

INTRODUCTION TO INTEGRATING SUSTAINABILITY INTO CURRICULUM

Enakshi Sengupta, Patrick Blessinger and
Taisir Subhi Yamin

ABSTRACT

In this ever changing world, managing our ecosystem and creating a sustainable future seems to be one of the biggest challenges facing humanity. This challenge is further enhanced by ignorance or apathy of people toward the concept of sustainability. In most cases, students who are our future generation are left without any insight, commitment or even understanding their role and responsibility toward creating any meaningful beliefs and actions related to sustainability. Sustainability education is becoming crucial, mainly for young generation so that they have an understanding of concepts such as economic prosperity, resource equity, energy uses, and environmental health and concerns. While educating them on sustainability begins in institutions of education, it is important that sustainability education is well entrenched in the curriculum and everyday practice of their lives. This chapter introduces the volume series on sustainability where authors from different parts of the world narrate their own experience of imbibing sustainability into their curriculum and teaching sustainability to students.

Keywords: Sustainability; curriculum; future generation; environmental concern; education; economic prosperity; transformative education; interdisciplinary approach

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INTRODUCTION

United Nations Educational, Scientific and Cultural Organization (UNESCO) (2009) advocates imparting knowledge in sustainability to students through which it enables students to develop the attitude, skills, and knowledge toward sustainability and take firm and decisive actions in their everyday lives to help inculcate sustainability throughout society. Education in sustainability has been supported by global frameworks such as the United Nations' Decade of Education for Sustainable Development (2005–2014) and the Global Action Programme on Education for Sustainable Development (post-2014), both led by the United Nations Educational, Scientific and Cultural Organization (UNESCO) (Buckler & Creech, 2014; UNESCO, 2014).

Higher education institutions have a role and responsibility in promoting sustainability in young minds by developing students as change agents (Moore, 2005; Svanstrom, Lozano-Garcia, & Rowe, 2008), encouraging ideas which are expressed freely, challenging paradigms, and promoting creativity and growth of knowledge (Barth, Godemann, Rieckmann, & Stoltenberg, 2007; Cortese, 2003; Lozano, 2006). Sustainability is not a standalone concept, and it is reflected in various other subjects, being multidisciplinary in nature (UNESCO, 2014). The very nature of this subject can be a contested terrain, which is multilayered and multifaceted, thus creating scopes for debates and creative learning (UNESCO, 2014).

It is argued and agreed by educationists that there exists an urgent need to educate students and enable them to understand sustainability matters so that while growing up they assume the role of pro-sustainability citizens, caring for their planet and surrounding with a futuristic view toward conserving and preserving the planet for future generations. In spite of having a general consensus about the positive effects of sustainable education there lies a whole plethora of contradiction surrounding the nature of pedagogy and the right way to administer sustainability education. It is often perceived in colleges and universities that sustainability-driven courses are delivered with a banking concept of education where a lecture-driven class often deposit knowledge without a proper understanding of the concept and without facilitating a process to address curiosity and encouraging debates. In light of such methods, it becomes imperative that new methodologies and frameworks are developed by academics to facilitate the understanding of sustainability (Cervantes, 2007). A worldview should be imparted to students that encompasses different interpretations of sustainability so as to avoid educational disconnect. Goekler (2003) argues that the concept of sustainability cannot be learned by merely receiving lecture-driven notes. Students need to develop the ability to think multifaceted ways and be tolerant to differing and even paradoxical views from different corners of the world.

The aim of imparting education to understand sustainability is to empower students to make decisions that balances the need to preserve healthy ecosystems and ultimately promote vibrant economies with an equitable social system. Studies have shown that students who are given discourses in sustainability are more motivated, better behaved, and sensitive toward their environment.

Such curriculum provides connections between students and their local communities facilitating collaborative work in promoting healthy lifestyles. Sustainability education has not become mandatory in many institutions of higher education and is often neglected as a component of undergraduate curricula in most institutions. Hence, individual faculty members from their own initiative and interest becomes the primary drivers of integrating sustainability education into undergraduate courses (Matten & Moon, 2004).

