by positive reflections on their group collaboration and the only two groups to resolve a conflict) and low functioning groups (those denoted by mismatches in shared reality with conflict always bubbling below the group's awareness) are contrasted side by side. In the examples of the latter, ten out of the twelve group maps appeared with this pattern, characterized by a lack of shared reality. Meaning, when analyzing, sometimes it appeared as though they were *not* members of the same group, as one member's perception of the group's functioning and their use of the skills conflicted significantly with others' accounts of the same situation. Meanwhile, conflict was always brewing in the undercurrent;

avoided, masked, or explained away, but never confronted. Further, during the focus group interviews, students indicated a broad continuum of commitment to confronting and working through conflict among their peers, indicating a lack of knowledge about how to collaborate effectively.

Figure 4-6 Concept Map of Group Functioning



The second, very potent assumption was: *Good collaboration means surviving the assignment.* Focus group participants commented on their interest in collaborative training while also discussing their frustration regarding the class time being devoted to such training, feeling they were being pulled from the completion of assignments. Likewise, a predominant theme in student reflections was a penchant for efficiency in collaboration, another indication of their naiveté about the process of collaboration; a process that, by nature, takes longer. This tendency to prize efficiency could likely also explain their avoidance of conflict, the resolution of which is a time consuming endeavor. Clearly, the completion of the assignment was king, regardless of relationships that were slain in the process. This is understandable, a likely byproduct of such work accounting for nearly 85-90% of the final course grade. In sum, the *process* was not incentivized, so what motivation could students have for making the journey of relationship-building a priority?

An extension of this finding was another assumption identified: *Engagement for the purpose of productive collaboration and higher learning is of little value.* Noticeable in Figure 4-7 regarding the high functioning groups was the commitment made by the groups to engagement. This was a pattern found in other groups, even if conflict was not being confronted. When engagement was a priority and a characteristic of group interaction, students tended to comment to a greater extent about their own learning and development. This was also evident in the researcher's field notes from experience in the classroom. Often, students were given time to work on their product development assignments, ranging from 20-45 minutes. Though students may have complained in class and during the focus group interviews about the lack of time they were given to work on these assignments, by observation, most groups demonstrated an approximate 10-15 minute threshold for group interaction, after which the group disbanded to continue working on the assignments individually, leaving class early. Consistent with student reflections, groups who habitually stayed late and utilized the class period to discuss and work together were also those who prized engagement and noted a more successful collaborative experience.

These three assumptions represented important implications for needed alterations for the future regarding the skills development portion of the course. But, it also commanded reconsideration of course policies and aspects of the course design. First, if engagement was the gateway to the development of all other skills, but students were permitted to take it or leave it, then the researcher could likely anticipate skills development to continue to flounder. Likewise, if the completion of assignments remained the chief incentive to performance with little link to behavior during the completion of such assignments, then the worth of collaboration would remain low. The question became how to insure engagement and incentivize the journey. The researcher looked at course policies, such as grade weighting, attendance requirements, and participation expectations to identify where a different tact could be taken. The following policies were generated, which appeared on the new course syllabus:

- **About collaboration:** Collaborative work is fundamental in this course, not only for the completion of your product development proposal, but for your own learning and development. Neither is possible without full participation and engagement. *Participation is defined as making attendance a priority, being fully present during class and group interaction, having a learning attitude, and contributing to group work in a meaningful way.* Approximately 50% of individual course grades are attributed from such engagement, research, and reflection on experience in the course. Therefore, *no more than three absences during the semester are permitted; each absence exceeding three results in the reduction of one letter grade.* Attendance will begin on the second day of class and *no absences are considered excused*, so budget accordingly. Exceptions to this policy are at the instructor's discretion and are only made in extreme circumstances. Students with perfect attendance characterized by active engagement will receive an increase of up to 5% in their final course grade.
- **About participation grades:** Approximately *30% of your course grade is based on participation* as defined above. Students will receive a mid-term and final participation grade. Formal assignments related to this portion of your grade will simply receive –'s (weak), ✓'s (ok), or +'s (strong) (Participation assignments A-E). Other assessments are made through observation by the instructor as well as attendance.
- **About group work:** There will be a portion of class time devoted to working on group assignments, indicated in the course agenda as "group work." This time will be structured by the instructor and *students should plan to remain in class during the full class period*.

Further, during the development of lesson plans and assignments, care was taken to insure that assignments, discussions, and activities, requiring group engagement, were a central feature in the course implementation. A series of group assignments, completed throughout the semester to culminate in a product development proposal, were already a fundamental portion of the course. But, both formal and informal participation assignments were added to require group collaboration and engagement. Class discussions and activities were designed to put students together, either in their semester-assigned group or in randomly assigned groups to allow frequent exposure to other personalities. In sum, interaction and collaboration became inescapable. Nearly every graded component of the course would be attributed to collaborative output and the quality with which the *process* of that work was conducted. Two reflective writings were designed to prompt students to take note and learn from the *process*; what happened, what was learned, and what has changed in light of their experience collaborating in the course. In this new context, students would find it challenging to remain isolated.

Lastly, to insure student participation in the *company training* at the beginning of the course as well as consistency in expectations for collaborative conduct, three class periods were made mandatory, supported by the following policy stated in the syllabus:

- **About mandatory attendance during Week 2-3:** There are *three class periods* for which collaborative training will be conducted. Attendance is required during this time to progress in the course, as it would be if you were being trained by a new company. Exceptions to this policy are at the instructor's discretion and will only be made in extreme circumstances.

To conclude, the opportunity to experiment with lesson plans and activities related to ESD in the pilot study aided immeasurably to the redevelopment of the course for its official launch. The decision-making process conducted in regards to course policies and design was challenging. Chiefly, this venture commanded the researcher to consistently reflect and articulate what is important in education. The policies and course design decisions presented here are, in some ways, unconventional by comparison to other courses in the AT program. Indeed, significant trade-offs were made and risk abounded.

Though not easy, adherence to the ESD framework required these difficult choices in hopes that student learning and development might be enhanced. The researcher is grateful to the participants as well as the primary professor of the course for their generous contributions to the advancement of the current study.

CHAPTER 5 - **Results**

> "The most important epiphany, hands down, is the realization of sustainability being a current event, a real event, not only just in our world, but in *my* world . . . a culmination of all I was taught has prepared me to face this world with a whole new set of eyes on this issue and this industry as a whole. The learning experience was unlike anything I had ever experienced before. Rarely will class material inspire you to change the way that you live your life. This class did that . . . I feel that this is going to be one of the most beneficial classes of my college career" (007_Reflection 2).

In the previous chapter, a model for course redevelopment for sustainability was described and the process of using the model to redevelop the course used in the current study was explained. The results of an eight-week pilot were also discussed. This chapter, first, describes the implementation of the course as it unfolded over the semester and describes some changes and adjustments that were made during this time. Next, some illustrations of student work are presented to aid the reader in understanding the influence sustainability had on creative work in the course. Finally, this chapter describes the findings related to the study's two key research questions: 1) How do students experience a course that uses the Education for Sustainable Development (ESD) framework? and 2) How does the use of ESD enhance the student learning and development experience?

Description of the Course

The course began during the last week of August 2010, the fall semester. The course met twice per week on Tuesdays and Thursdays. Each class period was one hour and fifty minutes long. The course utilized an online university portal to upload course materials and post grades. A wiki was also used as a platform for collective class research and to assist groups in collaborating with each other outside of class.

The first week of the course concentrated on introducing the student to product development, sustainability, the course role play, and values-focused thinking. On the first day of class, students were introduced to apparel product development and sustainability

as well as central debates regarding sustainable design, such as who is responsible (consumer, designer, manufacturer, etc.), on what level will it take place (local vs. global), how fast it should happen, and what it should look like (Thorpe, 2008). Students were also introduced to the semester role play and the six change agent skills that would be emphasized during the course. The syllabus was also reviewed at this time, then students were let go early. During the second day of class, students were given their group assignments for the semester. Then they were introduced to apparel product development in more detail and the change agent skill values-focused thinking. Students were then prompted to use their newly acquired knowledge about values-focused thinking to work in their assigned semester group to develop a design code of ethics.

The following three class periods were devoted to *company training,* collaborative training which centered on conflict resolution as well as the democratic process. Two of the company training class periods were devoted to the textbook *The Eight Steps to Conflict Resolution* by Weeks (2008). The first two class periods were devoted to four of the eight steps and included a series of conflict scenarios that students were required to work through in groups, using the steps discussed that day. These scenarios were written by the instructor based on real conflict situations that had occurred in the course in past semesters, but were framed in an industry setting. Additionally, short videos were used throughout the lesson plans to illustrate points, some by the television series The Office as well as a conflict scenario from Project Runway. The third class period of the company training outlined the democratic process, emphasizing the importance of democratic dialogue and debate. Two Ted.com videos were used to illustrate the importance of both leading and following (Derek Sivers, *How to start a movement*) as well as the art of democratic debate (Michael Sandel, *What's the right thing to do?).* Then, the instructor walked students through a nominal group process, in which students learned a formal democratic process for insuring the inclusion of everyone's perspectives. Students then used this tool to springboard the development of a group contract, in which they set standards of work ethic for their group.

Once training was complete and groups had spent time getting to know each other and developing guideposts for their design as well as group work, the following week was spent exploring the future. Two class periods were devoted to exploring both a broad perspective of the future, including a collective lecture using articles from *The Futurist* journal and a second, more narrow discussion, related to the future of the fashion industry, using the report *Fashion Futures 2025* (Forum for the Future, 2010). In the former, students were assigned to read different articles by group from the journal, the *Futurist,* and were required to present the high points of their reading to the rest of the class, so everyone could use the information. In the latter, students worked in groups workshop-style, to complete an activity included in the *Fashion Futures 2025* report called A Day in the Life. Students were broken into randomly assigned groups and given a specific future scenario from the report. Randomly assigning groups insured that each semester-assigned group member would return to their group to vote on their scenario of choice, having had different scenario experiences to consider. In this discussion, students answered questions like, "Where do you live? Where do you work? How do you get there? Where do you shop? What do you wear?" Students shared insights about their scenario with the rest of the class. Then, students returned to their semester-assigned groups to vote on which scenario they would prefer to design for in their semester project. Next, students worked in their semester-assigned groups to create a consumer profile for their chosen scenario, using the information generated from both class discussions.

After student groups began working on their semester project, beginning with the consumer profile, the following three and half weeks were used to cover a series of sustainable design paradigms. Concurrently, students continued to complete group assignments including a market scan of their chosen merchandise category (to survey the competition) and a theme and inspiration presentation for their line. These class periods were generally broken into 45-60 minute segments. The first part of the class period was devoted to a sustainable design paradigm lesson plan, a related activity in which students were often asked to use the paradigm to generate an apparel design concept, and a class critique, in which the class was asked to criticize the paradigm and its application to

apparel. These lesson plans were typically followed by open group work time in which the instructor would visit with groups individually while they worked on their project assignments. Students were introduced to sustainable design paradigms during this time in the following order: Product Service Systems, Industrial Ecology, Biomimicry, Cradle to Cradle, Design for Environment, and Design for Well-being.

When the sustainable design paradigms lessons concluded, students were introduced to the semester's most intense assignment, the design concept and brief. Students were asked to integrate their previous collective research, group assignments, their chosen scenario, and key sustainable design paradigms to guide the development of the physical designs of their line and use a brief to explain their strategies. Students were permitted a class period and a half to work in their groups to brainstorm and pull their ideas together. Then, the instructor, playing the role of *Director of Product Development*, used an entire class period to meet with each group privately in her office to collaborate with the groups on their assignments ideas as well as to discuss group functioning and offer suggestions for ways to enhance collaboration. During this same week, students completed their first reflective writing.

As decision making was growing more complicated by the ninth week of class, students were introduced to the final change agent skill systems thinking. Students completed two activities from the *ESD Tool Kit* (McKeown, 2006), designed to help students identify social, environmental, and economic perspectives, recognize conflicts between them, and formulate trade-offs with sustainability in mind. Students were then asked to sign up to read a selection of articles of their choice about apparel brands that use sustainable strategies. They were asked to analyze these brands, using a triple bottom line template, identifying for example, environmental strengths, weaknesses, threats, and opportunities for each brand. A week later, students pooled these notes in a collective triple bottom line analysis of the sustainable fashion industry. Their notes were used in class to identify conflicts and formulate viable trade-off strategies while also learning more about the sustainable fashion industry.

While students continued to develop their design work, they were introduced to well-being marketing, and the marketing dossier assignment. During the tenth and eleventh week of class, students were introduced to analytic tools such as Walker's (2006) Aesthetic Typology and life cycle assessment. As students finalized their design concept and marketing dossier, they were introduced to product specifications and costing assignments. Again, the triple bottom line was used during the costing portion of their specification work, in which they were asked to use a table developed by the instructor, to consider the externalities of their design decisions, adding a percentage to their bottom line for such costs.

Students were introduced to sustainable sourcing strategies during the twelfth week of the course. It became apparent at this time, however, that students were consumed with the completion of the semester project and the planned sourcing-related assignment, a collective stakeholder analysis, was not going to be possible. After discussing this prospect with other faculty as well as students in the course, the sourcing assignment was dropped, which opened up more time to devote to completing final specification assignments and preparing for the class exhibit.

The final three weeks of the course were used to work collaboratively toward these ends. The instructor met with groups individually to collaborate and answer questions. These class periods were structured to allow the instructor a short visit with each group to discuss their progress on assignments and work through any issues related to their group functioning, offering the groups feedback on both. These were particularly interactive class periods in which students asked many questions and requested feedback on completed work by the instructor.

Students brainstormed together to develop an exhibit theme, which they coined "Nostalguristic;" meaning, all four brands developed by the class had taken inspiration from both the past (nostalgia) and the future (futuristic) to develop sustainable fashion. Promotional materials including postcards and posters were prepared and posted throughout the college. Students were permitted a certain number of postcards to share

with their peers and family. The exhibit was also promoted via a power point announcement in the lobby of the college.

On the final day of the course, the class exhibit was held. Students prepared poster presentations of their group's product development proposals as well as a complementary laptop slideshow to illustrate other important information about their brand. Each presentation station was accompanied by a description of the scenario for which the group had designed for. Some groups had prepared other props; for example, one group prepared an interactive magnetic board illustrating changeable components of their custom denim brand, while another group offered plantable tree pots with their brand's logo printed on them. Prior to the public presentation, students peer reviewed the other group presentations, filling out an assessment form related to the qualitative criteria of the assignment and posing questions to the groups about their work. Finally, the exhibit time was approximately an hour and a half and yielded over twenty attendees, both students and faculty. Students stood with their presentations and helped their teammates explain their work to passersby as they came through. Several days after the exhibit, students completed their final reflective assignment.

Illustrations of Student Work

Following are a series of illustrations that are representative of the semester project completed during the course. Illustrations represent work from two of the four student groups. These are illustrative of how sustainability influenced the participants' creative and strategic work in the course. This work is organized by group and includes creative work for three aforementioned assignments: theme and inspiration, design concept, and marketing strategies. Each group's work is introduced by a brief description of the overall design concept and the future scenario for which the group designed. Some participants have requested that their full names be associated with their creative work, while others have opted to maintain their confidentiality.

Dual Natured Apparel (DNA)

This group developed a custom denim design concept for the Slow is Beautiful fashion futures scenario. The scenario is characterized by a high rate of consumer acceptance of sustainability, a byproduct of stiff regulation and carbon restrictions on purchasing. The group used sustainable design paradigms like Design for Well-being and Product Service Systems to guide their work. Customers of the custom denim could purchase jeans which came with a 10-year warranty and number of services, including tailoring, redesign, and classes to teach consumers how to preserve fashion items by redesigning with found objects and denim scraps. The team's inspiration was a mosaic and 18th century architecture, as their consumer market was highly diverse and their denim line was very tailored and structured (Figure 5-1). The design concept including denim with custom component options as well as some redesigned jackets made from recycled denim (Figure 5-2). To market the products, the group developed a website that would aid them in demonstrating transparency, a key concern among consumers in the scenario (Figure 5-3 to 5-8). Work was completed by Caroline Nyman, P007, P008, and P013.

Figure 5-1 Example of Student Work: DNA Inspiration Board

Figure 5-2 Example of Student Work: DNA Design Concept Board

Figure 5-3 Example of Student Work: DNA Website Homepage

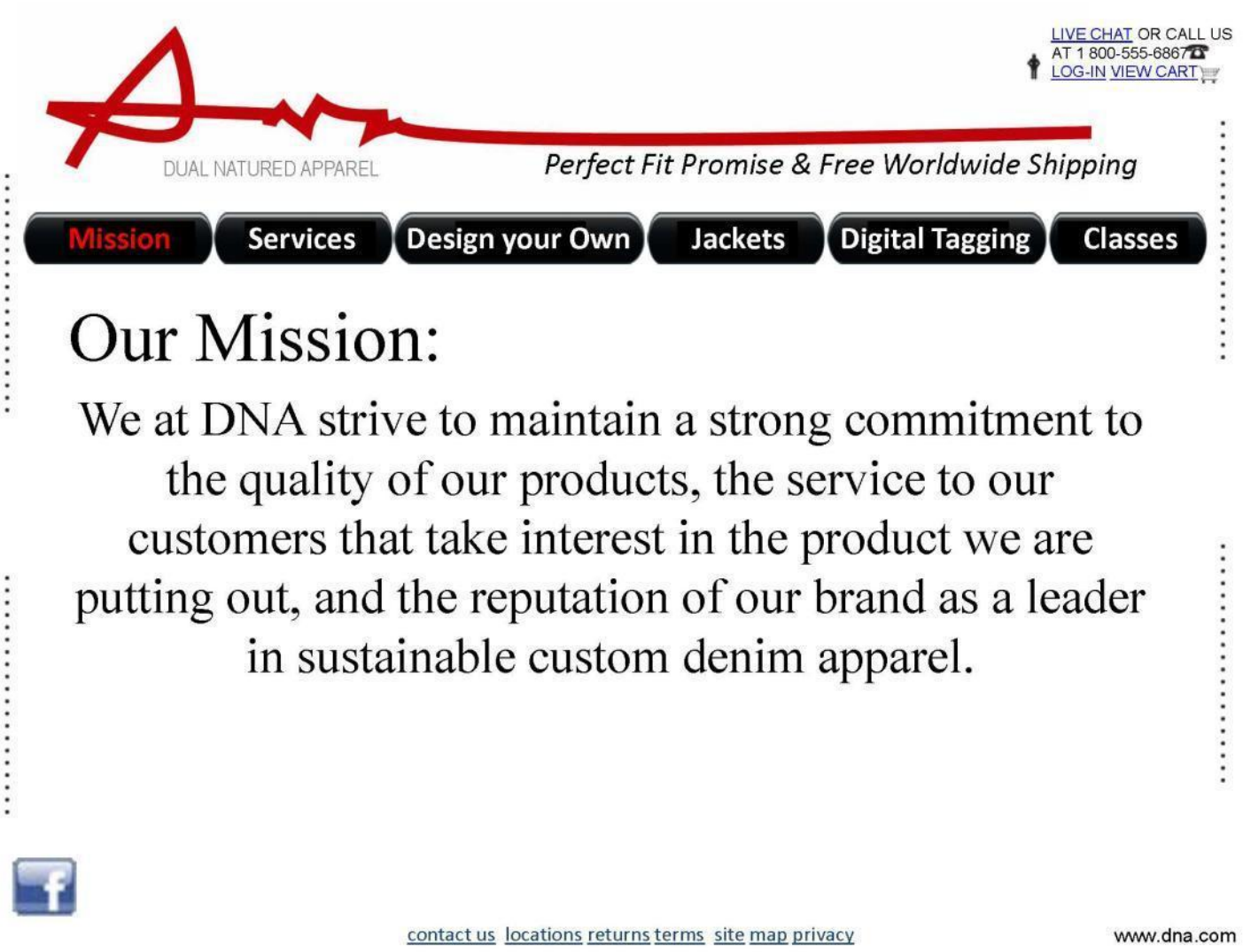


Figure 5-4 Example of Student Work: DNA Website Continued

Figure 5-5 Example of Student Work: DNA Website Continued

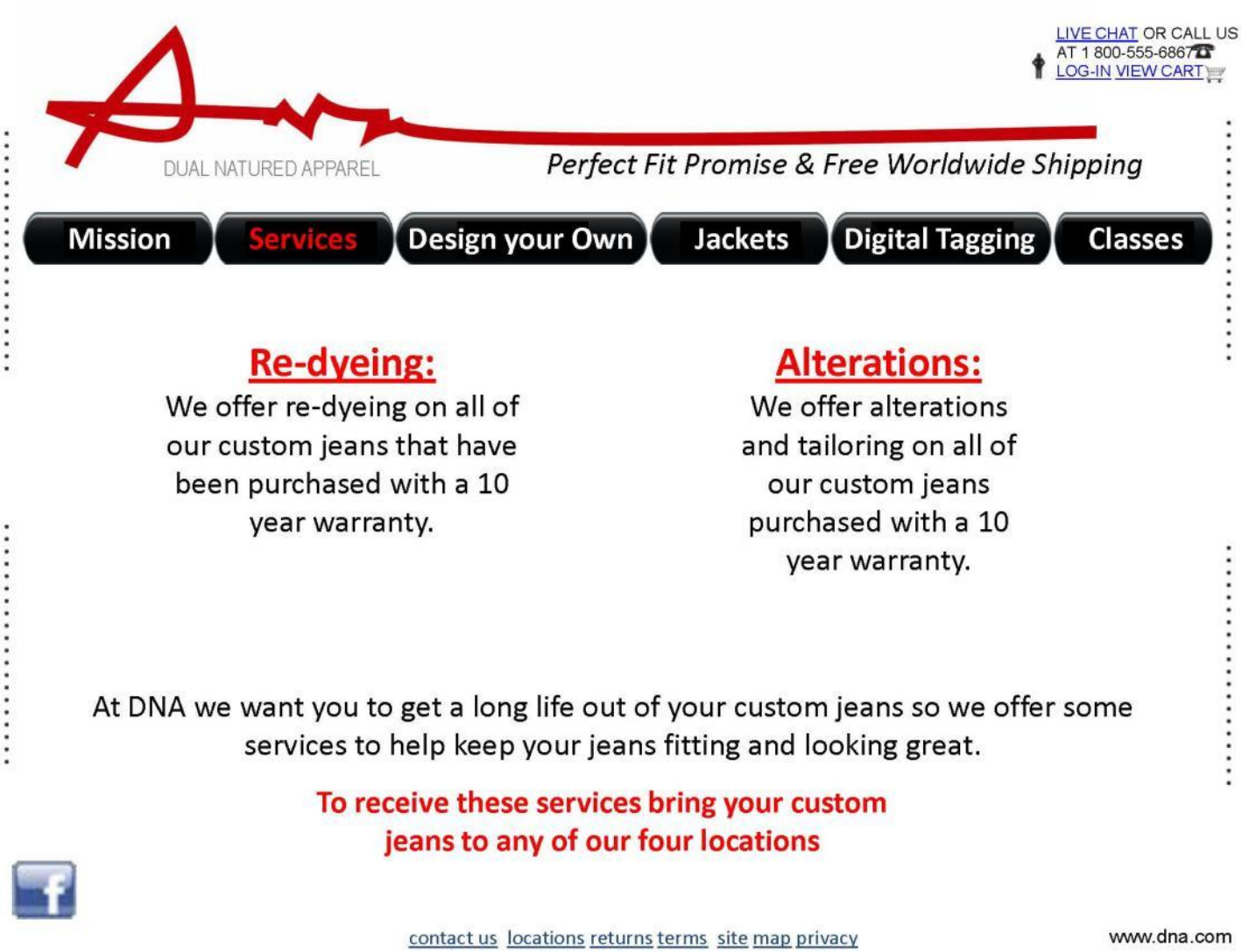


Figure 5-6 Example of Student Work: DNA Website Continued

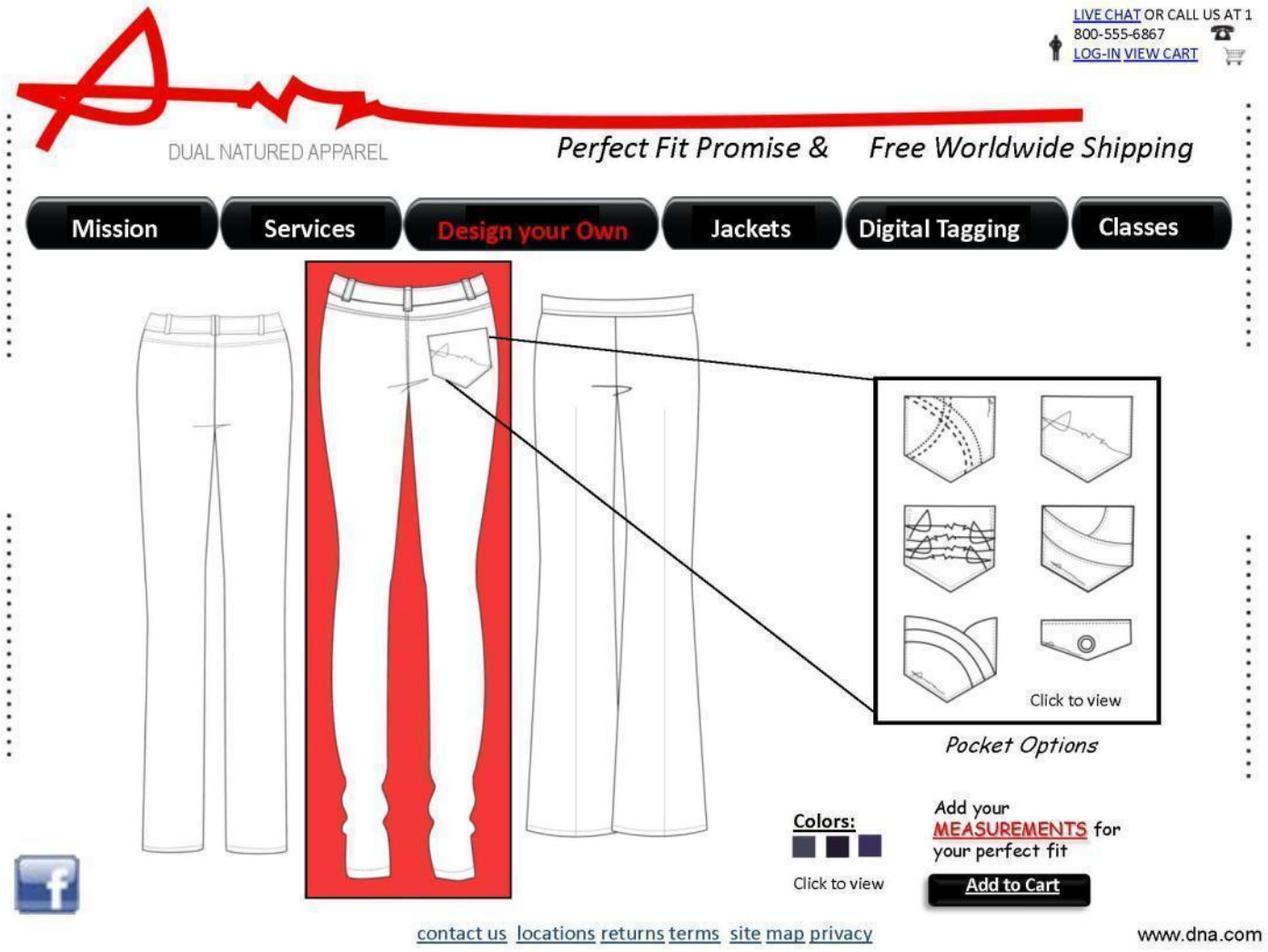


Figure 5-7 Example of Student Work: DNA Website Continued

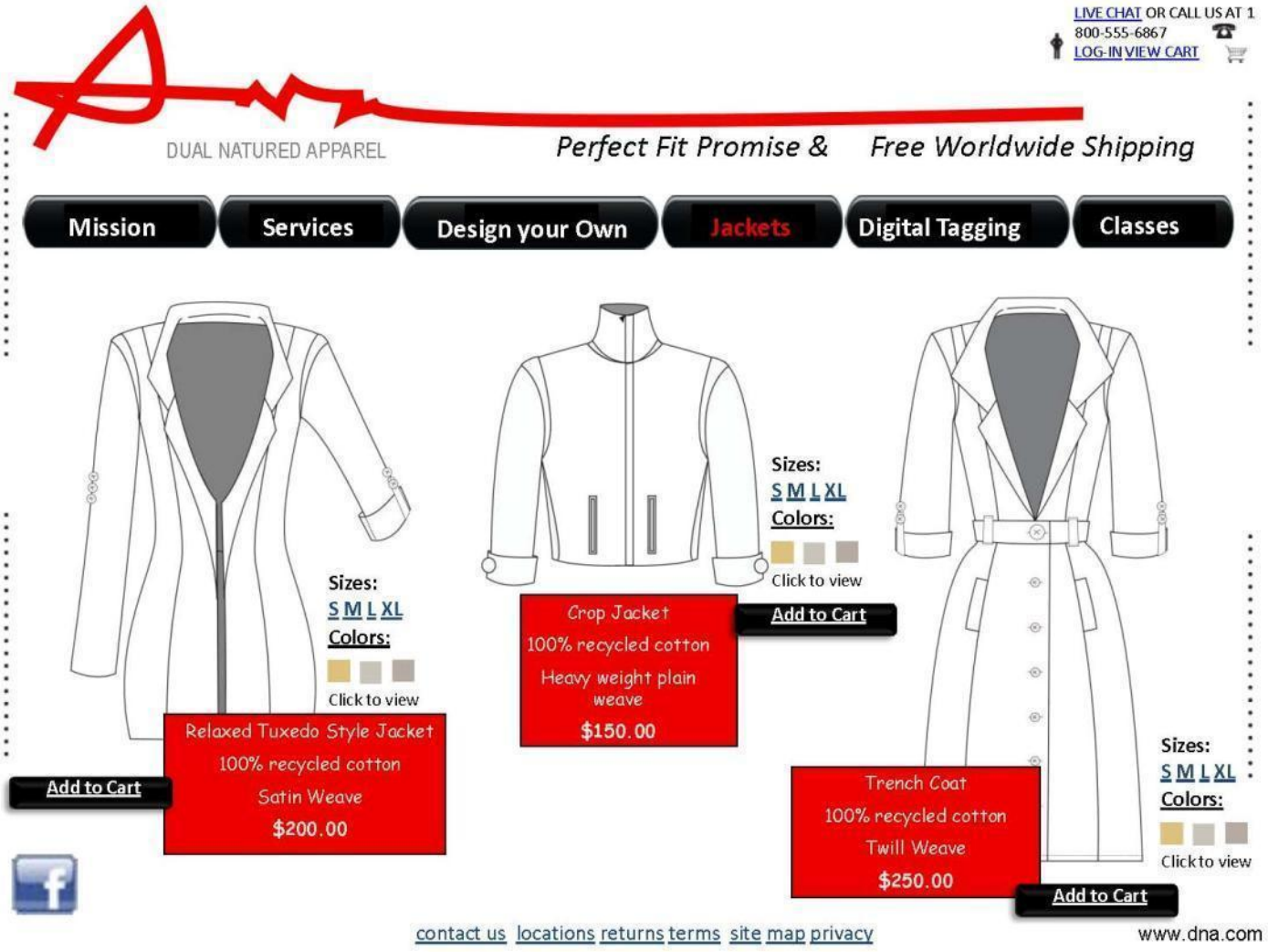
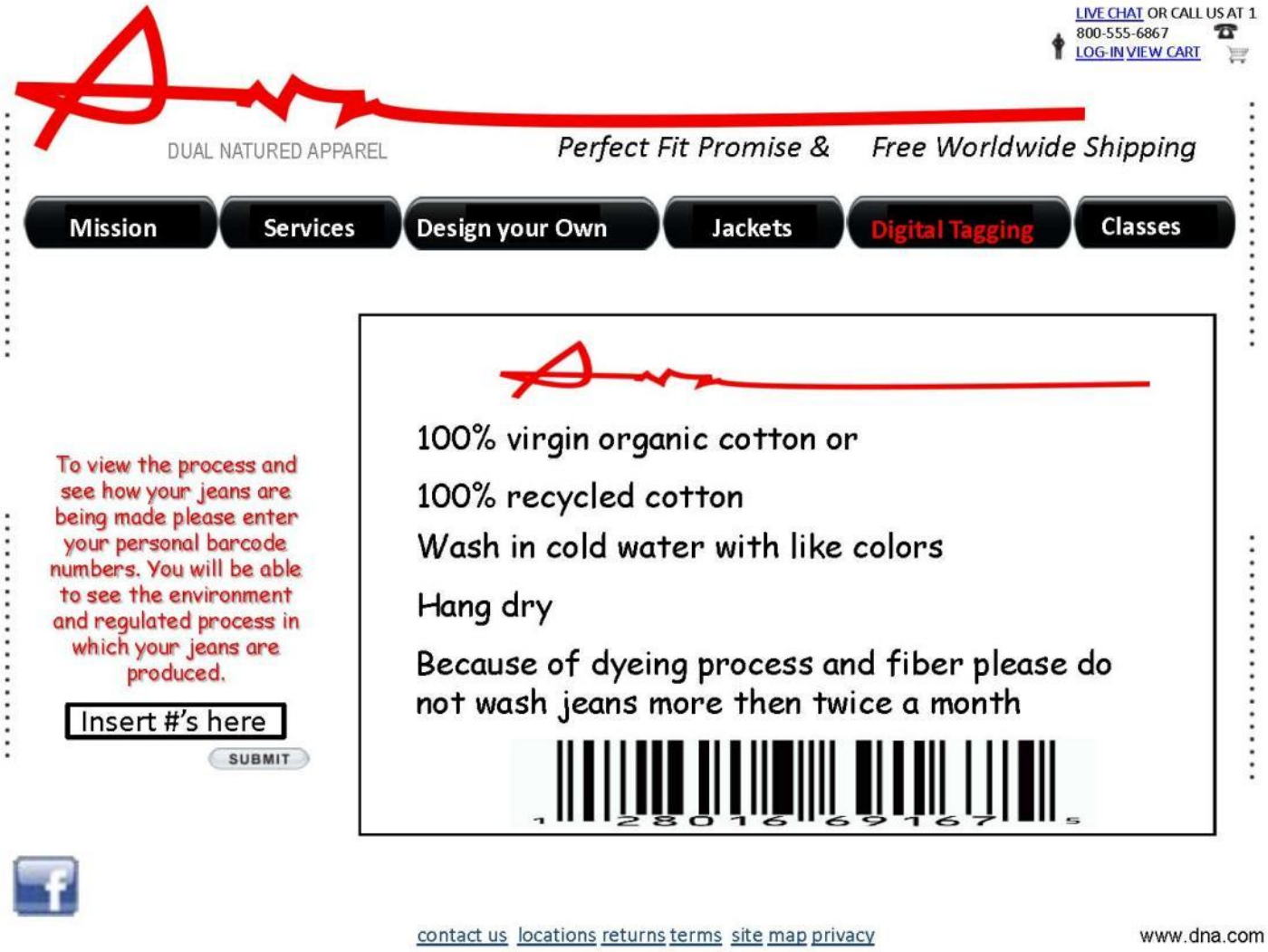


Figure 5-8 Example of Student Work: DNA Website Continued



AbUrbe and Mutatis Mutandis

This group developed a line of hemp apparel for women for the Patchwork fashion futures scenario. The scenario is characterized by a reverse in globalization resulting in highly fragmented global regions, which is why the group chose to develop two lines to demonstrate how a global brand might market differently in two regions, the West coast (Mutatis Mutandis; meaning changing what needs to change), where consumers are more progressive in regards to sustainability acceptance, and the East coast (AbUrbe; meaning from the city), where consumers are more resistant to sustainability. The group used the sustainable design paradigm Design for Environment to guide their work. Customers could purchase multi-purpose apparel made of hemp that could disposed by returning it to the company for recycling or could simply planting it their backyard. The team developed different inspirations for both the West (Buddha) and East (celerity) coast lines (Figure 5-9). The design concept included a high tailored collection in which components could zip on and off and be unzipped to alter the garment silhouette for the West coast (Figure 5-10), and a more relaxed, unstructured collection in which components could be buttoned on and off and reversed to change the overall look for the East coast (Figure 5-11). A map of the line's material cycle is illustrated in Figure 5-12. Among the marketing strategies implemented by the group were a store layout designed compactly to aid in a substantial reduction in energy use, the use of an interactive mirror to "try on" products rather than stocking large inventory levels in house, and a number of phone applications that could be used to shop and receive styling advice from the brand (Figure 5-13 and 5-14). Work was completed by Margaret Campbell, Alexis Cotton, and P009.

Figure 5-9 Example of Student Work: AbUrbe and Mutatis Mutandis Inspiration Boards

Figure 5-10 Example of Student Work: AbUrbe Design Concept Boards

Figure 5-11 Example of Student Work: Mutatis Mutandis Design Concept Boards

Figure 5-12 Example of Student Work: Mutatis Mutandis Product Service System Map

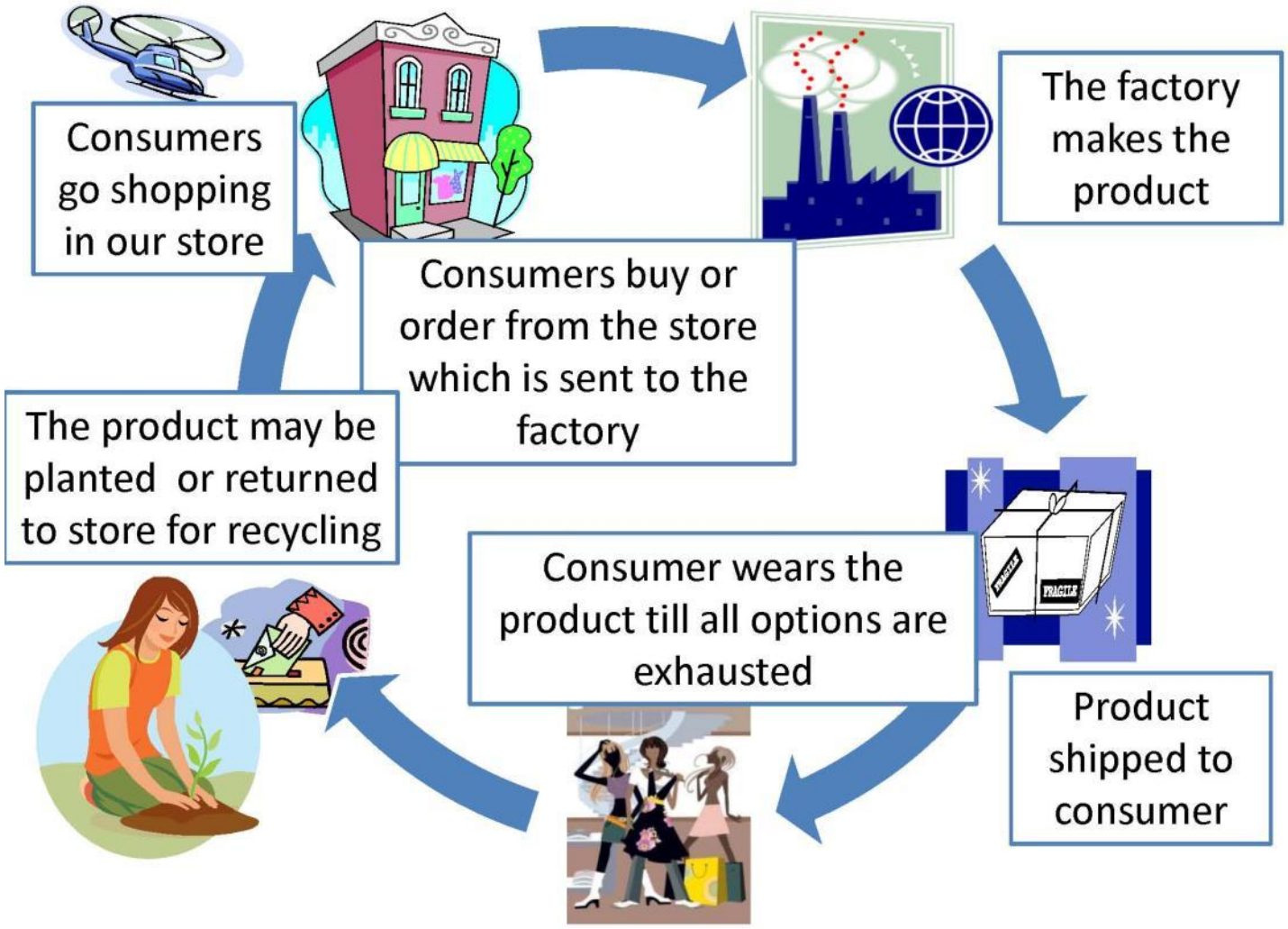


Figure 5-13 Example of Student Work: AbUrbe Store Layout with Interactive Mirror

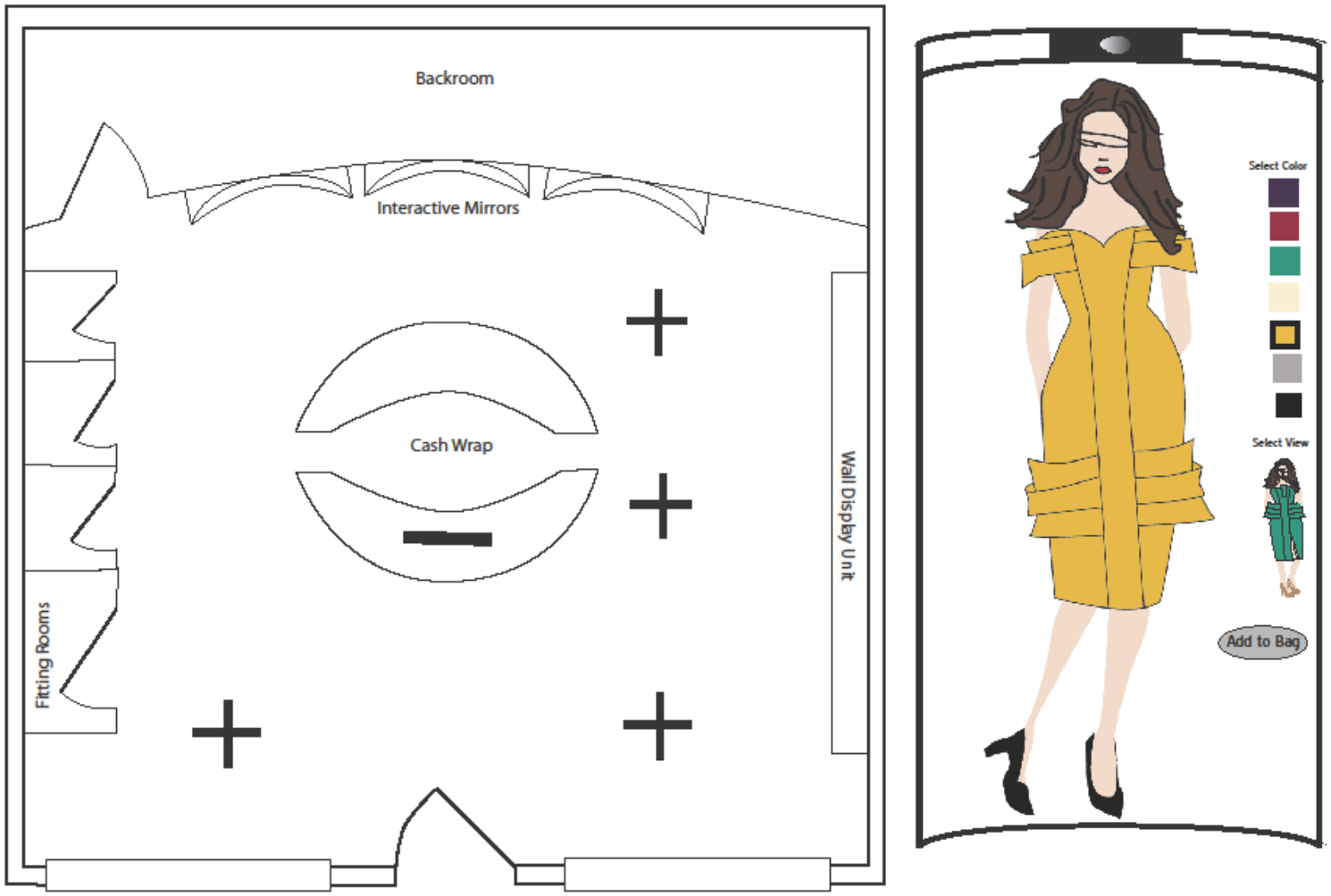
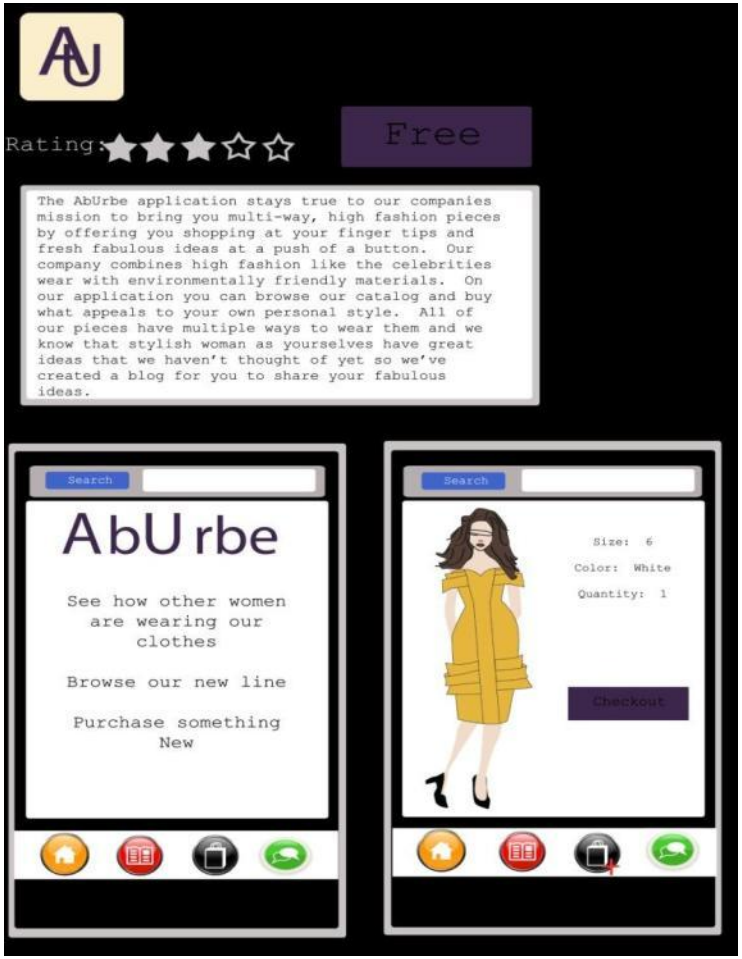


Figure 5-14 Example of Student Work: AbUrbe and Mutatis Mutandis Phone Applications



Presentation of Results

The presentation of case studies varies widely (Merriam, 1998). Akin to qualitative research, the results of case studies are not necessarily presented as findings as much as they are a "thick" description that is experiential in nature, including many variables and an account of interaction with participants (Merriam, 1998, p. 29; Stake, 1995, p. 39). The following is a portrayal of student perceptions about their experience completing the apparel product development course that was reframed using the ESD framework. Themes from students reflections and focus group interviews are presented here. In some cases, excerpts from the researcher's reflexive journal have been used to support themes discussed by participants, and in other cases it has been used to enhance the story told by students, offering alternative perspective.

This presentation is organized first by the study's two primary research questions, and then by sub research questions. For clarity, the sub-questions were designed to answer the two overarching questions, and as those two questions are summative in nature, these will be addressed more descriptively in Chapter 6. Meaning, answering the sub-questions with the study's data will be the focus of this chapter. Tables are displayed throughout this discussion to illustrate support by participant and data type for each of the study's themes. The themes found in these tables are annotated with the aforementioned superscript codes (Chapter 3) to signify their origins consistent with the study's coding rubrics found in Appendix G-J. The key for these annotations is also displayed in Table 5-1.

Table 5-1 Theme Annotation Key

$^{(T)}$ = Theory-driven code $^{(I)}$ = Inductive code	$^{(L)}$ = Related to learning $^{(D)}$ = Related to development	$^{(ESD)}$ = Education for Sustainable Development $^{(C)}$ = Constructivism $^{(ZPD)}$ = Dialectical constructivism

Q1. How do students experience a course that uses the ESD framework?

Q1A. What are the learning and development outcomes that students experience in the course implementation?

Most of the learning and development outcomes experienced by students during the course implementation fell under two broad categories: those related to learning about sustainability and those related to learning and development related to the ESD skills. To begin this presentation, the outcomes related to sustainability will be discussed.

Sustainability literacy

One of the most important learning outcomes according to students was Sustainability Literacy, a goal of ESD, and thus, a theory-driven theme. Sustainability Literacy is defined in the study as: knowledge related to sustainability, considered fundamental to empowering individuals to make change and move others to make change. Under this broad category, four primary inductive themes emerged, discussed in participant reflective writings as well as the focus group interviews. Table 5-2 illustrates support by participant and data type for each of these four themes.

Table 5-2 Learning Outcomes: [T][L]Sustainability Literacy[ESD]

	Reflection 1	Reflection 2	Focus group interviews
[I][L]Sustainability knowledge & awareness	P002_R1 P004_R1 P007_R1 P010_R1 P011_R1 P012_R1 P013_R1	P002_R2 P003_R2 P004_R2 P005_R2 P007_R2 P008_R2 P010_R2 P011_R2 P013_R2 P014_R2	P002_I1 P001_I1 P002_I2 P001_I2 P002_I2
[I][L] Recognizing importance & need for change	P002_R1 P005_R1 P007_R1 P008_R1 P011_R1 P012_R1	P002_R2 P003_R2 P004_R2 P005_R2 P007_R2 P010_R2 P014_R2	P007_I1 P002_I1 P005_I1 P004_I1 P001_I2 P003_I2 P002_I2
[I][L]Sustainable strategies	P002_R1 P004_R1 P005_R1 P006_R1 P008_R1 P009_R1 P010_R1 P011_R1 P012_R1	P002_R2 P004_R2 P005_R2 P008_R2 P010_R2	P004_I1 P005_I1 P002_I2 P001_I2
[I]Personal consumption change	P002_R1 P012_R1	P004_R2 P005_R2 P008_R2 P011_R2	P002_I1 P005_I1 P002_I2

First, participants discussed that some of their most important learning outcomes were related to Sustainability Literacy, the first being Sustainability Knowledge and Awareness. Participants discussed a substantial increase in their knowledge of and awareness about sustainability and its implications for the apparel industry:

> P014_Reflection 2: "In no other class had we learned so much about all the different aspects of social and environmental responsibility . . . Learning all the different aspects to product development and how sustainability can and should play such a huge part in it was very significant and lead me to change my views not only on the fashion industry but also where I might see myself in coming years. No other class did we go in to such depth in the issue, so what I learned helped me understand it better."

> P011_Reflection 1: "Sustainability as a whole is a major learning epiphany I have experienced in this course. You hear things in the news about sustainability and I have talked about it very little in some of my courses but since being in this class my

knowledge has expanded tremendously . . . I also didn't know that so many companies were trying to improve their businesses by creating a sustainable product that is both socially and economically responsibly produced."

P001_Interview 1: "I think that for me I just learned so much about sustainability on a whole. This is really the first class or this year is the first time I've really learned about sustainability. We didn't really know anything about it and how it affected fashion or anything."

Some participants emphasized a new appreciation for the complexity of sustainability:

P004_Reflection 1: "One epiphany I have had in this course so far is that there are many components to sustainability. What I mean by that is, before this course I did not know much about sustainability. I knew what sustainability meant but I really did not know what it all entailed."

P011_Reflection 1: ". . . I didn't know that there were so many different views and ideas going around about sustainability and the ways to improve it. "

P010_Reflection 2: ". . . the epiphany that I feel was the most important is realizing that there is more to sustainability than I ever realized. I always knew a little bit about sustainability but I was never really into it."

Audible among these comments was an indication of the absence of sustainability in their AT program, and therefore, the absence of a viable comparison point for which to contrast their newfound expansion of knowledge. Many participants commented that this was the first time in their program that the concept had been defined holistically, including a broad view of all three tenets (social, environmental, and economic) and a connection made between the definition and their discipline in real terms. On the first day of class, the

researcher made this note after a discussion with students related to sustainability's definition:

> Reflexive Journal Entry 1: "The majority of students were concerned about sustainability. A few mentioned the desire to learn more about it. It was evident that they were hearing about it in some other classes, while others expressed they were not getting enough information about it. Some expressed that they felt responsible for knowing about it because they knew the industry was changing. Several students expressed skepticism about the apparel industry, wondering if they could do more than they were doing . . . These students are concerned about sustainability and seem hungry for the information . . . The most concerning finding today is the lack of ability to define sustainability and engage in the most simple of debates about it. They may or may not be getting the most basic information about sustainability in their program. They have already indicated a sense of unpreparedness for the industry. They may also be receiving multiple messages that conflict. They may also be receiving nothing. It is too soon to tell."

Though participants perceived a seemingly dramatic leap in their knowledge and awareness about sustainability, admittedly they had come to the course with little or no background on the topic. Notably, their discussion about their learning in this area was not terribly complex or descriptive, simply indicating a move from nothing to something. This may be indicative of their reflective skills generally, but it may also indicate the absence of a language for sustainability. This is unsurprising. What is more interesting is the extent to which some participants had arrived at the course with an off-putting or detached attitude about sustainability, an attitude which shifted over the course of the semester to a more positive notion. This shift will be discussed later in greater detail during the discussion about the students' learning and development process and ways in which their suppositions about sustainability were challenged during the course. But, the following are several examples of how participants described their attitudes about sustainability at the beginning of the course:

P001_Interview 1: Personally, I was kind of turned off about sustainability before taking this class . . ."

P011_Reflection 2: I was turned off by the idea of sustainability before taking the class . . ."

P010_Reflection 1: "I'm not one of the "go green" people

P007_Interview 1: ". . . I think going into it too my whole mindset of the whole thing was that this [sustainability} is for other people. It's not something that everyone is going to have to be concerned about, the people that really actually care are going to take care of it and whatever."

The next theme was Recognizing Sustainability's Importance and Need for Change. Participants recognized the importance of sustainability in the apparel industry or the world and recognized the need for change:

P007_Interview 1: "I think the most important epiphany to me was realizing not *only* how important sustainability is *now*, but realizing in turn how important it will be in the future when I am working in the apparel industry. I never really understood its importance and always just looked at it as 'another green issue in the world' but have since learned from this course that it is much more than that, directly impacting my future and the future of the next generation. . . I think something can definitely happen too if there's more people out there that are going through classes like this that are you know, their ways of thinking are being challenged and their core view on where the industry is going to get altered."

P008_Reflection 1:"Some of the major epiphanies that I have had in this course have been about the issues of sustainability, like for example when reading the different scenarios of our project I realized that these scenarios like Community Couture are

real and is where our world is headed, not some made up science fiction ideas. It made me realize that if we as a world don't start caring more about sustainability we are headed for some pretty scary scenarios, like not having any natural resources left and no water at all in parts of the world."

Some participants discussed the responsibility necessary to make change:

P003_Reflection 2: "I learned so much in this class, and something I had always thought was that it was always the consumer's fault that there is so much waste in the world. What I ended up learning was that everyone is to blame for it; and nothing will ever change if companies don't begin to change and take action."

P011_Reflection 1: "We also focus on who has to make these changes possible, and it's basically everyone. The product developers have to first decide to make this change and then the consumers have to make the choice to purchase the product. I have also learned that sustainability in the future isn't going to be a choice, it's going to HAVE to be for people and the environment to be able to survive."

P004_Interview 1: "I think this class provides us with the ability to be a change agent or at least get us thinking about it, which is more than I really thought about prior to any of this. I think it gets you more comfortable with the idea that one person really can make a difference and it doesn't have to be solving world hunger. You can do it just a little bit at a time by influencing the company that you work for, by recycling just little things like that. I think it just makes you more aware to the possibilities."

Many participants expressed an interest in making change themselves and desiring to influence change in others. Interestingly, participants perceived the types of changes needed to be small and reasonable, something they could *do,* rather than revolutionary:

P008_Reflection 1: "I guess before I read these [scenarios] I had only a little understanding about these issues and had not fully grasped the idea of how it would truly affect me, and after reading them I really understand how much is going to affect me and the rest of the world and I want to do more to change it. I also realized that there are simple things that I can do to change it and want to learn more about what I can do."

P002_Interview 1: ". . . now I feel like there's so many little things that we've learned about that we can do that really do make a difference . . . it's not a big dramatic thing that I would be doing, just little things that could help . . . Because even if you were completely against it you're sitting back and you're like 'well, really if I don't do something it's going to be bad,' so I think you feel obligated, but in a good way, to just try to do little things to make a difference."

P004_Reflection 2: "I feel like it makes me think about what I can do in my everyday life to help contribute and what I can do in the way of educating others, even if it is just a friend on what simple little practices they can start doing to help further the sustainable movement."

Though most students at the end of the course reported that they felt ready to be a change agent in the apparel industry, this readiness was not evident at the beginning of the course, as noted by the researcher on the first day of class:

Reflexive Journal Entry 1: "I discussed how the industry is now shifting and re-thinking the professional skill set they will require of graduating AT students. One of the ideas is that change agents are needed in the industry. I showed a slide with the ACPA's list of descriptors of change agents (authentic, curious, ethically competent, etc.) and asked: Are you a change agent? Silence. I followed up with: Do you feel empowered to go out and make change in the industry? I got a lot of hesitant looks and one very confident, "yes." This student explained that she could not think about

working for a company or in an industry that would continue to be unsustainable. She would not be able to think any other way. But, the majority of students were extremely hesitant. It was clear that they are mostly concerned, but they are not entirely confident that they will *be the change."*

Another important learning outcome for participants was the theme Sustainable Strategies. Participants indicated that they had a better understanding of the strategies that are currently being used or could be used to solve sustainability-related issues in the apparel industry. Discussions in this theme were widely varied, most likely due to the wide purview of sustainability strategies covered in the course across the apparel product development process. Some participants talked specifically about a seeming smorgasbord of options:

P010_Reflection 2: "When we were talking about companies that are going absolutely all green I never realized that they really are going ALL green. From their buildings, the lighting in their buildings, how they make their clothing, what they make their clothing with, and the boxes they are shipping their merchandise in. We talked about how we can use waste as a resource and how waste equals food. I honestly never knew about both biological metabolism and technical metabolism, and that clothes can actually be put back into the soil and bought back as redesign."

P004_Reflection 1: **"**When I first thought of sustainability, organic cotton came in my head because that is really the only thing I knew about that related to sustainability. Now it is much more than that. What comes to mind now is: the way fabrics are made and dyed, how and where the clothing is manufactured, what the clothing is made of and what findings are on it, how the clothing is designed, what can be done with the clothing after it is used, what packaging is used to ship the product, and last but not least, how can we change the mind-set of people to become more sustainable with their clothing. Never did I think that there were so many different ways you could go about sustainability, especially the design aspect."

Other participants spoke about specific strategies explored in the course that were particularly interesting to them:

> P012_Reflection 1: "The second epiphany that I have had was that there are ways other than the fast production of goods that can generate money in the apparel industry. Until this class I never thought about the use of product services as a moneymaker for an apparel company . . . The use of product services is a way for companies to continue to make money and work with apparel goods, but differentiate them and slow down the rate of over consumption."

> P009_Reflection 1: "One epiphany that I have experienced so far was the value-added service idea. I have wanted to have my own business for a while. There are so many boutiques or t-shirt lines, so there has to be a value added service that differentiates one's business from another. I have always tried to have a differentiated advantage but I never thought of services as that differentiated advantage . . . Learning about and discussing the different sustainability design paradigms has really opened my eyes to all of the different ways one can differentiate their product or business."

Participants clearly perceived this aspect of the course as a source of empowerment, *ideas they could use*. Some participants indicated that this aspect of the course was particularly stimulating, increasing their engagement and creativity:

> P005_Interview 1: "This project has been kind of fun because I feel like I'm doing something different. I feel like if it wasn't focused on sustainability it would be kind of the same as other classes. We're learning something new and learning how to implement it so I think it makes it more interesting."

> P012_Reflection 1: "I feel like I have been seeing things in a more creative light since this lecture [Cradle to Cradle], such as what products I could see being remade, or

processed into new things. While not all of them may be entirely thought out at this point of time . . . it has sparked a new interest and me thinking about common materials in a new way."

But, success along the road to learning these strategies was inconsistent from the researcher's perspective. The student's ability to fully understand the strategy and innovate with it in an apparel context was hit or miss, depending on the exercise. In some cases, particularly strategies like Cradle to Cradle and Design for Environment in which there was a heavy environmental component, participants' implementation seemed to be prohibited by their lack of materials knowledge. For example, students had little knowledge of which fibers were biodegradable and which could be recycled infinitely without a loss of quality. Specifically, students did not appear to understand the interaction of fiber type, dyes and finishes necessary to select choices to increase sustainability. In other cases, students often perceived more barriers to the strategy than advantages. This inconsistency is illustrated in the following journal entries made by the researcher, evidencing a mix of success and disappointment:

Reflexive Journal Entry 8: "Students seemed very comfortable with this concept [Product Service Systems -- PSS], and discussion commenced right away . . . When it came time to share with the class, I was blown away. One group's idea was a technological garment, used by the scenario, but with services like tech support, online wardrobe swapping (because design is digital rather than material), and a hotel service in which they could go online, order their vacation looks, have it delivered to their hotel, then have the hotel could ship the looks back for remanufacturing at the end of their vacation! Wow! . . . In another group, they just kept going, kept adding features, kept building on the initial spark. It was evident they had been thinking about the concept and how they might design with it while I was talking . . . They came up with a denim business in which they would make jeans that were designed for a 10-year lifespan. They would offer tailoring and redesign services to insure maintenance over the life of the garment. But, they also included

classes that consumers could take, learning to knit with recycling denim yarn, re-dyeing classes – using these classes to educate consumers on how to preserve their apparel. Brilliant! . . . After everyone shared their ideas with the class, I asked them, 'In what ways is PSS limited in the context of apparel?' They spoke right up: competition saturation, consumer resistance, and company talent that it takes to perform such services. Then, I asked 'What advantages might PSS hold for apparel?' Again, spoke right up, making points like increased loyalty, closing the material loop, and saving money that would otherwise be spent on high-cost virgin resources. I ended the lesson plan feeling confident that students understood this concept and how it related to apparel."

Reflexive Journal Entry 12: "The lack of innovation evident in today's redesign activity (Cradle to Cradle) is disappointing, although the materials knowledge is clearly the tripping point. Although students seemed to enjoy this activity, students at another university that I conducted the same activity LOVED the idea of redesign and enjoyed showing each other up with their ideas when it came time to share them. This was not happening today. Students also struggled to focus their ideas into one concept. This may be a byproduct of having multiple lesson plans about design paradigms and feeling pulled in many directions . . . The fact that, at the end of today, students clearly understood that these design paradigms force creativity and also expand the number of ways to innovate, is hopeful. Perhaps, they are still absorbing the information and need to reflect about how they might use it. Maybe the class activity in these lesson plans needs to be a take-home, where they have time to go home with the idea and reflect, research, and conceptualize how they may apply it. They are obviously unable to cite specific instances in which the strategies may be used, but they obviously see the merit in using such strategies because they are creative. So, maybe it's the reflective period that is missing. Maybe asking them to design something on the spot is too much pressure" (J12).

Reflexive Journal Entry 13: "So, I asked: What are the challenges for using this paradigm [Design for Well-being] for apparel? Students were very talkative. Some students that usually say little spoke up. They had thought about many barriers, like: consumer acceptance, financial backing for unusual business concepts, designer talent, lifestyles focused on time and efficiency, shopping would have to become more special, selfishness (not necessarily thinking about how the purchase will affect others). When I asked for what they thought the advantages were, most had a tougher time? One spoke up and talked about the social advantages like with participatory design – more people would be in contact with each other. Students seemed more intent discussing the barriers. But, that is okay, because it did demonstrate that they are aware of the implications of such a paradigm for fashion, which is the whole point."

Finally, some students indicated that their experience in the course had led them to change some of their own personal consumption habits. Though not a particularly strong theme in the study, it did emerge across all three data collection periods:

P012_Reflection 1: "I have noticed myself being smarter with my buying decisions since taking this class and really thinking about how necessary and how much use I will get out of a garment, as well as what it is made out of."

P005_Reflection 2: "Learning about green washing really changed my sustainable purchasing habits. I have been trying to do things to make my living more sustainable. I'm not the best, but I do try. Before this class, I cared, but didn't really change my habits that much. After learning so much in this class . . . I have become way more conscious and have started to buy more sustainable goods (even if they were a little more expensive) . . . I have also warned my friends and family to do the same. I even printed off the green washing article and gave it to my parents to read."

P008_Reflection 2: "I have also learned lots about all the little things I, as a consumer, can do to make a difference in environmental and social impacts of clothing production and consumption. Like for example by learning how much of an effect just the care of maintaining your clothing by washing and drying has on the environment and by trying to wash and dry clothing less can make a difference. And also just being a more aware consumer when I am out shopping and trying to look for clothing and brands that might offer a take back program for recycling or reuse can make a difference."

Change agent skills: Working with others

Some of the most powerful themes discussed by participants in the study related to learning and development derived from working with others. As the skills component of the study was a fundamental attribute of the ESD framework, this overarching theme was theory-driven. Learning outcomes related to working with others will be discussed first.

Table 5-3 presents four primary inductive themes related to things learned about working with others and illustrates participant support for those themes by data type. Admittedly, students discussed what they were learning from their collaborative experience in the course during their reflections, but were more subdued about these outcomes when it came to the focus group interviews. This may be related to the organization of focus group interviews by collaborative teams in, leading participants to be more reluctant to discuss what they were learning in front of their peers.

Table 5-3 Learning Outcomes: [T]Change Agent skills[ESD], Working with Others

	Reflection 1	Reflection 2	Focus group interviews
[I][L]Time does not heal all wounds	P004_R1 P005_R1 P006_R1 P012_R1 P014_R1	P004_R2 P006_R2 P012_R2 P014_R2	P002_I2
[I][L]Good communication encourages inclusion	P001_R1 P002_R1 P003_R1 P004_R1 P005_R1 P007_R1 P008_R1 P009_R1 P010_R1 P012_R1 P013_R1 P014_R1	P002_R2 P003_R2 P004_R2 P005_R2 P008_R2 P010_R2 P012_R2 P014_R2	Not mentioned
[I][L]Awareness of personal behavior	P003_R1 P004_R1 P005_R1 P006_R1 P007_R1 P008_R1 P012_R1 P013_R1	P001_R2 P003_R2 P005_R2 P006_R2 P008_R2 P009_R2 P012_R2 P014_R2	P004_I1 P002_I2 P003_I2
[I][L]I am not an island	P001_R1 P004_R1 P008_R1 P010_R1 P011_R1 P014_R1	P001_R2 P004_R2 P005_R2 P006_R2 P009_R2 P010_R2 P012_R2 P014_R2	P002_I2

Participants discussed how they had learned, as the result of their experience in the course, that conflict must be confronted promptly, rather than wishfully thinking it away:

> P002_Interview 2: "I'm more passive when it comes to resolving things and sometimes I'll let them slide, but now I think I've learned that if I keep letting them slide it's not going to solve anything so now I just speak up in the beginning so we won't have a problem farther down the line."

> P006_Reflection 1: "I really, really, really dislike conflicts. I like people to feel comfortable and happy, and for me, conflicts equal discomfort. I recognize that when a conflict does arise it needs to be addressed quickly and professionally, but it is so much easier said than done. I have been working on it for a long time and will continue to work on it, although it's definitely a slow change for me."

> P004_Reflection 2: "I learned that when tension is brewing it's better to speak about it or bring it up rather than to let it go and let it build and present a bigger problem . . . . I know working in groups takes a lot of work and sometimes, and there will be

tension, but you just have to work through it and know that talking and bringing up issues when they arise is the best because if you let them go then can turn into something bigger and, that can halt progress and foster negative emotions among group members."

In some cases, participants consciously focused on improving their conflict resolution skills across the semester and learned this lesson as the result of that focus. Others learned this lesson through experiencing a series of adversities that could have been avoided had a lurking conflict been confronted earlier. These dimensions are best illustrated between the first and second reflections of participants:

P012_Reflection 1: "One skill that I have always struggled with is shying away from conflict. I don't know why as a senior in college I still feel that if you ignore conflict it means it is not there. Throughout this class and the group work I hope to become better able to recognize conflict, and be able to confront situations as they arise and acknowledge that it is just part of group work."

P012_Reflection 2: "Prior to this class I definitely was an avoider. I had the mentality that drawing attention to the problem would make it worse. Also, I thought that if no one else was bringing up the issues then maybe I was the only one who felt that way and therefore should not bring it up and disrupt the entire group dynamic. Through this class I have learned that walking on eggshells within a group does not make the group dynamic stronger."

P014_Reflection 1: "We know we shouldn't just let conflict happen without doing anything about it. Sometimes we feel it would just be easier to ignore the problem than actually deal with it, which probably in the end will back fire on us . . . In the future as a group we can't ignore a problem because it will most likely just get worse. In the future acknowledging that we as a group have a problem and then resolving that problem together can only benefit the group and maybe with a fully functional group we can come up with better ideas for our projects."

P014_Reflection 2: “I acknowledged that conflict but chose for the longest time to do nothing about it, which in the end definitely didn't help anything.”

Some participants acknowledged conflict as an important conduit for growth or learning.

P014_Reflection 2: “I think some people would be upset or embarrassed to say they had conflict but I think in this situation and setting it was a good thing our group had conflict.”

P005_Reflection 1: “I think that this course gave us the primary push to know that it’s more helpful to us if there’s discussion and healthy conflict.”

For the second theme, Good Communication Encourages Inclusion, many participants discussed having learned that good communication insures inclusion of all members, increasing collaborative ability. Specifically, participants discussed having learned that clearly expressing personal viewpoints and listening to others’ viewpoints without judgment was fundamental to insuring everyone’s participation and contribution to group work:

P004_Reflection 2: “It seemed when we all talked and threw our ideas things just came together a lot better. Giving everyone in the group the opportunity to speak and give ideas was great because then we all knew what everyone was thinking and we were all mostly on the same page with things, and for us that was a big plus.”

P001_Reflection 1: “I think that in the future I need to not only make notes on the ideas but also collaborate aloud with them. By doing this, we might be able to come up with an even better idea than before. I am very introverted so I tend to take these ideas and my opinions about them and keep them on the inside but by doing that, my group has no idea what I am thinking.”

P012_Reflection 2: ". . . you need to take into account what is going on in others' lives when working together in the group. Working together does not just involve getting the project done, but it also involves a lot of understanding and inclusion of everyone. Many times when working in groups of three, there are times when it seems it is two against one. Our group strived to make sure that everyone was included so this would not be the case. We would go around and make sure that everyone had a chance to voice our opinion. If there was a case where two people agreed and the third did not we make sure to explain each idea in detail and not just go with a majority vote."

P003_Reflection 1: "I feel like listening is one of the most important parts because if you do not listen to your group members, you will not get much accomplished. Also, if you criticize or judge other people's ideas, they will begin shying back from sharing any more of their ideas . . . Groups are based on expressing your opinions and what you think, so for our group to get anything accomplished, everyone has to help out and share."

Again, in some cases, this lesson was learned through experiencing some adversity, clearly seeing what they might do differently in the same or similar situation:

P004_Reflection 1: "Maybe next time I will not take immediate leadership and start working, I will consult with the group and see how everyone wants to complete the lab and go from there, and also we could check in with each other throughout the process of working on the labs to make sure no one is getting overwhelmed with the workload."

P008_Reflection 2: "In the future I hope to be able to listen and not make any assumptions about other people's ideas right off the bat without having to be reminded that I might be doing so even if the ideas are not something that I would

normally chose myself, because everyone has a right for their ideas to be heard and not criticized."

One participant discussed a variation of this theme, unique to the study:

P005_Reflection 1: "One epiphany I learned during this course is that group members can respectfully critique each other's ideas and opinions without anyone getting upset. When this happens, it benefits everyone in the group. I feel that because our group can do this, it shows a sense of maturity and mutual respect for each other."

In the third learning outcome theme related to working with others, Awareness of Personal Behavior, only two participants did *not* include this outcome in their discussions at some point during the study. Most participants indicated that, during the course, they had become more aware of their personal strengths, weaknesses, or behavioral patterns. In some cases, this learning outcome was brought about by the course expectation which required students at the beginning of the course to decide what skills they most wanted to work on for the semester:

P006_Reflection 2: "I found out that because I am so strong in how I think about things that others can be somewhat intimidated and that is not what I want at all! So as I continue working in group I will continue to make myself more open minded and less guarded."

P001_Reflection 2: "In the beginning of the course, we took a test to see the things we most struggle with. After having the things that I struggle with brought to my attention I actually started noticing them while in group situations. Such as I tend to just shut down when it comes to conflict; meaning, I have an avoidance problem."

P005_Reflection 1: "Discussing these skills in class made me aware of how I act in groups and what I need to improve on. I immediately knew that I wanted to focus

on my input towards the group. I think subconsciously I always thought about this when doing group work, but I didn't really think too hard or focus on it as a skill. Now that I'm aware, it's something that I think about when we are doing group discussion."

P004_Interview 1: "I think [the instructor] has made it so that we're more aware . . . you just kind of go through the steps a lot of times and don't really pay attention to " 'this is how I learned, this is how other people may perceive my actions, this is how I perceive them myself' so it's been good to challenge ourselves as well."

Finally, participants discussed the learning outcome, I Am Not an Island. Participants indicated that they had learned that good collaboration, even if it is difficult, requires everyone's involvement and shared labor, and this is preferable to working individually or one person doing everything. For some, the student's perception of leadership had evolved:

P012_Reflection 2: "Prior to this class my idea of group work many times involved splitting up the project into different parts then all getting back together and putting the pieces together. This mentality does not add to learning and it does not involve much interaction."

P011_Reflection 1: "When working in a group it's not all about what one person wants or what you want, but bringing all your ideas together and making it something great."

P001_Reflection 2: "I have had a leadership role at my job for about two and a half years now but I have never been comfortable being a leader in school. I entered this class dreading the group aspect of it because I normally dislike group projects. Once we started our labs, I realized how important a leader is and what they do. A leader

should not be doing the whole project on their own but instead be delegating jobs and overseeing the processes."

P005_Refection 2: "Next time I am in a group, I am going to greatly encourage *actual* group work. Many times when working in groups each member picks a section he or she wants to work on and just focuses on that. After the 'group work' is individually done, someone puts everything together. This results in non-cohesive work that doesn't get close to the greatness of the group's ability . . . I do feel like encouraging group work when there are different members may be complicated. I need to come up with ways to convince other members that we can really benefit from working together."

In regards to developmental progress made related to working with others, the outcomes were expansive and among the most powerful themes in the study. In Table 5-4, six of the most important developmental outcomes according to students are presented, illustrating participant support across each data type.

Table 5-4 Development Outcomes: [T]Change Agent Skills[ESD], Working with Others

	Reflection 1	Reflection 2	Focus group interviews
[T][D]Ability for personal expression[ESD]	P001_R1 P003_R1 P004_R1 P005_R1 P008_R1 P009_R1 P010_R1 P011_R1 P012_R1 P013_R1 P014_R1	P002_R2 P003_R2 P004_R2 P005_R2 P006_R2 P007_R2 P008_R2 P010_R2 P011_R2 P012_R2 P013_R2	P001_I1 P005_I1 P007_I1 P004_I1 P006_I1 P002_I2 P001_I2
[T][D]Ability to listen without judgment[ESD]	P001_R1 P002_R1 P005_R1 P006_R1 P008_R1 P009_R1 P010_R1 P011_R1 P013_R1	P002_R2 P005_R2 P006_R2 P008_R2 P009_R2 P013_R2	P004_I1 P003_I2
[I][D]Ability to build ideas	P001_R1 P003_R1 P004_R1 P005_R1 P006_R1 P007_R1 P008_R1 P010_R1 P011_R1 P012_R1 P013_R1 P014_R1	P001_R2 P007_R2 P008_R2 P009_R2 P010_R2 P012_R2 P013_R2	P004_I1 P001_I1 P002_I2 P003_I2
[T][D]Ability to collaborate democratically[ESD]	P001_R1 P002_R1 P004_R1 P006_R1 P007_R1 P008_R1 P011_R1 P012_R1	P001_R2 P002_R2 P004_R2 P005_R2 P006_R2 P007_R2 P008_R2 P009_R2 P012_R2 P013_R2 P014_R2	P006_I1 P003_I1 P002_I1 P005_I1 P001_I1 P002_I2 P001_I2 P003_I2
[I][D]Ability to be all in	P001_R1 P005_R1 P007_R1 P008_R1 P009_R1 P010_R1 P011_R1 P014_R1	P001_R2 P002_R2 P003_R2 P004_R2 P005_R2 P006_R2 P007_R2 P008_R2 P011_R2 P012_R2 P014_R2	P003_I2
[T][D]Ability to acknowledge & resolve conflict[ESD]	P001_R1 P002_R1 P005_R1 P011_R1 P012_R1 P013_R1	P001_R2 P003_R2 P004_R2 P005_R2 P006_R2 P010_R2 P011_R2 P012_R2 P013_R2 P014_R2	P002_I2 P001_I2

Beginning with the first theme and one of the most powerful themes in the study, Ability for Personal Expression, *all* participants in the study indicated that they had improved their ability to communicate effectively. A theory-driven theme reality to ESD's emphasis on meaningful and effective communication, participants described an improved ability to "speak up" or express their ideas without being afraid of embarrassment or hurting someone's feelings:

P005_Reflection 1: "I think the most important progress I have made in this course is related to my voice when dealing with groups. I know that I don't express my opinion that well in groups, and oftentimes I'll regret even saying anything. The reason I'm so reluctant to express myself is fear of looking stupid. I analyze people a lot and notice that people do sometimes laugh or talk negatively when someone asks or says something that they perceive as being stupid . . . I see them as brave for having the guts to speak up and voice their opinion."

P010_Reflection 2: "This class has definitely helped me be more open and express my ideas to my group . . . By the time we got to the last few labs it was really easy for me to open up with my group and have more say in the discussions."

P012_Reflection 1: "I am expanding my communication skills by learning how to better communicate in my group. I might have an idea in my group, but verbally stumble when I'm explaining it to them. I have started to improve in this aspect by taking the time to first collect my thoughts and then explain it. I am also doing better at listening to my group members."

For the next theme, Ability to Listen without Judgment, another theory-driven theme related to ESD's emphasis on good communication, participants discussed that they had improved their ability to listen to others without judgment and include everyone's perspectives, insuring their interaction with their group members connoted tolerance, respect, and mutual understanding. Many participants indicated that they had improved their ability to listen without being dismissive or critical:

P013_Reflection 2: "I have become a better listener in this class, asking questions in a non-confrontational way if I don't understand an idea. Since I was able to understand those ideas and concepts better, I was able to explain my ideas in a way that my group members understood . . . When you listen, you have to focus on what that person is trying to get across and interpret the message. You also have to

respect their idea and their participation in the group whether the idea fits or not. If it is a poor idea, you have to be careful about how you handle the situation. You can't simply reject their idea. You have to acknowledge it."

P004_Interview 1: "I think being the design student in our group if I hear an idea and I don't know how to implement it, then I really struggle to encourage others' ideas. So, for me, I have been learning and I will continue to learn this I'm sure, but to step back and kind of see the big picture and just let everyone send their ideas and really make sure I understand where they're going . . . then it's not just my ideas."

P006_Reflection 2: "I have come to realize that while I say I am open-minded and like hearing others ideas, I still often like my ideas best. So, throughout this class I have learned to engage more in others ideas, asking questions so I understand the why behind their ideas, and it has been so amazing."

P009_Reflection 2: "I also worked on actively listening to my group member's suggestions. While I still struggled with quickly dismissing ideas, I knew it was something I needed to work on, so I noticed when I did it."

The next inductive theme, Ability to Build Ideas, was closely correlated in the data with the previous two themes. Clearly, personal expression and the ability to listen to others' expression were used to build ideas. Participants discussed an improved ability to build ideas or solutions *with* others. Some participants emphasized the ability to collaboratively brainstorm, while others emphasized their ability to build upon others' ideas:

P001_Reflection 1: "I really like when people make suggestions about my designs because it makes me think about them in a way that I haven't before. I was focusing on detachable parts of the clothing but [a group member's] suggestion really opened

my eyes to a different design aspect. I had already been thinking about reversible pieces but [another group member's] idea brought it to a completely new level. I felt positive about this because it felt like the designing part wasn't all on my shoulders, but that my group was being actively involved in it."

P012_Reflection 2: "I think that this is because individually we were putting all of our thoughts out on the table. We were no longer worried about hurting one another's feelings by disagreeing with an idea. In addition to adding upon ideas and building them into stronger ideas we began to break apart ideas and take bits and pieces instead of constantly agreeing with ideas."

P004_Reflection 1: "As for the way I think, when someone says an idea that makes me think of what could be added on to their idea or gives me an idea from their idea. So, it's like we work off of what each other says to reshape and restructure the idea until it's all what we want it to be."

P002_Interview 2: "I couldn't just keep my opinion to myself, we all had to talk about what we were thinking for our line and where we wanted it to go and what we wanted to keep with our ideas and what we wanted to edit out."

During the focus group interviews, one participant associated the course's emphasis on sustainability with an improved ability to build ideas:

P003_Interview 2: "I think with having to focus on sustainability and making sure that our product was sustainable, it caused us to definitely communicate more. Kind of like what I said before, it kind of just made us learn how we needed to challenge each other and if an idea's thrown out we need to look at that idea and take it apart and see how we can make it better."

Admittedly, participants may have experienced the previously discussed developmental progress as the course emphasized idea generation, primarily around resolving sustainability issues in apparel product development. Interestingly, the researcher observed this transformation occurring at approximately mid-semester, evidenced in the following journal entry:

> Reflexive Journal 14: "I was really excited today to hear about the inspirations that were being used for some of these lines and some of the design ideas that were coming out of the groups. It appears, as I anticipated, that this is an overwhelming assignment, sifting through all of these ideas, choosing the ones to focus on, letting the rest go, wanting to do everything, but not being able to. At the same time I think that it is important that they experience that kind of process, as it is inherent when you do anything related to sustainability. Time will tell if they are able to select ideas thoughtfully and also develop plans that are responsive to industry issues. It appears that they are all thinking pretty innovatively and perhaps they feel some pressure there. As one group indicated today, there is a lot to think about and sometimes you can get excited about too many things and lose your focus . . . So, I don't think that these students lack imagination or innovative ideas, it appears more a skills challenge, being willing to express themselves as well as embellish others' ideas (and not being afraid to embellish others' ideas)."

Further, during this same class period, the researcher became aware that *her* ability to build ideas may have been eclipsing the students' ability to do so independently, which led to an adjustment in her practice:

> Reflexive Journal Entry 14: "I recognized today, I need to attempt to be less generous with ideas of my own. I think [the students] feel compelled to adopt my ideas, so I'm going to try asking them more questions about what they think they would like to do, instead of imposing my own. This is a very difficult task for me, as I am a natural 'brain-stormer.' But, I am seeing that in the absence of an answer,

students are more than willing to simply adopt a better idea, especially one that comes from the 'keeper of the grades.'"

In the fourth theme related to development progress and a theory-driven theme related to ESD, Ability to Collaborate Democratically, participants discussed an improved ability to collaborate, both leading *and* following when necessary, as well as adjusting their personal preferences for the good of the group:

P001_Reflection 2: "As we started doing the labs, it really made me either step up as a leader or step back and be a follower. These really helped me deliver leadership skills and as time went on, I feel they have grown significantly. Now I think I can contribute as a leader and a follower and improve my group either way"

P009_Reflection 2: "Being that I was the most outgoing person in my group I took on the leadership role very quickly. Throughout the semester I learned how to be a better leader, by knowing when to take the lead or follow someone else's lead to better the group."

P006_Reflection 2: "I have never enjoyed group work because I have almost always been stuck with doing all the work. And while I did do a fair amount for these projects, my team members were also doing their fair share. We all worked together and that's a concept I've never really seen in any of the other group projects I've been a part of."

P005_Reflection 2: "I am very proud of the work we did throughout the semester. I am most proud of our [class project]. I know the reason why we did so good on this is because we wrote the entire thing as a group . . . [A group member] and I did the majority of the writing, but even though [another group member] was working on the designs, she still made valuable input. I felt like we used the skills that we were best at and combined them to create something great."

In these discussions, some participants emphasized their ability to take a "we" approach to projects as opposed to working individually:

> P012_Reflection 2: "It goes to show that when you are working within a group you need to think about what is best for the group . . . The skills I have developed in having a group attitude as opposed to individual thinking really increased my ability to take a lot away from group work."

> P007_Reflection 1: " . . . the experience I have gained in these projects working as both a leader and a worker under the facilitation of a leader have been very important from a collaborative progression standpoint . . . I think the greatest progress I have made in this course so far has been in my ability to think outside of myself. I used to always want so badly for a project done in a group to greatly reflect myself and for my personality to shine through in it. This was a very selfish way of thinking. Since the beginning of the course, I have been able to let go and see where other ideas can better an overall project. I can still see myself in parts of the work that gets finalized, but even better than that, I am able to see where we all came to an agreement and chose what was best."

One participant seemed struggle with the titles of "leader" and "follower," but by the end of the course, developed an ability to toggle between the two:

> P013_Reflection 2: "'A-ha' moment number one dealt with leadership skills. I realized that when you are put in a group setting, there is normally one person that tries to take control or be the facilitator of the group. I have stronger opinions and great ideas, but I'm not a born leader. However, I also didn't want to be a follower. I've always marched to the beat of my own drum. You can still have your opinions and ideas though; let someone else take the reins occasionally. You can essentially eliminate that, 'one leader and its many followers,' mentality . . . I think I was struggling with the title, 'Follower,' but leaders need followers and vice versa."

In the next inductive theme, Ability to Be All In, participants discussed an improved ability to interact with and engage in group work fully, sharing information freely and demonstrating accountability to the group. Audible here was that while some participants improved their ability to engage, they also struggled to shake their previous approach to group work:

> P008_Reflection 2: "Before taking this course I was not a very accomplished group member, that is to say I would help work on group projects and do what was required of me, but I never really got that involved or invested within the group and its dynamics. But with taking this course it required me to fully interact and engage in the group itself and not just the work involved. By learning to listen to all of our group members idea's and allowing them to express themselves and learning from their ideas and vice versa by them allowing me to express my ideas and opinions I became a very engaged and interactive member of our group rather than just someone who wanted to just get the work done and not really care about anything else."

> P001_Reflection 2: "I think at the beginning of the course I had a hard time being engaged fully because in other courses with group projects each person normally took a section of the work and worked on it by themselves. In this course, it was group participation the entire way through and each lab involved all three of us to complete it. Therefore, I really had to open up and share what I was thinking so our group could excel at the project at hand."

Some participants emphasized the ability to demonstrate a strong work ethic:

> P007_Reflection 2: "The course has really opened my eyes to the importance of hard work, and doing your part in getting things done. The projects became much more intricate in the detail and steps involved to complete them, and as a result the amount of time it took to get them done was heightened . . . once I was able to lay

everything out and see what needed to happen, I realized all that needed to be done was me working harder. I've taken the work ethic required for this class to my other courses and as a result . . ."

P011_Reflection 2: "I was fully engaged in learning and completing assignments during class and outside of class. My group members knew that if there was something that needed to be done then I would complete my part of the assignment and have it finished on time. I was also engaged by critiquing and reviewing things that were done on our own rather than as a group."

P003_Interview 2: "I feel like you definitely have to be there because we had a lot of group time in class so if you weren't there during class you would miss out on important group time . . . it definitely made you want to be there no matter what."

The last theory-driven theme related to working with others, Ability to Acknowledge and Resolve Conflict, was, like the learning outcome, Time Does Not Heal All Wounds, one of the weaker themes among the development progress described by participants. Nevertheless, the theme was discussed across all three data collection periods. Participants indicated they had improved their ability to acknowledge the presence of conflict or resolve a conflict in a mutually beneficial way during the course. Most participants associated their progress with applying the skill during conflict situations experienced in the group:

P001_Reflection 2: ". . . I feel like my other members butted heads frequently and I could actually see myself stop talking and wanting to leave when this happened. I realized I had to work on it and when it came to conflict between them I would speak up and try to find a compromise between them or explain what the other person meant in a different way because I feel much of the time the conflict came from a lack of communication."

P006_Reflection 2: "I really don't enjoy conflict, I never have. But this class has taught me to step back and look at conflict as a way to grow and see another person's perspective. [A group member] and I definitely had the most conflict as we are probably the most different creatively and personally, but we were able to work through our differences by communicating and acknowledging what was causing this extra tension. I feel like this class has forced me, in the best possible way, to be more open to conflict and expressing my opinion in a way that doesn't make others feel boxed in or like my way and thoughts are the only way to go."

P013_Reflection 2: "I sat down and talked with [a group member] because I think that's who the biggest power struggle was with. We realized that both of us have stronger personalities and opinions. After our talk, things went much smoother. All of my collaborative skills bloomed; especially since after the talk, I felt the group was in synch."