Accreditation and advising bodies in higher education have urged the pressing need to impart education focused on corporate social responsibility (CSR) and sustainability mainly to train future leaders (e.g., The Association to Advance Collegiate Schools of Business [AACSB] International, UNESCO, and the World Business Council for Sustainable Development). Yet, many institutions fail to realize the need for such training and still remain a firm believer of “shareholder value oriented governance of capitalist organizations” model (Matten & Moon, 2004, p. 329). Battle to reconcile such views on one hand and on the other hand promoting concepts of sustainability and that of social responsibility remains a challenging aim for academics.

Research into the subject of teaching sustainability investigated deans and directors at the top 50 global MBA programs (2006 Global MBA rankings, by *Financial Times*) revealed that a majority of them are required to teach ethics, CSR, and sustainability topics and have included them as a part of their curriculum (Christensen, Peirce, & Hartman, Hoffman, & Carrier, 2007). These topics and others subjects associated with them have seen a significant rise in incorporating them into mainstream curriculum in Western European countries and the United States. An institution can prepare its leaders for tomorrow to lead toward sustainability only after the students have been given a full exposure to the subjects with the help of their curriculum. “Undergraduate curriculum should be modified so every student in all academic departments has knowledge of the subject” (Kaifi, Khanfar, Noor, & Poluka, 2014, p. 40).

Higher educational institutions while creating future leaders for tomorrow “need to have a proactive strategy in shaping the perspectives of business leaders through sustainability related management education, research, management, and training programmes” (Park, Sarkar, & Bunch, 2012, p. 4).

Education has the capability of being a catalyst in changing and preparing students with capabilities to promote sustainability. In order to respond to these challenges, higher education institutions should undertake adequate steps in transforming not only their curriculum but also their teaching and learning techniques (Barth, 2014). Academics should develop programs and modules catering toward imparting lessons on sustainability and CSR and use innovative teaching methods that integrate topics like sustainability, sustainable development, CSR into their courses and curricula (Parkes et al., 2017).

Academics in the past have conducted studies to find out about courses on sustainability that are offered in universities. Their study revealed that a limited number of universities have imbibed these courses into their curriculum. Rundle-Thiele and Wymer (2010) had examined standalone courses in New Zealand and Australia and found that only 27% of universities in Australia offered a dedicated

course in ethics, CSR, or sustainability. Exploration of both European and US-based institutions found that CSR and sustainability (CSRS) are offered as compulsory standalone courses or modules (Moon & Orlitzky, 2011). The data from these studies showed that more than 75% of undergraduate programs and more than 55% of MBA programs offered CSRS courses.

The importance of such courses is emphasized by accreditation bodies such as AACSB International through its Resource Centre for Business Ethics, as well as by the establishment of an ethics commission. While the center is focused on business ethics, the stated mission of the resource center is to impart a comprehensive source where information can be gathered on tools and frameworks and discussions can be made regarding ethics, sustainability, and CSR in business schools (AACSB International, 2013). AACSB International explicitly ties three concepts of ethics, CSR, and sustainability in one chain and advocates the three areas be integrated in all disciplines. Yet, no comprehensive study has been conducted to find out how individual topics have been presented and its impact on the learning outcome of the students.

LITERATURE REVIEW

Bridges and Wilhelm (2008) suggested three E's approach to teaching sustainability which includes ecology, equity (social), and economic (financial). Academics while teaching the concept was urged to consider that business success will depend on ecological and social success and a negative impact on either of them will show financial outcome in poor result.

AACSB, the accreditation board, has proposed a new standard while elaborating the teaching of sustainability and CSR and has explicitly stated that an institution of higher education must exhibit its commitment to emerging CSR issues. It should have an inclusive policy where the institution practices diversity, sustainable development, and environmental sustainability across cultures. These concepts should be further embedded in its procedures, curricula, research, and other activities.

Education for sustainability is understood differently by different faculty members. This ever evolving subjects with various dimensions and definitions requires academics who are keen on transformative education urging a personal transformation if required (Wooltorton, 2002). While working on students' comprehension of their learning about sustainability, Segalàs, Ferrer-Balas, and Mulder (2010) found that student's comprehension of the term sustainability is confined to technology and discovered minimum relevance in social and attitudinal aspects.