Change agent skills: Critical thinking

Some of the weakest themes in the study discussed by participants were those related to critical thinking, another fundamental component of the ESD framework and a theory-driven theme. It is debatable whether this was actually some of the weaker progress made among students, or if the course's focus on sustainability and collaboration simply overshadowed this aspect of development. During the quantitative survey, students self-reported significant progress in the three theory-driven thinking skills. Thus, the data collection method choices made in this study simply may not have been ideal for discerning such outcomes. Nevertheless, most of the four themes to be discussed here were derived across all three data collection periods, with the exception of systems thinking, which was not introduced in the course until after the first reflection was collected, and values-focused thinking, both of which were not discussed during the focus group interviews. Table 5-5 illustrates all four themes and support for each by participant and data type.

Table 5-5 Development Outcomes: (T)Change Agent Skills(ESD), Critical Thinking

	Reflection 1	Reflection 2	Focus group interviews
(T)(D)Ability for values-focused thinking(ESD)	P004_R1	P001_R2 P011_R2 P013_R2	Not mentioned
(T)(D)Ability to reflect(ESD)	P005_R1 P012_R1	P006_R2 P012_R2	P004_I1 P007_I1 P002_I1 P003_I1 P006_I1 P002_I2 P003_I2
(T)(D)Ability for systems thinking(ESD)	Not introduced at the time of reflection	P001_R2 P004_R2 P009_R2 P011_R2 P013_R2 P014_R2	Not mentioned
(I)(D)Ability to think creatively & imaginatively	P002_R1 P003_R1 P004_R1 P006_R1 P008_R1	P002_R2 P003_R2 P007_R2 P011_R2	P003_I2 P002_I2

The first three themes in Table 5-5 are theory-driven themes, skills that were an explicit part of the learning and development outcomes for the redeveloped course. The first theme, Values-focused Thinking, was introduced to students on the first day of class. Some participants discussed how their ability to articulate and use their own personal values to compass decision making had improved:

> P001_Reflection 2: "I feel that my values-focused thinking skills have grown as well. I think I articulate things a lot better than I did when I entered into the course. I feel that I can express my values freely and also listen and appreciate other group member's values as well."

> P011_Reflection 2: "This class has continued to help me grow in expressing myself not only in the class, but a whole. I have learned that my ideas and values can help to improve and expand on others ideas."

As previously mentioned, this skill was introduced to students on the second day of the course, and may have been overshadowed by the collaborative training which followed it immediately. But, interestingly, the researcher observed students easily absorbing this concept:

> Reflexive Journal Entry 2: "I explained that the fundamental activity that we do in this course is design; we design apparel, marketing plans, etc. I asked, 'Is design a moral issue?' Students were very quiet. I asked, 'In what ways could design be a moral issue?' Slowly they began to talk about materials choices, where and how you produce goods, how you market the product, etc. They all made great points . . . I asked, 'What is the relationship between sustainability and personal values?' They hesitated. Then, a couple spoke up that personal values affect how we behave and the decisions we make. I asked, 'How do we acquire them?' This they were more confident. Again, they gave great examples that went beyond just upbringing, like culture, who you hang out with, and more. Several of them indicated life experiences as an adult that have shaped their values. I asked, 'Do values change?' They confidently said, 'yes' which was interesting. Again, several of them indicated that they had experiences where the way they were raised became ineffective and so they changed what was important to them."

In sum, though students did not entirely connect personal values to design practice right away, the dialogue with students about their personal values, sustainability, and how values may change to better support sustainability was not as challenging as the researcher had anticipated. Interestingly, in a later discussion regarding the quantitative skills survey used at the course's end, students seemed to perceive themselves as entering the course with a moderate to strong understanding and ability for this skill.

The next theme related to critical thinking, Ability to Reflect, was discussed to a greater extent during the focus group interviews than in the reflective writings. This may be attributed to the fact that the template used to guide the students in their reflections (Appendix D) did not prompt them to self-score or evaluate themselves at all on this skill. But, by the end of the course, perhaps after using this skill, they had far more to say about it. Participants discussed an increased ability to reflect on their own personal behavior or experience with improved action in mind:

P012_Reflection 2: “When you are working in groups you are working with a variety of personalities and at times it is easy to get frustrated especially when you are just looking at things from your point of view. By having the chance to step back I was no longer upset about the issue; my concern moved to what can I do to improve upon it instead of dwelling upon the issue . . . learning how to effectively reflect on an experience has been one of the greatest things I have taken away from this class . . . I think that this skill has allowed me to not only improve upon myself, but also acknowledge that changes do need to be made and forced myself to confront my own actions. In a way reflection has become a way for me to hold myself accountable for change instead of dealing with the status quo.”

P003_Interview 1: “I think the personal reflection also goes with that because if you are adding stress to yourself or freaking out about things, if you take a step back and look at that and see why you reacted that way what other things could have gone into the reason you reacted or the reason the situation even came up. You can help either prevent it in the future or know how to deal with it different which is very helpful.”

Notably, reflective writings are an uncommon assessment method for apparel marketing students, though apparel design students are often required to journal. The researcher knew this would be a challenging skill to develop among seniors, and experienced some apprehension while attempting to make the assignment expectations clear to students:

Reflexive Journal Entry 13: “I am nervous about the reflective assignment, but today’s discussion seemed to alleviate some of the mystery for them and help them be successful. But, it is very challenging to ask seniors to do something that, with the exception of the three design students, they have never done before. And, it is probably fair to discern that the design students have only been asked to reflect on design related things, not their own learning and development. I think if they can just be descriptive, which is what I emphasized today, and show me they are willing

to step back from the situation and take a look at what's happened, they will be successful. But, on a lighter note, I am not sensing that they do not see the wisdom of the assignment. I was receiving a lot of nods as I went through the directions and as I argued the assignment's relevance to their learning. I am not, for instance, getting a bunch of scowls or rolling eyes that would indicate I'm asking for the impossible and irrelevant. So, we'll see."

The next theme, Ability for Systems Thinking, was discussed the most among participants during the second reflection. This skill was not introduced to students until after the first reflection was collected. Participants indicated that they had improved ability to think in systems (identify relationships, conflicts, and resolve conflict among the parts of a system) as the result of completing this course. Some described a newfound ability to see all parts of a system, identifying relationships and conflicts between parts, and in some cases, resolving conflict between parts with innovative trade-offs. Particularly, most participants described the struggle to balance sustainability tenets with the economic bottom line:

P009_Reflection 2: "As the semester progressed I got to develop my systems thinking skills more. When we chose our materials we had to balance the cost and what sustainable materials we wanted to use."

P011_Reflection 2: "At times it was hard to have multiple perspectives because you would want to complete your assignments one way, but weren't able to because of too high of cost for the consumer who were on tight budgets. In our scenario there were many times when the environmental and economic perspectives did not meet the social perspectives of our consumer so we had to create something that would both help these causes but also keep the consumer happy as well . . . You have to take the social, environmental, and economic aspects all into consideration when completing your product."

> P013_Reflection 2: “As the class went on, my knowledge and use of multiple perspectives grew and they’re still growing. I’m still learning every day. I can look at our concept [scenario] and pull out certain; economic, environmental and social perspectives. Identifying the relationships between those perspectives and conflicts is a bit more complicated. When I’m able to take more time with a specific aspect of our concept, (or maybe a specific lab) I’m able to analyze what’s actually going on in the situation and better identify how to solve it. I think when the group looked at the problem together; it was easier to see the relationships and conflicts of the different perspectives."

Participants were far more descriptive when discussing their use of systems thinking. Clearly, the use of the sustainability triad had, in some cases, aided students in navigating the complexity embodied in the decision making required in their semester project. The day the researcher introduced this skill to students, she observed this framework to be challenging, but helpful in helping students organize sustainability issues and developing innovative solutions. In a class activity, students were asked to use some sustainability principles from social, environmental, and economic tenets and use these to generate some product development ideas. This activity was following by a similar analysis of real brands in the sustainable fashion industry. The researcher describes this activity in the following journal entry:

> Reflexive Journal Entry 17: “As some groups completed their lists, I walked around and asked them to identify the most challenging conflict and generate an innovative trade-off. This took some time, but students finally began identifying where an environmental strategy might mean consequences socially or economically. They were then able to think about how they could possibly accomplish a little bit of both. Groups were not necessarily identifying the easiest conflicts either, such as trying to economically afford an environmental initiative. They were taking their specific strategies and trying to figure out a middle-of-the-road solution where they could better balance doing some of both, rather than neglecting one end. So, as I was now

confident that they could see this, I asked: 'So, what was so challenging about this activity?' I got, 'Everything!' They talked about it being so much to think about, and all the principles were interrelated or overlapped, and it was overwhelming to think about having to think about all of it to make a decision . . . so, this activity seemed to be pretty cerebrally taxing, they really had to think about things and they seemed a little tired at the end . . . but, I did not get the sense that they couldn't manage to think in this way. Ultimately, they got it, they understood where things conflict, they understood how to think about it, they understood how they might go about finding better balanced solutions. I think they also learned more about the sustainable fashion industry and some of what they read they found surprising. They seemed to end the class period with a holistic vision of this industry and better understanding of what is going on out there and what is not yet happening . . . The sustainability principles warm-up seemed more challenging than the industry analysis to them. I wonder if this was because the sustainability principles were *not* framed in fashion terms, they were general principles related to overall sustainability of the planet, and not necessarily the industry."

Finally, though not an explicit theory-driven component of the study, the theme Ability to Think Creatively and Imaginatively, emerged from the data as an even stronger theme than the three previously discussed. Across all three data collection periods, participants discussed an improved ability to think "outside of the box." In most cases, this discussion was tightly correlated to the course's focus on the future as well as sustainability:

P004_Reflection 1: "I feel like I am trying to think outside the box. What I mean by that is when I have an idea to add I want to make sure that it fits with what we are talking about but I also want it to be one that none would have thought of, and I feel that I am getting better with that . . . I want to continue thinking about things more in depth than just coming up with a quick answer."

P003_Reflection 2: “I thought that all the different scenarios the groups were assigned was interesting. I have never thought of myself to be a very imaginative person, so doing this project has been kind of hard for me. I usually don’t like to think into the next year, so forecasting to 2025 was difficult. It also made it more fun, because we could basically do whatever we wanted and be however creative we wanted, so that was a fun aspect.”

P011_Reflection 2: “My imagination has definitely grown during this semester, with the scenario you are given I had to have a creative mind set and think outside of the box of the typical things you would see happening now.”

But, the researcher observed this progress as, admittedly, touch and go. In most cases, the researcher found students to have an increased level of innovation when some parameters were imposed in the activity or project, versus, letting the student brainstorm untethered and edit down their own idea:

Reflexive Journal Entry 8: “I have had intermittent moments when I have not been sure if these students could step out of their box and play a little. I think today was a significant turning point. Where, on [previous class period], students seemed like they were trying to find the doable or conventional idea, like choosing to design for their own age group. But, today, they seemed to step out, choosing products and service ideas that were very unique compared to each other . . . Their engagement in class today was very exciting. Students seem to understand the concept and be trying to link it to apparel.”

Reflexive Journal Entry 13: “It was obvious in the activity portion and particularly the barriers discussion at the end, that students understood what this paradigm was about and how it could be used in apparel design. Some of my former qualms about the students’ level of innovation were quieted today. It was evident that when I provided them more parameters in the activity, that freed them up to be more

innovative. When I leave them wide open to imagine anything, it seems too overwhelming and is too challenging, especially when the activity follows the lesson plan immediately. So, they have to scramble to come up with something . . . this is an important insight: When teaching for sustainability, an inherently complex and overwhelming topic, parameters that can focus students are important to brainstorming."

Quantitative skills survey results

To better understand the qualitative findings discussed above regarding the six change agent skills, a quantitative survey was administered during the final week of the course. The purpose of the survey was to determine, 1) if students perceived a significant change in their skills development as the result of completing this course, and 2) if there were differences in perceived amount of change among the six skills. The survey was designed to measure the participant's perception of their knowledgeability about the skills emphasized in the course and their level of confidence to use these skills in their future work. The survey was termed the Change Agent Skills Final Survey (Appendix E). As it was unlikely that participants would understand the skills enough at the beginning of the course to evaluate them, a retrospective survey design was optimal. The survey prompted students to think back to when they first began the course and compare where they felt they began compared to where they perceived they were at the end of the course. A 7-point Likert Scale was used. A repeated measures analysis of variance (ANOVA) was conducted with the two factors being Skill (6 levels: Communication, Collaboration/Cooperation, Conflict Resolution, Systems Thinking, Values-Focused Thinking, and Reflection) and Time (2 levels: Pre/Post).

Reliability was examined by determining a Cronbach's alpha for each *set* of items comprising a skill-related scale. All scales had good to very good reliability: Effective Communication (pre alpha=.80, post alpha=.86), Collaboration/Cooperation (pre alpha=.85, post alpha=.88), Conflict Resolution (pre alpha=.90, post alpha=.92), Systems Thinking (pre alpha=.89, post alpha=.85), Values-Focused Thinking (pre alpha=.88, post alpha=.83), and Reflection (pre alpha=.87, post alpha=.98).

Table 5-6 presents the result of the ANOVA. There was an expected main effect of Time [F(5, 13)=181.44, p<.001], indicating that participants' rated their skills significantly higher for the post score (M=5.55, SE=.20) than the pre score (M=3.40, SE=.22). There was also a significant main effect of Skill [F(5, 65)=4.68, p<.01]. Thus, in meeting the first objective of the survey, it was determined that students perceived a significant change in their knowledgeability and confidence across all six change agent skills. Notably, Bonferroni post hoc tests indicated that this main effect was driven by the overall mean (collapsing across time) of Systems Thinking (M=4.14, SE=.21) being lower than those of Collaboration/Cooperation (M=4.64, SE=.21) and Values-Focused Thinking (M=4.72, SE=.19). In other words, students perceived their knowledgeability and confidence about systems thinking to be generally low (as evidenced in the pre mean), compared to skills such as Collaboration/Cooperation, for which they perceived themselves as entering the course with a higher knowledgeability and confidence.

There was also a significant Skill X Time interaction [F(5, 65)=4.46, p<.01], presented in the fourth column of Table 5-6, reflecting the amount of change for each skill. A one-way ANOVA of the post-pre difference scores indicated that there was borderline greater improvement in Systems Thinking compared to Values Focused Thinking (Bonferroni test p<.06]. In sum, Systems Thinking evidenced the greatest amount of change among the skills. As noted above, this high amount of change is likely due to the student perception of their knowledgeability and confidence *beginning* at a lower level; meaning, Systems Thinking may have been a skill for which students perceived they had the most to learn. More importantly, however, univariate analyses indicated that all six scales (all p<.05) showed significant improvement from the pretest to the posttest, and there were no significant differences between the post-test means. In other words, students displayed significant improvement along all of the six skills, regardless of their initial skill level.

Table 5-6 Perceived Mean Improvement in Change Agent Skills

Skill	Pre	Post	Change	Total
Effective Communication				
M	3.69	5.50	1.81	4.59
SE	.22	.21	.66	.20
Collaboration/Cooperation				
M	3.61	5.67	2.06	4.64
SE	.24	.22	.69	.21
Conflict Resolution				
M	3.21	5.43	2.21	4.32
SE	.24	.23	.64	.22
Systems Thinking				
M	2.91	5.38	2.46	4.14
SE	.27	.21	.86	.21
Values-Focused Thinking				
M	3.77	5.67	1.89	4.72
SE	.23	.18	.59	.19
Reflection				
M	3.21	5.68	2.46	4.45
SE	.34	.24	.97	.27
Total				
M	3.40	5.55		
SE	.22	.20		

The use of the quantitative survey raises some interesting issues, particularly related to critical thinking skills like Values-focused Thinking and Systems Thinking. Earlier, participants discussed how their ability to articulate and use their own personal values to compass decision making had improved. Likewise, the researcher observed students easily absorbing this concept, and though she observed that students did not entirely connect personal values to design practice right away, the dialogue with students about their personal values, sustainability, and how values may change to better support sustainability was not as challenging as the researcher had anticipated. Similarly, in the quantitative survey results, Values-focused Thinking also evidenced the highest pre mean score (M=3.77, SE=.23) of all six skills; meaning, students perceived they already had a high level of knowledgeability and confidence about this skill when the course began. But admittedly, this concept was new to students. Obviously students were particularly responsive to the idea of identifying and articulating what was important to them and using that as a compass for their design endeavors. Why this was so, begs future research.

Further, in regards to Systems Thinking, participants were far more descriptive about their use of systems thinking in the qualitative data, compared to the other critical thinking skills. It seemed the use of the sustainability triad aided students in navigating the complexity embodied in attempting to balance social, environmental, and economic priorities during decision making. But, the researcher observed the introduction of this skill to students to be especially challenging. In the quantitative survey results, the exceptionally low pre mean score (M=2.91, SE=.27) coupled with most significant amount of change for Systems Thinking affirms this observation; meaning, this skill was likely perceived as the newest concept being added to students 'critical thinking repertoire. This correlation in the data is unsurprising, but again, indicates a skills area in which AT education may be most lacking and a pertinent area for future exploration.

Other outcomes: Lifelong learning and transfer

Two final themes emerged during data analysis, Lifelong Learning and Transfer, both theory-driven themes related to ESD and constructivism. The Lifelong Learning theme

was comparatively weaker than Transfer, another of the study's most powerful themes. Table 5-7 illustrates the support for each of these themes by participant and data type.

Table 5-7 Other Outcomes

	Reflection 1	Reflection 2	Focus group interviews
(T)(L,D)Lifelong learning(ESD+C)	P004_R1 P008_R1 P012_R1	P002_R2 P005_R2 P012_R2 P014_R2	P001_I2 P002_I2
(T)(L,D)Transfer(ESD+C)	P001_R1 P002_R1 P003_R1 P005_R1 P007_R1 P009_R1 P011_R1 P014_R1	P001_R2 P003_R2 P004_R2 P005_R2 P006_R2 P007_R2 P010_R2 P011_R2 P012_R2 P013_R2 P014_R2	P003_I1 P001_I1 P002_I1 P004_I1 P005_I1 P002_I2 P001_I2 P003_I2

In some cases, participants discussed that their experience in the course had led to an increased desire to learn more about the course's topic, supporting the Lifelong Learning theme, a theory-driven theme. Sometimes a participant would describe how they continued thinking about the topic long after class was over, and sometimes, would complete voluntary research on their own to gain more knowledge:

> P014_Reflection 2: "Learning all this new information was challenging so outside of class I used the Internet as a source to further my knowledge and learn about other companies that were doing well."

> P012_Reflection 1: "The Cradle to Cradle lecture along with the slideshow of clothing made from unusual resources really sparked my interest. I was so interested in this lecture that I actually ordered the book from Amazon and have been reading it to gain more knowledge. Since the lecture I have been able to see common materials in a new way. It has also gotten me interested in researching companies in which these aspects of a continuous product loop are very important to them."

> P005_Reflection 2: "One epiphany I learned is that I will need to gain a lot more knowledge on sustainability in order to focus on that in my career. I thought I knew a lot after the first half of the semester, but I learned so much more. I know that I

have a lot more to learn and discover. There is so much information out there (good and bad), and I need to become more knowledgeable in all of it. . . I have made a point to do more research on sustainability. Whenever I read blogs on fashion I also make a point to look at blogs about sustainability, which was something I never did before."

One of the most powerful themes in the study was Transfer, as nearly every participant in the study discussed at some point during the three data collection periods that they anticipated applying or had already applied learning or development from the course to new and different situations. Clearly, participants perceived this course as being highly relevant to their future career. In most cases, participants indicated that they anticipated applying what they gained during the course in their future career as well as life, most of which related to collaborative skills gained, but in some cases, knowledgeability about sustainability:

P003_Reflection 1: "This will help me in other classes and in the real world. When I get a job, I know there will be times that I have to work with other people and collaborate our ideas. Knowing what I know now, it will make it easier to work with other people, even if we don't get along. I know the most important aspects and how to implement them."

P014_Reflection 1: ". . . I can easily understand why we were given this project and how it will help us in our future careers. Sometimes it is difficult to work on a project that is hard to see the benefits, but with this project the benefits are much clearer and in a real world company if I didn't want to get fired I'd have to learn to communicate more."

P002_Interview 2: "I think the collaboration part was important to learn because when we do go into the future and have a job it's not just going to be us by ourselves working, we're working within a company and working as a group. Even if you start

your own business you're still going to have partners in that business. So I think it's really important to learn how to work in a group setting."

P006_Reflection 2: "I feel like I am taking away things that will get me through life and have made me a better person, both personally and career related."

P004_Reflection 2: "Learning more on what it is [sustainability] and what I can be in the future if more people adopt its ideas is curious to me, because soon I will be out in the apparel industry working and I will be curious to see if anything that I have learned is similar to what others have learned while in school and see if there is anything that I can do to help progress the sustainable movement. I feel like I am more educated on sustainability and if I am ever presented with a problem in a job that has to do with sustainability, I feel that I can be more confident in knowing what I am talking about and being able to try and problem solve as efficiently as possible . . . I feel like I can better think of what ways that I personally could contribute in a work setting."

In some cases, participants were already applying what they had gained in the course to different scenarios, at school and work:

P012_Reflection 2: "I know that this is a tool [reflection] that I will continue to use in my future. I have already experienced using it for another class where group work was not going as smoothly as this class. Going through the steps of reflecting has really helped me in problem solving as well as maintaining a positive attitude when working in a group environment."

P002_Interview 2: "I'm a manager so I have to deal with a lot of that stuff, resolving things or communicating things effectively and sometimes I tend to just shut down when I don't want to deal with a situation, but instead now I try to be more vocal about it but also in an appropriate way, not shut down and then at the end I'm mad

about something and nobody knows why. So now I make sure that I'm communicating better."

P001_Interview 2: "Conflict resolution, just like instead of an "we" there's a lot of "I" that I like to do in my own areas instead of thinking about it, but I already know that I get to a point where I don't know what to do anymore. So, I call a lot of people who are my employees just to come and help me out and get everybody's opinion just so we can work together more as a group and just figure out conflict. I'm not afraid to go up to people and figure out what's going on and let's just fix everything that's happening."

In some cases, participants indicated that the course had directly influenced their career plans:

P014_Reflection 2: "This class has really got me thinking about working for a company that deals with a lot of sustainability issues in a good way."

P005_Reflection 2: "I think the most important epiphany is realizing that I should know more about sustainability. I realized sustainability was something that I was passionate about after I first starting learning more about it and reading the 2025 scenarios. I then decided that I wanted to do something meaningful with my career and not just have a job to make money."

During a discussion with students on the last day of class, the researcher noted affirmation of the outcomes discussed above:

Reflexive Journal Entry 29: "I posted a slide with the course learning outcomes on it. I read each one, explaining it. I asked them, were there any learning outcomes they felt had not been achieved? They were silent for a while, looking over the learning outcomes. They looked like they were struggling to come up with something. So, I asked, 'Do you feel like you achieved these learning outcomes this semester?' I

> received an entire class of nods. But, I did ask again, 'Were there any of these that you feel like you are not walking away with?' No. So, then I asked them to look over the list and select one of the most important things, the most useful things, they would take away from this course? I asked them to go around the room. Five students felt the most important learning outcome they were taking away was the understanding, practice and implementation of the sustainable design paradigms. One student said that the most important was the scrutiny of assumptions that inhibit sustainability. Four students said that the six skills that were incorporated into the course were the most important thing they would take away. And, five students said the most important thing they would take away was the ability to envision and forecast action for a sustainable future. I asked, just to make sure, if they all felt like they understood the product development process. All students nodded . . . Personally, if I had selected three of the most important things I thought they should be taking away it would have definitely been the three they identified: Visioning a sustainable future, learning how to implement sustainability, and learning how to use the collaborative and thinking skills."

Study outcomes and the influence of Tyler and Eisner

When contrasting the above discussion of learning and development outcomes with the planned course learning outcomes, both explicit and implicit, in Table 4-10, a note regarding the use of the course redevelopment model in Chapter 4 is necessary. Tyler (1949), an influential author on the model used in this study, was an advocate of precisely stated outcomes which could be precisely measured and assessed; while, Eisner (2002) believed that room should be made for emergent outcomes, and in some cases, the outcomes should change the goals. In the current case, using only the planned learning outcomes would have arguably sold these students short. Clearly, the planned learning outcomes, both explicit and implicit, for the course were achieved, but they were significantly extended by the student experience. Emergent outcomes abounded, such as the ability to think creatively and imaginatively, changes made in personal consumption habits, the embrace of a lifelong learning attitude, the application of course learning and

development to new and different situations as well as the expansive number of abilities improved related to working with others. In fact, these particular outcomes that extended the planned learning outcomes are admittedly more broad and perhaps more enduring in nature; meaning, these emergent outcomes seem more applicable to everyday life and will likely impact the student in the long term, beyond a course about sustainability. This embodies both the philosophy of Eisner (2002), but also aligns with the intent of ESD to provide the students with the capacity for a higher quality of life. Additionally, the strength of both Tyler's and Eisner's philosophies about learning outcomes were useful in this case, as Tyler contributed to the planned learning outcomes in a structured way, a need for a novice curriculum developer, while Eisner influenced room left for emergent outcomes.

Q1B. What aspects of the course had the most and least impact on learning and development outcomes?

According to participants' discussions about the design of the course, many of the theoretical underpinnings of the course redevelopment were considered impactful, in learning and development terms. In Table 5-8, themes related to the aspects of the course with the most impact according to students, are illustrated. The overarching or categorical themes are highlighted in bold and relevant sub themes are listed.

Table 5-8 Aspects of Course with Greatest Impact

	Reflection 1	Reflection 2	Focus group interviews
(T)(L)Holistic infusion of sustainability(ESD+C)	P002_R1 P007_R1 P011_R1	P002_R2 P005_R2 P006_R2 P007_R2 P011_R2	P007_I1 P001_I1 P004_I1 P005_I1 P001_I2 P002_I2
(T)(L,D)Reality modeling(ESD+C)			
(T)(D)Democratic role play(ESD)	P001_R1 P008_R1 P009_R1 P014_R1	P001_R2 P007_R2 P014_R2	P002_I1 P002_I2
(I)(D)Company training	P003_R1 P005_R1 P006_R1 P011_R1 P012_R1 P014_R1	P001_R2 P012_R2	P003_I1 P005_I1 P004_I1 P001_I1 P002_I2 P003_I2
(I)(D)Group contract	P001_R1 P010_R1 P012_R1		P003_I1 P002_I1 P003_I2
(I)(L)Real world applications illustrated	P002_R1 P007_R1 P010_R1 P012_R1	P002_R2 P003_R2 P007_R2 P014_R2	P001_I2 P002_I2
(I)(L)Focus on the future	P001_R1 P003_R1 P005_R1 P006_R1 P007_R1 P008_R1 P011_R1 P014_R1	P002_R2 P003_R2 P011_R2 P005_R2	P003_I1 P001_I1 P001_I2 P003_I2 P002_I2
(T)(L)Supplemental materials(C)	P002_R1 P005_R1 P007_R1 P008_R1 P010_R1 P011_R1 P012_R1	P002_R2 P005_R2 P011_R2	P001_I1 P003_I1 P002_I2
(T)(L)Variety(C)	Not mentioned	P012_R2 P014_R2	P007_I1 P004_I1 P001_I1
The instructor			
(T)(L,D)Instructor responsiveness (ESD+C+ZPD)	P008_R1 P010_R1	P002_R2 P007_R2 P008_R2	P003_I1 P002_I1 P007_I1 P004_I1 P005_I1 P006_I1 P001_I1 P001_I2 P002_I2
(T)(L,D)Interaction with expert(ESD+C+ZPD)	P001_R1 P007_R1 P009_R1 P010_R1	P001_R2 P002_R2 P003_R2 P004_R2 P006_R2 P009_R2 P011_R2 P013_R2 P014_R2	P002_I1 P003_I1 P004_I1 P002_I2 P001_I2
(T)(L,D)Feedback loops(ESD+C+ZPD)	Not mentioned	P003_R2 P006_R2 P009_R2 P011_R2 P012_R2 P013_R2 P014_R2	P007_I1 P003_I1 P002_I1 P005_I1 P003_I2 P001_I2
(T)(L)Practice what you preach(ESD)	P007_R1	P005_R2 P006_R2 P007_R2	P004_I1 P002_I2 P003_I2

Table 5-9 Aspects of Course with Greatest Impact Continued

Other mechanisms for learning and development			
(T)(L,D)Collaboration(ESD+C)	P001_R1 P003_R1 P004_R1 P005_R1 P007_R1 P009_R1 P010_R1 P011_R1 P012_R1	P001_R2 P003_R2 P005_R2 P006_R2 P008_R2 P009_R2 P010_R2 P011_R2 P012_R2	P006_I1 P002_I1 P001_I1 P003_I1 P005_I1 P002_I2 P001_I2 P003_I2
(T)(L,D)Discussion(ESD+C)	P004_R1 P005_R1 P006_R1 P007_R1 P008_R1 P009_R1 P010_R1 P011_R1	P002_R2 P003_R2 P004_R2 P005_R2 P010_R2 P011_R2 P012_R2	P007_I1 P006_I1 P003_I1 P002_I2 P001_I2 P003_I2
(T)(L)Action (ESD+C)	P002_R1 P004_R1	P002_R2 P011_R2	P004_I1 P001_I1 P007_I1 P002_I1 P003_I1
(I)(L,D)Small class size	P008_R1	P005_R2 P008_R2	P005_I1 P001_I1 P002_I1 P006_I1 P003_I1 P002_I2 P001_I2
(T)(L)Authentic assessment(ESD+C)	Not mentioned	P013_R2	P007_I1 P006_I1 P004_I1 P003_I1 P002_I2

Holistic infusion of sustainability

Holistic Infusion of Sustainability, a theory-driven theme and a fundamental tenet related to ESD during the course redevelopment was perceived by participants as positively impacting their learning. As the course content was reframed entirely to better support sustainability; *un*-sustainable language or root metaphors were reduced during redevelopment. A broad perspective was taken in the course, focusing on sustainability issues in product development and the major concepts that characterize it, a systems approach. Notably, this broad approach is underpinned by a constructivist philosophy. As a result of these course design choices, participants often described the course experience as being "all about sustainability" or described how all course topics were tied to sustainability in some way. In some cases, participants even perceived interrelationships between course topics or assignments, coming together at the end create a big picture. Participants seemed to discuss this theme the most during the focus group interviews, which may have been the point in time when all the pieces were coming together for them:

> P011_Reflection 1: "The course in a whole is focused on sustainability so every theory or idea we learn in class in focused on this concept."

P001_Interview 2: “I think that in this class it kept staying on sustainability. [In other courses] you keep learning something new every time then take a test then move on, but this one just kept pushing sustainability, how you can use it, what’s going on right now in the world, what’s going to happen in the future, the fabrics you name it and it just kept dealing around sustainability and at the end we’re just going to have a big project about it. As long as it focused on that one topic then it was able to process a little more of what’s going on with it.”

P007_Interview 1: “I think the thing for me that I’ve learned from the class is just or the thing that I found interesting about it was the structure of the class itself; I’ve really never taken a class like this before. Not just on sustainability but just the fact that the material itself has kind of been one direction the whole way through, I really never had a class like that until now . . . some of them you take stuff from projects we did in the past and you’re implementing maybe stuff that you did on that one towards the next, but then you get a board or some kind of way of advertising or what have you and I think we as group have reflected on a couple of our projects going forward into what we’re doing now.”

P002_Interview 2: “The class focused on the whole the entire time so we were slowly building up things, but we never forgot about what we did in the beginning because we were building upon it constantly the whole time. Like [another participant] said it wasn’t like you learned it, took a test and then forgot about it; you constantly had to keep your mind on it. For parts of our project we wanted to do a certain thing but it affected another thing down the line so we really had to keep focus on what we were doing and how it would affect the company as a whole. So that kept me really focused on things and really interested in things. I really liked it rather than just taking tests about it, being involved in the whole process.”

Notably, this discussion evidences the greatest support for the course redevelopment model (Chapter 4), which largely was designed to insure such cohesion and interrelationship as well as consistency in terms of the topic.

Reality modeling

Reality Modeling, a theory-driven component related to ESD and constructivism, was closely correlated to the previously discussed theme, as its focus is on real life situations or problems and an effort made to emphasize real approaches/applications to that situation or problem, increasing the learners' capacity for problem-solving. Participants discussed five sub themes related to this course approach as enhancing their learning or development. The first, Democratic Role Play, a theory-driven theme related to ESD, was a strategy used in the course design, embodying a democratic framework. Democratic dialogue was fostered. Both leading *and* following in a problem situation were a large part of the course structure, reducing the propensity for one group member to dominate. This was not a particularly strong theme in the study, nevertheless, some participants identified this aspect of the course, particularly the structure of course assignments centered on leading *and* following (e.g. "designated facilitators" or "real management titles") as enhancing their skills development. For clarity, most participants who identified this theme as enhancing their development of skills emphasized the concept of rotating leadership, which largely prevented the domination of one member or a default leader, something that had clearly been a pattern in their previous group work in other courses:

> P002_Interview 1: "I think the big thing has been that [the instructor] has assigned specific facilitators to be in charge of different parts of the group project. That's really helped when you have to have effective communication if you're going to lead the group so that everyone stays on track. That's been a big thing that I think has helped . . . You have to assign and break up things so that not one person is doing everything and then making sure that everyone is on the right track and checking back with them."

P014_Reflection 2: “In other classes I would just let the dominate person take that role throughout the whole project . . . But also by giving each member a set title in the beginning of the class also helped decide who would take on the leader role with certain assignments . . . in group settings there is usually always a dominant person who takes that role, but in this course it was set up so that wouldn't happen and I appreciate that because it allowed me to improve on my leadership skills.”

P008_Reflection 1: “I also think that by assigning certain labs to be facilitated by our different group members it allows each of us to have an opportunity to lead rather than one person taking charge on every single lab, and the work load is evenly distributed among members.”

The next theme, Company Training, completed at the beginning of the course and modeling a real work situation in which participants, who were playing the role of product development “employees,” were prepared for productive and effective collaboration. Students were required to identify skill areas they most wanted to improve during the course, just as a performance review in the real world would require. Participants indicated that the emphasis in the course on this training prepared them for productive and effective collaboration:

P012_Reflection 1: “I think that all of the group training that we went through, and the conflict resolution information helped in my development in learning from group work and realizing I need to better acknowledge conflict . . . By everyone in the class experiencing the same training I thought it was a great starting block for group work. Everyone was on the same page because of this.”

P001_Reflection 2: “I think the beginning of my progress was the conflict training we had at the beginning of the course. It brought to my attention the things that are my weaknesses . . . I feel that it mostly made me realize what I do wrong in group situations so I could catch it before I did it.”

P005_Interview 1: "I think knowing about all of these [collaborative skills] before you start working in the groups you really start thinking about all the different things you do to work together better, more than just getting along or whatever . . . since they were all brought up at the beginning everything was up front and everyone was made aware of it so you all kind of started off on the same page knowing expectations."

Some participants associated being required to target certain skill areas as prompting their skills progress:

P006_Reflection 1: "On those first days of class [the instructor] had us write down what we wanted to work on doing better - that really challenged me. I have been working on being more conscious of conflict and not running from it. It helped me a lot to write it down and know that someone was holding me accountable for working on it."

P003_Interview 1: "At the beginning of the class [the instructor] said 'I want you to write down the three things that you struggle with working in a group and by the end of the class I want to see a development' so you have increased your learning at these things, you've become better in them."

One participant discussed how the training was a key ingredient that shifted her attitude about group work in general:

P012_Reflection 2: "Another epiphany I had was just in my attitude toward group work. I think I am more prepared to go out in the work world and deal with groups on a daily basis because of this class. The skills I have developed in having a group attitude as opposed to individual thinking really increased my ability to take a lot away from group work. The fact that group work can result in a positive final product instead of a horrible dreaded feeling gives me a brighter outlook on

working in groups in the future. Learning the steps to working together and dealing with conflict has been a major contributor in this."

Group Contract, another sub theme of Reality Modeling, required students to develop a group contract at the beginning of the course to set clear expectations for work ethic, akin to a code of conduct often developed in a real work situation. A small number of participants indicated that preparing this contract, "plan," or "ground rules" with group members insured everyone understood the expectation for work ethic and associated this contract with insuring accountability and a focus on development:

P002_Interview 2: "When it came to the group aspect of it we really discussed and laid out a plan for our group in the beginning."

P003_Interview 1: "[The instructor] also allows us to be accountable too because we created codes of conduct in our own groups. So [the instructor] is holding us accountable but we're also holding each other accountable and I think that means so much, especially in a group setting. If you can set your standards and expect that your group members hold to it then that's incredible."

P012_Reflection 1: "The first assignment of the group contract I believe contributed a lot to how we have worked as a group and in turn my learning thus far in the class. By setting up goals and plans in advance everyone knew what their expectation was as a group member and right from the beginning the potential for small conflict was eliminated . . . By not having to worry about whether or not everyone will show up for class and things like that we have been able to get a lot more out of group work, because we are not wasting discussion time with how logistics of the group should work . . . With everyone knowing their expectations there no longer are issues about people not meeting deadlines or not contributing to group ideas, or showing up for class. When these issues are not on the table there is more discussion time

that contributes to ideas of the project rather than time spent worrying about group members not doing their work."

Next, participants cited the Reality Modeling sub theme, Real World Applications Illustrated, as contributing to their learning, particularly learning about sustainability. The course utilized videos or other image-related materials that illustrated or explained the application of course concepts in the real world, designed to enhance learning and application of course concepts to course work. Participants indicated that illustrations of the real world applications of course concepts, especially those related to sustainability, via videos, websites, or other image-related materials enhanced their learning:

P002_Interview 2: ". . . we always had Power Points and then within the Power Points [the instructor] had videos or she would talk about companies and go to their website or have a video about their company. So, then we could really relate it to something that was real so we could understand it more."

P014_Reflection 2: "The way we learned about certain aspects of sustainability were helpful in coming to the realization of how important sustainability is. Looking at companies and seeing what they are doing right and what others were doing wrong was really helpful."

P012_Reflection 1: "I was really inspired by the lecture about Cradle to Cradle. I have always wanted to be more involved in the textile end of the industry . . . The video about the Swiss company was very interesting to me. I found it interesting how much the company improved with the changes they made to the dyes that they use on their textiles."

Clearly, when students could either see or read about how real companies were trying to apply sustainability tenets to their business model, they became more confident as well as engaged in their own application of these ideas to *their* work, as illustrated by one of the

researcher's interactions with students during the triple bottom line analysis of the sustainable fashion industry, a systems thinking activity:

> Reflexive Journal Entry 17: "They got a little fired up about some of the initiatives they read about, like Nau, who initially donated 5% of their profits to charities, unheard of in the industry, which was one of many things that led to them to go belly up . . . I asked them what surprised them or what they found interesting about what they discovered. They offered multiple examples. One student had no idea that Nike was doing all that they were doing. Students who read about Nau had a lot of things that they could see led to the company's undoing. I asked them what they thought led to the company's demise the most. They talked about the company being too ambitious, wanting to do it all, needing a lot of capital to launch the brand, too revolutionary. They were both critical of the some of the industry strategies, but also were inspired or intrigued by all that is going on out there. They also identified how some companies seem to have more tunnel vision when it comes to the sustainability tenets, like focusing a lot of environmental issues and not a lot on social . . . ! I asked them what they learned about the sustainable fashion industry in this activity. A student said, 'They've got a long way to go.' Another student said, 'There is a lot going on out there.' Another student talked about how it was interesting to see some companies really focusing on just one tenet of sustainability, but not necessarily balancing initiatives – some companies tended to focus on environmental or social initiatives exclusively."

The next Reality Modeling sub theme Focus on the Future was related to the course's focus on fashion for 2025, prompting students to envision a sustainable future and imagine how the apparel industry may change, being more responsive to current real world challenges like resource depletion and climate change. Many participants identified this aspect of the course as enhancing their learning related to sustainability. In most cases, participants described this aspect of the course as especially challenging, demanding greater creativity and imagination:

P002_Interview 2: “It allowed me to imagine more than just thinking about what’s going on right now. The things that I design for the future is nothing like I’ve designed before, but they made me—even the sustainability aspect of it gave it a whole new twist on how I was designing things and how to make things more reusable or how you could wear it multiple ways, that was the focus on our line . . . I learned a lot more about designing and how I could design . . . I think it really allowed me to be more creative in my designs and even the inspiration boards and things like that.”

P007_Reflection 1: “The most important ingredient contributing to my realizations made on the future of apparel can also be credited to readings done in class, specifically the “Fashion Futures” article that we read last month. The reading presented different four scenarios that we could exist in, as well as what issues were present in them. It made the material we were going through more understandable because I felt more involved in it, like I was playing one of those life-scenario type of games.”

P003_Interview 1: “I think with using the scenarios it makes us kind of think outside of the box more than we have been challenged in other classes. Especially as design students we’re the same—the types of designs you do are different but the collections consist of separates that are the same types of pieces and that’s been good and challenging about this class . . . I feel like it forces you to be so much more creative.”

P003_Reflection 1: “I think that it’s hard enough to try and predict the future, but when you add all of the technology we have in this world, it becomes even more difficult. This is where our imagination’s come into play. Since we are designing jackets with special qualities, we have to think what new things could be invented or added to better them.”

Supplemental materials and variety

The next theme, Supplemental Materials, and a theory-driven theme related to constructivism, was a prominent consideration in the course's design. Focusing on a relevant problem often requires the use of supplemental materials about the specific problem, as textbooks are designed as more broad and general. Although two textbooks were used in this course, participants identified the use of supplemental readings, such as articles about sustainability and the Fashion Futures 2025 report, as being interesting to read and enhancing their learning. According to participants, these were preferable to the textbooks used. Interestingly, in a discussion found later in this chapter regarding how participants compared their experience in this course to others in their program, it was clear that students were more likely to read what was required because it was interesting and was directly applicable to their coursework:

> P002_Interview 2: "I think the reading really helped me a lot too. Sometimes there was a lot of reading, but it was all really interesting so it wasn't hard to read and it all was relatable to what we were doing or things that might happen in the future. So, it was really easy to read because it was things that could actually happen so it made you connect what you're doing now to what could happen in the future.

> P007_Reflection 1: ". . . the reading we did a couple weeks back entitled "Fashioning Sustainability touched on a number of issues and offered solutions for each one. It made fixing the problem(s) and adapting to a sustainable lifestyle more comprehensible for me."

> P003_Interview 1: "The text book we have has some good pictures and there are some good sections, but I know [the instructor has] taken some of our chapters from a sustainability book that she likes. So maybe if she took a chapter from the textbook that we have now and just have that chapter to read or a section of it that would be more beneficial than the actual book."

In a discussion with students on the last day of class, the researcher made the following notes which affirmed the comments above:

> Reflexive Journal Entry 29: "I asked them about each of the textbooks. I asked them the level of reading difficulty. Neither were difficult to read according to the students. Students did not like the conflict resolution text. Students said this book was kind of silly and seemed to dumb down the concept, was too simple. Some students said that the lesson plans were very clear and more interesting, but the book was not useful in the course or beyond. The *Designer's Atlas* was interesting to read, they said, but only moderately useful to the course work. A few said that this book was a little repetitive with reading from other courses. Some of them thought that it might have been better to use segments, rather than entire chapters of this book. The supplemental reading, on the other hand, was most useful and interesting to read. Interestingly, students commented that they *actually read* these readings because they knew they would be expected to use that information in class for the discussions and they were actually useful to class activities, as opposed to other courses where reading is only loosely linked to lesson plans. So, the supplemental readings were a hit."

Finally, Variety, a much weaker theme compared to other impactful aspects of the course, was a theory-driven theme influenced primarily by constructivism in the course design. Variety was an important consideration in both how concepts were presented to students as well as in the options students were given in how they wanted to communicate what they were learning. The idea behind this approach is that variety accommodates a wider range of learning styles. This theme manifested in the student experience in several different ways. Some participants identified this approach as enhancing their learning by using a variety of approaches to illustrate a course concept. Other participants identified this aspect of the course design as empowering, in that they were given choices in what and how they wanted to pursue in course assignments. While others spoke about how the

variety in how the course assignments seemed to be designed to flex different skills, from assignment to assignment:

> P001_Interview 1: "I think because we read about it and then [the instructor] lectures, and then we apply it to group work that at each step I feel like I understand it but then once you go to the next step then I understand it even more. That's really broadened my learning just doing everything three times in three different ways."

> P014_Reflection 2: ". . . given the power to actually come up with our own ways to go about sustainability helped me learn it through our own company and decisions we had to make."

> P004_Interview 1: "With the projects we get to apply the ones that really spoke to us and put them together in different ways which is helpful. Instead of on tests where you have to memorize everything and even things that might not be your thing as much and you don't get a chance to apply that. That's helpful . . . Since there are so many different aspects of projects and stuff to this class it does give a chance for everyone's strengths to show through, which if you're not a good test-taker in other classes you have to learn to be a better test taker because there is no other option. I think that's good, it gives everyone a chance to really shine."

> P007_Interview 1: "I mean going into it I really didn't think that it would be very different after the first couple of weeks and it was going to repetitive, it's like 'Okay we know what this is now, how much different is it going to be, it's the same thing over and over,' but it has been different and all the projects have been beneficial to what we're doing and they're not the same every time."

The instructor

Clear in participant descriptions of their experience in the course, the instructor played a pivotal role in both student learning and development. From both an ESD and constructivist perspective, but especially a dialectical perspective of constructivism, the

instructor takes a more personal, interactive, and collaborative approach to teaching and is more sensitive and responsive to individual learners. Participants discussed this aspect of their course experience the most during the focus group interviews. Four theory-driven sub themes manifested in their discussion (Table 5-8).

One of the strongest themes discussed extensively during focus group interviews, was Instructor Responsiveness. A theory-driven construct modeled by the instructor during the course, this theme is about being responsive to the learner's current level of development, remaining flexible enough to cover unexpected ground or travel in unexpected directions to increase understanding or encourage student exploration. Thus, boredom or frustration is carefully managed by the instructor. Participants described the instructor as sensitive or responsive to their learning or development needs. This theme manifested in a variety of ways in discussions by the participants. Some participants emphasized the instructor's ability to explain course concepts in a way that was understandable to them:

> P008_Reflection 1: "Some of the aspects of this course that have contributed to these epiphanies are that during our lectures the ideas about sustainability get broken down into simple ideas that you can fully understand and are not crazily abstract and difficult to the point that I feel that there is nothing to understand."

> P007_Reflection 2: "The thing that really helped me wrap my head around this whole course and have my eyes continually opened to epiphanies like this was my instructor being able to 'speak English' about these ideas and concepts that were very foreign to me for so long."

Other participants emphasized the instructor's willingness to adjust her approach in teaching a particular concept to increase understanding. As mentioned previously, the Cradle to Cradle lesson plan was a particularly challenging one for students in the course, primarily due to students' lack of materials knowledge. The researcher went back to the drawing board after the lesson plan, re-worked the information, then reviewed it again in the next class. Interestingly, this adjustment, this willingness to go back until understanding had been reaching, made a seemingly indelible impression on participants:

> P002_Reflection 2: "What helped me to learn was how my teacher interacted so well with us till we understood. An example, in cradle to cradle a lot of us got lost so we

got another lecture better suited for us to get a better understanding of what it was and it helped a lot. Having someone to listen to us for feedback meant they know when something is wrong."

P008_Reflection 2: "I also liked the way that if we did not understand an idea or concept that we could go back and go into more detail until everyone understood it, again it is not like this in larger classes because most professors would never really go back and redo a lecture just because a couple people did not understand the way they explained it."

P004_Interview 1: "[The instructor] has been great because if we don't understand she really stops and either reformats the lecture; there was one where it was really confusing and we were just sitting there like 'Uh I don't even know how to go about doing this assignment.' So, the next class she had reworked it and presented it in a way and it made so much more sense. I think she was aware that we were confused and went back, so that was helpful to all of us. We were able to see everything from different ways that were more understandable."

Notably, being attentive to the learning and development needs of students was the subject of many of the researcher's journal entries. Specifically, the researcher made extensive notes regarding her miss-steps during the Cradle to Cradle lesson plan:

Reflexive Journal Entry 11: "Then, I introduced the activity, which is where everything went South. I asked them to design a waste=food concept, identifying some P-list materials and then designing a garment for their target market for maximum food value. When I introduced the activity, I asked for questions, and everyone seemed like they were ready. But, then I noticed students taking a lot of time to get started. Many pulled up the Sustainable Materials Index and took some time to look through that. Upon retrospect, introducing that tool was too much and probably overwhelming. It was as if everything was thrown at them at once. [One

group] was the first to start brainstorming. But, when I visited them to hear their ideas, they clearly did not understand recyclability . . . some students looked extremely exhausted . . . [another group] did not understand that Nylon 6 is not used for apparel. They also did not get that the fiber content must be in 100% form to recycle it. [In another group] . . . students clearly did not understand that blends were out . . . so, I stopped the train and asked, 'Okay, obviously this is a challenging one. So, what is making this activity challenging? Or is it that many of you are tired?' A couple spoke up and said it was a little of both. They were obviously tired. One student said that the expectation was not clear as to what I wanted them to design. She was also confused if I wanted them to use the information I had just given them or forecast other advancements based on their specific scenario. Then, another student said that their textiles knowledge was very limited. They did not necessarily know what hemp fabric would look like, thus it was difficult to brainstorm a garment concept with a fiber they were unsure would be complementary. I asked, " 'In your textiles course, you receive swatches, correct?' A student replied, 'Oh, that was so long ago!' Another student piped in, 'And we don't learn anything about sustainability in that class.' I assured her that I understood that, and it was enlightening that they were unfamiliar with materials choices and that that was making it difficult . . . so [after a class critique about the concept] I said, 'Well, that was a rough one.' Students chuckled. I assured them I would help them better understand this concept as we continued to work on their projects, so they will surely better understand this later if they were confused by today . . . going back, I clearly see where I made assumptions about their materials knowledge. I assumed that they knew what apparel materials were biodegradable and what wasn't. That was naïve. I think it would be a good idea at this point to 1) clarify during the next class period, and also 2) re-issue lesson plan notes that give more information . . ."

Other participants emphasized the instructor's seeming accessibility and responsiveness in situations when students were "stuck":

P003_Interview 1: ". . . [the instructor is] very attentive, she answers her emails and if you have a question or a problem you can go to her and she's really excellent at just being there and I think that's unusual for a professor in some cases so that makes the class so much easier and better to be a part of. So in that way I think she's helped me just be a better people-person."

P002_Interview 2: "I think what was really helpful was [the instructor] was really involved in each group. So if we were stuck on something she would help us since she obviously knew more about sustainability than we did. So she could direct us to certain websites or readings to figure our way through the problem."

P001_Interview 2: "One thing [the Instructor] did was no matter if you were stuck you could just email her and she would reply right away and just try to help you out or she would meet with you any time and help you and guide you to the right way that we were going. Her help is what progressed me so I'm really glad she was there to push me toward the right way of what I need to do to get the job done."

P002_Interview 2: ". . . [the instructor] was always available. Before one of our first projects was due I was really stuck on it and so I could come into her office and she helped me look at my ideas and give me other suggestions for it. It was like she could help us think differently about it so we weren't stuck in that one spot."

Some participants discussed the instructor's responsiveness to student stress:

P002_Interview 1: "I agree, [the Instructor has] been really good about checking back with all of us to make sure we are on the right track so none of us are overwhelmed . . . she's always very aware of how we're doing and if we seem really exhausted or just everyone's really tense. She'll kind of just feel out the atmosphere and ask us what would be the best case scenario."

> P005_Intereview 1: "What I feel like, too, is if she feels like we're getting overwhelmed with everything she wants us to focus on doing well on the project rather than all the other little assignments so she'll back off an assignment if she feels like we're getting overwhelmed which is really nice."

As the researcher was teaching this course for the first time, she regularly checked in with students to discern the extent to which signs of stress were related to *this* course or others and attempted to adjust accordingly. Sometimes this responsiveness seemed to take students by surprise. An example:

> Reflexive Journal Entry 12: "I asked, 'How's it going?' I explained that I had observed that they appeared very tired and maybe seemed overwhelmed and I wanted inquire if that was about what is going on in other classes or if there is something we can do differently in this class. Students explained that there were a lot of papers coming due this week. I asked to clarify, 'Is there anything we need to do differently in this class, anything that might be frustrating or overwhelming?' Many of them looked at me like they couldn't believe I was offering the question. I received a resounding , 'No.' So, I further clarified that they just had a lot going on with other courses and their exhaustion was not necessarily stemming from this class. They affirmed that that was indeed the case. I offered, 'Would it help you to not move on to the next assignment in this class today, as this is what I had planned for, so you would have a weekend with nothing pressing in this class?' 'Yes!'So, I was fine to do that, and had already mulled over what I might be willing to let go of. They seemed to be very happy to have something off their plate, even if it was just for a few days."

At the same time, some participants also discussed the instructor's penchant for challenging students, pushing them beyond their current learning and development:

> P004_Interview 1: "[The instructor is] all about challenging us and making us advance our learning I think."

P003_Interview 1: "[The instructor] challenges us. I think a lot of times you go into a class and teachers say they're going to challenge you, but then they don't end up challenging you at all. They don't end up following through with that and she's really kept up with that and 'Hey, are you actually learning this stuff, is this a part of what you're trying to communicate, is this going to be a part of your life ahead?' That's really important to her and she's not backed off . . . She has really challenged us to grow within our groups and just as individuals in how we move forward in our lives."

Closely related to Instructor Responsiveness was the next theme, Interaction with the Expert. Influenced by dialectical constructivism, this theme emphasized the collaborative role of the instructor to a greater extent as well as her expertise. This collaboration is thought to allow the learner to try on the expert's (the instructor's) conceptual frameworks or practices as she shares her expertise, which thrusts the learner beyond their current level of learning or development until the learner becomes autonomous. Evidencing considerable power, this theme was identified by participants as enhancing their learning or development. Specifically, participants described the instructor's high level of involvement in their work as helping them learn about the course concepts, but that is also aided them in developing their collaborative skills. Some participants emphasized the instructor's involvement as a coach and facilitator:

P007_Interview 1: "After every lecture [the instructor] will come by when we have group time like right towards the end of class and she sits down with us for at least probably 10 minutes each, maybe less sometimes, but just kind of checks in on where we're at with stuff, if anything that we don't understand and moves on to the next group just to make sure that it wasn't one of those things where it's 'Okay here's what I want you to do, go.'"

P001_Interview 2: "[The instructor] would really just help out when you need it and just come sit with your group and just acknowledge every single person and get

everybody's opinion, which makes everybody know what's going on. It just made us actually work together and actually listen to each other."

P002_Interview 2: "I think how [the instructor] was very interactive with all the groups and very involved in all of our projects."

Other participants emphasized the instructor as an important source of ideas and other resources, considered fundamental to idea generation:

P001_Reflection 1: "I think the main aspect to my epiphany moment was having an outside opinion enter into our group work. Sometimes I think people are so focused on a single idea that they forget about other ideas so having a fresh mindset enter the group can spark new ideas. I really like the private meeting because it was time really focused on what we were doing with no outside noise."

P002_Interview 1: ". . . [the instructor] will give us really good ideas and kind of guide us more than just, 'Okay here's your project, this is what I want at the end,' she really just makes sure that we're staying on that track and helps us to know where we're going."

P003_Interview 1: "It's awesome because [the instructor] has ideas from working in the industry and from her own personal thoughts that she can give to us and then we can bring them in and that's awesome."

P004_Interview 1: "Because we can tell how much information [the instructor] has, it might not be necessarily be what she presents, but she brings in other sources like a lot of the recommended readings and stuff has really helped just broaden all of our knowledge."

Unsurprisingly, students discussed this aspect of the course the most during their final reflection and focus group interviews, most likely because class periods after mid-term were largely devoted exclusively to collaboration. Interestingly, early in the course, the researcher noted that some students seemed resistant to her collaboration, sometimes withholding their work, resisting inviting her in for feedback. But, during the second half of the course, the researcher describes a shift in her own approach and in student behavior:

> Reflexive Journal Entry 16: "Overall, students seem to be engaging me more in a true collaborative relationship. I don't get the sense at this point that they are trying to figure out the 'right' answer as much as they are trying to embellish their own ideas and strengthen their proposals. I am trying to work on not telling them what to do, as I am a natural director. So, I am trying to give them several options and let them decide. I also am trying to wait until I hear their idea, before I started offering my own, in order to allow them to stay true to their own vision. I think that this indicates that they may be perceiving me as a collaborator to a greater degree now, involving me earlier in the process, rather than at the end when I'm grading . . . and, I am thoroughly enjoying this time!"

> Reflexive Journal Entry 28: "I have been busy during these collaboration days. I typically make my rounds early in the class period, but then find myself consistently bouncing from group to group as questions arise in their work. In other words, my interaction with them is steady throughout the class period. Some questions that I get throughout the class period are repetitive to other groups, but other questions vary widely and seem to be specific to the scenario in which the group has designed for. Some requirements of the assignment have not been applicable to the group's line and we have negotiated changes. Students seem more comfortable now approaching me about such exceptions and arguing their point of view to justify their decisions. They also seem at greater ease with simply asking questions and including me in their process, which has not always been the case."

Associated with the previously discussed instructor-related theme is Feedback Loops, another theory-driven sub theme influenced by both ESD and dialectical constructivism. According to Vygotsky (1978), giving students continual feedback often prompts contradictions to their suppositions, prompting new learning. This practice was modeled by the researcher during the course and acknowledged by students as being exceptional compared to their experience in other courses. Participants discussed this theme most extensively during their second reflection and the focus group interviews and identified ample feedback on their behavior as well as their course work as enhancing both their learning related to course assignments and skills development:

> P003_I2 "I feel like we had a lot of feedback, probably more feedback than I feel like I've had in a lot of courses. Even throughout any of the other assignments [the instructor] was very detailed on things that we needed to work on and I feel like that's a lot more feedback than I've gotten in the past . . . she would look over our assignments before it was due if we had it done early. So, that was nice to get her feedback, if we were even on the right page for it . . . I think that helps you learn a lot better because you not only are 'Okay I got a B or an A on this assignment' you're also thinking 'Okay, well, how can I make sure I get that 100% next time.' It gives you kind of a goal to reach on your development."

> P007_Interview 1: ". . . when we get these PDFs back from our grading I've never really had such an in-depth reasoning for grading the way that [the instructor] does. She lays it out like, 'Here's what you did wrong, here's what I wanted, here's what you should do next time' and it's always really descriptive, it's four or five sentences a piece; you know exactly what you did right or wrong about it. She tells you what you did right and she encourages you about it and all that good stuff."

> P003_Interview 1: "It's a great balance of it too, it's not just overly critical or 'everything was awesome!' . . . Just even with [the instructor] going back through and making comments on it like, 'Maybe you should try this or that,' that was really

helpful because it's hard to see all the different pieces and components that go into it when you're in the middle of it. So, having her be this unbiased mediator sort of and giving her thoughts on things, that was really beneficial to me. It was a good mentor sort of thing and made me realize things from a different point of view."

P012_Reflection 2: "The feedback that [the instructor] took the time in writing on each of our reflections really helped me as well. Being able to see [her] comments not only helped build upon my skills, but also reiterated the importance of reflecting since [she] had taken so much time in giving feedback."

P005_Interview 1: "I think having the personal feedback, like with our reflections I know we each got different things and she just told us all what we need to work on to better what we want to better."

P006_Reflection 2: "I have never had a professor who has been such an incredible mentor while still staying in that position of authority and being a teacher. [The instructor] made me want to rethink how I've been handling conflicts and to be respectful of all thoughts, no matter how crazy I think they might be. [The instructor] has really taught me to think things through before opening my mouth and shutting another person's idea down. I will always be an opinionated and strong-minded person, but I know I would have taken so much longer to understand that if not for [her] teaching and active reflections on my actions and thoughts."

During a discussion with students on the final day of the course the researcher received very similar comments from students. Clearly, the amount of feedback seemed exceptional to them compared to other course experiences, but interestingly, this seemed exaggerated to the researcher when she reflected upon the actual time she spent doing this:

Reflexive Journal Entry 29: "They all seemed to be very pleased with the amount of feedback that they received. I clarified whether that was in the classroom or on

assignments. They said both. Some of them talked about the fact that in other courses, they might get a point breakdown on a rubric, but they never received so much feedback about what they did *right* and what they could improve on. This feedback seemed VERY important to them and something that was very helpful to their learning. One student commented that she had never had another instructor go through every aspect of an assignment like I had and give the type and amount of feedback I gave. She said she really learned a lot from that . . . I also felt like it was not that taxing on me to give that feedback. Obviously, when I was in the classroom with them, my sole function was to interact with them throughout their group work time. I was up and about quite a bit, which I think if I had just sat there and allowed them to work, they would have had a different experience. But, it was not requiring time out of my regular schedule to provide that, as I was supposed to be in class with them anyway. Although, I did note earlier in the semester that it seemed to take them about eight weeks to realize that that was what I was there for, which was also interesting. Further, when I was grading their assignments and providing feedback, admittedly, I only had four assignments to grade at a time, so it wasn't like it was taking an inordinate amount of time. And, because I had collaborated with them on the assignments and usually given some pretty structured feedback on the work before it was submitted, it was pretty easy to grade and give feedback, as I better understood the team's conceptual processes, what they may have intended to say, etc. It is far more difficult to grade assignments that you are seeing for the first time, and often don't meet the qualitative criteria, because the students were working alone and not given the support. I cannot imagine what these projects might have looked like, had I not been an involved coach. Hmm . . . So, in sum, this was another key finding that was immensely helpful to learners that did not take a lot of labor on my part."

Another interesting and related development which occurred on the final day of the course was a notable byproduct of this feedback. During a peer review process for the

class's final exhibit, the researcher discovered that students seemed to have improved their ability to *give* feedback as well as learn from it:

> Reflexive Journal Entry 30: "I asked students to first take the next half hour, before our exhibit began, to complete their peers reviews. They used a rubric form I created. I asked them to score their peers' presentation in three concentrated areas on a scale of 1-5. I also asked them to ask team members questions about their presentation and to make meaningful comments to their peers (beyond, 'hey, nice job!') . . . when I looked at the forms later, students had done what I had asked. And, I even saw a little of myself in their feedback. They gave positive comments and were descriptive about what exactly it was they liked and why. They also gave their peers constructive feedback on things they felt were amiss. I could see myself in some of the things they seized on. I was impressed with their ability to take a critical eye to these presentations."

Finally, one of the weakest of these four themes related to the instructor was Practice What you Preach, a theory-driven theme related to ESD. According to ESD literature, it is recommended that the instructor model behavior and demonstrate an interest in supporting sustainable development or sustainability. Primarily in the focus group interviews, likely because they felt more comfortable talking about the instructor with an outside moderator, participants describes the instructor as passionate or invested in sustainability and identified these attributes as enhancing their engagement and learning about sustainability:

> P005_Reflection 2: "I've thought about how my positive thoughts on this course might change with a different teacher or group. I feel as though I wouldn't have been as passionate about our project. [The instructor] shows a lot of enthusiasm about sustainability and that really made me more enthusiastic."

> P002_Interview 2: ". . . I feel like [the instructor's] education or the way she knew so much about sustainability really helped everybody, it made us understand it a lot

more than just reading it out of a book . . . I guess just that I feel like this course would be different if someone else were teaching it. I feel like a lot of the positive things that came out of the course were from [the instructor] personally; her personality and the way she interacts with everybody . . . She was really invested in the course so it made us invested in it, too."

P003_Interview 2: "I feel like she was passionate about the subject so I think that helped make us not just be like 'Oh it's more sustainability stuff.' It was important to her so she exuded that importance and shared that passion for it . . . it's hard to not want to be engaged when you see somebody up there so engaged in the subject."

P004_Interview 1: "I think because she is so passionate about sustainability and is so knowledgeable, that's really helped because a lot of us didn't come from a background where we knew a ton about sustainability, we might have touched on it here and there in classes, but not had a whole course about it . . . she really cares about it as well."

Other mechanisms for learning and development

There were a variety of other aspects of the course design that participants identified as being impactful to their learning and development experience (Table 5-9). Two of the most powerful themes in the study related to aspects of the course that were impactful were Collaboration and Discussion, both theory-driven themes. Collaboration, an aspect of the course design influenced by both ESD and constructivism, was a fundamental consideration during the course redevelopment. Strategies were used to foster frequent social interaction and shared work, a key conduit thought to extend and shift learner suppositions. Nearly every participant at some stage during the study identified this emphasis in the course as enhancing both their learning and development. In fact, the outcomes gained by students as the result of working in a group were seemingly expansive. Some participants directly connected this aspect of the course to their learning:

P006_Interview 1: ". . . It's never been a strong point of mine to work in a team because I guess I've kind of discovered by working in that group I have a strong personality, and so are some of the people in my group. So, we have conflicting opinions sometimes so you have to really collaborate and work together and it has been kind of hard, it has been a lot of work . . . but it's good; you learn a lot more that way."

P004_Reflection 1: ". . . I feel that the collaborative time we have face to face enhances the way I interacted with others and the way I think. Being face to face with people allows for dialogue which is good when working in groups because everyone can say what they need to say and get feedback from the others immediately"

P001_Interview 1: ". . . I think by collaborating as a group has helped us learn even more because it's not just that [a group member] already knows this and she's going to write a paper on it. It's bringing what she knows and what I know together and making a better paper."

Other participants directly linked the collaborative experience to progress made on their collaborative skills such as an ability to *share* work, to relinquish control and work more democratically, and to express themselves:

P003_Interview 2: "I feel like we got to focus more on our group and the actual *process* of the assignment instead of just focusing on just getting the assignment done. I feel like we had work that was done better than other courses because we actually focused on working well as a group as well as getting it done and not just getting the assignment done."

P002_Interview 1: ". . . just the working with the group, I've learned a lot from that. Because this has definitely been the most collaborative, hardest group project I've

ever had. Normally it's just you meet up with a group and you do a little bit, but this you have to stay very inter-connected, so I have just learned a lot about that."

P006_Reflection 2: "Also, since this is solely focused on group work, it forced me to take a different approach and make sure I was not taking on all the responsibility, which is so difficult for me! I like to know that things are getting done how I want them to be done. But I definitely had to let go of the reigns and allow other creative minds to work with me and not against me, if that makes sense."

P002_Interview 2: "Just because of the group collaboration I couldn't just keep my opinion to myself, we all had to talk about what we were thinking for our line and where we wanted it to go and what we wanted to keep with our ideas and what we wanted to edit out.

P001_Reflection 1: "The aspect of this course that is really helping me be a more effective communicator is that everything is a group project. It forces me to speak up and not keep everything inside."

Many participants emphasized a comfort level attained by working collaboratively in a group and as a class, which seemed to aid learning and development as well:

P008_Reflection 2: "By have the class broken into groups starting from the very beginning it allowed people to get really comfortable and familiar with the members of our groups rather than just splitting people into groups occasionally throughout the semester to work on smaller projects like most other classes do. Since I was working with the same people all the time I really got to know them as individuals and get familiar with how they work on things and to feed off of them and vice versa to make my ideas and their ideas much better overall."

P010_Reflection 2: “Being with the same group throughout the whole semester really helped with this, so we weren’t with different people every two weeks. By the end of the semester I felt really comfortable around all my group members.”

P002_Interview 2: “But it made me more comfortable that not only do we have to work with our group we have to work with other people as well. It made me comfortable with the whole class and being able to talk to them and kind of see where they’re coming from, because I really didn’t know anybody in the class.”

Some participants discussed a new appreciation collaborative work, and in some cases, a sense of satisfaction or pride derived from the experience:

P012_Reflection 2: “We were all very pleased with the final product. The final product was something that we were all proud of and something that represented us as a group and as a brand . . . The fact that group work can result in a positive final product instead of a horrible dreaded feeling gives me a brighter outlook on working in groups in the future . . . Prior to this class my idea of group work many times involved splitting up the project into different parts then all getting back together and putting the pieces together. This mentality does not add to learning and it does not involve much interaction . . . . Through the set-up of our group work in this class we worked together on every aspect of the project.”

P014_Reflection 2: “Group work can be difficult and stressful but if you go into it with a good attitude the outcome could be better than if you went it alone“. . . after everything was said and done and our project was finished, I could see what we had accomplished and the realization of group work and what it can accomplish . . .”

P003_Intereview 1: “I don’t think our groups would have been as effective if we didn’t have all the collaboration and stuff because it would just be the design students doing the design part and the marketing students doing the marketing part

and none of it transferring over just everyone having their own projects. It wouldn't be as cohesive that way."

P006_Reflection 2: "By the end of the semester I not only felt respect for my team members, but also a kinship. I enjoy their company and while I'm quite sure if we worked together again we would still have very different opinions we would be able to work through them and together create something wonderful . . . I also didn't know I could enjoy a class so much that was all group work, that thought still blows my mind . . . I never thought working in groups would teach me so much about life in general, and the interactions that happen on a daily basis."

Clearly, collaboration was a chief component of a positive learning and development experience. Importantly, this component is not uncommon in other AT courses, but participants seemed to perceive that this experience was made more meaningful by the structure and expectations associated with collaboration. After a discussion with students on the final day of the course, the researcher made this note:

Reflexive Journal Entry 29: "I asked, 'What are the course elements that were most valuable?' Students talked about how intense the collaborative experience was. They had group work in other courses, but they never learned a lot from that experience as they did in this course. I was getting a lot of nods from students. Some talked about the fact that all assignments were completed collaboratively and then having the skills component in the background really made the experience meaningful. They seemed to take more away from this collaborative experience than any other in their program."

Another powerful theme and mechanism for learning was Discussion. A theory driven theme and a chief consideration during the course redevelopment, the learning environment was designed to foster ample discussion on course topics (learner-learner, learner-instructor verbal dialogue) as a mechanism for challenging the learner's

suppositions. Participants identified class discussion, verbal dialogue about course topics, as enhancing their learning and development:

> P003_Interview 2: "… the class discussions were good … I felt like It was more engaged than I have been in the past and just feeling like everyone else is in the discussion with you and you're not just speaking out by yourself."
>
> P012_Reflection 2: "Many times our group would find ourselves discussing the material more in-depth and explaining parts that we needed more clarification on. Being able to talk to others about the material especially when you have the context of the project really helped me learn."
>
> P003_Interview 1: "Something I so appreciate is the discussion. We have real discussions, we can sit and talk about things and it's not like we're in a class setting, it's more like this. And everybody has so many different points of view that it's great because you can hear them all and nobody feels like they're pressured to say things or that we're going to judge them for what they're saying … It makes it so much less stressful in one sense and I think it makes me retain so much more information when I can talk it out with somebody or when there are more voices going on."
>
> P004_Reflection 1: "I may discover something that I had never even thought of when discussing my ideas with another group member."
>
> P007_Interview 1: "You have to communicate; communication is a lot of the class so if you're not talking then you're not getting much out of it."

Notably, discussion seemed to be highly correlated with learning about sustainability. Discussion seemed to be an important conduit for navigating its complexity:

P009_Reflection 1: “Discussing these paradigms has made it a more interactive learning experience, which is ideal for my learning style. I can read chapter after chapter of information, but I really don’t grasp a concept until I discuss it out loud.”

P005_Reflection 2: “Hearing my classmates, who also find sustainability important, talk about things that we didn’t even read about made me feel like I need to step up my game and know more about something I’m passionate about.”

P004_Reflection 1: “Learning and then talking about these paradigms makes them more understandable when you can relate them to something you are working on.”

Early in the course, the researcher observed that students were rather hesitant to talk about their perspectives on sustainability as well as other course topics, perhaps because the majority of these students were marketing students who were accustomed to larger class sizes and less interaction in class. But, at about four weeks into the course, students seemed to have warmed to the idea:

Reflexive Journal Entry 8: “Students seem to be getting used to activities and discussion, as they seem to be less hesitant to get it started when I ask them to do something. They seem more willing to speak up when I ask them questions during a shared discussion or during my lecture. I have also seen several students who I have wondered if they were interested in what was happening in class, as they were quiet or seemed difficult to approach, that have come alive in some of the activities and group work, and in their discussions with me. I am not sure if that is about me, and trying to figure out if I know what I am talking about! Or, if I have hooked them somehow with these ideas, and now they want to get involved.”

The next theme, Action, was a theory-driven theme related to both ESD and constructivism. A primary consideration in the design of course lesson plans, the course emphasized real action in the classroom and without, encouraging learners to explore,

invent, and apply course concepts. Participants identified this aspect of the course, citing "hands-on" activities or other types of application, as enhancing their learning or development. Participants talked about this theme the most during the focus group interviews:

> P001_Interview 1: "I think [the instructor] lectured and then we actually had to apply it to our projects. So if you didn't get it during the lecture then you have to go apply it to either the group activity we were doing that day or to our actual group projects for the presentation or whatever. So, if you didn't know them then you had to learn them and you had to learn to apply them. It wasn't just knowing them it was actually applying them to a real scenario . . . for me learning it hands-on makes me learn it better than just reading about it. If you actually have to apply it then it sticks with you and you actually understand the concept a lot more."
>
> P004_Interview 1: "It's very interactive. It forces you to get out of your comfort zone. I think it's easy to pretend like you understand things and if you don't then everybody knows. It's one of those you can see it in your projects, you can see it in the way you answer questions."
>
> P002_Interview 1: "Well I don't think we'd get as much out of it as if you were just sitting in a lecture hall talking about sustainability, people would just be like 'Eh' but when you have to apply it…"
>
> P004_Reflection 1: "After learning about the paradigms, then applying them to activities inside class that we can relate to ourselves and our ideas it makes it easier to understand what they are talking about what have components go into each paradigm. After the activities I sometimes still think of ways to apply or change what I have learned."

P011_Reflection 2: "The fact that we had to implement everything we learned about in lectures, readings, and lectures we had to implement in small assignments which really put learning ideas into my head and made them stick so I could help create a great final project."

The next theme, Small Class Size, was an inductive theme discussed almost exclusively during the focus group interviews. Participants indicated that their learning and development was enhanced by having a small number of students in the class. This aspect of the course was important to participants for various reasons; however, most participants associated this aspect of the course with an increased comfort level necessary to expressing their ideas openly and without reservation:

P002_Interview 2: "I think the smaller classroom setting really played a part of people interacting with each other and being comfortable with each other. Because I know I wouldn't speak up in a large classroom."

P006_Interview 1: ". . . the size of the class was amazing to me because all the other classes have been such big lecture classes. I've been basically, well not a wall-flower, but pretty much I've been a lot more scared to stand up and say what I think. This class has made me come out and speak up when I have something to say. It's made me come into my own more."

P003_Interview 1: "Because you're really able to be aware of what others are thinking and to organize your thoughts and creativity in a way that you can share with others and not be intimidated."

P005_Reflection 2: "Another aspect of this class that helped was our class discussions. Because our class was so small, more students would speak up, which motivated me to do the same. I don't think I would have spoken up so much if more students would've been in our class."

> P008_Reflection 1: "Some of the things that have contributed to my progress are that since it is such a small class I feel much more comfortable speaking up about my ideas during lectures and class discussions whereas in larger class rooms I do not."

One participant discussed how the small class size lent itself to flexibility in the course:

> P008_Reflection 2: "Again I think a lot of this learning came from the way the class was structured, I think that by having the class being smaller and less rigidly structured it allowed for more learning opportunities."

Another participant associated the small class size with a higher level of accountability in the course as well as the instructor's responsiveness:

> P001_Interview 1: "The small nature of the class also holds everyone that much more accountable. Which I think is why a lot of us haven't had huge group issues of people showing up because in a class with 14 people or however many there are its obvious if you aren't there . . . and I do think that other professors would be more—they do care, it's just hard to see that when it's not in a small setting like we are in this class."

The final theme related to aspects of the course with the greatest impact was Authentic Assessment, a theory-driven theme related to both ESD and constructivism. This theme was also discussed by participants almost exclusively during the focus group interviews. The course design utilized methods of assessment that were designed to make transparent the process by which the learner arrived at their conclusion, and not just the conclusion. Participants identified the use of authentic methods of assessment (e.g. projects, reflections, exhibits) in the course as enhancing their learning. Audible in this discussion is students' abhorrence for "test taking," which they seemed to associate with short-term retention and a lack of real application:

P002_Interview 2: ". . . It wasn't like you learned it, took a test and then forgot about it; you constantly had to keep your mind on it . . . I really liked it rather than just taking tests about it, being involved in the whole process."

P007_Interview 1: "I think a lot of that might be the fact that it's not one of those classes where you sit there, you listen, you take the notes, you take the tests; the projects are graded like a test but they're not tests."

P006_Interview 1: "I've loved that so much that this class is not just all about tests because in those classes I feel like it's measuring your ability to memorize things and it's not really measuring your ability in learning things. You're actually discussing things with your group and getting these assignments done and it really is measuring your understanding of the material it's not so much measuring your memorization skills."

Some participants emphasized the connection between the use of authentic assessment and personal freedom or creativity:

P004_Interview 1: "With the projects we get to apply the [sustainable design paradigms] that really spoke to us and put them together in different ways which is helpful. Instead of on tests where you have to memorize everything and even things that might not be your thing as much and you don't get a chance to apply that. That's helpful."

P003_Interview 1: "I learn so much better when there's not so much focus on testing in the traditional testing sense. I know we're all getting tested based on the projects we do and our participation in class, but I think it's so much more relaxed and you can get a better idea of what people's creativity is, how people work when you can have that collaborative nature."

P013_Reflection 2: “It was a very creative class and I really liked the format of it (more papers and projects; no tests). I don’t feel like testing really measures the knowledge gain of a student. They stress out, usually cram and most of it leaves their head after the exam. I will keep what I learned in [this] class though.”

During the final exhibit for the class, considered an authentic form of assessment, the researcher observed and mingled with student groups, making the following notes:

Reflexive Journal Entry 30: “I watched students interact with the visitors. They all seemed to share the explanation of their concept, filling in the blanks where another team member left off. They seemed excited and pleased with their work and seemed to enjoy telling others about it. Several groups commented to me that this beat the heck out of making formal presentations, that it was far more enjoyable. [One group] talked about how they had to present a paper recently with six other group members and what a boring experience that was. They explained that working with that many group members required them to all work individually, so the end product was pretty disjointed and often did not make sense. Though they were given a specific time to present, they explained that many of them went on way too long, but they had never really practiced the presentation, so what more could be expected? So, this experience seemed to be fun, but also something they probably learned a lot more from, because they had to repeatedly explain their concept and get instant feedback as to where understanding may be lacking. [Another group] commented later that they had their presentation down to a science by the end of the exhibit! It was great to see students, after 15 weeks of intense work, smiling, relaxed, and having a good time.”

Aspects of the course with least impact

So far, the aspects of the course with the greatest impact on learning and development according to students have been discussed. During the focus group interviews, participants were asked if there were aspects of the course that had hindered their learning or development. Three primary themes emerged in these discussions, illustrated in Table 5-10 by participant and data type. Although the student reflections were not intended to derive this type of information, there were exceptions in two of the themes, in which comments were made by participants in their reflective writings.

Table 5-10 Aspects of Course with Least Impact

	Reflection 1	**Reflection 2**	**Focus group interviews**
(I)(L)Lack of proper scaffolding	Not intended to be derived from this data	Not intended to be derived from this data	P001_I1 P005_I1 P007_I1 P003_I1 P002_I2 P003_I2
(I) (L)Multi-disciplinary team overworks designer	Not intended to be derived from this data	P008_R2 Not intended to be derived from this data	P003_I1 P005_I1 P001_I1 P002_I1 P006_I1 P002_I2 P003_I2
(I)(L)Classroom/period logistics are challenging	P001_R1 Not intended to be derived from this data	Not intended to be derived from this data	P003_I2 P001_I2 P002_I1

In the first theme, Lack of Proper Scaffolding, participants indicated that, at times, the course did not reflect proper scaffolding; meaning, topics or assignments were introduced before the learner could digest previous concepts and this was disruptive to their learning. Participants described the challenge of juggling multiple assignments at one time and/or the introduction of new material before the learner gained closer on previous concepts or work:

> P001_Interview 1: "The thing that's frustrating to me sometimes is when we have three labs that are due and then we have to do some little side activity on top of already needing to concentrate on getting our main lab done. That's the most frustrating thing for me."

P005_Interview 1: "Or I think we'll be working on the lab and then [the instructor] will start talking about the next lab and by the time you start working on that next lab you don't have all that information fresh on your mind."

P007_Interview 1: "My head just gets caught in between labs. I am constantly thinking "which one are we doing?" Not constantly, but you know what I mean."

Some participants acknowledged that this "juggling act" was inherent in the semester project:

P003_Interview 1: "It gets a little overwhelming; I feel like the lectures are so beneficial, but there are some times when we have so much that is due that next class day or that next week that I can't absorb it all and I'm just thinking, 'Oh my gosh I have all of this to get done, why are we still talking about this.' I know this is important to learn, in the back of my mind I know that, but I can't learn it because I'm focusing on something else."

P007_Interview 1: "I think on the other side of the coin though, with all the stuff [the instructor] wants to accomplish that might be the only way that it can get done."

Another participant identified the "company training" conducted at the beginning of the course as disruptive to the semester project:

P003_Interview 2: ". . . maybe bringing in our project a little bit earlier because I know we had the conflict training part of it where we just kind of learned how to work as a group and maybe if we did that, but also in the back kind of started doing our first or second labs also, I think that would help with not having all the design stuff left for the end."

Admittedly, the juggling required to accomplish all the pieces of the product development process included in the course was an industry condition that was implicitly

built into the course design. However, there were obviously times in which this juggling was disruptive to the time that is humanly necessary to understand and apply new learning. The researcher did make a number of adjustments throughout the course to better accommodate when bottlenecks were occurring, as noted by participants in the earlier discussion about the instructor.

In the next theme, Mutli-disciplinary Team Overworks Designer, participants indicated that, at times, the work load on the design student in the group was too heavy. Marketing students indicated that they felt ill-equipped to assist in design-related assignments. Notably, the need to cross-train marketing and design students was prominent in this discussion:

> P003_Interview 1: "I think another thing that makes this class just a little bit stressful is the dynamics of the group . . . I feel like there is so much design work that the design students have to do all of it. I think in some ways that's great, but then in other ways there is so much to get done that it's really a lot of pressure. So, if there were a way that we could have something that would allow everyone to be a part of the design process more . . . I think it goes both ways. If we as design students have more knowledge of the business side and marketing side of things, I think that would be so much more beneficial to everybody."

> P001_Interview 1: "I know [a group member] and I thought we felt pretty bad for [the design student] on this last one. We had to write the design paper, but that's nothing compared to what she had to do . . . because we were kind of feeling the same way when she had to do our boards, which they were spectacular, but I felt like she just did everything."

> P006_Interview 1: "Talking about just our major, over all there's Marketing, there's Design . . . I would feel much better if it was more of a not totally Design/Marketing in one major because that would be too much, but if the Marketing students got to take a few sewing classes as well as the sketching classes and then the Design

students took some more of our Marketing classes that would be more beneficial I think. I really wish I would've taken some sewing classes."

Though the researcher did attempt to pull marketing students into the design process by encouraging them to sketch during brainstorming or to research and bring relevant design images to their designer, it was largely ineffective. Most concerning, the researcher, on a number of occasions, observed marketing students being overly shy and insecure about their ability to communicate their design ideas, by sketching or technological means, which was concerning, and ultimately led to the design student taking on too much work:

> Reflexive Journal Entry: "At the end of today's lesson plan, I told them that I really wanted them to spend their group time today hashing out the specifics of their physical designs and that I also wanted the marketing students to aid the Head Designer in those designs; that just because they were marketing students did not mean that they weren't designers, even though their sketches may not be as sophisticated. As I circled the room today, a couple groups seemed very timid to try it. This is interesting. Most groups seemed to be over reliant on their Head Designer to sketch and generate design ideas, yet they all seem to be able to describe key aesthetics that the designs should embody. But, they resist trying to draw it out – which I think would really assist the designer and insure creativity."

> Reflexive Journal Entry 17: "I dropped by [a group] to check in on how their design work was coming. I got a tentative response. I asked about sketches. They giggled. The Head Designer said she wasn't entirely sure how to proceed at this point. Another member said that they essentially knew what they all needed to look like. But, I affirmed, they now needed to make it real. One member asked if they might bring images of things they liked to the Designer to help sketching. I encouraged them to Google and find garment construction details that they liked that would put some details on the designs so the Head Designer could get going with flats. I said to

the whole group that they all needed to sketch even it was hokey looking (they laughed) or collect images, so they could make it real – and, I added I was looking forward to seeing what they came up with next week! They laughed."

Reflexive Journal Entry 20: "Generally, I am concerned about technological skills, not just design but other software. When working with [one group] on their PSS map, the team was completely unfamiliar with all the things that Power Point could do for them . . . They seem to be uncomfortable with using this technology to develop a professional, polished presentation. They seem uncomfortable with general aesthetic/design principles – like colors that look nice paired together, textures, etc."

Finally, the last theme considered the least impactful on learning or development was Classroom/period Logistics are Challenging. Although this aspect of the course was entirely out of the control of the researcher, participants indicated that, at times, the nature of the physical classroom (which was small and cramped) and the long class period were onerous:

P002_Interview 2: "I think one thing that detracted from my learning was the really small classroom. It got really loud and then we couldn't even hear ourselves . . . we're all like crammed together on these two long tables. There wasn't a whole lot of room to spread out to work on your project and you could always hear the other groups talking so it distracts me a lot from focusing on what I'm doing."

P003_Interview 2: "I think because the class was so long maybe, I feel like from [class time] if we were working on group work or if we had a lecture all morning and then had 40 minutes of group work, just by the end of it you were definitely drained; just mentally. Maybe if it was a shorter class but work throughout the week you could maintain the students' attention longer I think."

Interestingly, the researcher detected right away that this space would pose some challenges for the course:

> Reflexive Journal Entry 1: "Today was the first day of class. We have had a room change and are now in a much smaller, windowless, oppressive space. It was 80 degrees when I unlocked the door this morning. The conference room is very cramped and it's underdetermined how comfortable this is going to be. I have done some re-arranging to make it more comfortable. We'll see."

Q1C. How do students experience the process that leads to learning and development outcomes?

There were a number of ways in which participants described their learning and development experience. As previously mentioned, this was the most challenging research question to answer, as many participants struggled to describe their learning or development process in a descriptive way. But, when the researcher was able to compile descriptions of the learning process by participant, the story became far richer (explained in Chapter 3). The following six themes emerged, primarily from student reflections, though some themes were discussed again during the focus group interviews. Table 5-11 illustrates the six themes and their origins by participant and data type.

Table 5-11 Characteristics of Learning and Development Process

	Reflection 1	Reflection 2	Focus group interviews
(T)(L,D)Personal relevance(ESD+C)	P001_R1 P007_R1 P012_R1 P013_R1 P014_R1	P002_R2 P005_R2 P007_R2 P012_R2	P001_I1 P002_I2 P003_I2
(T)(L,D)Challenging suppositions(ESD+C+ZPD)	P004_R1 P005_R1 P006_R1 P007_R1 P008_R1 P010_R1	P001_R2 P003_R2 P004_R2 P005_R2 P006_R2 P007_R2 P008_R2 P011_R2 P012_R2 P014_R2	P002_I1 P007_I1 P001_I1 P001_I2
(I)(L)Learning gradually expands	P002_R1	P001_R2 P002_R2 P004_R2 P005_R2 P006_R2 P007_R2 P014_R2	P001_I1 P002_I2
(I)(L)Socially reliant outcomes	P001_R1 P002_R1 P003_R1 P004_R1 P006_R1 P008_R1 P011_R1 P012_R1	P001_R2 P002_R2 P003_R2 P004_R2 P005_R2 P007_R2 P008_R2 P012_R2 P013_R2 P014_R2	P006_I1 P001_I1 P003_I1 P002_I2
(I)(D)Adversity experienced	P001_R1 P004_R1 P005_R1 P006_R1 P009_R1 P010_R1 P012_R1 P013_R1	P001_R2 P002_R2 P003_R2 P004_R2 P006_R2 P009_R2 P010_R2 P011_R2V P012_R2 P013_R2 P014_R2	Not mentioned
(I)(D)Practice yields confidence	P003_R1 P004_R1 P005_R1 P006_R1 P008_R1 P010_R1 P014_R1	P001_R2 P003_R2 P004_R2 P005_R2 P006_R2 P008_R2 P009_R2 P014_R2	Not mentioned

The first theme, Personal Relevance, was a theory-driven theme related to both ESD and constructivism. Making course topics/material personally relevant to the student increases engagement. Consequently, participants described their learning and development experience as being characterized by a personal interest in course concepts:

> P007_Reflection 1: "Learning how different scenarios could potentially play out in my life and the lives of others by the way the world changed really had me thinking outside of class for quite a while."

> P012_Reflection 2: "The first reflection was when I realized how beneficial reflection can be to group work as well as personal attitude. Once I received feedback it only

confirmed that this task is something that is very important and something that I can apply to everyday life situations as well as all of my other classes."

P003_Interview 2: "It was probably one of my favorite classes that I've taken at K State just because I feel like I got a lot out of it personally . . ."

Many participants associated the course emphasis on how sustainability might manifest in the future as personally interesting, and thus, engaging:

P001_Reflection 1: "I feel that the concept of designing for the future scenarios is interesting to me so I want to make the most out this class and really learn from it . . ."

P002_Interview 2: ". . . It's been a positive experience and it's been eye opening since it is more involving sustainability in it and I feel like I haven't learned a lot about that in the past. It's kind of made me also not only think about the class but think about things personally for my future and my job future. So it's been really eye opening and opening my mind to more things."

P005_Reflection 2: "I think the reason I liked this course so much was because of the people in it and its focus on sustainability, not the product development portion. I think if the class wasn't focused on sustainability, I wouldn't have been so interested."