A second finding in this field showed that a student only exhibited knowledge and understanding about sustainable development which applied a more community-oriented and constructive approach (Myers & Beringer, 2010). In a more recent study, Segalàs, Mulder, and Ferrer-Balas (2012) discovered a "mismatch" that lies among the "experts" and students' understanding of sustainability. Students either perceive sustainability as unrelated to social and institutional aspects or they barely perceive sustainability as a complex issue; hence, a general

apathy can be seen in studying or trying to understand the subject. Researchers in this field have urged on systems and multidisciplinary thinking, with a greater focus toward, “reorientation of the pedagogy and the learning processes” (Segalàs et al., 2012, p. 302).

Sustainability teaching is not confined to books and lecture slides but requires both educators and students to understand their own values, hidden assumptions, motivations, beliefs, and actions (Holdsworth, Wyborn, Bekessy, & Thomas, 2008). Teachers cannot merely teach the subject without being involved in it and reflecting how their own work, their knowledge, and their teaching may impact the environment and economy of the region they belong to, especially if it is a growing and transforming economy. Active and reflective learning with transformative and participative approach with the usage of case studies developed locally and globally help to expose the students to various viewpoints and urge them to think critically in solving complex global issues and consider the consequence of their acts and accept responsibility for creating a sustainable future for their next generation (Scott, 2009).

While presenting his case on sustainability in higher education, Sterling (2004) puts forward three approaches that an educational institution can adopt while teaching sustainability:

- (1) Educating about sustainability – an accommodative response.
- (2) Education for sustainability – a reformative response.
- (3) Capacity building – a transformative response.

The first and the most basic level is to offer modules on sustainability with the rest of the curriculum designed for the school. The next level is more advanced which talks about the institution transforming itself as a sustainable organization. The third level is more comprehensive in dealing with students who can be transformed by adopting the skills of sustainability. Starik, Marcus, and Clark (2010, p. 377) criticize the “incrementalism reform approaches that most individuals, organisations and societies have employed to address critical global sustainability issues...” and demand more transformative sustainability results in higher education, mainly while teaching management education.

Stubbs and Schapper (2011) advocated interdisciplinary course content while including sustainability education into the curriculum. Beijing Normal University in China and Aalborg University in Denmark added another dimension toward sustainability education by adopting interdisciplinary and cross-cultural content in a project-based learning approach toward sustainability (Du, Su, & Liu, 2013). Chhokar (2010) pointed it out that most institutions of higher education lacks interdisciplinary skills of staff and students which is needed to integrating sustainability into the curriculum.

CONCLUSION

Promoting sustainability with the help of curriculum is by no means an easy task as one needs to incorporate the take-away factor of the student while designing

the course. System and consistent framework to assess the learning experience and learning outcome has to be kept in consideration at all times while designing such courses. The syllabus, learning modules, assessment protocol are vehicles through which sustainability is communicated and imbibed into the learners. While designing a curriculum with modules on sustainability the faculty members have to keep in mind the trends that impact a learner's success. The instructor's knowledge and passion about the subject shall determine the instructor-learner relationship and the outcome of the delivery of the modules. This relationship often transcends the content-specific competencies and results in sustainability in action where the instructors have observed the learners keenness to apply sustainability in everyday life.

CHAPTER OVERVIEWS

“Integrating Sustainable Development into Healthcare Curriculum,” by Professor Russell Gurbutt and Professor Dawne Gurbutt, sets the scene for the need of sustainable development in the healthcare curriculum by discussing the contemporary context of healthcare provision and its associated challenges. Set within the context of the developing contemporary healthcare agenda in the UK, the chapter focuses on an exploration of the drivers for integrated care and the impact this has on curriculum development. An example of post-graduate curriculum development to teach integrated care to clinical staff guides the reader through the issues presented by the context and the need for sustainability in both content and design. The challenges of barriers and enablers to integrated care is considered and the extent to which a cultural mind-set transition might occur among participants to align initiatives to sustainable development goals (SDGs). The curriculum required participants to critically understand the political, economic, social technological, and ethical contexts driving service redesign and apply critical thinking to navigate development paths through the changing health and social care landscape. A leadership dimension championed innovation applied to reimagining integrated responses to wicked problems.