P014_Reflection 1: "One reason it has been easier to interact and communicate my ideas is because the project itself is very interesting."

One of the strongest themes related to the learning and development process was Challenging Suppositions, another theory-driven theme related to ESD as well as dialectical constructivism. The course was designed to extend or challenge what the learner knew previously, causing contradictions in the learner designed to stimulate new learning.

Participants described their learning or development experience as being characterized by a transformation in their perspective or a contradiction or extension made to what they knew previously. As previously mentioned in the discussion regarding Sustainability Literacy, this characteristic was especially associated with learning about sustainability and sustainable fashion, in which some students were initially turned off or detached about the concept and then experienced a shift in perception. Many described a process by which they had to relinquish their former perceptions:

> P007_Interview 1: "… I think going into it too my whole mindset of the whole thing was that this [sustainability] is for other people. It's not something that everyone is going to have to be concerned about, the people that really actually care are going to take care of it and whatever. After being in the class for as long as we have been it is like an industry wide issue."

> P001_Interview 1: "Personally I was kind of turned off about sustainability before taking this class and now I actually think about things and see there are fashionable ways to be sustainable and turn it into your everyday life."

> P008_Reflection 2: "An epiphany that I have had throughout the entire course was the major increase in my understanding of sustainability and sustainable design. For example, my preconceived ideas of sustainable designs before I began this course were that they were very outlandish and expensive and not something that anybody would really be wearing on a daily basis, if at all. I had in my mind pictures of high fashion runway shows in which models were wearing clothes made out of recycled metal and other very strange things. But, I learned that sustainable designs are not really this at all and that there are lots of sustainable designs out there that are exactly what I wear on a daily basis and that these designs in most cases are not really any more expensive than the clothes I already pay for and the pay-off socially and environmentally for buying these designs are substantial especially in the long run."

P007_Reflection 1: "Being able to let go of my preconceptions of sustainability and be willing to learn this information and then apply to my career path was another major factor in reaching this epiphany."

P011_Reflection 2: "I knew little about product development process or sustainability as a whole before this course. It has taught me everything that goes into the development process and all things you have to consider. I was turned off by the idea of sustainability before taking the class, but now I know it's very important and can be very fashionable. I think sustainability is the way of the future."

Challenging Suppositions was also a characteristic of the students' development process, as many participants discussed their struggle to relinquish old ideas or behavioral patterns regarding collaboration. As participants worked through this struggle, many discussed a shift to a more positive perception of this type of work:

P005_Reflection 1: "I started out being a little intimidated by my group since [two other group members] were friends before. I felt like I could end up being the odd-man-out. I thought that if we had a disagreement that they would just go with each other's ideas rather than considering mine. However, as we've continued to work together, I can see that my initial feelings were most likely wrong. Our continuous interaction makes me feel more comfortable around them and I've realized that no one person has all the best ideas."

P001_Reflection 2: "At the beginning of the course in the first labs, I feel that I was less engaged. I was so used to doing group projects the way we have in the past that it was hard to get involved if I was not in charge."

P004_Reflection 2: "I had to step back my leadership and let someone else take charge and I had to help contribute instead of doing it on my own. That was tough for me because I know if I do it, it will get done, but it always is not the best because it is just coming from my point of view and not of the views of the others in the group."

P006_Reflection 2: ". . . at the very beginning I was super hesitant to let my group members do the work. I was worried it wouldn't get done and I would suffer for it. I didn't want to deal with any conflicts. Preferably, I hoped that any problems we would have would just float away and life would be great and our projects would get done. As the semester progressed and we had to work more and more together I realized this way of thinking, on both accounts, wasn't going to work."

P012_Reflection 2: "The fact that group work can result in a positive final product instead of a horrible dreaded feeling gives me a brighter outlook on working in groups in the future."

Closely correlated with the previously discussed theme, Holistic Infusion of Sustainability, was the process related theme, Learning Gradually Expands. A comparatively weaker theme, but one represented across all three data collection periods, participants most often described their learning experience as a gradual expansion of learning over time. In these discussions, some participants described course concepts as "building on themselves:"

P002_Reflection 1: "One of the most important epiphany I feel important was how the future could look like and how we have to make a changes now. The idea that first made me experience this was when we read Outlook 2008. I was able to read my assigned article about what they predict about the future and then it lead to a discussion in our group about the whole article. I learned of the water problems, the way technology will grow and even how fashion may change later on. We continued

to have other readings about the world and resources and a lot talked about the same problems so it all gave a connection to each other. The repeated ideas and situations opened my eyes to the problems we have now."

P002_Interview 2: "The class was . . . focused on the whole entire time so we were slowly building up things, but we never forgot about what we did in the beginning because we were building upon it constantly the whole time."

Another of the strongest themes related to the students' learning and development process was Socially Reliant Outcomes. Participants indicated that their learning experience in the course was characterized by a reliance on or engagement with peers to arrive at high quality outcomes, a notable byproduct of the course's emphasis on collaboration:

P012_Reflection 2: "My group members also helped very much. Early on in the course we really started acknowledging one another's strengths. Once this had taken place it really made it much easier for us to work as a group. Since we were able to combine our strengths and in turn improve upon our weaknesses we were able to produce work that each of us were proud of . . . Being able to talk to others about the material especially when you have the context of the project really helped me learn. I was able to build up my weaknesses based on my group members' strengths."

P011_Reflection 1: "In past classes I am usually the one who just sits and listens and does what other students suggest. I am now speaking up during class discussions and also expressing my ideas to the group and asking them to help me expand on the idea and make it more creative and one-of-a-kind."

P008_Reflection 2: ". . . when working on our inspiration board I would have never come up with something as good by myself as what we came up with as a group

because my ideas were not as good as some other people's ideas. So, the end result of the board turned out really well because it allowed multiple views and ideas to be expressed and the best one to be chosen rather than just one person's mediocre ideas."

Some participants emphasized their interdependence on their peers:

P003_Reflection 1: ". . . it makes it easier that I have group members to help produce more ideas."

P001_Reflection 2: ". . . I started realizing how much more we need to depend on each other so we have our best work show."

The next theme related to how participants characterized their development experience was Adversity Experienced. Participants indicated that their development experience especially related to the development of collaborative skills, was characterized by some type of adversity experienced in the group, which prompted an increase in the development of collaborative skills. These experiences went unmentioned during the focus group interviews, likely due to group members' presence. Nevertheless, this theme was prominent across both student reflections. The following excerpts were carefully selected for generality to protect the confidentiality of participants who were, in some cases, involved in sensitive situations:

P014_Reflection 2: "It was obvious our group had trouble getting along . . . I think my conflict skills were put to the test and the conflict within the group able me to progress and learn more about conflict and to not just sweep it under the rug . . . It was unfortunate that our group had struggled, but if we hadn't struggled I don't think my skills would have progressed."

P010_Reflection 2: "As a group we definitely started out on the wrong foot. We weren't really working as a team . . . we obviously had some communication

problems this semester when it came to working on [assignments]. We kind of just left the whole lab to one person to be in charge of completing."

P006_Reflection 1: "I struggled with our interaction through an inability to find that mutual understanding . . . for example, [a group member] and I seem to butt heads the most of anyone in the group, not only because our ideas very different, but so are our thought processes. I have learned to brush these off and move forward with whatever and whoever's idea the group, as a whole, thinks is best."

P003_Reflection 2: "At first, I thought everything was going good, but our group had numerous miscommunications that we had to deal with. The best way to deal with this is communication, which I am sometimes not very good at. So, after dealing with this, our group worked better together and I felt like I took initiative and became the group leader . . . I think if nothing else, that's what one very important thing I learned. If things aren't working out, I need to be more expressive and let my group know what I think and how I feel. It was definitely a positive learning experience."

It is important to note that though most students experienced some sort of adversity during their collaborative work in the course, that in earlier discussions regarding themes, such as Instructor Responsiveness and Interaction with Expert, participants also indicated that this aspect of collaboration was carefully managed by the instructor. It is unlikely, had the instructor been less involved in navigating students through these various challenges, that this theme would have been as highly correlated with developmental progress made.

Finally, in the last theme Practice Yields Confidence, participants indicated that their learning and development experience in the course was characterized by practicing new behaviors, which yielded greater confidence. As discussed during the Challenging Suppositions theme, many students arrived at the course with erroneous conceptions of collaboration, many of which were discovered to be dysfunctional. As these suppositions

were challenged, many participants discussed practicing or trying out new practices, feeling more confident over time about their ability to collaborate in the way the course advocated:

> P003_Reflection 1: "I think that the process that led up to this progress I have made is practice. The only way we can better ourselves is by doing more work . . . I know that there are many things that I need to work on, so I just need to keep working on them and trying to better myself."

> P006_Reflection 1: "Acknowledging the areas (conflict resolution) that I need to work on, beginning to work with my group and getting to know them, having some disagreements, sharing our thoughts on why our ideas are more relevant than the other person's, dealing with disagreements calmly and having the group decide on best idea."

> P008_Reflection 2: "I feel that being in charge of making decisions within our group is a good thing because it requires you as an individual to become more confident with yourself by allowing you to trust yourself that you will make the right decisions that will benefit your group the most and not yourself. By doing this it also has helped me to become a better leader too."

In some cases, students were practicing certain behaviors across the semester and reflecting about them, as demonstrated between the first and second reflections:

> P005_Reflection 1: "I think I need to continue to be more involved with the group from an individual standpoint. Instead of feeding off of other's ideas I should continue to feel daring and converse on my initial individual ideas. I think it's situations like these that will help me feel more confident and if I don't continue to step forward, I will maintain being reserved with my judgments . . . I must continue to express myself so I can gradually become more comfortable."

P005_Reflection 2: "Although I definitely developed a strong ability to work in a group, my confidence when dealing with other people has also become stronger. I feel more confident discussing things with other students and I realize that everyone else is probably feeling intimidated too . . . I now know that I won't be judged for asking questions and that most other students are willing to interact with me. I just need to take initiative and feel confident with myself, even when I feel stupid."

P014_Reflection 1: "I guess the start of my progress really happened around the time when we had a [group member] out sick, and another who didn't show up, leaving just one group member and myself to do the presentation. So, for that assignment I had to take on a leader role, which helped me feel more comfortable. After that it was just easier to share my ideas. I was put in a situation where I had to be the leader which helped me gain confidence."
P014_Reflection 2: "Taking on the leadership role also gave me confidence because being a shy person I never saw myself in that type of role neither in school or in the industry."

One participant associated the concept of practice to learning about sustainability:

P004_Reflection 1: ". . . since we are using some of the paradigms to develop our own product line, it gives me more practice and learning because the more I talk about and use the paradigms the more I learn about them."

Q1D. How do students compare their experience in the course to other courses in the apparel and textiles program?

During the focus group interviews, participants were asked to compare their experience in this course to others in their program, identifying both similarities and differences. Six themes emerged from these discussions. Table 5-12 demonstrates the origins of these themes across participant as well as data type. Though this question was

intended to only be answered during the focus group interviews, there were some exceptions in which participants were making distinctions during their reflective writings.

Table 5-12 Comparison to Other Courses

	Reflection 1	Reflection 2	Focus group interviews
(I)(L)Course models discipline processes	Not intended to be derived from this data	Not intended to be derived from this data	P003_I1 P003_I2 P002_I2 P001_I2
(T)(L)More holistic infusion of sustainability(ESD)	Not intended to be derived from this data	Not intended to be derived from this data	P002_I1 P004_I1 P003_I1 P005_I1 P002_I2 P003_I2
(I)(L)Course material is more applicable	Not intended to be derived from this data	P008_R2 Not intended to be derived from this data	P001_I1 P002_I1 P005_I1 P002_I2 P003_I2 P001_I2 P003_I2
(I)(D)Group work is more productive	P001_R1 Not intended to be derived from this data	P008_R2 P014_R2 Not intended to be derived from this data	P003_I1 P002_I2 P003_I2 P001_I2
(I)(L,D)Instructor is more engaged	Not intended to be derived from this data	P007_R2 P013_R2 Not intended to be derived from this data	P004_I1 P005_I1 P001_I1 P002_I1 P003_I1 P003_I2 P001_I2
(I)(L,D)Class size is smaller	Not intended to be derived from this data	Not intended to be derived from this data	P003_I1 P002_I2 P001_I2 P003_I2

In the first theme, Course Models Discipline Processes, participants indicated that this course was similar to other courses in their program in that some previously attained practices and processes were required during the course. For example, most students in design and marketing programs learn how to create garment flats, assemble a design inspiration board, and write garment specifications, practices that were used during this course:

> P002_Interview 2: "I think on the design aspect it was really similar in how I've learned in my design classes with creating an inspiration board and then creating your line. It was the exact same thing I've done in my design classes except I'm not actually making the things here. Same process."

> P003_Interview 2: "I feel like it went over definitely similar topics that we've gone over in classes and I feel like it's kind of taking a lot of classes that we've taken and

> just putting them all together and allowing us to apply that information that we've learned. I liked how she didn't really go too in depth with the lectures because a lot of it we had had before. I think the only new stuff for me was just the more in depth design paradigms for sustainability that was something I hadn't really seen a lot of in the past."
>
> P003_Interview 1: "It's applying a lot of things that we've learned in other classes, all the projects have a basis of things that we've learned elsewhere and just taking them to the next level."

This finding affirms that the course redevelopment did not result in a loss of discipline-specific processes or practices that are important for the preparation of apparel industry professionals, as there existed a potential for sustainability to overshadow these discipline staples. Rather, participants perceived their discipline's practices as being extended by the integration of sustainability.

The next theme, More Holistic Infusion of Sustainability, one of the more powerful themes related to this research question, is related to the theory-driven theme discussed earlier in aspects of the course with greatest impact on learning. As the redevelopment of the course was aimed at the integration of sustainability, it is unsurprising that participants identified this feature as exceptional compared to other courses in their program, resulting in a deeper understanding of sustainability. But, participants also described this course as being more cohesive than other courses they have taken. Meaning, course modules evidenced relationship to each other across the semester, rather than being disjointed:

> P001_Interview 1: "There's so much information and since we haven't learned that much about sustainability I guess if they had just tried to bring in a few things about it I would have no idea what was going on. I don't think I would understand the reason for its importance or how to implement it in our projects."

P002_Interview 2: "I think other classes could do that too. I feel like in other classes I've had where it keeps building, but it might not be as emphasized that that's what we're doing so people just kind of learn it and forget about it."

P004_Interview 1: "I think this [course] is more focused, too. Where some of our other classes are so broad, I think [another course] is the same way, it's a focus class. But, before this year I feel like we were kind of all over the place, there wasn't a straight focus."

Interestingly, during the first focus group interview, participants, in light of their experience in this course, began to brainstorm about courses in the program in which they perceived sustainability could be better integrated as well as how some departmental practices could be altered to better steward resources used to complete required projects:

P006_Interview 1: "I think one thing that can be done in the aesthetics class or in the history class or in any of our classes, we could just say deal with current events: 'Here's what's going on with sustainability right now.' We're not really taught in any of the other classes what's going on with sustainability, so I think that would help to know more of what's currently going on so that we're not just smacked in the face when we come to this class."

P002_Interview 1: "I think if we would have had a course focused only on sustainability then in each class we could be more creative with our sustainable ideas because we'd have a better idea."

P004_Interview 1: ". . . we have a program that's focused on sustainability, but we haven't really learned that much about it and then our projects in general aren't very sustainable. Especially for design, we have to get yards and yards of fabric and may not use all of it; we're really wasteful."

> P003_Interview 1: "Because you can talk about it a lot. You can say sustainability is great, but if you're not actually implementing it then it makes me think "Well why am I even learning about this?" Because clearly—some people think it's important but then most people really don't care about it because it's not being demonstrated."

Notably, participants seemed to detect the need for alterations to both the explicit as well as implicit curriculum. During a class discussion about a chapter from *Sustainable Fashion* about sustainable sourcing, a similar conversation emerged between the researcher and students:

> Reflexive Journal Entry 23: "I asked them about needed changes to deliver those components, I mostly focused on what they, as seniors, felt like might need to change to better prepare AT graduates to deliver these components. This was a lively discussion. They almost fought to get a word in! Some talked about needing a " 'whole other major for sustainability.' They felt like until the last year of their program, they had not been really familiar with, for example, alternative fiber choices, how to analyze costs, etc. One student said she did not feel prepared to run a sustainable company. I asked them specifically what they might change about their program. One talked about the need to better educate about alternative fibers. Another talked about the need to slow down the fashion cycle, and not promote the fast fashion model as much. Another talked about a lot of 'waste' that was created in their program in terms of the paper and fabric they often used – this seemed to be a particular hot button. I probed a little more about the creation of cross-functional teams: Did they feel equipped to work with others in the industry that may not speak their industry's language?' A couple of them talked about how, in their AT program, they don't necessarily work with students outside those boundaries – this was another issue that several students discussed."

Another powerful and related theme discussed by participants was Course Material is More Applicable, in which participants indicated that there was a stronger relationship

between the course material they were learning about and its application to their required work compared to other courses in their program. Consequently, participants say they were more inclined to read and complete other work in preparation for class:

> P002_Interview 2: "I feel like I read everything for this class and in other classes you don't necessarily have to, but in this class we went over everything and because it was a small classroom you pretty much had to talk about it. So it kept me up with the reading and kept me more involved in the course work . . . in order to understand the paradigms you would have to do the reading and know what you're talking about in the discussion."

> P003_Interview 2: ". . . if you didn't do the reading you couldn't do the discussion. So I feel like that was really important because I feel like a lot of readings that I do in class, I'll get to class and the teacher either reiterates it or it's not touched on at all."

> P008_Reflection 2: "Like for example the fact that the class was smaller made me more accountable in reading and learning the material because I was required to participate in class discussions unlike in larger classes where you are just basically required to show up and take notes and don't have to participate in discussions unless you want to."

In this discussion, some participants emphasized the "hands-on aspect" of the course:

> P002_Interview 2: "I think it's a lot more hands-on so it's different than other classes."

> P001_Interview 1: "This class is a lot more hands-on than all of our other classes, for marketing students anyway."

Other participants emphasized the applicability of the course material in general to situations outside of class, considered exceptional compared to other courses in their program:

> P005_Interview 1: "I feel like a lot of the information we get in the class, I can see me using it in my future a lot more than some of the other classes. In some of the other classes I'll be reading the book and it'll kind of seem like common sense and then you have to take a test on it and the test is hard. I feel like the information that we get from this class, I can picture myself using it in the future a lot more."

> P001_Interview 1: "I find myself—I think about this class more, things will remind me of things that I learn and I'll be applying it in the real world rather than just reading about it, taking the test and then moving on."

Clearly, students are concerned about the applicability of what they are learning to the work they are required to complete as well as how it may apply to their real lives. Interestingly, during a class period in which there was a lull, the researcher overheard a related conversation among students on this topic:

> Reflexive Journal Entry 17: "I overheard an interesting discussion today about a couple other classes in our program. I'm not sure what classes they were talking about. But, they were making comments like, 'If all [the instructor's] going to do is read the slides, why should I have to come to class?' '[The instructor] said that they were having a hard time teaching the class because we all sit there like zombies, but there's really nothing for us to *DO* . . .' Other comments were, '[The instructor] said the exam would be just over the readings, which means I am going to have to read the whole book now, because I've never picked it up.' Another students chimed in, 'I keep forgetting there's a textbook for that class!' Other students discussed how they had an A in the class but weren't entirely sure how they earned it."

Admittedly, the earlier comments by participants as well as this discussion makes clear that this generation of students may find little merit in reading unless it is directly related to some outcome, which many educators assuredly find contention. Nevertheless, what is audible, in this case, is that engagement was increased by a strong relationship between course material and required work as well as real life.

The next theme, Group Work is More Productive, was discussed during the focus groups as well as several student reflections. Participants indicated that the required group work in this course was more productive and yielded more learning compared to other courses in their program. Specifically, participants associated this successful experience with the course's emphasis on collaborative training:

> P002_Interview 2: ""When it came to the group aspect of it we really discussed and laid out a plan for our group in the beginning. In other classes they just kind of throw you into a group, but don't really discuss about what you're going to do when conflicts come up. So, we already had ground rules set if things were to happen, so we were prepared for that."
>
> P003_Interview 2: "I feel like we had work that was done better than other courses because we actually focused on working well as a group as well as getting it done and not just getting the assignment done."
>
> P001_Reflection 1: "Unlike other group projects in other courses, all of us have a head position so it makes me accountable to step up so I have a voice in the group and don't just sit back and avoid conflict."
>
> P008_Reflection 2: "I wish more of my classes were structured this way because I think it makes people be more invested and accountable in their work because you have to be when you have three other people relying on you to complete your work on time and for it to be well done, so that it does not make any one else suffer for it when you don't. I personally felt highly accountable to make sure that I was getting

everything I was suppose to be doing done and then trying to help the other group members out as much as I could too."

Again, many participants discussed the need for this type of training earlier and in more detail in their program to insure their success:

P003_Interview 1:"I think going through this class it really makes me wish that some of our other classes were structured this way. I have an internship at [a company] this semester and everything is focused on group, everything . . . I've been a part of some bad groups, but if we had a better understanding of how to be in a group and how to work together I think that would be so beneficial . . . Because I know in the classes that we have that are more traditional . . . group dynamics are not really there, you have separate projects and 'Oh, you can do that one because you do this or you can do that side of it because you're whatever.' So, I think it would've been much more stressful to try and work within a group with as much information as we're given, but not really be connected to that group."

P004_Interview 1: "I think some of the group conflict resolution stuff, if that was applied even to this aesthetics class when we worked in groups, that would be helpful in any group situation because then you are holding each other accountable and you are all having—knowing that if you do have conflict it's okay, it's not that you're in a horrible group and that you need to work through it. And develop. Then, you don't go into the class as a senior saying, 'I know I'm going to dread this because it's all group work;' which is, I think, what a lot of us did."

One participant identified the course emphasis on working in the same group over time as also being helpful:

P002_Interview 1: "Some of the similar things along with that is we've had group projects within our other apparel classes, but it was maybe just one quick project

throughout the semester, it wasn't a constant project and wasn't a year-long adding up to the final end and all of it comes together, it was more just one little project."

Audible in many of these comments is a seeming gap between an industry expectation related to collaboration for which most students seemed to be aware of, and a lack of support in their educational program to meet that expectation.

The next theme, Instructor is More Engaged, is tightly correlated to themes discussed earlier, such as Instructor Responsiveness, Interaction with Expert, and Feedback loops; theory-driven aspects of the course with greatest impact according to students. This theme was discussed during the focus group interviews, but also emerged during some student reflections. Participants indicated that in this course the instructor was more engaged or involved with them, and in many cases, was more responsive to their learning or development needs compared to other courses in their program. Some participants emphasized in this discussion the instructor's involvement in their group's functioning which better supported collaborative skill development:

P001_Interview 2: ". . . I just think it focused more on the group instead of like in other classes they just throw you together and… let you go. [The instructor] just stays on you and figures out what's going on and what's not working in the group and helps you out . . . usually the classes I would have there are teachers engaged with certain students, but not with everyone and they don't take the time to know everybody like she did."

But, most participants emphasized the instructor's greater responsiveness to their learning needs compared to other courses in their program:

P004_Interview 1: "I think [the instructor's] well aware of what's happening and she's attentive to it all and that's different from a lot of classes that I've been a part of . . . Because sometimes you go into classes and if you don't understand things there's no way to understand them because professors won't go back and redo them or even when you go ask they're not able to explain it in a way that makes sense to

you. Everybody learns differently and hears things differently so if you're not able to make it make sense to you then it gets really difficult."

P005_Interview 1: "It's kind of like, how many professors if you went and told them you didn't understand one of the lectures would completely redo the lecture and then represent it? They wouldn't do that. They're like, 'Well, there's how many other students, did they understand it?' They're not going to do that for you."

P001_Interview 1: ". . . I enjoy the classes that the teachers care about you and care about your learning a lot more than the classes that you just go and your teacher doesn't even know your name. I can tell I enjoy those classes a lot more and am more engaged in learning and caring about what I am learning with professors who are actually into your learning."

P007_Reflection 2: "I was comfortable asking questions I needed to ask because I knew [the instructor] loved to answer them. Often times I see instructors on a high pedestal above their students, and while [the instructor] was in fact the authority figure of the room, I felt that she was able to connect with us on a personal level and make us comfortable, more than most classes. I'm far more open to learning in this type of scenario, and that was what really made grasping the message of this class and experiencing these epiphanies both natural and enjoyable."

Finally, the theme, Classroom Size is Smaller, was also a theme previously discussed by participants as an aspect of the course thought to enhance student learning and development. Participants indicated that this class was smaller compared to other courses in their program, which raised the comfort level of learners and increased engagement or interaction. Notably, most of these comments seemed to be derived from apparel marketing students, who are characteristically in larger classes, where apparel design students are, in most cases, learning in smaller studio courses:

P002_Interview 2: "I spoke up more in this class than I do in other classes and I felt more comfortable to speak up in this class. Maybe because it was smaller, but also because I think that really makes it comfortable for you to speak up in class and share your opinions . . . I think the smaller classroom setting really played a part in people interacting with each other and being comfortable with each other. Because I know I wouldn't speak up in a large classroom."

P003_Interview 1: "I think another difference is that I feel comfortable to speak my mind and to ask questions. I don't feel like questions that I ask, even if maybe somebody else totally understands what's going on and I don't, I don't feel like I'm asking a stupid question."

One participant associated the small class room size with the instructor's level of engagement:

P003_Interview 2: "But I feel like if the teacher is engaged –I don't know because there are definitely those teachers that I've had that were engaged in the class and they wanted feedback from students, but it was just kind of like a sea of students not answering. So, the smaller classroom definitely helped but it's hard to not want to be engaged when you see somebody up there so engaged in the subject."

Q2. How does the use of ESD enhance the student learning and development experience?

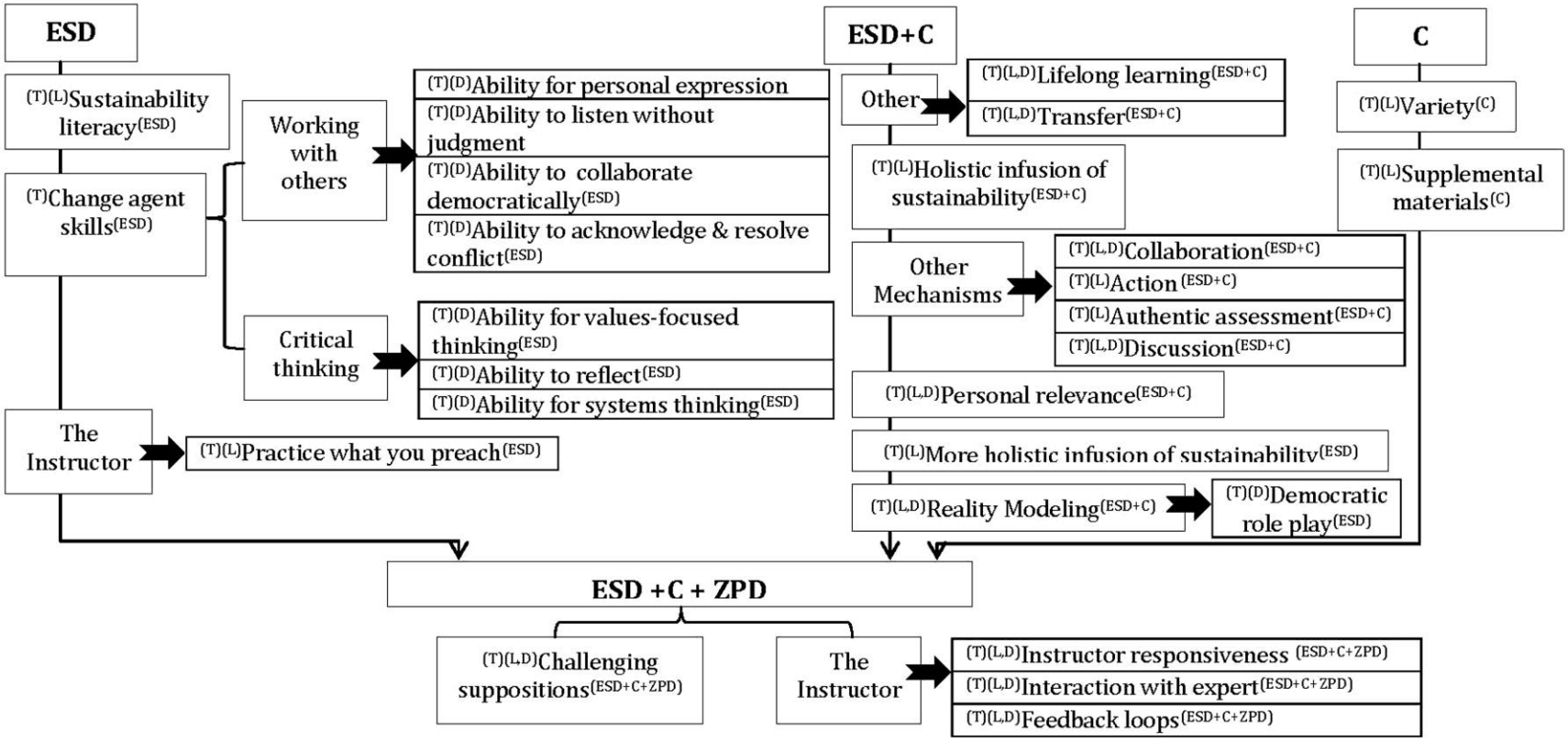
A discussion related to this overarching question is expanded upon in the final chapter. But, before this question can be addressed directly, it is imperative to first identify the ways in which the theoretical underpinnings of the study manifested in the students' learning and development experience. Since the theoretical underpinnings of constructivism, and particularly a dialectical perspective of constructivism, were highly interrelated with that of ESD, a concurrent discussion related to the following sub research questions is held.

Q2A. How does constructivism manifest in the learning and development experience of students in the course?

Q2B. How does the ESD framework manifest in the learning and development experience of students in the course?

To begin this discussion, Figure 5-15 presents a conceptual map of the theory-driven themes identified by participants as characterizing their learning and development experience, categorized by the various theoretical underpinnings fundamental to the study: Education for Sustainable Development$^{(ESD)}$, constructivism$^{(C)}$, and dialectical constructivism$^{(ZPD)}$.

Figure 5-15 Theoretical Underpinnings Manifested in Student Learning and Development Experience



T=Theory-driven · L = Impacts learning · D=Impacts development · ESD = Education for Sustainable Development · C = Constructivism · ZPD = Dialectical constructivism

Clear in Figure 5-15, is the influence that both ESD and constructivism had on the student learning and development experience, particularly the impact of the pedagogical approaches used in the course and the outcomes described by participants thought to be influenced by those approaches. First, it appears that ESD manifested in the student experience to the greatest degree in the learning and development outcomes achieved in the course, Sustainability Literacy and Change Agent Skills. As previously discussed in Chapter 2 and Chapter 4, the reframing of content for sustainability and the integration of skills thought to support sustainable development are two of the primary components of the ESD framework, excluding the development of personal values thought to support sustainable development. Thus, the fundamental nature of the framework was impactful, according to students.

Specifically, in a review of these two overarching themes, it is important to note where power evidenced. The inductive sub themes emerging under Sustainability Literacy, such as Sustainability Knowledge and Awareness, Recognizing Importance and Need for Change, and Sustainable Strategies, all seemed to be discussed by participants with similar frequency across all three data collection periods. But, under the Change Agent Skills themes, a disproportionate frequency was found. Chiefly, the learning and development outcome themes related to Working with Others, both theory-driven and inductive, were expansive and were significantly stronger than those related to Critical Thinking. Nevertheless, ESD played a role in both.

Several of the theory-driven sub themes related to Working with Others manifested in the student experience: Ability to Collaborate Democratically, Ability to Acknowledge and Resolve Conflict, and those related to effective communication, Ability for Personal Expression and Ability to Listen without Judgment. Of these, Ability for Personal Expression and the Ability to Collaborate Democratically were two of the strongest themes in the study. Three theory-driven sub themes were found in the data: Values-focused Thinking, Systems Thinking, and Reflection. Though these were discussed by participants as important development outcomes, the strength of these was comparatively weak across

the qualitative data. But, the results of the quantitative final skills survey indicate that students perceive a significant change from the beginning to end of the course in their knowledge and confidence across all six of the ESD-related skills, with Systems Thinking, evidencing the greatest amount of change. Nevertheless, it is likely that this imbalance between the Working with Others and Critical Thinking themes could be attributed the greatest portion of the course being concentrated on sustainability and collaboration.

ESD also played a role in other outcomes such as Lifelong Learning and Transfer, both of which are rooted in constructivism. Of these two, Transfer, was discussed with the greatest frequency across all three data collection periods. As previously evidenced in the participant comments related to Transfer, students identified this course as being highly relevant to their future profession as well as their real lives. Some students were *already* applying their learning and development to new and different situations.

ESD also manifested substantially in themes related to aspects of the course with greatest impact as perceived by students. This is unsurprising, as these theoretical underpinnings were a fundamental component of the course design. Specifically, when the instructor modeled the ESD-related tenet, Practice What you Preach, participants identified this aspect as impactful to their engagement and learning about sustainability.

The themes embodying an interrelationship between ESD and constructivism were the most expansive: Holistic Infusion of Sustainability, Collaboration, Discussion, Reality Modeling (Democratic Role Play), Action, and Authentic Assessment. Arguably, again, these six themes are fundamental components of the ESD framework. Of these themes, Collaboration was discussed among participants with the greatest frequency across all three data collection periods. The use of collaboration in the course was *the* most impactful aspect of the course design. This is most likely due to the structure and emphasis placed on collaborative skill development during the course, as it is debatable whether this outcome would be as evident in other course experiences lacking these features. As previously discussed by participants, group work is not uncommon in their academic program, but that work is not necessarily collaborative, nor is it thought to consistently enhance learning or development, as was the current case.

Discussion, carried similar significance to Collaboration, as the recurrent use of discussion in the course was identified with a similar rate of frequency across all three data collection periods comparatively. Notably, this aspect of the course seemed most important to participants when learning about sustainability. The use of Reality Modeling, and particularly the use of a democratic framework, was also important to participants, followed by the use of Action in the classroom. Finally, the use of Authentic Assessment was a particularly salient topic during the focus group interviews in which participants' disdain for test-taking was most evident.

Constructivism emerged solely in other impactful aspects of the course, such Supplemental Materials and Variety. Of these two, Supplemental Readings was more consistently cited by participants. Students responded positively to readings about sustainability-related issues, found them interesting, and were more likely to read them than other texts.

At the bottom of Figure 5-15, themes rooted in a dialectical perspective of constructivism are illustrated, most of which are related to the instructor's practice and her impact on shifting student suppositions: Instructor Responsiveness, Feedback Loops, Interaction with Expert. Both Instructor Responsiveness and Interaction with Expert were discussed extensively during focus group interviews as having impacted both learning and development. Students responded positively to the dialectical approach taken by the instructor in the course, engaging them on a personal level, responding to their individual needs, and adjusting her approach to increase understanding. Likewise, the approach recommended by Vygotsky (1978) was also considered impactful according to students; the concept of students interacting frequently with someone more knowledgeable and experienced, being permitted to try on their conceptual processes, frequently collaborating with them until they could become more autonomous in their thinking. Highly correlated to both of these themes is Feedback Loops, a primary mechanism for new learning, according to Vygotsky, and another aspect of the course cited by participants as being most impactful. All three of these latter themes were discussed with similar frequency among participants.

The theoretical underpinnings of the study also emerged in participants descriptions of their learning and development process: Challenging Suppositions and Personal Relevance. The theme Challenging Suppositions is influenced by a dialectical perspective of constructivism in which the goal of the educational experience is to challenge previous knowing, triggering new growth and learning. Challenging Suppositions was one of the most frequently discussed themes among those related to the learning and development process. In the previous discussion, students described how their suppositions related to sustainability as well as collaboration were challenged throughout the course, their previous ideas often proving dysfunctional or short-sighted. Similarly, the shared relationship of ESD and constructivism emerged in the theme Personal Relevance, in which participants described their learning or development process as being enhanced by a personal interest in the course.

Finally, in reviewing how participants compared their experience in this course to others in their program, ESD and constructivism played a role in the theme More Holistic Infusion of Sustainability. But, admittedly the three theoretical perspectives used in the study can be seen in other comparative themes not shown in the figure, such as Group Work is More Productive, Course Material is More Applicable, and Instructor is More Engaged. These themes, again, mirror some of the primary components of the ESD framework.

Summary

The preceding discussion has outlined a general description of the course narrative, illustrated students work completed during the study, and described the results found related to the study's research sub questions. In the next chapter, the two primary research questions will be addressed directly, including discussion, implications, and future research needed.

CHAPTER 6 - Discussion and Conclusion

The purpose of the following is to summarize, discuss, and make implications about the results of the current study as well as to recommend areas of research which are needed to continue the journey begun here. The need for this study was justified by a number of pressures impacting education. Chiefly, as discussed in Chapter 1, there is currently a need to clarify the purpose of apparel and textiles (AT) education, and specifically, the role sustainability should play in it. Further, it is easily argued that there is a demand being created at present for sustainability-minded apparel professionals, in light of the environmental, social, and economic apparel industry challenges discussed in Chapter 2, and the evolution that has been spurred to resolve them. Admittedly, the apparel industry is not entirely progressive on this front, but the beginning of a transition is evident. Though some AT academicians have discussed in the literature the need to transform AT education for this end (Chapter 1), the Meta goals for the discipline articulated by the International Textile and Apparel Association (2008) do not appear to embody a similar sense of urgency or dimension. At the same time, the UN has challenged higher education to integrate sustainability across all disciplines, creating a university-level pressure to evolve curriculum (UNESCO, 2003). Though progress has been slow in the area of pedagogical innovation and curriculum redevelopment, other progress has been made, making sustainability more important to the strategic mission of many universities. This multi-dimensional pressure makes change in the AT curriculum inevitable, but, research is needed about how to implement what appears to be revolutionary change. In the current study, it was argued that the ESD framework may provide a way forward, yet little is known about how the framework could be implemented in the AT curriculum or its subsequent effectiveness in this context.

Thus, the purpose of this study was *to examine the learning and development experience of students enrolled in a course that has been redeveloped using the ESD framework. A description of major outcomes and how they occurred has allowed for implications to be made about how AT education might be enhanced by the use of the*

framework, better preparing students for sustainable development. An apparel product development course was redeveloped according to the ESD framework using a curriculum development approach (Chapter 4). The redeveloped course was implemented during one semester for the purpose of examining its perceived impact on the learning and development experience of students. Fourteen participants, all AT undergraduate seniors, enrolled in the course and were studied using qualitative case study methodology (Chapter 3). The study's primary research questions were as follows:

Q1. How do students experience a course that uses the ESD framework?

Q1A. What are the learning and development outcomes that students experience in the course implementation?

Q1B. What aspects of the course are perceived to have the most and least impact on learning and development outcomes?

Q1C. How do students experience the process that leads to learning and development outcomes?

Q1D. How do students compare their experience in the course to other courses in the AT program?

Q2. How does the use of ESD enhance the student learning and development experience?

Q2A. How does constructivism manifest in the learning and development experience of students in the course?

Q2B. How does the ESD framework manifest in the learning and development experience of students in the course?

Four types of data were collected and analyzed: Students reflections, focus group interviews, a researcher reflexive journal, and a quantitative survey related to the change agent skills. The first two types of data were used to understand the student's learning and development experience in the course, as perceived by the student, while the researcher reflexive journal was used, in some cases, to corroborate student perspectives and to extend perspectives, in other cases. Both theory-driven and inductive coding was utilized during data analysis to derive themes across the data. The quantitative survey was used to

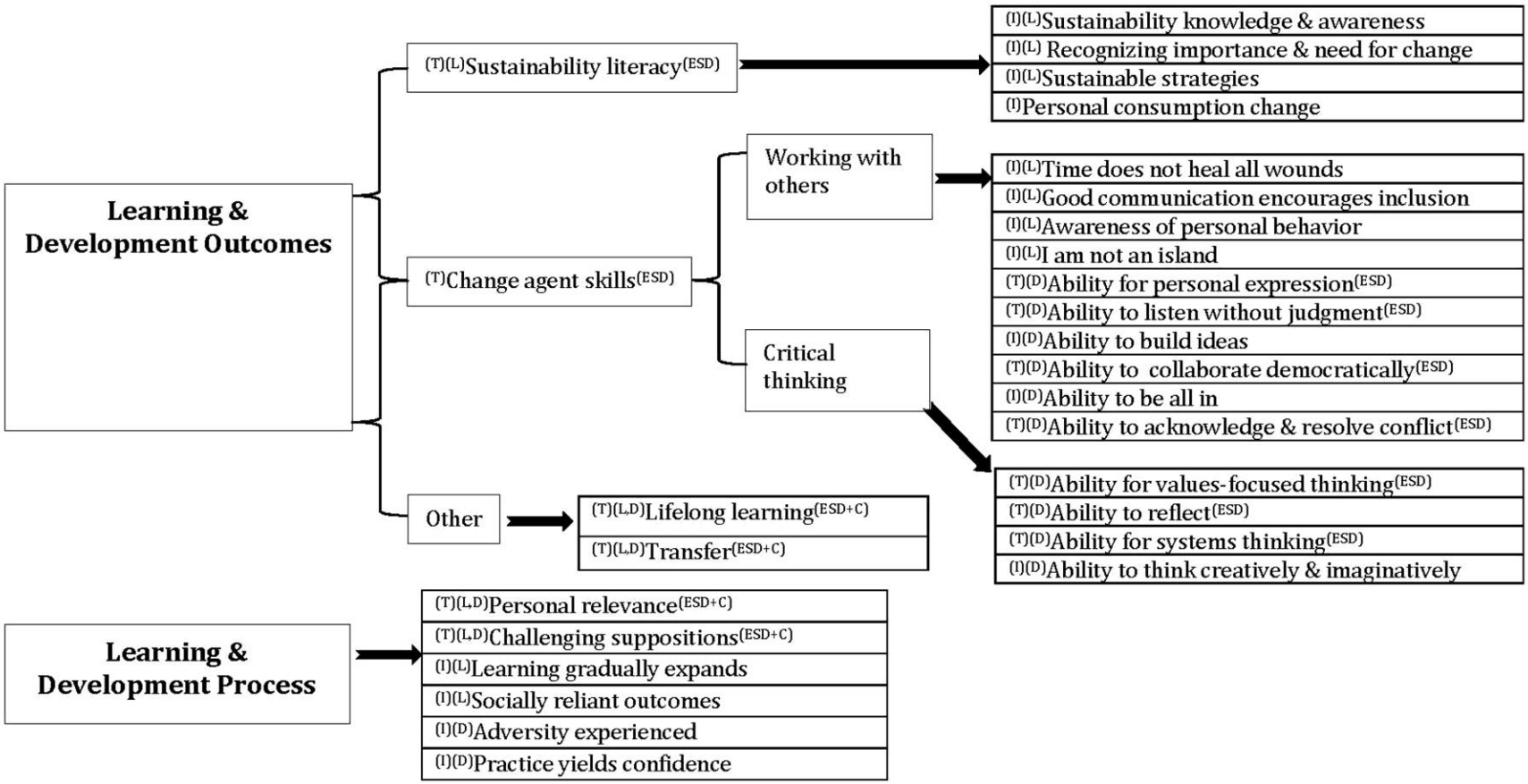
determine if students perceived a significant change in their knowledge and confidence related to the six change agent skills targeted in the redeveloped course and if there were significant differences in amount of change among those skills. A repeated measures ANOVA was used to analyze this data. Additionally, artifacts (course work) were retained, not for data analysis, but to describe the context of the case (see illustrations in Chapter 5).

As previously mentioned, the study's two primary research questions were not discussed directly in Chapter 5, as they are summative in nature. An exploration of the study's sub questions was imperative. As such, the following summary of the study's results are organized by these two overarching research questions. This summary is followed by a discussion in which implications and recommendations for AT education are made and areas of future research are identified.

Q1. How do students experience a course that uses the ESD framework?

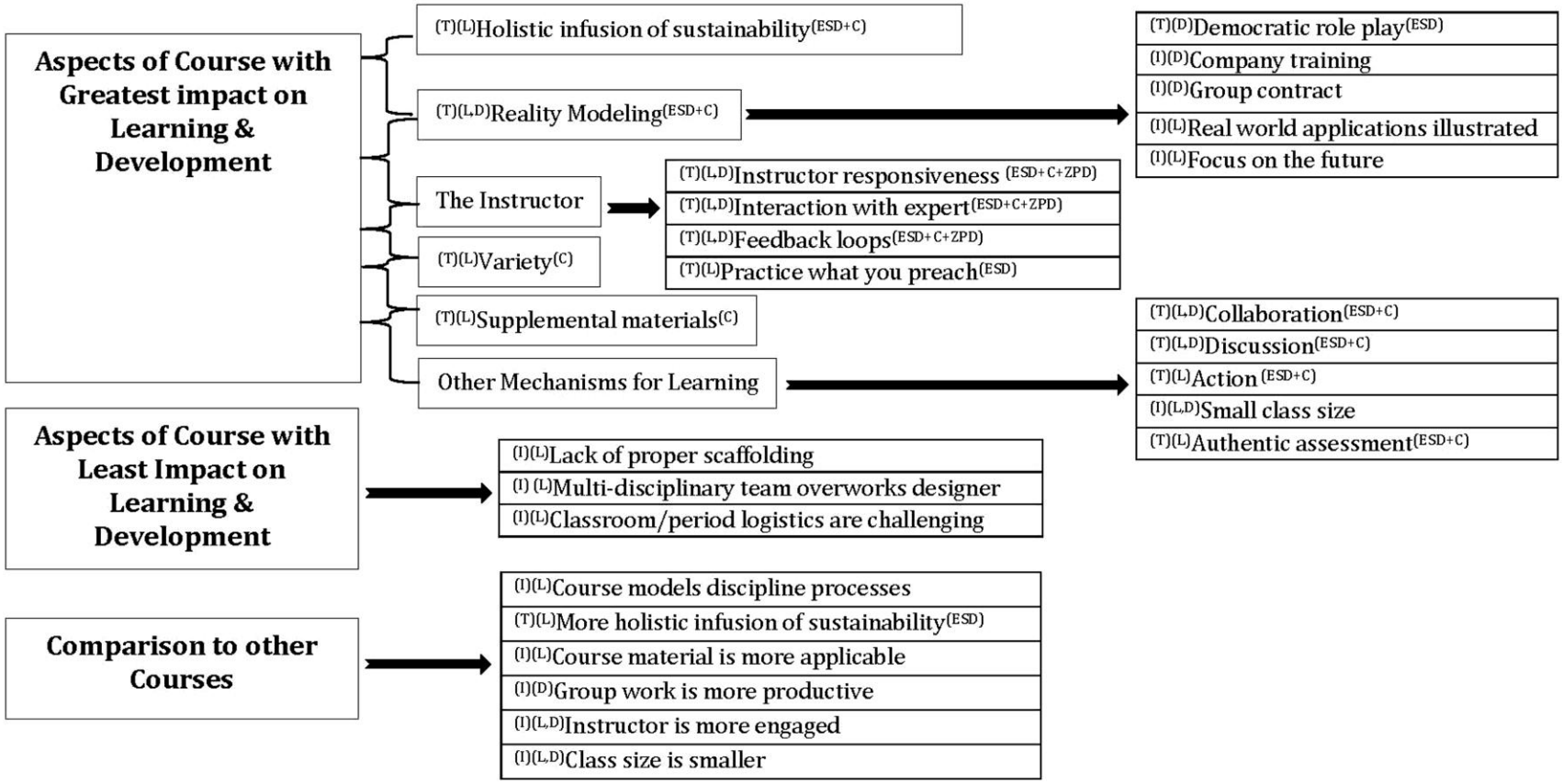
The following is a recap of the researcher's examination of the student experience, summarizing what students learned, how they developed, and what aspects of the course helped them learn and develop as well as how they experienced the learning and development process and how this experience compared to other course experiences in their program. Figure 6-1 and Figure 6-2 present a comprehensive map of the study's themes. To review, themes annotated with a $^{(T)}$ indicate a theory-driven theme, while an $^{(I)}$ indicates an inductive theme. Further, each theme is annotated for its theoretical influence where appropriate for ESD$^{(ESD)}$, constructivism$^{(C)}$, and dialectical constructivism$^{(ZPD)}$.

Figure 6-1 Map of Study Results



T=Theory-driven theme · I=Inductive theme · L = Impacts learning · D =Impacts development · ESD = Education for Sustainable Development
C = Constructivism · ZPD = Dialectical constructivism

Figure 6-2 Map of Study Results Continued



T=Theory-driven theme · I=Inductive theme · L = Impacts learning · D =Impacts development · ESD = Education for Sustainable Development
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Sustainability literacy, change agent skills, and other outcomes

Three major categories of outcomes were experienced by students completing the course (Figure 6-1). First and most expectedly, students experienced a significant leap in understanding about sustainability, expanding their knowledgeability, recognizing its importance and the need for change as well as understanding how some strategies which might be applied to resolve some of the apparel industry issues related to sustainability. Relatedly, some students also described changes made in their personal consumption habits as the result of their experience in this course.

More interesting, students in the course experienced an expansive number of learning and development outcomes related to the development of change agent skills, especially those related to working with others. Students experienced a variety of learning outcomes about how the effectiveness and productivity in collaboration could be increased by not avoiding conflict, communicating with everyone to insure inclusivity, being more aware of their personal behavior, and the better appreciating true collaboration as opposed to the domination of one person. Additionally, students experienced an increase in their ability to work with others, better utilizing a number of skills such as personal expression, listening, idea building, democratic collaboration, engagement, and conflict resolution. Similarly, students experienced an increase in their ability for critical thinking. Though these themes demonstrated far less power than those related to working with others in the qualitative data, results of the quantitative survey indicated that students perceived a significant increase in their knowledgeability and confidence across all six skills, with the highest amount of change evidenced in Systems Thinking. In sum, students experienced an increased ability for values-focused thinking, systems thinking, reflection, and the ability to think creatively and imaginatively. Other outcomes experienced by students were Lifelong Learning (the desire to learn more) and Transfer (the application of learning and development to new and different situations). This latter theme was one of the most powerful themes in the study, as students perceived this course to be highly relevant to their future careers.

Aspects of the course with greatest and least impact on learning and development

There were many ways in which the course design impacted learning and development, according to students (Figure 6-2). Students perceived that the holistic infusion of sustainability in the course impacted their learning, resulting in a cohesive, holistic perspective on sustainability that evolved across the course. Further, the use of reality modeling also impacted learning, manifesting in a variety of ways, such as the use of democratic role play, company training, and the group contract as well as the illustration of real world application of course-related concepts, and the course's focus on the future. The instructor also played a vital role in impacting learning and development experienced by students primarily through collaboration, counseling, and feedback that characterized the instructor's engagement and involvement with the student. The instructor's personal passion for sustainability as well as her knowledgeability on the topic was also perceived as impactful when it came to learning about sustainability.

The use of supplemental materials was perceived as impactful by students, particularly when it came to learning about sustainability. Similarly, the use of variety in how course concepts were presented and the options students were given to complete work in the course were also perceived as impactful on learning. Other mechanisms for learning used in the course were also considered impactful, especially collaboration and discussion, but also the use of action, authentic assessment methods, and a smaller class size. Notably, collaboration was *the* most powerful theme in the study.

Some aspects of the course were considered less impactful (Figure 6-2), primarily issues beyond the researcher's control; however, the mishaps during the course in regards to the ill-timed introduction of some course content and assignments was an exception. Some of the primary issues students spoke more negatively about were how some assignments overworked the design student in the group and how the physical nature of the classroom made collaboration challenging at times.

Characteristics of the learning and development process

There were a number of ways students characterized their learning and development process (Figure 6-1). When describing their learning process, students often

described it as expanding gradually across the course, ending with a big picture. Other characteristics of the learning and development experience included a high level of personal relevance which spurred engagement as well as some challenges to previous suppositions, which led to new learning and development. Most students also experienced some adversity which led to new growth through practicing new behavior, which yielded greater confidence. Lastly, students often described their learning and development process as being reliant on others for outcomes.

Comparison to other courses

Finally, when the students contrast their experience in the course with that of other courses in the same program, some similarities and differences emerged (Figure 6-2). Students affirmed that the course modeled similar processes and practices common in the discipline, but the concept of sustainability extended this common protocol. Differences, on the other hand, included greater productivity experienced during group work, a higher level of engagement on the part of the instructor, as well as the greater infusion of sustainability. Interestingly, students cited that the course content evidenced greater applicability to their course work, and in some cases, their real lives. Lastly, the class size was smaller than most students had experienced previously, as most were marketing students who are commonly placed in larger classrooms, while design students spend most of their time in small studio classes.

In answering the overarching research question regarding how students experienced this course, it is fair to surmise that students yielded a positive, though challenging, educational experience. It is easy to discern that in many cases, this experience was considered exceptional in comparison to other courses in the same program. Specifically, students seem to embrace the aspects of the course, which in many ways departed that which they were most accustomed, and seemed to fully appreciate the interaction, action, and application expected in the course, but were especially responsive to the course's focus on real world issues and solutions to those issues. Additionally, students experienced substantial progress in the way of skills, especially in terms of

working with others, but also for critical thinking, for which they perceived to be important.

Q2. How does the use of ESD enhance the student learning and development experience?

In Chapter 5, Figure 5-15 presented the ways in which the theoretical underpinnings of the study had manifested across a number of themes articulated by participants; which were rooted in ESD, constructivism, and a dialectical perspective of constructivism. Indeed, the theoretical perspectives which influenced the redevelopment of the course emerged in substantial ways in the student experience, particularly themes related to learning and development outcomes and the aspects of the course which were considered to impact those outcomes in a positive way.

To summarize the discussion from Chapter 5 related to how ESD and constructivism manifested in the student experience: Both had an important impact on the student learning and development experience. In fact, ESD manifested in the student experience to the greatest degree in the learning and development outcomes perceived as most important to students, such as Sustainability Literacy and Change Agent Skills (see Figure 6-1). Admittedly, these two themes are the primary components of the ESD framework, excluding the development of personal values thought to support sustainable development. Specifically, sub themes emerging under Sustainability Literacy, with the exception of Personal Consumption Change, all seemed to be discussed by participants with similar frequency across all three data collection periods. Also, when the instructor modeled the ESD-related tenet, Practice What you Preach, participants identified this aspect as impactful to their engagement and learning about sustainability.

Under the Change Agent Skills themes, a disproportionate frequency was found in the qualitative data. Chiefly, the learning and development outcomes related to Working with Others evidenced greater expansion and strength than those related to Critical Thinking, although the quantitative survey evidenced a perceived significant change according to students. ESD also played a role in other outcomes such as Lifelong Learning

and Transfer, both of which are rooted in constructivism. Students identified this course as being highly relevant to their future profession as well as their real lives. Some students were seeking to expand their knowledge about sustainability beyond the course requirements (Lifelong Learning), and in some cases, were *already* applying their learning and development to new and different situations (Transfer). The interrelationship between ESD and constructivism in the course also emerged in students' descriptions of their learning process (see Figure 6-1); chiefly, the themes Personal Relevance and Challenging suppositions.

The interrelationship between ESD and constructivism also manifested significantly in themes related to aspects of the course which were considered to most impact learning and development outcomes (see Figure 6-2): Holistic Infusion of Sustainability, Collaboration, Discussion, Reality Modeling (Democratic Role Play), Action, and Authentic Assessment. Again, these six themes are fundamental components of the ESD framework. It is easily argued that the use of collaboration in the course was *the* most impactful aspect of the course design. The use of constructivist approaches also emerged as impactful, such as the use of Supplemental Materials and Variety. A dialectical perspective of constructivism emerged in other aspects of the course identified by participants as having significant impact, including, Instructor Responsiveness, Interaction with Expert, and Feedback Loops; all underpinned by ESD.

Finally, ESD and constructivism were both an influence in themes related to the ways in which this course experience was different from other courses in their program, such as Group Work is More Productive, Course Material is More Applicable, Instructor is More Engaged and More Holistic Infusion of Sustainability. Notably, students articulated that the course, although using a different approach, was similar in discipline process and practices learned in other courses.

When examining Figure 6-1 and 6-2 in comparison to Figure 5-15, a pattern can be seen among the theoretical themes as influencing many of the inductive themes in a variety of ways. For example, there were theory-driven themes identified in the data related to Change Agent Skills: Working with Others, specifically articulated by the ESD literature;

but, the inductive themes which stemmed from this component of the course were expansive, including things learned about working with others as well as an increase in a variety of abilities related to effective collaboration, as articulated by the student. Similarly, from the theory-driven theme Reality Modeling, an important construct to ESD, stemmed a number of inductive themes considered important to students like Company Training and Focus on the Future. Thus, in answering the overarching research question related to how ESD enhanced the student learning and development experience, it seemed that the use of the framework most enhanced the outcomes for which students took away, related to sustainability and working with others (see Figure 6-1). Further, in Figure 6-2, the many theoretical constructs of ESD also emerged as being highly influential in the process *to attaining* those outcomes, such as Reality Modeling, particularly its emphasis on democracy, and Practice What you Preach. Many of the approaches considered highly impactful in the course related to ESD were heavily rooted in constructivism, such as Holistic Infusion of Sustainability, Collaboration, Discussion, Action, and Authentic Assessment. Further, the ESD approach, rooted in constructivism, also appeared to enhance the *process* of learning and development by Challenging Suppositions and stimulating engagement through Personal Relevance.

Implications and Recommendations

This study has provided support for the use of ESD in an apparel and textiles context. The study has also contributed to the current dialogue about sustainability education by describing ways in which sustainability may be integrated in a social science discipline and described some challenges and outcomes which may emerge in these contexts. The following discussion is organized first by implications and recommendations for sustainability education generally. Then, specific implications and recommendations for AT education are made.

The Study's Contribution to Sustainability Education

Though the Decade for Education for Sustainable Development (DESD, 2005-2014) has demonstrated significant progress in the way of campus greening and research initiatives (Cotton, Bailey, Warren, & Bissell, 2009; dele Harpe & Thomas, 2009; Sterling & Scott, 2008), the greatest gap in the ESD literature is in pedagogical innovation and curriculum redevelopment strategies. Practical ways to implement ESD are currently missing from the literature (Everett, 2008; Landorf et al., 2008; Reid, 2002). This is particularly the case in higher education, where the integration of sustainability has been especially slow (Bossellman, 2001; Everett, 2008; Rode & Michelsen, 2008). Especially dogging the implementation of ESD is confusion about how to respond to the initiative and a seeming inability to navigate institutional barriers in the university and the government (Haigh, 2005; Wals & Jickling, 2002). The current study addresses these challenges. First, this study provides some answers about how ESD could be implemented in higher education. Specifically, the case demonstrates ESD's application in a social science discipline, as many of the current case studies available about the implementation of ESD reflect the hard sciences only. Secondly, the current study demonstrates how meaningful change can be made at the course level, avoiding a host of institutional barriers entirely. This study should empower practitioners uninterested in patiently waiting for the system to change. Arguably, if more practitioners made changes suggested in this study, perhaps the system, in turn, would be forced to change from the classroom up. The following discussion identifies the primary areas in which the current study adds to the larger ESD dialogue currently under way.

Connecting awareness to behavior and assessing change

Discussed in Chapter 2, education has been considered an important conduit for sustainability (McKeown, 2006), but a gap exists between awareness about sustainability and sustainable behavior (Jucker, 2002). Thus, simply providing more content about sustainability does not entirely insure that learners will behave more sustainably. Specifically, Maclean and Ordonez (2007) argue that the current educational system's emphasis on credentialing rather than competence, devalues attention paid to the learning

journey. Rather, learners must be personally involved in activities that command talents such as understanding others, truth seeking, and personal determination. The classroom = real life.

The current study demonstrates, particularly in the learning and development outcomes that were unplanned and less specific to the course's topic like changes to personal consumption habits, the development of lifelong learning attitudes, and transfer, that education can lead to meaningful changes in behavior that will likely stick with the learner longer than the course's specific topic. Learners did become personally involved and engaged in the learning process of this course and a number of emergent outcomes far surpassed the planned learning outcomes in Table 4-10; for example, the ability to think creatively and imaginatively, changes made in personal consumption habits, the embrace of a lifelong learning attitude, the application of course learning and development to new and different situations (transfer). There are several implications to be made about this finding. One, these changes were not a part of the explicitly stated goals of the course. A recommendation of Eisner (2002) was to call out the implicit, making this a part of the curriculum development process. Resounding affirmation of this practice is also found in the ESD literature (Jucker, 2002; Kevany, 2007; Wals & Jickling, 2002). Likewise, Eisner (2002) also advocated for room to be made for emergent outcomes, as opposed to Tyler (1949) who was a proponent of precisely stated and measured outcomes.

Thus, these aspects became a part of the course redevelopment process in the current case, manifested in broadly stated learning outcomes designed to be extended and the development of an implicit course goal to develop change agents and help learners foster an ethical compass. Subsequently, students achieved far more than the planned learning and development outcomes explicitly stated in the course syllabus. Additionally, the implicit goal of the course was evidently achieved by many of the students. Students discussed an ignition of their desire to learn more, to use what they were learning in their lives, and some adopted new consumption habits to better support sustainability. Yet, these goals were never explicitly communicated to learners; nor were students given any tangible incentive to adopt these behaviors. Rather, this implicit goal was ever-present in

the instructor's mind, her implicit agenda embodied in how she implemented the course and interacted with students. When the instructor demonstrated a passion and interest for sustainability, practicing what she preached, students were impacted. This experience demonstrates the power of the implicit. Thus, one implication is that developing planned learning outcomes is just the beginning to implementing ESD. The educator must also be mindful and intentional about the implicit goals of ESD when they implement their educational program. She should also invite emergent outcomes, allowing students to put skin on goals *they* feel are important, rather than limiting students to the plan only.

Correspondingly, another implication of this experience is how to design assessment for such. If learning outcomes are only broadly stated, emergent outcomes are invited, and implicit goals are at play under the surface, how do we discern if education is doing what it should? More importantly, how do we engage students in an experience where the goals are more nebulous and perhaps difficult for them to measure? Several techniques were utilized in the current cases that are recommended for such a task. One, the use of reflective writing prompted learners to reflect on what their *experience* was, not just the products of their experience. In the descriptions of students' experience, it was easily discerned by the instructor what was being achieved and how this aligned or did not align with the goals of ESD. Also, the use of reflection in this experience made students more aware of their *behavior*, which likely prompted students to begin making some connections between their newfound awareness about sustainability and how they behave. Likewise, unlike most courses in which the largest portion of the course grade is typically attributed to the production of course work, written or otherwise, this course only attributed half of the course grade to such. Meaning, students were also required in this course to *practice* some of the change agent skills while producing their course work, which required them to pay attention to their behavior and reflect on that behavior. Evidently, while they practiced, other behaviors related to sustainability began to manifest in their experience. In sum, incentivizing the journey and choosing assessment methods that make the journey transparent may better connect awareness with behavior and better account for change.

Class size

A theme which repeatedly emerged in the current study was the small class size of the current case. This aspect of the course was not only considered exceptional compared to other courses in the same program, but was also considered highly impactful to learning about sustainability, as the intimacy of the classroom allowed for ample interaction and discussion on the topic considered important to managing the complexity of the concept. Accordingly, Cotton et al. (2009) also found that one of the primary barriers to implementing sustainability education was class size; specifically, the tension between constructivist pedagogy characteristically used to implement ESD and large class size. Thus, practitioners who characteristically teach larger classes may wonder how ESD may be implemented, if class size is considered an inherent impediment.

Admittedly, having a smaller number of learners in the room allows for more discussion, exploration, debate, and discovery. On the other hand, a number of techniques used in the current case such as the use of democracy in the design of students groups, the use of reflection as a mechanism for attention paid to behavior, not to mention the approach taken to infuse sustainability, and most important, reality, in the course holistically by way of the course redevelopment model (Chapter 4), illustrate just a few examples of ways in which a course could be impacted without mandating a reduction in class size. It is perhaps more important to scrutinize where a small class size is most important to delivering certain outcomes important to ESD. Perhaps, when an understanding of sustainability is necessary early in a learner's program, a small class size is ideal, where other techniques like the use of democracy could be used for larger numbers to deliver other outcomes related to working with others. Arguably, many of the constructivist approaches used in this case may likely be best delivered for small numbers, but the constructivist authors cited in Chapter 2 encourage practitioners to select pedagogical approaches based on what will best enhance engagement in each particular context (Geelan, 1997; Millar, 1989; Noddings, 1990; Simpson, 2002).

The use of time-honored pedagogical practice for ESD

Related to the discussion above is that this case has demonstrated that the use of time-honored pedagogical practice is salient in regards to teaching sustainability and sustainable development. Some ESD authors discussed in Chapter 2 beg for a new practical, pedagogical approach to implement ESD. But, the theoretical underpinnings utilized in the current case, such as constructivism, particularly a dialectical perspective, and the use of the Zone of Proximal Development (ZPD) make an argument that there is little need to reinvent the wheel. Rather the use of philosophies like those of Elliot Eisner (2002) and Lev Vygotsky (1978) can enhance the implementation of ESD. Though ESD's advocacy for sustainability literacy and the development of change agent skills were influential in developing the study's most important learning and development outcomes according to students, it was indeed *how* this was implemented that was impactful, and the *how* was most influenced by constructivism. Further, responsive to the discussion above about class size, the constructivist strategies used in this case can be selected based on the specific context. For example, the concept of the ZPD, in which the instructor continually interacts with the learner to expand sustainability knowledge and carefully manage complexity may be more appropriate to smaller class size, where the embodiment of reality in course content does not necessarily mandate a small group of learners.

Reframing content

In Chapter 2, the need to scrutinize the dominant culture paradigm in education was discussed (O'Sullivan, 2004), specifically the traditional production to consumption model that the current educational system emulates (Foster, 2002; Haigh, 2008; Rees, 2003). The ESD literature strongly advocates for the transition from the industrial model of education which is currently poised for exponential growth to a closed looped system in which education could support the better stewardship of resources in which growth may no longer be the goal (Bosselman, 2001; Jucker, 2002; Scholottman, 2008). But, the challenge is in *how* to align education with this new purpose, as making the connection between sustainability and some disciplines has been noted as one of the primary barriers to the implementation of ESD (Cotton et al., 2009). One of the most important contributions of this study is the development of a mechanism to align discipline specific content, which

may embody unsustainable root metaphors like growth, to sustainability and sustainable development. Particularly helpful is the demonstration of how social science content, a behaviorally-laden field lacking hard and fast scientific principles, could be aligned to sustainability and sustainable development. The redeveloped course embodied a balance of scientific principles and behavioral tenets related to sustainability, offering students a more holistic picture of what is required to achieve sustainability.

Indeed, the course redevelopment model discussed in Chapter 4 is an important step toward the relinquishment of ideas inherent in the Industrial Revolution which have been proved dysfunctional in the current ecological crisis. In fact, the current case demonstrates how the topic of product development itself was reframed to better align with the achievement of fundamental human needs and the greater respect of limits imposed by the ecosystem. Further, the structure and systematic process of the model influenced by Ralph Tyler (1949) offers individual practitioners a method by which they can derive learning outcomes for the courses they teach *now*, even if the redevelopment of the entire curriculum is currently impossible. Likewise, the influence of Elliot Eisner (2002) in the recommended approaches to the development of learning experiences and assessment provides another useful framework for developing experiences related to sustainability that will insure a high level of engagement and student empowerment. Lastly, as the approaches of Tyler and Eisner have been used historically to design *entire* curriculum, the structure of the course redevelopment model could very well be used to redevelop entire curricula for ESD in the future.

The Study's Contribution to AT Education

Students perceived the use of ESD in the apparel product development course positively impact their learning and development experience. Students also perceived this course to be highly relevant to their future career in the apparel industry, attributing this to the course's emphasis on learning about sustainability as well as the development of collaborative skills. Moreover, some students expressed a greater inclination to prepare for this class, completing readings or other exercises, as they found this work to be more applicable not only in the classroom, but to life in general.

Moreover, students perceived that *the way* in which these two components were implemented in the course, in many cases, was as important as *what* was being implemented; and in some ways, these methods were considered superior compared to other courses experienced in the same program. Interestingly, during one of the focus groups, a conversation evolved among students about changes they would recommend for their program, in light of their experience in this course, of which representative comments were presented in Chapter 5. In that discussion, changes to the explicit as well as the implicit curriculum were noted. Specifically, students discussed how courses as well as departmental practices could evolve to better align with sustainability. Students made recommendations for how sustainability might be better integrated in a number of courses positioned much earlier in the program, but also identified where observed behavior did not align with the messages that were being conveyed about sustainability. For example, students discussed the conflict between the department's reputation for being sustainability-minded and the immense resource usage required in the program. This is a poignant example of the discussion in Chapter 4 regarding the implicit and null curriculum by Eisner (2002) and affirmation of Orr's (2004) contention discussed in Chapter 2, that *how* we do things in education is as important as *what* we do. One important implication of this study is that, in the transition to a sustainability-minded curriculum, AT education, as Eisner (2002) submits, must make more transparent the dominant ideologies that influence our curricular decisions as well as our *behavior*. If we are going to promote sustainability, we must embody this tenet not only in our course content, but our course policies, codes of conducts, and assignment requirements.

The remainder of this discussion is organized to explore some of the primary ingredients considered most prized by students in the course and to make implications for AT education. Included in this discussion are recommendations for the ways in which ESD may be used to enhance the educational experience in AT.

Sustainability literacy in AT education

Evident in this study was ESD's role in fostering sustainability literacy among students in the redeveloped course. But, notably, as mentioned in Chapter 5, this leap was

contrasted against a backdrop of nothing, as most students arrived at the course with an inability to define sustainability holistically and to engage in the most basic debates about it. Nevertheless, students considered their expansion of knowledge and understanding as well as a seeming empowerment by this newfound knowledge to make change themselves as fundamental to their positive experience in the course. This empowerment of students during the course is a considerable accomplishment, particularly as many of them came to the course being turned off by or detached from sustainability.

It is important to note that this empowerment was likely fostered by how sustainability was framed in this course: as an exciting opportunity to innovate. During the pilot for this study, discussed in Chapter 4, the researcher acknowledged that students do not necessarily pursue the AT field for the same reason that others join the Peace Corps or pursue a degree in Biology. Rather, AT students seem to be attracted to the field for creative and aesthetic reasons: they love the costume, the color, the texture, the fantasy, the imagination. Denying students what attracts them to this field, for the sake of sustainability, was a less than engaging approach used during the pilot. Attempting to engage AT students about sustainability with intellectual or ethical appeals was found considerably less satisfying by comparison to the current case, in which students were encouraged to use what they found engaging about AT to innovate and imagine new design and product development protocol for sustainability. It is likely this approach was a key agent in changing some of the negative perceptions students had about sustainability at the beginning of the course. Thus, an important implication of this study is to use what students find most engaging about the AT field as the conduit for teaching sustainability. Likewise, discussed in Chapter 4, though a number of secondary sources were used to speak to students needs, part of the process of developing learning outcomes for this course, Tyler (1949) recommends that students be interviewed about what they want to learn about or what they feel is important in their education. AT education may benefit from an exploration of what this generation feels is important for their AT program, as the gap between what students felt they needed in this case and what they were receiving in

their curriculum was obviously wide. This will make AT education more relevant and engaging.

As discussed earlier, none of the above will be possible without first aligning AT with sustainability's intent. Currently, a pink elephant of sorts looms in AT, as the discipline's preoccupation with unsustainable root metaphors like consumerism and growth complicate the holistic integration of sustainability. During the discussion of the eight-week pilot (Chapter 4), it was evident that the lack of cohesion in that case caused students to feel as though they were being pulled in two very different directions. This tension was a byproduct of applying *some* sustainability approaches in the course while leaving others out. But, in the current study, participants did not indicate this tension in the description of their experience. It is reasonable to surmise that the course redevelopment model (presented in Chapter 4) insured this alignment and cohesion. Thus, the greater use of such mechanisms may hold promise for AT academicians to more effectively integrate sustainability in the curriculum.

Furthermore, students commented that the redeveloped course modeled expected discipline processes and practices for which they were accustomed (Chapter 5). This affirms that the core content expected in an AT product development course was not lost for the sake of sustainability, another important contribution made by the use of the model. Students still learned about the product development process. It was simply *reframed* for the purpose and language of sustainability. Notably, approaches such as the development of sustainability majors or separate courses about sustainability may give one the impression that *more* content is needed to make the integration of sustainability a reality. But, this study demonstrates that traditional content can be *reframed*, without any bureaucratic process or additions made to an already bulging curriculum, a contention made in the ESD literature review in Chapter 2. By using the course redevelopment model, this course was, in fact, implemented rather quickly and practically. But, the redevelopment of textbooks and other teaching materials will also be necessary, as AT textbooks commonly place sustainability topics in a box, in a separate chapter, or in the appendix.

Another implication of this study for the enhancement of AT education is the need to prepare students to go deep to foster the needed revolution. Many of the participant comments related to the theme Recognizing Importance and Need for Change, indicate that students in this study perceived the types of changes needed to transition to sustainability as being small and reasonable; things they can actually *do.* They did not necessarily perceive an impending revolution, as the literature in Chapter 2 suggests. Though the empowerment of students during this course was a considerable accomplishment, this naivety about the real changes that may be commanded of them to make the sustainability transition should not be ignored.

Likewise, as noted in the discussion about sustainability literacy in the researcher's reflexive journal, the road to teaching sustainable strategies during the course was rocky, primarily because students lacked appropriate knowledge about materials. But, they also struggled to be imaginative and creative, and often found more barriers to the sustainable design theories than advantages. The researcher identified during her experience teaching a series of lesson plans related to sustainable design theories that students' capacity for imaginative and creative thinking seemed to be proportional to parameters set to aid them in navigating the complexity of decision making. Meaning, brainstorming about how sustainability might be used in a product development context was facilitated by imposing some specific limits on students. Though students made impressive strides in their ability to implement sustainability in their work, when all limits were off, students quickly became overwhelmed by the possibilities.

These shortcomings are likely consequences of the absence of sustainability in the overall curriculum. But, importantly, this discussion indicates some primary areas in which curriculum must be enhanced if real change is to be made. Although arguably satisfied by their expansion of knowledge about sustainability in the course, students admittedly remained on the surface only, according to the researcher. Thus, the question becomes: In what ways could the ESD approach be used to help students go deep and better understand the revolution needed?

Obvious changes would be to introduce the concept of sustainability early in the AT program. But, other, more extensive changes are necessary; chiefly, a transformation in the traditional textiles course into the context of biodegradability and recyclability; upcycling and downcycling. The need for a far deeper understanding of the interaction between fibers, dyes, and finishes to achieve sustainability is considered fundamental to implementing design protocols like Cradle to Cradle and Design for Environment. But, other design theories for which students were exposed to in this course, such as Industrial Ecology, address sustainable principles that are applied to the entire system or supply chain. These concepts might be integrated into retailing or manufacturing related courses, allowing students to explore in greater depth the applicability of these principles to apparel retailing, sourcing, production, and distribution. In sum, if students were permitted to explore sustainability principles in depth across the AT curriculum, they would likely be far less overwhelmed when, in a capstone course such as this, they are asked to be imaginative and creative on a much higher level. It is also worth noting that students in this study were especially responsive to the course's focus on the future. Perhaps, exploring visions for a sustainable future, though a challenging approach, may be another useful strategy for integrating sustainability in the AT curriculum.

Complicating this potential endeavor is the discovery made in the current study regarding how apparel marketing students perceive design as work for which they are not naturally inclined. As design is the key inception point of a product life cycle rich in environmental and social impacts, it may be wise to make design work more accessible to *all* AT students, not only design undergraduates. Further, as mentioned early in Chapter 1, designers represent a critical conduit for attracting consumers to a more sustainable lifestyle (Walker, 2006). Subsequently, if change in the apparel industry is to be possible, *all* future apparel professionals must be empowered to develop and communicate compelling alternatives.

Most importantly, this case demonstrates the integration of sustainability literacy in a product development course, a subject which embodies a broad spectrum of global

apparel industry issues. Thus, ESD's potential to enhance AT education could be broadly applicable to many other courses in AT program.

Skills for sustainable development in AT education

The other primary component of ESD which may enhance AT education is the integration and development of skills, particularly those related to work with others, but also critical thinking. Arguably, when reviewing the results of this case, the perceived impact of the collaborative component of this course seems to hold as much or even more power than the emphasis on sustainability literacy, according to students. Chiefly, students discussed that in this class they were more productive in and prepared for good collaboration. In their comments, students often contrasted this experience to other group work experienced in their program, in which they perceived to have rarely been given the support to know *how* to collaborate effectively. It was clear in themes such as Challenging Suppositions that many students struggled in this course to shake dysfunctional approaches acquired during previous group work. In several discussions in Chapter 5 regarding themes related to what students learned about working with others, how they were developing their skills related to working with others, and especially their comments about the use of collaboration in the course, it was clear that, in this case, working *together* became a powerful mechanism for both learning and development.

An important implication of this finding in light of how students characterized their former group work is that, as educators, we must not assume that by virtue of being together that students will have the self-discovery experience that we may be intending. In fact, if students are not developing the tools to collaborate effectively, we may be, in many ways, stacking the odds against their success, repeatedly putting them in situations where their learning and development may be hindered rather than helped.

Clear in the discussion related to the theme Transfer, students are understandably preoccupied with how they will perform in their careers in the industry. But, a much bigger picture is at stake when contemplating the significant challenges and choices concerning sustainability this generation of students will likely face in their lifetimes. As a reminder, the integration of these collaborative skills was, from an ESD perspective, considered

critical for the development of collaboration and cooperation in local and global communities, primarily centered on the need to solve sustainability related problems *together* (Chapter 2). Admittedly, ESD includes the work place, but generally advocates for a higher quality of life delivered through an increased ability for good relationships with diverse stakeholders. It is easily argued that AT education may not be supporting the development of behaviors that serve the immediate concerns of the student, performing on the job, or the bigger picture, engaging and participating in local and global communities. Similar to the previous discussion about fostering sustainability literacy through the explicit and implicit curriculum, AT education may be enhanced by the ESD approach to skills development, by being more intentional about *how* students go about their work during their education.

Further, in the Chapter 5 discussion about themes related to Working with Others, the learning outcomes and the developmental progress presented both indicate that students may have a skewed perception of leadership. For instance, many students discussed struggling to relinquish control or to stop dominating, while others struggled to step up and lead, but neither embraced a balance between the two. Specifically, in the theme Reality Modeling: Democratic Role Play, the democratic concept of leading *and* following, depending on the needs of the group, was a new idea, but one considered very effective by students. Many seemed to respond positively to the idea of rotating leadership responsibilities as well as learning how to follow others effectively; sharing intellectual contribution and labor more cooperatively. As democracy is considered a fundamental component of ESD, again, AT education may be enhanced by the use of this approach when designing collaborative projects.

Similarly, Working with Others' sub themes like Time does not Heal All Wounds and the Ability to Acknowledge and Resolve Conflict were some of the weaker themes in the study. This may simply be indicative of maturity levels among students, but it may also indicate an area that receives the least attention in the AT program. Thus, AT education may also be enhanced by better emphasizing the development of conflict resolution skills.

Likewise, many students noted that they experienced some adversity during their group work, but that this prompted new learning and growth. It is debatable whether this would have been such a powerful mechanism for new learning had the course not emphasized collaborative skills development. Also notable was the involvement of the instructor in the careful management of these adverse situations, as perceived by students. Subsequently, another important implication here is that when implementing ESD, we should not try to shelter students from adversity or encourage them to avoid such, but rather, be an observer and skilled facilitator to insure that it is the mechanism for growth it can and should be. This may require professional development for AT educators.

As previously mentioned, the themes related to critical thinking skills were not discussed as heavily as those related to working with others in the qualitative data. There may be a number of reasons for this. Chiefly, students perceived the course to focus on two primary areas: sustainability and collaboration. Thus, the critical thinking skills, for which far less class time was devoted, may have simply been perceived as extraneous compared to the learning and development for which they felt was more important. This weakness may also be related to the assessment method used in the study, a self-report, which may not be the most ideal method to assess thinking skills. Likewise, reflection is not a common assessment method in the AT discipline, particularly for marketing students, which may have presented a challenge to discerning how students' thinking skills were progressing. But notably, students in this course noted that it was a helpful to be required to pay attention to what their experience was. Greater use of reflection may be useful for sustainability as well as other topics in AT education.

Nevertheless, though the critical thinking skills related to ESD (values-focused thinking, systems thinking, and reflection) were mentioned inconsistently in reflections and focus group interviews, the results of the quantitative survey indicate that students perceived a significant change for the better in their knowledgeability and confidence across all six skills, with the most significant amount of change perceived in Systems Thinking skills. Interestingly, students perceived their knowledgeability and confidence in this skill to have begun at the lowest point compared to the other five skills, indicating that

this particular skill was likely the newest concept to them. Likewise, students were the more descriptive about their use of systems thinking compared to the other thinking skills. Specifically, the use of the sustainability triad in the course, a common method noted by the ESD literature, seemed to provide a useful framework for helping students navigate complexity in decision making. As mentioned earlier in the discussion about sustainability literacy and the need for parameters to aid student decision making, this framework may enhance the integration of sustainability in AT education by providing a scaffold that could be used across the curriculum. Whatever the case, the need to integrate this particular skill in the AT curriculum is most urgent, as it was perceived to be the most foreign to students, but the most helpful in making decisions related to sustainability.

Pedagogy for sustainability in AT education

Considerable was the perceived impact of the approaches used in the course design. In the previous discussion, some successful approaches have been mentioned, such as scrutinizing the explicit and implicit curriculum and the use of mechanisms like the course redevelopment model to insure cohesion and the successful reframing of content without losing important discipline practices. Other approaches include the use of frameworks like democracy and the sustainability triad to increase the development of skills related to working with others and critical thinking. As seen earlier in Figure 5-15, ESD manifested most significantly in the expansive number of learning and development outcomes in the course related to sustainability and change agent skills. But, it was the pedagogical approaches of ESD rooted in constructivism, and in some cases a dialectical perspective of constructivism, that were also perceived to be the most impactful on those outcomes.

Sub themes under Reality Modeling, such as Company Training and Group Contract, were strategies used in the course for which students felt were critical to making expectations clear and adequately preparing them for successful collaboration. In sum, creating a real life work situation in the classroom in which students, playing the role of product development "employees," were trained for the task and developed a code of conduct for the semester seemed to be an engaging way to increase other themes that emerged in the study, such as Personal Relevance. Likewise, other Reality Modeling sub

themes like Real World Applications Illustrated and Focus on the Future, were strategies which made the sustainability challenges in the apparel industry come alive, according to students. Though students commented earlier in Chapter 5 that the focus on fashion for 2025 was immensely challenging and required thinking on a much higher level than perhaps they were accustomed, the use of illustrations of real industry applications of sustainability made the task more comprehensible. Moreover, students considered the material in this course to be more applicable to their actual course work as well as their real lives compared to other courses in their program, a likely byproduct of these approaches. An important implication here is that fostering sustainability-minded and highly-skilled professionals requires a high level of engagement, one likely to only be fostered by making content real and relevant to the student personally. Admittedly, this requires the educator to be more connected to real world events and applications as well as responsive to her students and their needs.

This latter point leads to another powerful pedagogical approach considered fundamental to the students' learning and development experience, the instructor's engagement and involvement. According to students, the instructor in this course was more engaged compared to other courses in their program. Though some student comments about the instructor in Chapter 5, such as those related to the theme Practice What you Preach, might lead one to believe that a particular personality may be required for sustainability education. But, arguably, the instructor in this study, though personally passionate about sustainability as well as the development of skills, was modeling approaches underpinned by ESD, constructivism, but especially a dialectical perspective of constructivism.

Specifically, a number of themes, underpinned by dialectical constructivism, such as Instructor Responsiveness, Interaction with Expert, and Feedback Loops, manifested strongly in the students' experience. As previously mentioned, the instructor was an important facilitator for assisting students in navigating adversity during collaborative work. But, the instructor was also considered a collaborator, as many students mentioned her ability to brainstorm with them and offer her ideas and experiences.

Relatedly, some students characterized the amount of feedback given by the instructor in the course, both orally and written, to be exceptional compared to other courses and an important mechanism for new learning and development. Also, some students noted that the instructor maintained an authoritative position, but was flexible and responsive to shift gears if that is what students needed. A key implication here is that the collaborative approaches recommended by ESD, but especially the interactive emphasis advocated by Vygotsky (1978), were perceived as highly engaging by students. It could be argued that the instructor, in this case, effectively kept students in the Zone of Proximal Development (ZPD) (Chapter 2), in which students were not bored or overwhelmed but experienced continual mechanisms for growth. This approach may be used to enhance AT education generally, but it could be argued that this approach was particularly important to teaching sustainability, in which the instructor needed to interact with students to discern understanding so she could adjust her approach when needed. Meaning, as students arrived at this course with varying levels of understanding about sustainability, it was important to remain connected to students to insure the instructor was responsive to their current level of development and could provide feedback responsive to that level of development.

Lastly, it is important to emphasize that while modeling these practices, the researcher experienced a wide range of emotions, which she tracked across the semester during her reflexive journal entries. Evident in this emotional range was the fact that teaching in this matter was often unpredictable, perplexing, and disappointing as well as inspiring, joyful, and highly satisfying; emotions any close relationship might involve. In Figure 6-3, the researcher took the emotions tracked during reflexive journaling and input them into a Wordle. The emotions experienced most often appear the largest in the diagram. The implication of this experience is that educators who wish to use this approach must be prepared for the journey before them which may, at times, seem random and unforeseen, and will undoubtedly require great ingenuity. This approach is embodied in the discussion from Chapter 2 about the learning curve required in teaching ESD. Clearly,

teaching sustainability requires one to embark on a journey with the destination unforeseen.

Figure 6-3 Emotions Wordle

Future Research

This study makes an important contribution to the ESD literature, offering practical strategies to implement ESD, for which the literature has been deplete until now. Most significantly, this study is one of the first to implement ESD in a social science context, as few case studies of its kind exist. But, more research is needed, particularly to address some of the limitations presented in the pedagogical approaches recommended here, such as small class size and assessment. More experiments are needed to explore the implementation of ESD strategies in larger classes. More work is also needed to refine assessment methods to discern behavioral and attitudinal changes as well as knowledgeability.

Admittedly, this study is the first of its kind for the AT field. The two primary components of the ESD framework considered most impactful in the current study, sustainability literacy and change agent skills development, could feasibly be integrated across the AT curriculum. For example, the sustainable design theories discussed earlier could be integrated across multiple courses. Further, graduating levels of change agent skills may also be introduced across the curriculum, becoming a backdrop to most courses, particularly those involving group work. But, little is known about how this may be organized and the support which may be required to aid AT faculty in making these changes. The use of the course redevelopment model may provide a starting point for organizing such, but nevertheless, this is an area ripe for innovation and further research.

Another area needing further exploration is the integration of critical thinking, particularly thinking skills considered most important to sustainability and less common in AT education: value-focused thinking and systems thinking. Both interesting and perplexing was the responsiveness of students in this case to the concept of Values-focused thinking. Though this was a new idea introduced to students, the researcher observed students easily adopting the practice of articulating and using their own personal values to compass decision making. In the quantitative survey results, students also indicated that

they perceived themselves as having *the most* knowledgeability and confidence about this skill, compared to the other five change agent skills at the beginning of the course. Clearly, these students easily embraced the idea of identifying and articulating what was important to them and using that as a compass for their design endeavors. Understanding why this was so was beyond the scope of this study, but will remain an area in need of examination. A better understanding of how those personal values can be tapped to guide course work related to sustainability, may indicate ways in which this may be fostered in different ways *across* the curriculum.

Additionally, results of this case demonstrate that Systems Thinking is a skill for which AT students have the least familiarity. The quantitative survey results indicated that this skill evidenced the lowest pre mean score and the most significant amount of change from the beginning to the end of the semester. This is unsurprising, but does indicate a skills area in which AT education may be most lacking and a pertinent area for future exploration. Further, it seemed that the use of the sustainability triad aided students in navigating the complexity embodied in attempting to balance social, environmental, and economic priorities during decision making. But, more examination of the use of this tool, and perhaps other frameworks, is needed across a variety of AT contexts.

Conclusion

To summarize, the use of ESD may enhance AT education by offering a framework to reframe its discipline's content for sustainability as well as integrate the development of skills related to working with others and critical thinking, better preparing its graduates for sustainability and sustainable development. It is imperative that AT education begin a dialogue regarding unsustainable root metaphors evident in the discipline, such as consumerism and growth, and how these may be navigated to make sustainability a reality in the curriculum. The field must also scrutinize *how* its educational experiences are crafted, as it was evident in this study that the *how* is as important as the *what*. Arguably, as the apparel industry is second to few industries on the planet and a key player in the global

economy, stakes are high for AT education to evolve *now* and better provide the industry with sustainability-minded change agents.

Bibliography

ACPA – College Student Educators International (2008). Toward a sustainable future. *American College Personnel Association*. Retrieved from http://louisville.edu/student/about/ACPASustainabilityMonograph.pdf.

Adendorff, L. (2009). Seven macro trends in the textiles and apparel industry: Management briefing. *Just-Style*, June, 2-5.

Allenby, B.R. (1999). *Industrial ecology.* New Jersey: Prentice Hall.

Alvesson, M. & Sköldberg, K. (2009). *Reflexive methodology: New vistas for qualitative research.* Thousand Oaks, CA: Sage Publications, Inc.