Promoting sustainability veered away from accepting short-termism in favor of interventions that equip participants with the agility to address wicked problems and anticipate the rapid role change and development which is inherent within the service. The role of collaborative education in relation to embedding cross-cutting themes and patient voices as well as securing multiple gains in interdisciplinary themes, building networks, role modeling, and creativity thereby supporting a way of working that supports sustainability has been discussed in this chapter.

“Embedding Sustainable Development in the Curricula: Learning About Sustainable Development as a Means to Develop Self-awareness,” by Louise Manning and Luis Kluwe de Aguiar, addresses the extent to which sustainable development can be taught as part of the curricula at a university in the United Kingdom (UK). Since the topic tends to be shrouded in complexity (Al Rawahy, 2013, p. 400), sustainable education is generally a difficult concept to explore in

an educational setting. Those attempting to teach it ought to have enough inter- and transdisciplinary skills to be able to foster in the students not only knowledge assimilation but also deep acquisition of values (Lambrechts, Mulà, Ceulemans, Molderez, & Gaeremynck, 2013; Faham, Rezvanfar, Mohammadi, & Nohooji, 2017). Sustainable education is embedded in the curriculum of Food Technology students throughout their four year degree at Harper Adams University. A brief description of how curricula is organized is presented. Emphasis is given to one module in the final year of the degree where the content and pedagogical practice as well as the pedagogic nature of the learning environment is analyzed in the light of the literature.

Particularly, the learning outcomes suggested for sustainability-related subjects (Fields, 2009; OECD, 2008) and the works of Lambrechts et al. (2013) among others are used to scrutinize both the extent the teaching and learning practices are developed, and the extent to which they equip the students with skills such as critical thinking, analysis, reflection, and complex problem solving. Two case studies are presented: the Loess Plateau (China) and the Chiapas Coffee Farmers (Mexico). These serve to also contextualize the extent to which the students can draw from teaching and learning strategies in the module in question as well as other experiences (personal or from other modules), and use these to frame the problem-based learning. This allows them to gain a deeper meaning of the topics covered and also to work with problems with aspects of uncertainty and imperfect levels of information.

“A Comparative Analysis of Approaches to Integrating Sustainability into the Curriculum at a University in a Small Island Developing State in the Caribbean,” by Alana Griffith and Winston Moore, is about the University of the West Indies (UWI) which has undoubtedly played a significant role in the development of the Caribbean. As a higher education institution in the Caribbean, the 70-year old UWI has accomplished this directly and indirectly by “advanc[ing] learning, creat[ing] knowledge and foster[ing] innovation for the positive transformation of the Caribbean and wider world.” This chapter utilizes courses in different disciplines – economics and sociology – to highlight innovative teaching strategies that are employed to engage students, the inclusion of sustainability into the curriculum and linking taught units to the SDGs as well as how students confront these issues. The case study courses are delivered at the UWI’s Cave Hill Campus in Barbados and the two courses are “Caribbean Social Problems” and “Economic Planning.” The chapter demonstrates the cross-cutting nature of challenges to sustainable development needed in Caribbean Small States that are vulnerable to climate change, natural disasters, and other environmental challenges as well as the necessity of integrating sustainability and the SDGs into course delivery to ensure the future development of the region does not compromise future generations.

“Integrating Sustainable Development into the Curriculum: A Case Study on the Developing of Sustainability Competencies in Industrial Design Students at a Bachelor Level in Mexico,” by Martha Elena Núñez López, Robert Huddleston, and Roberto Pablo Martínez Lozano, presents a case study on integrating sustainable development into a bachelor’s degree course in industrial design.

The research is being conducted at Tecnológico de Monterrey (TEC), Mexico, where the lead author is a Professor of architecture. TEC is one of the world's largest universities, with 26 campuses nationwide and 91,285 students. Mexico has a five-year national development plan: the "Plan Nacional de Desarrollo 2013–2018" ([Government of the Mexican Republic, 2013](#)). It provides a basis for guiding the policies and programs of the Government of Mexico. The focus of this study is the PND's "quality education goal to make scientific, technological and innovation development pillars for sustainable economic and social progress."