Anfara, V.A., Brown, K.M., & Mangione, T.L. (2002). Qualitative analysis on stage: Making the research process more public. *Educational Researcher, October*, 28-38.

Arbuthnott, K.D. (2009). Education for sustainable development beyond attitude change. *International Journal of Sustainability in Higher Education, 10*(2), 152-163.

Armstrong, C.M. (2009a). Teaching sustainability holistically, non-peer-reviewed article, *International Textiles and Apparel Association Newsletter, January/February, 31*(3), 8.

Armstrong, C.M. (2009b). *Sustainability in apparel and textiles education*. Oral presentation, K-state Research Forum; First place in social sciences; Manhattan, KS.

Armstrong, C.M. & LeHew, M.L.A. (2011). Sustainable apparel product development: In search of a new dominant social paradigm for the field using sustainable approaches. *Fashion Practice, 3*(1), 29-62.

Armstrong, C.M. & Meyer-Brosdahl, D.C. (2009). *Surveying knowledge, attitudes, and interest about sustainability among apparel & textiles undergraduates.* Poster presentation and proceedings, International Textile & Apparel Association, annual conference, Bellevue, WA (2009).

Armstrong, C.M. & Rudd, L.E. (2009). *Transformational integration of sustainability into an apparel manufacturing course*. Oral presentation and proceedings, Greening of the Campus VIII, Ball State University, Indianapolis, IN.

Armstrong, C.M. & Hiller-Connell, K.Y. (2010). *Evaluating systems thinking skills among apparel and textiles undergraduates.* Oral presentation, K-state Research Forum; First place in social sciences; Manhattan, KS.

Armstrong, C.M. (2010). *Tackling assessment of education for sustainable development: A rubric for collaborative work*. Poster presentation, Kansas State University Sustainability Conference 2010; Manhattan, KS.

Bandura, A. (1977). *Social learning theory.* Englewood Cliffs, NJ: Prentice-Hall, Inc.

Bandura, A. (1989). Social cognitive theory. In R. Vasta (Ed.), *Annals of child development, 6, Six theories of child development* (1-60). Greenwich, CT: JAI Press.

Bartlett, P.F. & Chase, G.W. (2004). *Sustainability on campus: Stories and strategies for change.* Cambridge, Massachusetts: The MIT Press.

Bateson, G. (1972). Steps to an ecology of mind. San Francisco, CA: Chandler.

Baugh, G. (2008). Fibers: Clean and green fiber options. In J. Hethorn & Ulasewicz, C. (326-357), *Sustainable Fashion: Why Now?* New York, NY: Fairchild Books, Inc.

Benyus, J.M. (1997). *Biomimicry.* New York: HarperCollins Publishers, Inc.

Berg, B.L. (2001). *Qualitative research methods for the social sciences.* Needham Heights, MA: Allyn and Bacon.

Betts, M. (2007). Deconstructing 'the perfect t-shirt.' In L. Hoffman (Ed.), *Future fashion: White papers* (27-35). New York, NY: Earth Pledge.

Bickhard, M. H. (1997). Constructivisms and relativisms: A shopper's guide. *Science & Education 6*, 29-42.

Bogdan, R.C. & Biklen, S.K. (1998). Qualitative research for education: An introduction to theories and methods (3rd ed.). Boston, MA: Allyn & Bacon.

Bonnett, M. (2003). Education for sustainable development: Sustainability as a frame of mind. *Journal of Philosophy of Education, 37*(4), 675-690.

Borneman, J. M. (2008). Balancing textiles' quest for sustainability. *Textile World.* Retrieved from http://www.textileworld.com/Articles/2008/February_2008/Departments/From_

The_Editor.html.

Bosselmann, K. (2001). University and sustainability: Compatible agendas? *Educational Philosophy and Theory, 33*(2), 167-186.

Bowers, C.A. (2001). Challenges in educating for ecologically sustainable communities. *Educational Philosophy and Theory, 33*(2), 258-265.

Braungart, M. (2007). Eco-effective fashion. In L. Hoffman (Ed.), *Future fashion: White papers* (189-196). New York, NY: Earth Pledge.

Brooks, J. G. & Brooks, M.G. (1999). *The case for constructivist classrooms.* Alexandria, VA: Association for Supervision and Curriculum Development.

Brosdahl, D.J.C. (2007). The consumption crisis. In L. Hoffman (Ed.), *Future fashion: White papers* (7-16). New York, NY: Earth Pledge.

Buchanan, P. J. (2008). How to bring manufacturing back home. *WorldNetDaily.* Retrieved from http://www.worldnetdaily.com/pageID=38144.

Business and Company Resource Center (2008). Apparel. *Encyclopedia of Global Industries*. Retrieved from http://galenet.galegroup.com.er.lib.k-state.edu/servlet/BCRC?vrsn=unknown&locID=ksu&srchtp=ind&ids=apparel&c=1&iType=sic&mode=i&ste=85&tbst=tsIS&cind=2300+Apparel+and+Other+Finished+Products+Made+from+Fabrics+and+Similar+Materials&tab=1024&docNum=I2501600020&bConts=16162.

Calder, W. & Clugston, R.M. (2003). Progress toward sustainability in higher education. *Environmental Law Reporter, 33*, 10003.

Camill, P. (2002). Watch your step: The impacts of personal consumption on the environment. *Journal of College Science Teaching, 32*(1), 29-35.

Carpenter, S.R., Mooney, H.A., Agard, J., Capistrano, D., DeFries, R.S., Diaz, S…Whyte, A. (2009). Science for managing ecosystem services: Beyond the millennium ecosystem assessment. *PNAS, 106*(5), 1305-1312.

Cervantes, G. (2007). A methodology for teaching industrial ecology. *International Journal of Sustainability in Higher Education, 8*(2), 131-141.

Cheek, W. (2009). Using the ITAA four-year baccalaureate program meta goals in a larger context: Program assessment. *International Apparel and Textiles Association Newsletter, 32*(1), 10.

Cheek, W.K., & Moore, C.E. (2003). Apparel sweatshops at home and abroad: Global and ethical issues. *Journal of Family and Consumer Sciences, 95*(1), 9-19.

Chyzy, B. (2007). Green is good but cheap may be better . . .*Fashion Business International, August/September,* 6-8.

Clark, E. (2007). Climate change; the cost benefits of environmentally sustainable initiatives convince more businesses to go green. *Women's Wear Daily, 193*(76), 14S.

Cobb, P. (1996). Where is the mind? A coordination of sociocultural and cognitive constructivist perspectives. In C.T. Fosnot (Ed.), *Constructivism: Theory, perspectives, and practice* (34-52). New York, NY: Teachers College Press.

Collins, E. & Kearins, K. (2007). Exposing students to the potential and risks of stakeholder engagement when teaching sustainability: A classroom exercise. *Journal of Management Education, 31*(4), 521.

Colucci-Gray, L., Camino, E., Barbiero, G., & Gray, D. (2006). From scientific literacy to sustainability literacy: An ecological framework for education. *Wiley InterScience, 90*, 227-252.

Confrey, J. (1990). What constructivism implies for teaching. *Journal of Research in Mathematics Education, 4*, 107-122.

Cortese, A. (2003). The critical role of higher education in preparing for a sustainable future. *Planning for Higher Education, March-May*, 15-22.

Cotton, D., Bailey, I., Warren, M., & Bissell, S. (2009). Revolutions and second-best solutions: Education for sustainable development in higher education. *Studies in Higher Education, 34*(7), 719-733.

Council for Textile Recycling (2007). Don't overlook textiles! Retrieved from http://www.textilerecycle.org.

Creswell, J.W. (2007). *Qualitative inquiry and research design: Choosing among five approaches.* California: Sage Publications, Inc.

Dale, A. & Newman, L. (2005). Sustainable development, education and literacy. *International Journal of Sustainability in Higher Education, 6*(4), 351-362.

Datamonitor (2009a) Global – apparel retail (Report). Retrieved from http://galenet.galegroup.com.er.lib.k-state.edu/servlet/BCRC?as1=apparel+industry&vrsn=unknown&ai2=KE&locID=ksu&srchtp=adv&c=27&ab1=AND&ste=48&tbst=tsVS&ab2=AND&tab=2048&ai3=KE&ai1=KE&aca=inov&docNum=A210608215&bConts=2304.

Datamonitor (2009b) Global – apparel & textiles (Report). Retrieved from http://galenet.galegroup.com.er.lib.k-state.edu/servlet/BCRC?as1=apparel+industry&vrsn=unknown&ai2=KE&locID=ksu&srchtp=adv&c=27&ab1=AND&ste=48&tbst=tsVS&ab2=AND&tab=2048&ai3=KE&ai1=KE&aca=inov&docNum=A210608215&bConts=2304.

Datamonitor (2009c). United States – apparel retail (Report). Retrieved from http://galenet.galegroup.com.er.lib.k-state.edu/servlet/BCRC?as1=apparel+industry&vrsn=unknown&ai2=KE&locID=ksu&srchtp=adv&c=36&ab1=AND&ste=48&tbst=tsVS&ab2=AND&tab=2048&ai3=KE&ai1=KE&aca=inov&docNum=A188080838&bConts=2304.

Davis, C. (2008). February 2008 monthly update: Urbanization and environmental sustainability. *Earthtrends.org*. Retrieved from http://earthtrends.wri.org/updates/node/287.

Davis, C. (2008). February 2008 monthly update: Urbanization and environmental sustainability. *Earthtrends.org*. Retrieved from http://earthtrends.wri.org/updates/node/287.

de Eyto, A., McMahon, M., Hadfield, M., & Hutchings, M. (2008). Strategies for developing sustainable design practice for students and SME professionals. *European Journal of Engineering Education, 33*(3), 331-342.

de le Harpe, B. & Thomas, I. (2009). Curriculum change in universities: Conditions that facilitate education for sustainable development. *Journal of Education for Sustainable Development, 3*(1), 75-85.

Dewey, J. (1913). *The school and society.* Chicago: The University of Chicago Press.

Dickson, M.A., & Eckman, M. (2006). Social responsibility: The concept as defined by apparel and textile scholars. *Clothing and Textile Research Journal, 24*(3), 178-191.

Doll, W.E., Jr. (1993). The four R's—An alternative to the Tyler Rationale. A *Postmodern Perspective on Curriculum*. New York, NY: Teachers College Press.

Eagan, P., Cook, T., & Joeres, E. (2002). Teaching the importance of culture and interdisciplinary education for sustainable development. *International Journal of Sustainability in Higher Education, 3*(1), 48-66.

Easter, E.P. (2007). The environmental impact of laundry. In L. Hoffman (Ed.), *Future fashion: White papers* (94-104). New York, NY: Earth Pledge.

Egan, J. (2004). *Skills for sustainable development.* London: Office of the Deputy Prime Minister.

Ehrenfeld, J. & Lenox, M.J. (1997). The development and implementation of DfE programs. *The Journal of Sustainable Product Design, April*, 17-27.

Eisner, E.W. (1967). Education objectives—help or hindrance? *School Review, 75*(3), 250-260.

Eisner, E.W. (1998). *The enlightened eye: Qualitative inquiry and the enhancement of educational practice.* Upper Saddle River, NJ: Prentice Hall.

Eisner, E.W. (2001). What does it mean to say a school is doing well? *Phi Delta Kappan, 82*(5), 367-372.

Eisner, E.W. (2002). *The educational imagination: On the design and evaluation of school programs.* Upper Saddle River, NJ: Merrill Prentice Hall.

Elkington, J. (1998). *Cannibals with Forks: The Triple Bottom Line of 21st Century Business.* Oxford: Capstone Publishing Limited.

Ellis, A.K., Cogan, J.J., Howey, K.R. (1986). *Introduction to the foundations of education.* Englewood Cliffs, NJ: Prentice-Hall.

Ellis, G. & Weekes, T. (2008). Making sustainability 'real': Using group-enquiry to promote education for sustainable development. *Environmental Education Research, 14*(4), 482-500.

Environmental Protection Agency (2006). *Municipal waste generation, recycling, and disposal in the United States: Facts and figures for 2005*. Washington, D.C.: United States Environmental Protection Agency.

Etherington, K. (2004). *Becoming a reflexive researcher: Using our selves in research.* London, UK: Jessica Kingsley Publishers

Everett, J. (2008). Sustainability in higher education: Implications for disciplines. *Theory and Research in Education, 6*(2), 237-251.

Fabrycky, W. (1987). Designing for the lifecycle. *Mechanical Engineering, 109*(1), 72-74.

Ferdows, K., Lewis, M.A., & Machua, J.A.D. (2004). Rapid-fire fulfillment. Harvard Business Review, 81(11), 104-110.

Fien, J. (2002). Advancing sustainability in higher education: Issues and opportunities for research. *International Journal of Sustainability in Higher Education, 3*(3), 243-253.

Fiksel, J. (1996). *Design for environment.* New York: McGraw-Hill.

Filho, W.L., Manolas, E., & Pace, P. (2009). Education for sustainable development: Current discourses and practices and their relevance to technology education. *International Journal of Technology Design Education, 19*, 149-165.

Fletcher, K.T. (2007). Not one but many: New visions for fashion. In L. Hoffman (Ed.), *Future fashion: White papers* (275-283). New York, NY: Earth Pledge.

Fletcher, K.T. (2008). *Sustainable fashion and textiles: Design journeys.* London, UK: Earthscan.

Forum for the Future (2004). *Learning and skills for sustainable development*. London: Higher Education Partnership for Sustainability.

Forum for the Future (2007). Fashioning Sustainability: A review of the sustainability impact of the clothing industry. UK: Draper, S., Murray, V., & Weissbrod.

Fosnot, C.T. (1996). Constructivism: A psychological theory of learning. In C.T. Fosnot (Ed.), *Constructivism: Theory, perspectives, and practice* (8-33). New York, NY: Teachers College Press.

Foster, J. (2001). Education as sustainability. *Environmental Education Research, 7*(2), 153-165.

Foster, J. (2002). Sustainability, higher education and the learning society. *Environmental Education Research, 8*(1), 35-41.

Fox, R. (2001). Constructivism examined. *Oxford Review of Education, 27*(1), 23-35.

Fox, S. (2007). Cleaner cotton grown in color. In L. Hoffman (Ed.), *Future fashion: White papers* (128-136). New York, NY: Earth Pledge.

Gagnon, S. & Gagnon, Y. (2007). Eco-fabrics: Balancing fashion and ideals. In L. Hoffman (Ed.), *Future fashion: White papers* (36-45). New York, NY: Earth Pledge.

Geelan, D.R. (1997). Epistemological anarchy and the many forms of constructivism. Science & Education, 6, 15-28.

Gill, P. (2008). Economy of scale: A global context. In J. Hethorn & Ulasewicz, C. (165-183), *Sustainable Fashion: Why Now?* New York, NY: Fairchild Books, Inc.

Glock, R.E. & Kunz, G.I. (2005). *Apparel manufacturing: Sewn product analysis.* New Jersey: Pearson Prentice Hall.

Gough, S. & Scott, W. (2001). Curriculum development and sustainable development: Practices, institutions, and literacies. *Educational Philosophy and Theory, 33*(2), 137-12.

Gould, N. J. (2003). Fair trade and the consumer interest: a personal account. *International Journal of Consumer Studies, 27*(4), 341-345.

Graedel, T.E. & Allenby, B.R. (1994). *Industrial ecology.* Englewood, New Jersey: Prentice Hall.

Grusec, J.E. (1992). Social learning theory and developmental psychology: The legacies of Robert Sears and Albert Bandura. *Developmental Psychology, 28*(5), 776-786.

Gulwadi, G.B. (2009). Using reflective journals in a sustainable design studio. *International Journal of Sustainability in Higher Education, 10*(2), 96-106.

Haigh, M. (2005). Greening the university curriculum: Appraising an international movement. *Journal of Geography, 29*(1), 31-38.

Haigh, M. (2008). Internationalization, planetary citizenship and Higher Education, Inc. *Compare: A Journal of Comparative and International Education, 38*(4), 427-440.

Harle, K.J., Howden, S.M., Hunt, L.P., & Dunlop, M. (2007). The potential impact of climate change on the Australian wool industry by 2030. *Agricultural Systems, 93,* 61-89.

Harlow, S. (2007). The persuasive powers of cool. In L. Hoffman (Ed.), *Future fashion: White papers* (284-287). New York, NY: Earth Pledge.

Hawley, J. (2006). Digging for diamonds: A conceptual framework for understanding reclaimed textile products. *Clothing and Textile Research Journal, 24*(3), 262-275.

Hawley, J. (2007). From my closet to Africa: The dirt on post-consumer recycling. In L. Hoffman (Ed.), *Future fashion: White papers* (105-112). New York, NY: Earth Pledge.

Heine, L. (2007). The consequences of chemicals. In L. Hoffman (Ed.), *Future fashion: White papers* (197-209). New York, NY: Earth Pledge.

Herremans, I.M. & Reid, R.E. (2002). Developing awareness of the sustainability concept. The *Journal of Environmental Education, 34*(1), 16-20.

Hethorn, J. (2008). Consideration of consumer desire. In J. Hethorn & Ulasewicz, C. (53-76), *Sustainable Fashion: Why Now?* New York, NY: Fairchild Books, Inc.

Hethorn, J. & Ulasewicz, C. (2008). *Sustainable fashion: Why now?* New York, NY: Fairchild Books, Inc.

Hodson, D. & Hodson, J. (1998). From constructivism to social constructivism: A Vygotskian perspective on teaching and learning science. *School Science Review, 79*(289), 33-41.

Hopkins, C. & McKeown, R. (2005). *Guidelines and recommendations for reorienting teacher education to address sustainability.* Paris, France: United Nations Educational, Scientific, and Cultural Organization.

Hopkinson, P., Hughes, P., & Layer, G. (2008). Sustainable graduates: Linking formal, informal and campus curricula to embed education for sustainable development in the student learning experience. *Environmental Education Research, 14*(4), 435-454.

How green is becoming the new black in the textile chain (2007). *WSA: Performance and Sports Materials, 13*(4), 35-37.

Howarth, G. & Madfield, M. (2003). Sustainable product development thinking and assessment - A practical approach. Proceedings from *Design and Manufacture for Sustainable Development*. Cambridge, UK: Hornerton College.

Howard, P. (2008). Ecology, phenomenology, and culture: Developing a language for sustainability. *Diaspora, Indigenous, and Minority Education, 2*(4), 302-310.

Huckle, J. (2010). ESD and the current crisis of capitalism: Teaching beyond green new deals. *Journal of Education for Sustainable Development, 4*(1), 135-142.

Hulbert, S., Schaefer, M., Wacey, C., & Wheeler, K. (1997). *Education for sustainability: An agenda for action.* Washington, DC: U.S. Government Printing Office. Retrieved on March 24, 2008 from www.gcrio.org/edu/pcsd/toc.html.

Illich, I. (1973). *Tools for conviviality.* New York: Harper & Row, Publishers.

ITAA (2008). Four-year baccalaureate program meta-goals. Retrieved on March 29, 2009 from http://www.itaaonline.org/downloads/ITAA_Four_Year_Baccalaureate_Program_Meta-Goals_2008.pdf.

Jacob, J. (2007). Surveying the present an imagined future: The quest for a bright future in the textile and apparel professions. *Clothing and Textiles Research Journal, 25*(1), 349-374.

Jickling, B. & Wals, A.E.J. (2008). Globalization and environmental education: Looking beyond sustainable development. *Journal of Curriculum Studies, 40*(1), 1-21.

Jucker, R. (2002). "Sustainability? Never heard of it?" Some basics we shouldn't ignore when engaging in education for sustainability. *International Journal of Sustainability in Higher Education, 3*(1), 8-18.

Jucker, R. (2004). Have the Cake and Eat It: Ecojustice versus Development? Is It Possible to Reconcile Social and Economic Equity, Ecological Sustainability, and Human Development? Some Implications for Ecojustice Education. *Educational Studies Journal of the American Educational Studies Association*, *36*(1), 10-26.

Keeney, R. L. (1992). *Value-focused thinking.* Cambridge: Harvard University Press.

Keiser, S.J. & Garner, M.B. (2008). *Beyond design.* New York: Fairchild Publications, Inc.

Kelly, R. & Fetherston, B. (2008). Productive contradictions: Dissonance, resistance and change in an experiment with cooperative learning. *Journal of Peace Education, 5*(2), 97-111.

Kenan, S. (2009). The missing dimension of modern education: Values education. *Educational Sciences: Theory and Practice, 9*(1), 279-295.

Kevany, K.D. (2007). Building the requisite capacity for stewardship and sustainable development. *International Journal of Sustainability in Higher Education, 8*(2), 107-122.

Kininmonth, M. (2007). Evolution or revolution. In L. Hoffman (Ed.), *Future fashion: White papers* (63-72). New York, NY: Earth Pledge.

Kirschner, P.A. (2009). Epistemology or pedagogy, that is the question. In S. Tobias & Duffy, T.M. (Eds.), *Constructivist instruction: Success or failure?* (144-157). New York, NY: Rutledge.

Koberg, D. & Bagnall (1972). *Universal traveler.* Los Altos, CA: William Kaufmann.

Kolander, C. (2007). In defense of truth and beauty. In L. Hoffman (Ed.), *Future fashion: White papers* (168-176). New York, NY: Earth Pledge.

Konopnicki, P. (2009). Sustainability: The next 21st century workplace skill. *Techniques, 84*(8), 44-47.

Kozulin, A. (1986). The concept of activity in soviet psychology: Vygotsky, his disciples and critics. *American Psychologist, 41*(3), 264-274.

Kuznic, E. & Finley, M.L. (1993). Student self-evaluation: An introduction and rationale. In J. MacGregor (Ed.), *Student self-evaluation* (5-14). San Francisco, CA: Jossey-Bass.

Landorf, H., Doscher, S., & Rocco, T. (2008). Education for sustainable human development. *Theory and Research Education, 6*(2), 221-236.

Learning the golden rule (1999). *Textile World.* Retrieved from http://www.textileworld.com/Articles/1999/December/Features/Learning_The_New_Golden_Rule.html.

Lehew, M.L.A., & Meyer, D.J.C. (2005). Preparing global citizens for leadership in the textile and apparel industry. *Clothing and Textiles Research Journal, 23*(4), 290-297.

Lessor, R., Reeves, M., & Andrade, E. (1997). Interdisciplinary team teaching on sustainable development in Costa Rica. *Teaching Sociology, 25*, 134-149.

Lewis, H., Gertasakis, J., Grant, T., Morelli, N., & Sweatman, A. (2001). *Design + environment*. Sheffield, UK: Greenleaf Publishing.

Liu, C.H. & Mathews, R. (2005). Vygotsky's philosophy: constructivism and its criticisms examined. *International Education Journal, 6*(3), 386-399.

Ljungberg, L. Y. (2007). Materials selection and design for development of sustainable products. *Materials in Engineering, 28*(2), 466.

Lloyd, B. (2005). What is sustainability? The founder of green steps offers a working definition of the biggest buzzword in the marketplace. *Daily News Record, 35*(32), 16.

Loker, S. (2008). A technology-enabled sustainable fashion system: Fashion's future. In J. Hethorn & Ulasewicz, C. (95-126), *Sustainable Fashion: Why Now?* New York, NY: Fairchild Books, Inc.

Lombardo, M., Synder-Duch, J., & Bracken, C.C. (2004). Practical resources for assessing and reporting intercoder reliability in content analysis research projects. Retrieved from http://www.slis.indiana.edu/faculty/hrosenba/www/Research/methods/lombard_reliability.pdf.

Lourdel, N., Gondran, N., Laforest, V., Debray, B., & Brodhag, C. (2007). Sustainable development cognitive map: A new method of evaluating student understanding. *International Journal of Sustainability in Higher Education, 8*(2), 170-182.

MacGregor, J. (Ed.) (1993). *Student self-evaluation.* San Francisco, CA: Jossey-Bass.

Maclean, R. & Ordonez, V. (2007). Work, skills development and employability and education for sustainable development. *Education Research for Policy and Practice, 6*, 123-140.

Malhadas, Z.Z. (2003). Contributing to education for a sustainable future through the curriculum, by innovative methods of education and other means. Proceedings from

the *International Conference on Education for A sustainable Future: Shaping the Practical Role of Higher Education for a Sustainable Development.* Charles University, Karolinum: Prague, Czech Republic, September 10-11.

Marsh, C.J. & Willis, G. (2007). *Curriculum: Alternative approaches, ongoing issues.* Upper Saddle River, New Jersey: Pearson Prentice Hall.

Matusow, H. & Zeldin, S. (2007). Using what others toss out. In L. Hoffman (Ed.), *Future fashion: White papers* (113-116). New York, NY: Earth Pledge.

Mayer, R.E. (2009). Constructivism as a theory of learning versus constructivism as a prescription for instruction. In S. Tobias & Duffy, T.M. (Eds.), *Constructivist instruction: Success or failure?* (184-200). New York, NY: Rutledge.

Merriam, S.B. (1998). *Qualitative research and case study applications in education.* Hoboken, NJ: John Wiley & Sons.

McCracken, G. (1988). *The long interview.* Newbury Park, CA: Sage Publications, Inc.

McDonough, W. & Braungart, M. (2002). *Cradle to cradle.* New York: North Point Press.

McKeown, R. (2006). *Education for sustainable development toolkit.* Paris, France: United Nations Educational, Scientific, and Cultural Organization. Retrieved from www.unesco.org/education/desd.

Millar, R. (1989). Constructive criticisms. *International Journal of Science Education, 11*(5), 587-596).

Miller, D. & Williams, P. (2009). What price a living wage?: Implementation issues in the quest for decent wages in the global apparel sector. *Global Social Policy, 9*(1), 99-125.

Moore, J. (2005). Barriers and pathways to creating sustainability education programs: policy, rhetoric and reality. *Environmental Education Research, 11*(5), 537-555.

Moshman, D. (1982). *Exogenous, endogenous, and dialectical constructivism.* Development Review, 2, 371-384.

Mowbray, J. (2007). Can sustainability stay the distance? In L. Hoffman (Ed.), *Future fashion: White papers* (263-274). New York, NY: Earth Pledge.

Mulder, K.F. (2009). Don't preach. Practice! Value laden statements in academic sustainability education. *International Journal of Sustainability in Higher Education, 11*(1), 74-85.

Malhadas, Z.Z. (2003). Contributing to education for a sustainable future through the curriculum, by innovative methods of education and other means. Proceedings from the *International Conference on Education for A sustainable Future: Shaping the Practical Role of Higher Education for a Sustainable Development.* Charles University, Karolinum: Prague, Czech Republic, September 10-11.

Murray, P.E. & Murray, S.A. (2007). Promoting sustainability values within career-oriented degree programs; A case study analysis. *International Journal of Sustainability in Higher Education, 8*(3), 285-300.

Noddings, N. (1990). Constructivism in mathematics education. *Journal for Research in Mathematics Education*, 4, 7-18.

Oakes, S.R. (2007). Selling eco-fashion on main street. In L. Hoffman (Ed.), *Future fashion: White papers* (229-236). New York, NY: Earth Pledge.

Oliva, P.F. (2005). *Developing the curriculum* (5th ed.) Boston: Pearson Education, Ltd.

Oliva, P.F. (2009). *Developing the curriculum* (7th ed.). Boston: Pearson Education, Ltd.

O'Neal, G.S. (2007). Continents, cultures, curriculum: Some thoughts on the future of the profession. *Clothing and Textiles Research Journal, 25*(4), 375-379.

Orr, D.W. (2003). Viewpoint: Planning to learn. *Planning for Higher Education, 31*(3), 77-81.

Orr, D.W. (2004). *Earth in Mind.* Washington, DC: Island Press.

Orzada, B. & Moore, M.A. (2008). Environmental impact of textile production. In J. Hethorn & Ulasewicz, C. (299-325), *Sustainable Fashion: Why Now?* New York, NY: Fairchild Books, Inc.

O'Sullivan, E. (2004). Sustainability and transformative educational vision. In Corcoran, P.B. & Wals, E.J. (Eds.), *Higher education and the challenge of sustainability; Problematics, promise, and practice* (163-180). Dordrecht: Kluwer Academic Publishers.

Parker, L. & Dickson, M.A. (Eds.) (2009). *Sustainable fashion: A handbook for educators.* UK: Labor Behind the Label.

Parris, T. M. (2003). Toward a sustainability transition: The international consensus. *Environment, 45*(1), 12-24.

Phillips, D.C. (1995). The good, the bad, and the ugly: The many faces of constructivism. *Educational Researcher, 24*(7), 5-12.

Phillips, J.L. (1969). *The origins of intellect: Piaget's theory*. San Francisco, CA: W.H. Freeman and Company.

Piaget, J. (1970). Piaget's theory. In P. H. Mussen (Eds.), *Carmichael's manual of child psychology* (703-732). New York: John Wiley & Sons, Inc.

Pinar, W.F., Reynolds, W.M., Slattery, P., & Taubman, P.M. (1995). *Understanding curriculum: An introduction to the study of historical and contemporary curriculum discourses.* New York: Peter Lang Publishing.

Pollin, R., Burns, J. & Heintz, J. (2004). Global apparel production and sweatshop labor: Can raising retail prices finance living wages? *Cambridge Journal of Economics, 28*, 153–171.

President's Council on Sustainable Development (1994). *Education for sustainability: An agenda for action.* Washington, D.C.: U.S. Government Printing Office.

Pressley, M., Harris, K.R., & Marks, M.B. (1992). But good strategy instructors are constructivists! *Educational Psychology Review, 4*(1), 1992.

Quinn, S. (2008). Environmental stewardship and sustainable sourcing. In J. Hethorn & Ulasewicz, C. (358-384), *Sustainable Fashion: Why Now?* New York, NY: Fairchild Books, Inc.

Rechelbacher, H. (2007). Tomorrow is the new now. In L. Hoffman (Ed.), *Future fashion: White papers* (17-23). New York, NY: Earth Pledge.

Rees, W. (2003). Impeding sustainability? The ecological footprint of higher education. *Planning for Higher Education, 31*(3), 88-98.

Reid, A. (2002). Discussing the possibility of education for sustainable development. *Environmental Education Research, 8*(1), 73-79.

Reid, A. & Petocz, P. (2006). University lecturers' understanding of sustainability. *Higher Education, 51*, 105-123.

Richards, M. & Gabrielle (2007). Leather for life. In L. Hoffman (Ed.), *Future fashion: White papers* (53-62). New York, NY: Earth Pledge.

Robinson, N.A. (Ed., 1993). *Agenda 21.* New York: Oceana Publications.

Rode, H. & Michelsen, G. (2008). Levels of indicator development for education for sustainable development. *Environmental Education Research, 14*(1), 19-33.

Rodgers, C.R. (2006). "The turning of one's soul"—learning to teach for social justice: The Putney Graduate School of Teacher Education. *Teachers College Record, 108*(7), 1266-1295.

Rodie, J. B. (2003). Survival tactics. *Environmental Sustainability, 153*(3*),* 44.

Rogoff, B. (1990). *Apprenticeship in thinking: Cognitive development in social context.* New York, NY: Oxford University Press.

Rowe, D. (2000). Motivating student to be citizens who are positive change agents for career and community service. *Michigan Social Studies Journal, 12*(1), 35-38.

Rudell, F. (2006). Shopping with a social conscience: Consumer attitudes toward sweatshop labor. *Clothing and Textiles Research Journal, 24*(4), 282-296.

Secondary Materials and Recycled Textiles Association (2007). Textile recycling fact sheet. Retrieved from http://www.textilerecycle.org/.

Segalàs, J., Ferrer-Balas, D., & Mulder, K.F. (2008). Conceptual maps: Measuring learning processes of engineering students concerning sustainable development. *European Journal of Engineering Education, 33*(3), 297-306.

Schlottmann, C. (2008). Educational ethics and the DESD; Considering trade-offs. *Theory and Research in Education, 6*(2), 207-219.

Schor, J. B. (2005). Prices and quantities: unsustainable consumption and the global economy. *Ecological Economics, 55,* 309-320.

Schumacher, E.F. (1973). *Small is beautiful.* New York: Harper & Row, Publishers, Inc.

Schunk, D.H. (2008). *Learning theories: An educational perspective.* (5th ed.). New Jersey: Pearson Merrill Prentice Hall.

Schwartz, D.L., Lindgren, R., & Lewis, S. (2009). Constructivism in an age of non-constructivist assessments. In S. Tobias & Duffy, T.M. (Eds.), *Constructivist instruction: Success or failure?* (34-61). New York, NY: Rutledge.

Scott, W. (2009). Judging effectiveness of a sustainable school: A brief exploration of issues. *Journal of Education for Sustainable Development, 3*(1), 33-39.

Shanahan, H. & Carisson-Kanyama, A. (2005). Interdependence between consumption in the North and sustainable communities in the South. *International Journal of Consumer Studies, 29*(4), 298-307.

Sherren, K. (2008). A history of the future of higher education for sustainable development. *Environmental Education Research, 14*(3), 238-256.

Simpson, T.L. (2002). Dare I oppose constructivist theory? *The Educational Forum, 66*(4), 347-354).

Sipos, Y., Battisi, B., Grimm, K. (2008). Achieving transformative sustainability learning: Engaging head, hands and heart. *International Journal of Sustainability in Higher Education, 9*(1), 68-86.

Spiro, R.J. & Deschryver, M. (2009). Constructivism: When it's the wrong idea and when it's the only idea. In S. Tobias & Duffy, T.M. (Eds.), *Constructivist instruction: Success or failure?* (106-123). New York, NY: Rutledge.

Stables, A. & Scott, W. (2002). The quest for holism in education for sustainable development, *Environmental Education Research, 8*(1), 53-60.

Stake, R.E. (1995). The art of case study research. Thousand Oakes, CA: Sage Publications.

Sterling, S. (2004). Higher education, sustainability, and the role of systemic learning. In Corcoran, P.B. & Wals, E.J. (Eds.), *Higher education and the challenge of sustainability; Problematics, promise, and practice* (49-70). Dordrecht: Kluwer Academic Publishers.

Sterling, S., & Scott, W. (2008). Higher education and ESD in England: A critical commentary on recent initiatives. *Environmental Education Research, 14*(4), 386-398.

Stewart, D.W. & Shamdasani, P.N. (1990). *Focus groups: Theory and practice.* Newbury Park, CA: Sage Publications, Inc.

Svanström, M., Lozano-Garcia, F.J., Rowe, D. (2008). Learning outcomes for sustainable development in higher education. *International Journal of Sustainability in Higher Education, 9*(3), 339-351.

Swedberg, J. (2006). Natural selections: How to buy and produce sustainable fabric products that are environmentally and economically – sound. *Industrial Fabric Products Review, 91*(5), 46-51.

Terhart, E. (2003). Constructivism and teaching: A new paradigm in general didactics? Journal *of Curriculum Studies, 35*(1), 25-44.

Tilbury, D. (2004). Environmental education for sustainability: A force for change in higher education. In Corcoran, P.B. & Wals, E.J. (Eds.), *Higher education and the challenge of sustainability; Problematics, promise, and practice* (97-112). Dordrecht: Kluwer Academic Publishers.

Tobias, S. (2009). An eclectic appraisal of the success or failure of constructivist instruction. In S. Tobias & Duffy, T.M. (Eds.), *Constructivist instruction: Success or failure?* (335-350). New York, NY: Rutledge.

Tran, K.T.L. (2007). Ecology-minded labels promote sustainable message. *Women's Wear Daily, 194*(93), 12.

Translucent green: Environmentally friendly manufacturing processes are key concern of retailers and brands (2007). *Textile World, 157*(6), 49.

Tuckman, B. T. (1992). *Educational psychology: From theory to application.* Harcourt Brace Fort Worth, TX: Jovanovich College Publishers.

Tudge, J.R.H. & Winterhoff, P.A. (1993). Vygotsky, Piaget, and Bandura: Perspectives on the relations between the social world and cognitive development. *Human Development, 36*, 61-86.

Tyler, R.W. (1949). Basic principles of curriculum and instruction. Chicago, IL: University Chicago Press.

Ulasewicz, C. (2008). Fashion, social marketing, and the eco-savvy shopper. In J. Hethorn & Ulasewicz, C. (30-52), *Sustainable Fashion: Why Now?* New York, NY: Fairchild Books, Inc.

UNESCO (2003). *The United Nations decade for education for sustainable development.* United Nations Educational, Scientific, and Cultural Organization. Retrieved from http://portal.unesco.org/education/en/ev.php-URL_ID=26295&URL_DO=DO_TOPIC&URL_SECTION=201.html.

UNESCO (2005). *Contributing to a more sustainable future: Quality education, life skills and education for sustainable development.* Paris, France: United Nations Educational, Scientific, Cultural Organization. Retrieved from http://unesdoc.unesco.org/images/0014/001410/141019e.pdf.

Vaughn, S., Schumm, J.S., Sinagub, J. (1996). *Focus group interviews in education and psychology*. Thousand Oaks, CA: Sage Publications, Inc.

Venkataraman, B. (2009). Education for sustainable development. *Environment Magazine, 51*(2), 8-10.

Vitousek, P.M., Mooney, H.A., Lubchenco, J., Melillo, J.M. (1997). *Human domination of Earth's ecosystem. Science, 277,* 494-499.

von Glasersfeld (1990). An exposition of constructivism: Why some like it radical. *Journal for Research in Mathematics Education, 4*, 19-29.

von Glasersfeld (1996). Introduction: Aspects of Constructivism. In C.T. Fosnot (Ed.), *Constructivism: Theory, perspectives, and practice* (3-7). New York, NY: Teachers College Press.

Vreeland, J. M. (2007). A 5,000-year-old fiber gets a fashion update. In L. Hoffman (Ed.), *Future fashion: White papers* (118-127). New York, NY: Earth Pledge.

Vygotsky, L.S. (1978). *Mind in Society.* Cambridge, MA: Harvard University Press.

Waeber, P. & Engel, L. (2007). Not just another eco-label: An industry-wide solution. In L. Hoffman (Ed.), *Future fashion: White papers* (210-218). New York, NY: Earth Pledge.

Wackernagel, M., Schultz, N.B., Deumling, D. . . . Randers, J. (2002). Tracking the ecological overshoot of the human economy. *Proceedings of the National Academy of Sciences, 99*(14), 9266-9271.

Wackernagel M., White, S., & Moran, D. (1999). Using ecological footprint accounts: From analysis to application. *Ecological Economics, 29*(3), 375-390.

Wadsworth, B.J. (1978). *Piaget for the classroom teacher.* New York, NY: Longman, Inc.

Walker, S. (2006). *Sustainability by design.* London, UK: Earthscan.

Wal-mart (2007). Wal-mart announces expansion of associate-driven personal sustainability projects. Press release. Retrieved from http://walmartstores.com/pressroom/news/6379.aspx.

Wals, A.E.J. (2009). A mid-DESD review: Key findings and ways forward. *Journal of Education for Sustainable Development, 3*(2), 195-204.

Wals, A.E.J. (2010). Between knowing what is right and knowing that is it wrong to tell others what is right: On relativism, uncertainty and democracy in environmental and sustainability education. *Environmental Education Research, 16*(1), 143-151.

Wals, A.E.J. & Jickling, B. (2002). "Sustainability" in higher education: From doublethink and newspeak to critical thinking and meaningful learning. *International Journal of Sustainability in Higher Education, 3*(3), 221-232.

Walsh, J.A.H. & Brown, M.S. (1995). *Pricing environmental impacts: A tale of two t-shirts. Illahee, 11*(3&4), 175-187.

Warburton, K. (2003). Deep learning and education for sustainability. *International Journal of Sustainability in Higher Education, 4*(1), 44-56.

Weeks (2004). *The eight essential steps to conflict resolution.* New York, NY: Penguin Putnam.

Weenen, J.C. (1995). Towards sustainable product development. *Journal of Cleaner Production, 3*(1-2), 95-100.

Weisbrot, M. (2009, October 13). *A new role for the IMF?* Tikkun Magazine. Retrieved from http://www.tikkun.org/article.php/20091013105540620.

Weller, C.E. (2007). Need or want: what explains the run-up in consumer debt? *Journal of Economic Issues*, *41*(2), 583-592.

Welsh, M.A., & Murray, D.L. (2003). Ecollaborative: Teaching sustainability through critical pedagogy. *Journal of Management Education, 27*(2), 230-235.

Wimmer, W., Züst, R. & Lee, K-M. (2004). *Ecodesign implementation*. Dordrecht, Netherlands: Springer.

World Commission on Environment and Development (1987). *Our Common Future*. Oxford: Oxford University Press.

Wright, T.S.A. (2002). Definitions and frameworks for environmental sustainability in higher education. *International Journal of Sustainability in Higher Education 3*(3), 203-220.

Wuest, B. & McDonald, N. (2009). Application of the meta-goals. *International Apparel and Textiles Association Newsletter, 31*(3), 10.

Yin, R.K. (1989). Case study research: Design and methods. Newbury Park, CA: Sage Publications.

Young, C., Jirousek, C., Ashdown, S. (2004). Undesigned: A study in sustainable design of apparel using post-consumer recycled clothing*. International Textile and Apparel Association, 22*(1), 61-68.

Zimmerman, B.J. (1993). Commentary. *Human Development, 36*, 82-86.

Appendix A - **Focus Group Moderator Guide**

[Note to moderator]: Purpose of the study: *To examine the learning and development experience of students enrolled in a course that has been redeveloped using the ESD framework. A description of major outcomes and how they occur will allow implications to be made about how AT education might be enhanced by the use of the ESD, better preparing students for sustainable development*.

Introduction: *Welcome and thank you for volunteering to participate in this study. Your perspectives are important to us. There is no right or wrong answer to the proceeding questions, and it is not imperative that you agree with your peers' responses. Rather, your opinions and feelings about the research topics are all important to the study, so do not hesitate to share them.*

Purpose statement: *The purpose of this study is to better understand the experience you have had in the course Private Label Apparel Product Development, a course that has been redeveloped to integrate sustainability. Your participation is critical to understanding how changes to instruction and content impact students.*

Statement of confidentiality: *Your participation is not, in any way, associated with your final grade for this course, and your answers are completely confidential. Focus group participant identities will only be known to me and my assistant. Your names will be replaced by a participant number during transcription, after which, the recordings will be destroyed. Also, the transcription of this interview will be completed by a third party to further insure confidentiality. Though your instructor is a research collaborator and will review the transcriptions, this data will not be delivered to her until after final course grades are submitted. Additionally, statements made by participants may be used in publications to illustrate themes in the research project. However, any statement that may reveal your identity will never be used.*

Guidelines: *There are some guidelines I ask that you use as we proceed through the interview:*
1) You do not need to answer questions in order; when you have something to say, simply jump in!
2) When someone is speaking, please allow them to finish their thought completely before beginning to answer yourself. Keep in mind that though there are many of you in the group, we would like to hear everyone's perspective.
3) It is unlikely you will agree with everything that is said by other participants, and when you disagree it is important you make that known, but do it in a professional way as to not hurt other participants' feelings.

4) Our time is limited today to an hour and 50 minutes, so there may be times when I may need to stop the discussion and redirect in order to cover the most important topics related to the study. Are there any questions?

Warm-up: *I am sure that you all have gotten to know each other during the course of the semester, but I am not necessarily as familiar with you. So, if you could please tell me your name, how long you have attended K-state, and when you hope to graduate.*

Say to the participants: *The purpose of the following questions is to better understand the ways your learning and development were impacted by the course.*

1. So, first I would like for you to tell me about what your experience has been like taking this course.

2. What are some of the most important outcomes you will take away from this course? In other words, what were some of the most important things you learned?
   Prompts:
   - *What did you learn?*
   - *Why is what you learned important?*
   - *How did these learning outcomes change your perspective or behavior?*
   - *Look for: Sustainability content, collaborative & thinking skills, shift in values*

3. There were a set of skills [listed on your reference sheet] that were incorporated into the course because they were identified as being important for tackling sustainability-related problems. How did the inclusion of these skills in the course impact your own development of collaborative and thinking skills?
   Prompts:
   - *What were some of the skills you felt you made the most progress with during the semester?*
   - *How are you using these skills now or how will you use these skills in the future?*

4. When you look back on some of the most important outcomes you've discussed with me so far, what was the typical process or experience that brought these about?
   Prompts:
   - *In other words, how did those outcomes happen?*
   - *Description of what the experience of learning was like*
   - *How was this learning experience different from other learning experiences you've had?*

5. What aspects of the course were most helpful in achieving the learning and development you experienced this semester?
   Prompts:
   - *How did these help you learn/develop?*
   - *Things to look for: Pedagogy, course policies, the instructor as facilitator/collaborator, assignments (PD or reflective), activities, lectures, discussions, group work, other experiences outside class*

6. What aspects of the course had the least impact on your learning and development? In other words, were there aspects of the course that might have frustrated or concerned you, detracting from your learning?
   Prompts:
   - *Why were these aspects not helpful?*
   - *Things to look for: Pedagogy, course policies, the instructor as facilitator/collaborator, assignments (PD or reflective), activities, lectures, discussions, group work*

7. Compare this course to others you have taken in your apparel program. How was it similar to other courses in your AT program? How was it different?