The case study at TEC investigates a curriculum intervention, utilizing interviews with students to gather data on their responses to the university's current development of sustainability competencies. Their responses are explored through comparing a traditional semester with a semester in which sustainability contents and assessment criteria were added to the curriculum of the industrial design workshop courses. The results reveal that the students recognized a significant advance in their recognition and development of sustainability competencies and that this had resulted from this curriculum intervention. The chapter concludes by proposing that the findings of the study indicate that this pedagogical approach has the potential to contribute significantly to sustainable development education in Mexico.

Alice Cassidy, Yona Sipos, and Sarah Nyrose in their chapter "Programs, Workshops, Resources, and Other Supports for Post-secondary Sustainability Educators," speaks about the growing need to train and support educators to introduce or enhance aspects of sustainability into the curriculum. The authors have provided an overview of selected literature on the integration of sustainability development and education into the curriculum and related institutional leadership at the post-secondary level. Turning to educational development for sustainability education, they have shared tools and resources to support educators from any discipline, to introduce, integrate and/or enhance sustainability in their course, program or initiative. The authors found very few examples of workshops to help faculty and others who teach at colleges and universities. For one such example, the Sustainability Education Intensive (SEI), a three-day workshop was designed and led at the University of British Columbia (UBC). The chapter authors summarized the workshop aspects that they found helpful, and how participation affected them as sustainability educators. The authors further encourages post-secondary institutions to provide support in the form of workshops, tools, resources, and funding to help educators introduce or enhance aspects of sustainability into their courses and programs. Students are asking for this, and, as they are future leaders, it is important that educators address the numerous environmental, social, and economic issues that demand attention.

"*Hortus in Urbe: Building a Sustainable Development Curriculum in Chicago*," by Euan Hague, Howard Rosing, and Joseph P. Schwieterman, describes the development of an interdisciplinary graduate program focusing on sustainable urban development at Chicago's DePaul University. Locating the curriculum both in the administrative institutional context and the historical geography of a racially and economically segregated urban area, the authors discuss the

process of program formation and adjustment over its first five years of operation, 2013–2018. The chapter highlights some of the challenges encountered by program faculty, from internal curricular competition to external classification of the program under federal educational designation and also highlights some of the interdisciplinary innovations, such as requiring courses in geographic information systems (GIS) to aid spatial data analysis and visualizations. In the second part of the chapter, to assess the impact of the graduate program on students, the authors review and draw from reflection essays written by students who, while completing their studies, pursued internships with nonprofit organizations in Chicago.

They suggest that the interdisciplinary learning delivered in the curriculum has led to local stakeholders rethinking and conceptualizing how they advance their sustainability goals. The chapter concludes by tabulating the current employment of recent alumni to indicate how the graduate program is equipping students with the skills to succeed and impact on sustainability policy and practice. The authors maintain that it is necessary to push the understanding of “sustainability” beyond solely environmental concerns. By widening the concept to incorporate understandings of how economic development and community engagement must be included to deliver a sustainable city, the interdisciplinary curriculum challenges students to become leaders in local effort to make urban areas not only greener, but also more economically and socially sustainable for all residents.

“An Interdisciplinary Teaching Module on the Global Clothing Industry: Lessons from Working Across Four Disciplines and Two Universities,” by Niki Harré, Anis Azizi, Penny Brothers, Ties Coomber, Ellinor King, Andrea Michelle Mead, Sarah Saeckel, Manuel Vallée, Samantha Zi Lin Yeo, and Yulun (Darren) Zhang, presents a case study of The University of Auckland. As learning institutions that offer high-level expertise across a range of disciplines, universities are well positioned to develop students’ understanding of the complex, multi-level issues contemporary societies face and how to address these. Since 2016, the university has been teaching an interdisciplinary module on the global clothing industry to students enrolled in an introductory psychology course and a second year chemistry course at The University of Auckland in New Zealand. In 2016, the module also involved third year chemistry students, and in 2017 second year sociology students and graduate students in English literature from the University of Stuttgart in Germany took part.