   Prompts:
   - *Compare the course design & content*
   - *Compare learning and development outcomes*
   - *Attendance of other courses*
   - *Engagement in other courses*
   - *Group work experience*
   - *Level of difficulty*

8. There have been two ways in which we have taught this course:
   - The first way is to teach about apparel product development using traditional design and marketing approaches, creating a line of products for the current market. In this option, sustainable strategies may be incorporated into the product development proposal, but this is optional only and is not a running theme in the course.
   - The second option is the course you experienced, which was designed specifically to teach about sustainability and also increase collaborative and thinking skills to strengthen problem solving related to sustainability.

The course you experienced simply used the topic of product development to develop this knowledgeability and these skills. Imagine the first option had been used in the

course you are enrolled. In what ways do you think your experience in the course might have been different?

9. At the beginning of the course, you were asked if you were a change agent. How did you answer the question then? How would you answer the question now? Explain.

Wrap-up: [note to moderator] Please give participants a brief summary of major themes you have identified in the interview and get a sense via a show of hands of how strong each theme is among the group.

Say to participants: *We are now unfortunately out of time. I would like to summarize some of the major ideas that I have heard today and get an idea of how each of feel about them . . . [1, 2, 3 . . .] I am not looking for more discussion, but just a general since of how many of you share a similar perspective. How many of you feel . . . about . . . ? [1, 2, 3 . . .]. Is there anything you feel is important to add to this summary? There were some other ideas that we were not able to discuss completely . . . [1, 2, 3 . . .].*

Closing statement: *I want to thank everyone for your time and your participation in this study. I want to remind you that your identities will be concealed in transcriptions by replacing your name with a participant number, after which the recordings will be deleted. It is important that you do not discuss comments made by various group members and respect each participant's right to anonymity. Are there any other questions? Again, I appreciate your participation. Your honest responses have made a significant contribution to the study.*

Appendix B - **Field Note and Observation Template**

Field Notes							
Class topic:							
Date	/ /	**Day of the week**	T R	**Attendance**		**Time of completion**	
Descriptive notes				**Observations of student experience**			

Appendix C - **Researcher Reflexive Journal Template**

Reflexive Journal					
Class time:					
Class topic:					
Date	/ /	**Day of the week**		**Time**	**: AM/PM**
Narrative					
Feelings associated with what happened:					
• • • •					
Thought process associated with what happened & exploration of interpretations:					
Implications					

Appendix D - **Reflection Template**

Reflection Template (© Armstrong, C.M.; Kansas State University; 2009)					
Name:					
1) Give yourself a score for each dimension of the following 5 skills. Select a score from 1-5 that best reflects an *honest appraisal* of your current skill level. 2) Then move to the bottom of this document labeled "student reflection" & reflect on the guiding questions.					
1 = *No skill* *Bench warmer*	*2 = Below Avg.* *Beginner Apprentice*		3 = *Average* *Capable Apprentice*	4 = *Above Avg.* *Master Apprentice*	5 = *Exceptional* *Accomplished Expert*
Collaboration & cooperation	Engagement *Your score =*	An accomplished expert participates fully in the group process, sharing information freely, demonstrating a high level of accountability to the group, and building good relationships with group members.			
	Interaction *Your score =*	An accomplished expert's interaction with their group denotes the following qualities: Tolerance, respect, friendly, cooperative, helpful, & mutual understanding. The expert also makes sure all group members feel included.			
	Leadership *Your score =*	An accomplished expert shares leadership with group members & is sometimes the leader, sometimes the follower, based on what the group needs. The expert frequently adjusts their individual preferences for the good of the project.			
	Learning *Your score =*	An accomplished expert has a learning attitude, seeking to heighten their own learning from working with the group. The expert seeks to help the group generate an expansion of ideas.			
Effective communication	Listening *Your score =*	An accomplished expert practices intelligent and courageous listening in their group, refraining from criticism or dismal, and seeks to find the legitimacy in what is being said.			
	Expression *Your score =*	An accomplished expert communicates clearly, persuasively, & meaningfully and can express their ideas without dominating the discussion. The expert also encourages group members to freely express their ideas, keeps the group focused on solutions, and helps the group reach a consensus everyone can live with.			
Conflict resolution	Acknowledging *Your score =*	An accomplished expert anticipates conflict in group work & does not shy from it, as it is just part of having relationships. The expert is able to recognize when values, perceptions, or needs of group members may be in conflict with each other. The expert encourages the use of democratic discussion in order to bring to light the dimensions of the conflict.			
	Resolving *Your score =*	An accomplished expert emphasizes a "we" perspective, rather than an I-versus-you perspective when working through a conflict. The expert successfully resolves conflicts in an equitable, mutually beneficial way, which leads to an improved relationship among all group members.			

Systems thinking	Multiple perspectives *Your score =*	An accomplished expert can identify social, environmental, & economic perspectives of an issue or idea at the same time & explore those perspectives.
	Identifying interrelationships & conflicts *Your score =*	An accomplished expert can identify where social, environmental, & economic perspectives interrelate & may conflict. An expert is also okay with the uncertainty & ambiguity related to solving problems about sustainability and does not require a perfect answer.
	Decision making *Your score =*	An accomplished expert is able to create viable and innovative trade-offs between social, environmental, & economic ideas or priorities, creating a solution that is as sustainable as possible. The expert helps their group think about the impact of project decisions on society, the environment, & the economy, challenging the status quo as well as their own assumptions.
Values-focused thinking	Articulation *Your score =*	An accomplished expert is able to articulate their personal values in a professional way, but also appreciate & sees the legitimacy of others' values, even if they are unlike their own. Additionally, experts are able to reflect on their personal experience & use it as a resource in group project decisions.
	Imagining *Your score =*	An accomplished expert helps their group explore new alternatives based on the values the group members have in common, a values-first approach. Then, the expert is able to envision opportunities to realize alternatives, utilizing ethical thinking & frequently considering the various stakeholders that may be affected by the group's decisions.

Student Reflection

This is your time to reflect on what your lived experience has been like in the course so far. The more you reflect, the more you learn. So, it is to your benefit that you describe the journey in detail. (adapted from Pavlovich, Collins, & Jones, 2009)

Reflection on Change Agent Skills

Describe the skills (from the rubric above) <u>*you*</u> have most applied in your most recent group work (collaborative and thinking skills). Remember, this reflection should focus on <u>*you*</u>, and not an assessment of your group. The following are things to consider in this portion of your reflection:

1. Think: What has this experience been like? What did you do? What happened?
2. Reflect about how feel or think about this experience? What did you learn?
3. What might you do differently in the future in the same or similar situation?

Describe the most important developmental progress you have made in the course so far? In other words, in what ways have your collaborative and thinking skills progressed *the most*?

What were the most important ingredients contributing to this progress? In other words, what helped you make this progress? For example, aspects of the course, etc.

Trace the process that led up to this developmental progress and explain what this experience was like. In other words, *how* did you develop? Put this process in chronological order. What came first, then next, leading up to the progress you made. This chain of events may include experiences outside of class. Include a description of what the learning experience was like.

Reflection on Learning
What have been the major learning epiphanies or learning outcomes you have experienced in this course so far? (An epiphany is a sudden and significant leap in understanding or meaning, an "a-ha" moment, that changes how you think or act about something). Discuss why this learning has been in important or how it's been useful to you.
What were the most important ingredients contributing to these epiphanies or outcomes? In other words, what helped you achieve the "a-ha" or the outcome? For example, aspects of the course, etc.
Select the most important epiphany or outcome that you discussed above and trace the process that led up to that learning epiphany or outcome. Explain what this experience was like. In other words, *how* did you learn? Put this process in chronological order. What came first, then next, leading up to the progress you made. This chain of events may include experiences outside of class. Include a description of what the learning experience was like.
Reflection on Group Work
Please briefly explain the contribution and accountability of your group members.

INSTRUCTOR USE ONLY (Hatton & Smith, 1995)			
Points assessed:	**Instructor comments:**		
Reflection-on-Action Rubric			
"Reflection is deliberate thinking about action with a view to its improvement" (Hatton & Smith, p. 40).			
Technical reflection	**Descriptive reflection**	**Dialogic reflection**	**Critical reflection**
0-71 = F – 72-83= D	**84-95 = C – 96-108 = B**	**109-118 = A**	**119-120 = A+**
• Efficient & effective report of events • Strict evaluation of implementation	• Efficient & effective description of events **+** • Evidence that skills have been applied in some way • Open examination of one's own performance in their professional position in the group • Reflection has yielded a clearer understanding & important insights • Has yielded some plan for modified action **LEVEL TWO**	• Efficient & effective description of events **+** • Open examination of one's own performance in their professional position in the group • Reflection has yielded a clearer understanding & important insights **+** • Evidence skills are being applied as described by the rubric • Steps back from events/actions & mulls it over • May read like a conversation with oneself • Exploration of alternative explanations or alternatives • Offers more than one possible plan for modified action **LEVEL THREE**	• Efficient & effective description of events • Open examination of one's own performance in their professional position in the group • Reflection has yielded a clearer understanding & important insights • Evidence skills are being applied as described by the rubric • Steps back from events/actions & mulls it over • May read like a conversation with oneself • Exploration of alternative explanations or alternatives • Offers more than one possible plan for modified action **+** • Awareness & appreciation of ethical and moral dimensions • Awareness of wider historical, cultural & political values at play in the situation **LEVEL FOUR**

Appendix E - Quantitative Survey

Change Agent Skills Final Survey (© Armstrong, C.M. & Brannon, L.A.; Kansas State University, 2010)		
Directions: Think back to when you first began this course. Circle the number that best reflects your *knowledge* & *confidence* level in the following six skills based on when you *first began and where you feel you are now*.		
EFFECTIVE COMMUNICATION		
Not at all = 1 2 3 4 5 6 7 = Completely	**Beginning of course**	**Now**
1. How *knowledgeable* do you feel about effective communication skills as described by the Reflection Rubric?	1 2 3 4 5 6 7	1 2 3 4 5 6 7
How *confident* are you in your ability to . . . 2. . . . listen intelligently & courageously	1 2 3 4 5 6 7	1 2 3 4 5 6 7
3. . . . find legitimacy in others ideas, avoiding criticism or dismal	1 2 3 4 5 6 7	1 2 3 4 5 6 7
4. . . . express yourself without dominating the group	1 2 3 4 5 6 7	1 2 3 4 5 6 7
5. How *confident* are you that you could successfully apply effective communications skills as described in the rubric in your future work?	1 2 3 4 5 6 7	1 2 3 4 5 6 7
COLLABORATION & COOPERATION		
6. How *knowledgeable* do you feel about collaborative skills as described by the Reflection Rubric?	1 2 3 4 5 6 7	1 2 3 4 5 6 7
How *confident* are you in your ability to . . . 7. . . . participate fully in a group (sharing information & accountability)	1 2 3 4 5 6 7	1 2 3 4 5 6 7
8. . . . find ways to learn from group experiences	1 2 3 4 5 6 7	1 2 3 4 5 6 7
9. . . . adjust your personal preferences for the good of the group	1 2 3 4 5 6 7	1 2 3 4 5 6 7
10. . . .share leadership with group members	1 2 3 4 5 6 7	1 2 3 4 5 6 7
11. . . .interact with group members in the spirit of tolerance, respect, & mutual understanding	1 2 3 4 5 6 7	1 2 3 4 5 6 7
12. How *confident* are you that you could successfully apply collaborative skills as described in the rubric in your future work?	1 2 3 4 5 6 7	1 2 3 4 5 6 7
CONFLICT RESOLUTION		
13. How *knowledgeable* do you feel about conflict resolution skills as described by the Reflection Rubric?	1 2 3 4 5 6 7	1 2 3 4 5 6 7
How *confident* are you in your ability to . . . 14. . . . acknowledge when values, perceptions, or needs of group members are in conflict	1 2 3 4 5 6 7	1 2 3 4 5 6 7
15. . . . emphasize a "we" perspective when resolving conflict	1 2 3 4 5 6 7	1 2 3 4 5 6 7
16. . . . resolve conflict in an equitable, mutually beneficial way	1 2 3 4 5 6 7	1 2 3 4 5 6 7
17. How *confident* are you that you could successfully apply conflict resolution skills as described in the rubric in your future work?	1 2 3 4 5 6 7	1 2 3 4 5 6 7
Not at all = 1 2 3 4 5 6 7 = Completely	**Beginning of course**	**Now**
SYSTEMS THINKING		

18. How *knowledgeable* do you feel about systems thinking skills as described by the Reflection Rubric?	1 2 3 4 5 6 7	1 2 3 4 5 6 7
How *confident* are you in your ability to . . . 19. . . . consider multiple perspectives (social, economic, environmental) when working through sustainability-related problems & identify where perspectives may conflict	1 2 3 4 5 6 7	1 2 3 4 5 6 7
20. . . . create innovative trade-offs in order to make the most sustainable decision	1 2 3 4 5 6 7	1 2 3 4 5 6 7
21. How *confident* are you that you could successfully apply systems thinking skills as described in the rubric in your future work?	1 2 3 4 5 6 7	1 2 3 4 5 6 7
VALUES-FOCUSED THINKING		
22. How *knowledgeable* do you feel about values-focused thinking skills as described by the Sustainable Skills Rubric?	1 2 3 4 5 6 7	1 2 3 4 5 6 7
How *confident* are you in your ability to . . . 23. . . . articulate & share your values with a group in a professional way	1 2 3 4 5 6 7	1 2 3 4 5 6 7
24. . . . use values to guide decision-making	1 2 3 4 5 6 7	1 2 3 4 5 6 7
25. . . . consider all stakeholders in decision-making	1 2 3 4 5 6 7	1 2 3 4 5 6 7
26 . . . think ethically	1 2 3 4 5 6 7	1 2 3 4 5 6 7
27. How *confident* are you that you could successfully apply values- focused thinking skills as described in the rubric in your future work?	1 2 3 4 5 6 7	1 2 3 4 5 6 7
REFLECTION		
28. How *knowledgeable* do you feel about reflective skills?	1 2 3 4 5 6 7	1 2 3 4 5 6 7
29. How *confident* are you that you could successfully apply reflective skills in your future work?	1 2 3 4 5 6 7	1 2 3 4 5 6 7

Appendix F - **Course Syllabus**

Private Label Apparel Product Development AT645
Fall 2010 Syllabus

T•R 9:30-11:20

Instructor: Cosette M. Armstrong

"The fashion industry is locked into a cycle of *un*-sustainability . . . The good news is that the industry is *not* inherently unsustainable. People will always need clothes and want to express themselves through what they wear. If we can harness the industry's collective energy, adaptability and capacity for innovation, it can play an important role in creating a sustainable, fair and low-carbon world. Indeed, through its powerful marketing and trend setting, it could play a wider role in making sustainability desirable. *This is a huge opportunity*" (Fashion Futures 2025).

What's the course about?

This is a senior-level capstone course for marketing and design undergraduates. It is *an intense collaborative experience* in which you may synthesize and *apply industry knowledge* learned throughout your program (consumer behavior, design, marketing, textiles, retailing, sourcing) as well as *experiment with cutting edge industry paradigms*.

This semester, you will role-play an industry situation in which Green Sweat, Inc. a sustainable sportswear brand has gone belly up and needs your help. Your employer has purchased the company's assets and brand name in hopes that you, the product development division, will come up with a proposal to re-launch the line. A key concept that will be used to get started is *future-proofing*, by which companies use scenarios from the future to make strategic decisions to make their companies more sustainable.

In collaborative teams, you will *create a product development proposal* using fashion industry scenarios for the year 2025, including all aspects of planning leading up to production. The plan is broken up into a series of assignments including a consumer profile, category survey, a theme & inspiration, a design concept & brief, a marketing dossier, a tech pack, and a sourcing plan. The semester will culminate in a final exhibit for which the format will be determined by the product development division.

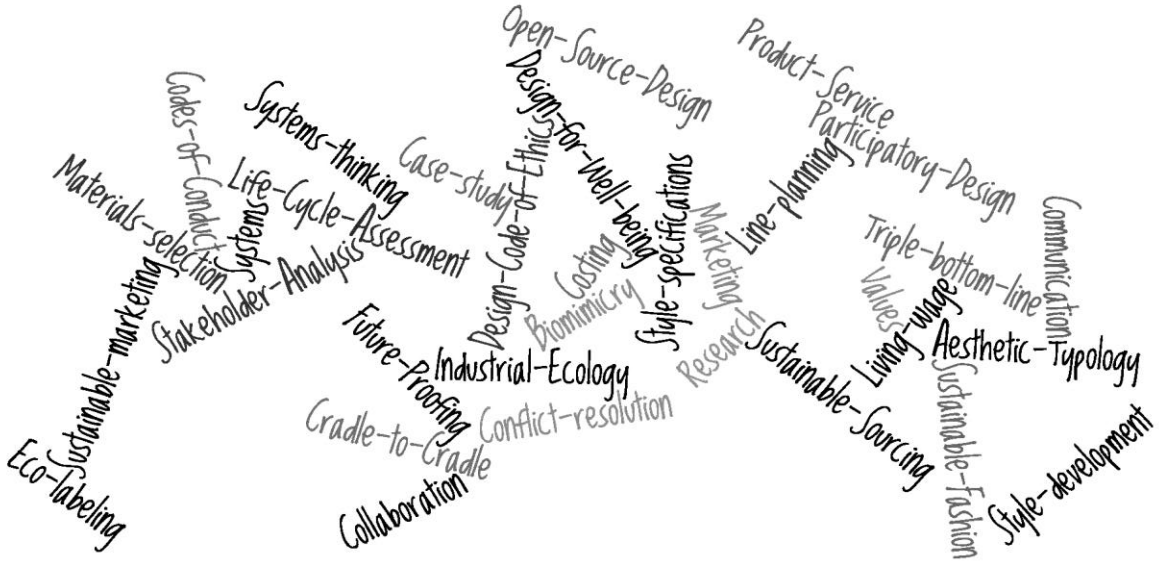
Required books: Thorpe, A. (2007). *The Designer's Atlas of Sustainability: Charting the Conceptual Landscape through Economy, Ecology, and Culture*. Island Press.* & Weeks (2004). The eight essential steps to conflict resolution. New York, NY: Penguin Putnam, Inc.*

A variety of supplemental readings will be used from relevant literature about sustainable product development and design. Some lab assignments are loosely based on the textbook *Perry's Department Store: A Product Development Simulation* (2006) by Guthrie, K.M & Regni, R.J.

Planned Learning Outcomes

- Define sustainability.
- Understand & implement the apparel product development process.
- Understand, practice, critique, & innovatively implement sustainable paradigms in this context.
- Understand, perform, & critique sustainability impact analyses. Implement responsive plans to such critiques.
- Understand & be responsive to the implications of consumer needs versus their wants on sustainability.
- Identify, scrutinize & be responsive to the political, cultural, and economic assumptions that inhibit sustainability.
- Explore values that underpin sustainability. Then, articulate & critique your own.
- Understand, practice, & demonstrate progress toward the development of six fundamental skills important for solving sustainability-related problems: Collaboration/cooperation, conflict resolution, effective/meaningful communication, reflection, systems thinking, & values-focused thinking.
- Envision & forecast action for a sustainable future in the apparel industry.
- Demonstrate skillful research methods.
- Understand & apply industry as well as sustainability related terminology.
- Utilize technology effectively & innovatively.

Course Topics



Course Policies

About collaboration: Collaborative work is fundamental in this course, not only for the completion of your product development proposal, but for your own learning and development. Neither is possible without full participation and engagement. *Participation is defined as making attendance a priority, being fully present during class and group interaction, having a learning attitude, and contributing to group work in a meaningful way.* Approximately 50% of individual course grades are attributed from such engagement, research, and reflection on experience in the course.

Therefore, *no more than three absences during the semester are permitted; each absence exceeding three results in the reduction of one letter grade.* Attendance will begin on the second day of class and *no absences are considered excused*, so budget accordingly. Exceptions to this policy are at the instructor's discretion and are only made in extreme circumstances. Students with perfect attendance characterized by active engagement will receive an increase of up to 5% in their final course grade.

About mandatory attendance during Week 2-3: There are *three class periods* for which collaborative training will be conducted. Attendance is required during this time to progress in the course, as it would be if you were being trained by a new company. Exceptions to this policy are at the instructor's discretion and will only be made in extreme circumstances.

About group grades vs. individual grades: Groups earn grades on lab assignments completed together, while other participation and reflection assignments are assessed individually. *The same grade is assigned to all group members for group assignments*. However, the instructor reserves the right to increase or reduce a student's individual grade if their contribution to the project is disproportionate to the rest of the group.

About participation grades: Approximately *30% of your course grade is based on participation* as defined above. Students will receive a mid-term and final participation grade. Formal assignments related to this portion of your grade will simply receive –'s (weak), ✓'s (ok), or +'s (strong) (Participation assignments A-E). Other assessments are made through observation by the instructor as well as attendance.

About group work: There will be a portion of class time devoted to working on group assignments, indicated in the course agenda as "group work." This time will be structured by the instructor and *students should plan to remain in class during the full class period*.

About due dates: *All assignments are due at the beginning of class, no later than 9:30AM on the designated due date*. Late assignments may be submitted for *up to* half credit. Though due dates may be renegotiated in advance, *due dates will not be moved to accommodate the mismanagement of group time*.

About the learning curve: As each group assignment contributes to a broader product development proposal, the potential for an Aha! moment in between lab due dates is plausible. Therefore, all assignments are graded per rubric criteria when submitted, but may be resubmitted when *meaningful changes* may result in an improved grade or an improved grade overall, as the new addition may provide clarity to the whole. *A meaningful change is defined as one that paints the project in a fresh or innovative light as the result of new learning or an Aha! moment by the group*.

About group mediation: Groups sometimes encounter disruptions due to a lack of attendance or accountability of a group member. When the issue cannot be resolved by the group, *members may deem it necessary to involve a facilitator (the instructor) to mediate a formal conflict resolution process*, which may lead to the termination of a group member. If a group member is terminated, they must find employment with another group, which will require petitioning other groups with a resume. A mediation template can be found on KSOL in the group documents folder to be completed by all group members and submitted to the instructor prior to an appointment, which should be made by all group members with the instructor outside of class. The mediation process is designed as a learning opportunity itself; therefore, group members electing to complete the process will receive participation credit based on their level of engagement and professionalism in the process.

About laptops: Students completing this course are required to come to class with a laptop to use during group work. Students are strongly encouraged to invest in Adobe Creative Suite to complete design-related assignments.

About professionalism: Texting, Googling, and other technology-related diversions are prohibited during instructor lectures and class discussions. If you need to text, take a call, or email, please step outside. *Students who do not respect this policy will be asked to leave.*

About the Wiki: This course will utilize a Wiki for many of the group assignments to be completed this semester. Please reference the Wiki ground rules before you begin group work. Also, *as lab assignments are assigned, group members are expected to commence work on the Wiki.* Meaning, it is vital to the group's productivity that you do not wait until the last minute to put your information into the group's document, as time will be needed before submission to synthesize and refine. It is highly recommended that *groups create mutually agreeable deadlines for information to be posted*.

About assigned reading: Required readings are to be read before the class date listed in the course agenda. Instructor reserves the right to quiz.

About Writing Styles: Reflections may be written in a conversational style, excluding texting-type code (i.e. LOL, OMG, IDK) for which your instructor is too old to translate. All other written work should be completed using APA format. *Assignments not in APA format will be returned to you for editing for a reduced grade.* Here are the high points:

- 12 Pt Times Roman or Arial Font
- .5 indentions
- 1 space after punctuation
- Double spacing
- Citation embedded where information is discussed (Lastname, 2010); no page number required unless using a direct quote (p. 53)
- No contractions (can't should be cannot)
- Reference section should have a .5 hanging indention

Please consult the AT645 Library Page or the Purdue Online Writing Lab for more specifics about APA: http://owl.english.purdue.edu/owl/resource/560/01/.

Course assignments

Quality engagement/learning attitude/group contribution/attendance	30%	(300 points)	
Reflections (2)		20%	(200 points)
Group assignments (8)		50%	(500 points)
Perfect attendance		+5%	(50 points)
		Total	**1000 points**

Point breakdown for group assignments:

Lab 1: Consumer Profile	5%	(50 points)
Lab 2: Product Category Scan	5%	(50 points)
Lab 3: Theme & inspiration	5%	(50 points)
Lab 4: Design Concept & Brief	10%	(100 points)
Lab 5: Marketing Dossier	10%	(100 points)
Lab 6: Tech Pack	7%	(70 points)
Lab 7: Sourcing Plan	3%	(30 points)
Lab 8: Final Exhibit (peer reviewed)	5%	(50 points)

Point breakdown for reflections:

Reflection 1	8%	(80 points)
Reflection 2	12%	(120 points)

Teaching philosophy

This is my 3-year-old niece who has recently enrolled in pre-school. In a philosophical conversation about education, she expressed to me some key ingredients that make her education satisfying: 1) Fun, 2) Talking with her friends, 3) Singing and dancing, 4) Doing stuff and making things (short naps & frequent snacks). In more sophisticated terms, she enjoys a constructivist learning environment in which she actively constructs what she knows using her own experience (or context) and interaction with her peers.

She is especially fond of being active in the classroom, being able to pursue things that are interesting to her, and being able to express what she is learning in a variety of ways. It is my teaching philosophy to provide such an environment (minus the naps & snacks, sorry). Lev Vygotsky (dialectical constructivism), John Dewey (individual-centered curriculum), and Elliot Eisner (educational imagination) have been especially influential. For a more eloquent explanation, see Sir Ken Robinson on Ted.com: http://www.ted.com/talks/sir_ken_robinson_bring_on_the_revolution.html (16:48).

Learning philosophy . . . *you will learn the most if you . . .*

- Intend to learn
- Reflect about what you are learning
- Talk to your peers about what you are learning
- Talk to me about what you are learning
- Try to live what you are learning
- Give up the need for one right answer
- Be open to new experiences & perspectives
- And, be willing to make mistakes & learn from them

Appendix G - Coding Rubric: Outcomes

Outcomes of the Course		
(T) = Theory-driven code (I) = Inductive code	(L) = Learning outcome (D) = Development outcome	(ESD) = Education for Sustainable Development (C) = Constructivism (ZPD) = Dialectical constructivism
Theme	***Definition***	***When to apply***
(T)(L)Sustainability literacy(ESD)	Sustainability literacy includes knowledge related to sustainability, considered fundamental to empowering individuals to make change and move others to make change.	*Apply sub themes*
(I)(L)Sustainability knowledge & awareness	Participants indicate that, as a result of completing this course, they have increased their knowledeability of and awareness about sustainability and its implications for the apparel industry as well as a better appreciate the concept's complexity.	When a participant indicates that they now have a better understanding or awareness about sustainability and its implications for the apparel industry or the world. May also include an appreciation for the complexity or dimensionality the concept embodies.
(I)(L) Recognizing sustainability's importance & need for change	Participants indicate that, as a result of completing this course, they recognize the importance of sustainability in the apparel industry or the world and/or recognize the need for change. Some indicate that they are ready to make change themselves or have a desire to influence change in others.	When a participant indicates that they recognize the importance of sustainability and/or the need for change. May include indications that participant feels ready to make change themselves or influence change among others.
(I)(L)Sustainable strategies	Participants indicate that, as a result of completing this course, they better understand strategies that are being used or could be used to solve sustainability-related issues in the apparel industry.	When a participant indicates that they understand strategies that are being used or that could be used to solve sustainability-related issues in the apparel industry. A broad range may be included, related to marketing, materials, disposal, etc.
(I)Personal consumption change	Participants indicate that, as a result of completing this course, they have changed the way they shop or have changed other consumption activities to better support sustainability.	When a participant indicates that they have recently changed their own behavior, such as their consumption habits, to better support sustainability.
(T)(D)Change agent skills: Working with others(ESD)	Participants indicate that, as a result of completing this course, they have learned about and developed change	*Apply sub themes*

	agent skills related to *working with others.* The course design itself emphasized the development of collaboration/cooperation, effective communication, and conflict resolution.	
(I)(L)Time does not heal all wounds	Participants indicate that, as a result of completing this course, they have learned that conflict must be confronted promptly, rather than wishfully thinking they do not exist.	When a participant indicates that they have learned that conflict must be confronted promptly, rather than denying it. May include description of conflict as an important conduit for growth or learning.
(I)(L)Good communication encourages inclusion	Participants indicate that, as a result of completing this course, they have learned that good communication insures inclusion of all members, increasing collaborative ability; including, clearly expressing personal viewpoints and listening to others' viewpoints without judgment.	When a participant indicates that they have learned that good communication skills, like expressing themselves clearly and listening to others' perspectives without judgment, increases inclusion of all group members and the group's ability to collaborate.
(I)(L)Awareness of personal behavior	Participants indicate that, as a result of completing this course, they are more aware or are reflective about their personal strengths, weaknesses, or behavior patterns.	When a participant indicates that they have become more aware of their personal strengths, weaknesses, or behavioral patterns.
(I)(L)I am not an island	Participants indicate that, as a result of completing this course, they have learned that good collaboration means *everyone working together*, *sharing the labor*, rather than one person doing everything by themselves.	When a participant indicates that they have learned that good collaboration, even if it's difficult, requires *everyone's involvement* and/or working together is preferable to working individually or one person doing everything.
(T)(D)Ability for personal expression(ESD)	Participants indicate that, as a result of completing this course, they have improved their ability to communicate effectively.	When a participant indicates that they have improved their ability to express themselves, which may include "speaking up" or sharing their ideas without being afraid of embarrassment or hurting someone's feelings.
(T)(D)Ability to listen without judgment(ESD)	Participants indicate that, as a result of completing this course, they have improved their ability to listen to others without judgment and/or use their "interaction skills," which connotes embodying tolerance, respect, and mutual understanding in an effort to include everyone's perspectives.	When a participant indicates they have improved their ability to listen to others more openly, without being dismissive or critical. May also be referred to in the data as "interaction" or "interaction skills."
(I)(D)Ability to build ideas	Participants indicate that, as a result of completing this course, they have improved their ability to build ideas or solutions *with* others.	When a participant indicates that they have improved their ability to brainstorm collaboratively and/or expand or build upon others' ideas.

[T][D]Ability to collaborate democratically[ESD]	Participants indicate that, as a result of completing this course, they have increased their ability to collaborate; effectively leading *and* following as well as adjusting their personal preferences for the good of the group.	When a participant indicates that they have improved their ability to collaborate with others, adjusting personal preferences for the good of the group. May include descriptions of leading *and* following or taking a "we" approach to projects as opposed to working individually.
[I][D]Ability to be all in	Participants indicate that, as a result of completing this course, they have improved their ability to interact with and engage in group work fully, sharing information freely and demonstrating accountability to the group.	When a participant indicates that they have improved their ability to interact with and engage in group work and/or demonstrate accountability or a "strong work ethic" in group work. May also be referred to in the data as "engagement" or "engagement skills."
[T][D]Ability to acknowledge & resolve conflict[ESD]	Participants indicate that, as a result of completing this course, they have improved their ability to acknowledged and resolve conflict.	When a participant indicates that they have improved their ability to acknowledge the presence of conflict and/or resolve a conflict. May include descriptions of the ability to reach agreements that are good for everybody. May also be referred to in the data as "acknowledging" or "resolving" skills.
[T][D]Change agent skills: Critical thinking[ESD]	Participants indicate that, as a result of completing this course, they have increased their ability to *think critically.* The course design itself emphasized the development of systems thinking, values-focused thinking, and reflection.	*Apply sub themes*
[T][D]Ability for values-focused thinking[ESD]	Participants indicate that, as a result of completing this course, they have increased their ability to articulate and use their own personal values to compass decision making.	When a participant indicates an improved ability to articulate and use their own personal values during decision making. May also be referred to in the data as "imagining" or "articulating."
[T][D]Ability to reflect[ESD]	Participants indicate that, as a result of completing this course, they have increased their ability to reflect on their own personal behavior or experience with improved action in mind.	When a participant indicates an improved ability to "step back" or reflect on their personal behavior or experience with improved action in mind.
[T][D]Ability for systems thinking[ESD]	Participants indicate that, as a result of completing this course, they have improved their ability to think in systems: Seeing all parts of the systems, identifying relationships and conflicts between parts, and resolving conflict between parts with innovative trade-offs.	When a participant indicates an improved ability to think in systems (identify relationships, conflicts, and resolve conflict among the parts of a system) as the result of completing this course. May also be referred to in the data as "systems thinking."

[I][D]Ability to think creatively & imaginatively	Participants indicate that, as a result of completing this course, they have improved their ability to think creatively and imaginatively.	When a participant indicates that they have had to use their creative and imaginative thinking skills in the course and/or have improved their ability to think creatively, imaginatively, or "outside the box."
[T][L,D]Lifelong learning[ESD+C]	Participants indicate that, as a result of completing this course, they have an increased desire to learn more about the course topic/material, and in some cases, complete voluntary research outside class to gain more knowledge.	When a participant indicates a desire or intention to continue learning more about a course topic, beyond the course. May also include descriptions of continuing to think about a topic after class or conduct voluntary research to gain more knowledge.
[T][L,D]Transfer[ESD+C]	Participants indicate that, as a result of completing this course, they *anticipate applying* or have *already applied* learning and development from the course to new and different situations.	When a participant indicates that they *anticipate applying* or have *already applied* learning or development from the course to new and different situations. May include descriptions of how the course has better prepared them for their future career or how it has influenced their future career plans.

Appendix H - **Coding Rubric: Impact of Course Design**

Impact of Course Design		
(T) = Theory-driven code (I) = Inductive code	(L) = Impacted learning (D) = Impacted development	(ESD) = Education for Sustainable Development (C) = Constructivism; (ZPD) = Dialectical constructivism
Theme	***Definition***	***When to apply***
(T)(L)Holistic infusion of sustainability(ESD+C)	Course content is reframed entirely to better support sustainability; *un*-sustainable language or root metaphors are removed. A broad perspective of the course content is taken, focusing on a "big idea" or problem and the major concepts that characterize it; preference for systems over fragmented perspectives.	When a participant describes the course experience as being "all about sustainability" or describes how all course topics were tied to sustainability in some way. May also include descriptions of course topics or assignments as being highly interrelated or fitting together to create a bigger picture.
(T)(L,D)Reality modeling(ESD+C)	Course design takes on a real life situation or problem and emphasizes real approaches/applications to that situation or problem to increase learners' capacity for problem-solving.	*Apply sub themes*
(T)(D)Democratic role play(ESD)	Course design embodies a democratic framework. Democratic dialogue is fostered. Both leading *and* following in a problem situation are part of the course structure, reducing propensity for one group member to dominate.	When a participant identifies the course concept of leading *and* following or the structure of course assignments centered on leading *and* following (e.g. "designated facilitators" or "real management titles") as enhancing their development.
(I)(D) Company training	The "company training" completed at the beginning of the course models a real work situation in which participants, who were playing the role of product development "employees," are prepared for productive and effective collaboration. Participants are also required to identify skills areas they most want to improve during the course, just as a performance review in the real world would require.	When a participant indicates that the emphasis in the course on collaborative training prepared them for productive and effective collaboration. May also include descriptions about being required to work on specific skills during the course.
(I)(D)Group contract	Participants create a group contract at the beginning of the course to set clear expectations for work ethic, akin to a code of ethics often developed in a real work situation.	When a participant indicates that preparing a contract, "plan," or "ground rules" with group members insured everyone understood the expectation for work ethic.

[I][L] Real world applications illustrated	The use of videos or other image-related materials that illustrate or explain the application of course concepts in the real world are designed to enhance learning and application of course concepts to course work.	When a participant indicates that illustration of the real world applications of course concepts via videos, websites, or other image-related materials enhanced their learning.
[I][L]Focus on the future	The course design focuses on fashion for 2025, prompting students to envision a sustainable future and imagine how the apparel industry may change responsive to current real world challenges like resource depletion and climate change.	When a participant indicates that the course's focus on the future or their future "scenario" has enhanced their learning. May include descriptions of this aspect of the course as challenging and thus, increasing their creativity and imagination.
[T][L]Supplemental materials[C]	The course is designed to focus on a relevant problem, and thus requires the use of supplemental materials about the specific problem; preferable to a textbook.	When a participant identifies the use of supplemental readings (e.g. articles about sustainability, future scenarios report, etc.) as being interesting to read and enhancing their learning.
[T][L]Variety[C]	The course design features a variety of modes of presentation (ways in which content is presented) as well as a variety of modes of response (ways in which the learner can express what they learn). Thus, a wider range of learning styles is accommodated.	When a participant identifies the use of a variety in course materials related to one course topic (e.g. lecture, readings, videos, activities) or having a variety of choices or approaches to utilize in completing assignments as enhancing their learning.
The Instructor	From both an ESD and constructivist perspective, the instructor takes a more personal, interactive, and collaborative approach to teaching and is more sensitive and responsive to individual learners. These attributes are extended by a dialectical perspective of constructivism in the following themes.	*Apply sub themes*
[T][L,D]Instructor responsiveness [ESD+C+ZPD]	Instructor is responsive to the learner's current level of learning or development; instructor is flexible to cover unexpected ground or travel in unexpected directions to increase understanding or encourage student exploration. Thus, boredom or frustrations are carefully managed by instructor.	When a participant describes the instructor as sensitive or responsive to their learning or development needs. May include descriptions of how instructor has adjusted her approach to increase understanding, helped a student get "unstuck," or the way the instructor explains concepts in "English" rather than "abstraction."

(T)(L,D)Interaction with expert(ESD+C+ZPD)	The instructor (the expert) interacts and collaborates with the learner frequently, sharing their expertise. This allows the learner to try on the expert's conceptual frameworks or practices, thrusting the learner beyond their current level of development until the learner becomes autonomous.	When a participant identifies interacting and collaborating with the instructor as enhancing their learning or development. May also include description of instructor being involved in course work.
(T)(L,D)Feedback loops(ESD+C+ZPD)	The instructor (the expert) provides continual feedback throughout the learning process.	When a participant identifies continual feedback on behavior and course work given by the instructor as enhancing their learning or development.
(T)(L)Practice what you preach(ESD)	Instructor models behavior and demonstrates an interest in supporting sustainable development or sustainability.	When a participant describes the instructor as passionate or invested in sustainability and identifies this as enhancing their learning.
Other mechanisms for learning	From both an ESD and constructivist perspective, the primary mechanisms for learning are collaboration, discussion with others, and real experience. These mechanisms are used to trigger contradictions, challenging the learner's suppositions, prompting new learning.	*Apply sub themes*
(T)(L,D)Collaboration(ESD+C)	Course design fosters frequent social interaction and shared work, the key conduit to extending and shifting learner suppositions.	When a participant describes their experience working in a group or the course design's emphasis on working in a group as enhancing their learning or development.
(T)(L,D)Discussion(ESD+C)	Learning environment fosters ample discussion on course topics (learner-learner, learner-instructor verbal dialogue) as a mechanism for increasing internal contradictions in the learner that prompts new learning.	When participant identifies class discussion, verbal dialogue about course topics, as enhancing their learning or development.
(T)(L)Action (ESD+C)	Course design emphasizes real action within the classroom and without, encouraging learners to explore, invent, and apply course concepts.	When a participant identifies "hands-on" activities or other types of application used in the course as enhancing their learning or development.
(I)(L,D)Small class size	Participants indicate that their learning and development were enhanced by having a small number of students in the class. This especially enhances learning about sustainability.	When a participant indicates that the small class size has enhanced their learning or made them feel more comfortable to participate in the class. May include specific reference to enhanced learning about sustainability in this way, as opposed to a "lecture hall" situation.
(T)(L)Authentic assessment(ESD+C)	Course design utilizes methods of assessment that make transparent the process by which the learner arrives at their	When a participant identifies the use of authentic methods of assessment (e.g. projects,

	conclusion, and not just the conclusion. These may include formal projects as well as classroom observations.	reflections, exhibit) in the course, rather than "test taking" as enhancing their learning.
[I][L,D]Lack of proper scaffolding	Participants indicate that, at times, the course did not reflect proper scaffolding; meaning, topics or assignments were introduced before the learner could digest previous concepts.	When a participant indicates that the pace of the course was disruptive to their learning or development. Descriptions may include the juggling of multiple assignments at one time and/or the introduction of new material before the learner gained closer on previous concepts or work.
[I][L] Multi-disciplinary team overworks designer	Participants indicate that, at times, the work load on the design student in the group was too heavy. Marketing students feel ill equipped to help in this area.	When a participant indicates that the design student in the group was over taxed with work during the project. May also include descriptions of inadequacy felt on the part of marketing students, who felt ill equipped to assist in design-related assignments.
[I][L]Classroom/period logistics are challenging	Participants indicate that, at times, the nature of the physical classroom (which was small and cramped) and the long class period were onerous.	When a participant indicates that the physical classroom was cramped or difficult to work in and/or the long class period made it difficult to stay attentive.

Appendix I - **Coding Rubric: Learning and Development Process/Experience**

Process/Experience		
(T) = Theory-driven code (I) = Inductive code	(L) Impact on learning (D) Impact on development	(ESD) = Education for Sustainable Development (C) = Constructivism; (ZPD) = Dialectical constructivism
Theme	***Definition***	***When to apply***
(T)(L,D)Personal relevance(ESD+C)	Making course topics/material personally relevant to the student increases engagement.	When a participant describes their learning or development process/experience as being characterized by a personal interest in the course material/topic or practices or a gained personal interest over time.
(T)(L,D)Challenging suppositions(ESD+C+ZPD)	The course is designed to extend or challenge what the learner knew previously, causing a contradiction which stimulates new learning.	When a participant describes their learning or development process/experience as being characterized by a transformation in their perspective or a contradiction or extension made to what they knew previously. May also include description of how the learner struggled to relinquish old thought or behavioral patterns.
(I)(L)Learning gradually expands	Participants indicate that their learning process/experience in the course is characterized by a gradual expansion of learning over time, across the semester.	When a participant describes their learning process/experience as being characterized by a gradual expansion of knowledge over time, across the semester. May include descriptions of the course concepts "building on themselves."
(I)(L)Socially reliant outcomes	Participants indicate that their learning process/experience in the course is characterized by the reliance on peers to arrive at high quality outcomes.	When a participant describes their learning process/experience as being characterized by a reliance on or engagement with peers to arrive at high quality outcomes. May be termed in the data as "learning skills."
(I)(D)Adversity experienced	Participants indicate that their development process/experience in the course is characterized by adversity experienced in the group, prompting the increased development of collaborative skills.	When a participant describes their development process/experience as being characterized by adversity experienced during group work.
(I)(D)Practice yields confidence	Participants indicate that their development process/experience in the course is characterized by practicing new behaviors which yields greater confidence.	When a participant describes their development process/experience as being characterized by practicing or trying out new practices and gaining confidence in their skills as they practice.

Appendix J - **Coding Rubric: Comparison to Other Courses**

Comparison to Other Courses		
(T) = Theory-driven code (I) = Inductive code	(L) = Related to learning (D) = Related to development	(ESD) = Education for Sustainable Development (C) = Constructivism; (ZPD) = Dialectical constructivism
Theme	***Definition***	***When to apply***
(I)(D)Group work is more productive	Participants indicate that group work in this course was more productive and yields more learning. Most participants associate this with the course's emphasis on collaborative training.	When a participant indicates that group work in this course was more productive than in other courses and/or may have yielded more learning. May include descriptions of other courses which "throw you together and let you go," rather than preparing the group for collaboration.
(T)(L,D)Instructor is more engaged	Participants indicate that in this course the instructor was more engaged or involved with students and/or was more responsive to their learning or development needs.	When a participant indicates that the instructor was more engaged or involved with students and was more responsive to their learning or development needs. May also include descriptions of an increased level of feedback compared to other instructors.
(I)(L)Course material is more applicable	Participants indicate that there was a stronger relationship between course readings and in-class activities or discussion to their required work. Consequently, participants indicate that they were more inclined to read and complete other work in preparation for class.	When a participant indicates that the course material was more applicable to their required work, so they are thus, more inclined to prepare for class by completing the readings or other work, as it is directly applicable to in-class activities/discussion or the semester project. May also include descriptions of the course material being more applicable to situations outside class.
(T)(L)More holistic infusion of sustainability(ESD)	Participants indicate that the course was more cohesive than other courses they have taken. Meaning, course modules evidenced relationship to each other across the semester, rather than being disjointed.	When a participant describes this course as being more cohesive and connected across the semester, rather than being fragmented or "all over the place." May include descriptions of greater depth of understanding about sustainability that was achieved.
(I)(L,D)Class size is smaller	Participants indicate that this class was smaller than most of their other courses, which raised the comfort level of learners and increased engagement or interaction.	When a participant indicates that this course's class size was much smaller than other courses they have taken and describe this attribute as enhancing their learning or development.
(I)(L)Course models discipline processes	Participants indicate that this course models other discipline practices or processes.	When a participant indicates that some aspects of the course were similar in practice or process to other courses in their program.