The module has the following features: (1) it focuses on a complex industry with ramifications for social and environmental sustainability; (2) it involves an issue of direct relevance to the students; (3) students teach those from another discipline as “subject experts,” and (4) students are assessed on their learning within their home course. An evaluation of the 2018 iteration with psychology and chemistry students ($N = 185$) showed post-test decreases in participants’ materialistic values and increases in knowledge and concern about the social and environmental impacts of the clothing industry. Many evaluation participants indicated that the module changed their decision-making when buying clothes, and there was a mean decrease in the frequency with which they intended to make purchases. The authors discussed the institutional barriers they faced and provide

five recommendations for other university teachers considering integrating an interdisciplinary sustainability module into existing courses.

“Integrating Sustainability into a Freshman-Engineering Course Through an Institute-level Initiative: A Teaching–Learning Model with Authentic Activity and Context,” by Raghu Pucha, Kata Dosa, Sunni Newton, Meltem Alemdar, Ruthie Yow, and Jennifer Hirsch, speaks about a campus-wide academic initiative (“Center for Serve-Learn-Sustain”) which was launched in January 2016 at Georgia Tech. It was aimed at preparing undergraduate students in all majors to use their disciplinary knowledge and skills to contribute to the major societal challenge of creating sustainable communities. The initiative collaborates with faculty in all six Georgia Tech colleges to develop courses and cocurricular opportunities that will help students learn about sustainability and community engagement and hone their skills by engaging in real-world projects with nonprofit, community, government, and business partners. Affiliated courses address various aspects of the Centre’s sustainable community’s framework, which presents sustainability as an integrated system connecting environment, economy, and society, and focuses especially on society – particularly social equity and community voice – to address this gap in technological education.

This chapter reports on one engineering instructor’s ongoing activities that bring social justice and sustainability into the engineering classroom through sociotechnical project-based learning. This cornerstone design course is one of more than 100 Centre-affiliated courses currently being offered, enrolling over 5,000 students across all six colleges. The activities in the course pertain particularly to the initiative’s vision that all graduates of the institute – a majority of whom will graduate with engineering degrees – are able to contribute to the creation of sustainable communities and to understand the impact of their professional practice on the communities in which they work. A situated knowledge and learning pedagogical theory is used in the affiliated course, where concept, authentic activity, and context are involved in student learning to produce useable robust knowledge. Sociotechnical project-based teaching model with contextualized design problems are used to engage students throughout the course that incorporate social justice and environmental sustainability through both individual and team projects. Pedagogical approaches to learning, strategies, and challenges for the implementation and assessment of intervention activities, data analysis on student reflection, pre- and post-survey data analysis are presented.

“Integrating Sustainable Development into the Curriculum: Enacting “Scalar Shifting” in ESD Competencies,” by Paul Benneworth, Renze Kolster, Martin Stienstra, Laura Franco Garcia, and Ben Jongbloed, talks about increasing interest in integrating sustainable development into higher education curricula in systematic ways to increase the sense of autonomy and agency of young graduates in addressing “grand challenges.” This education for sustainable development (ESD) is not merely about providing knowledge of the challenges in delivering sustainable societies but in raising awareness of opportunities to create local solutions, a willingness or desire to construct those solutions, and the organizational skills to implement these solutions in context. However, because these courses are integrated into academic curricula, students must learn practical-ends driven

skills in ways compatible with existing academic standards frameworks oriented toward theoretical understanding. These can lead to very different pedagogical orientations (theoretical and practical), one reason that could explain the relatively limited uptake of ESD within higher education to date. We develop a model by which a single educational experience could help to bridge between these two orientations and highlight that the key issue here is the transitions between the different scales of the problem, and how that in turn relates to the development of key ESD competencies. We explore this conceptual framework with a single study of an example of student volunteer projects in which students spend 2–4 months working on a knowledge transfer project to the global south, while also researching how that project contributes to solving the SDGs. We reflect on tensions, problems, and solutions to ensure that universities produce graduates who are effectively oriented to tackling the urgent contemporary societal issues, while also gaining valuable personal development experience and career perspectives.

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