

Technical and Vocational Education and Training Curricula at the Lower Secondary Level in Jamaica: A Preliminary Exploration of Education for Sustainable Development Content

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Abstract

Education for Sustainable Development (ESD) is critical for Caribbean countries such as Jamaica as the country grapples with various sustainability issues. The integration of ESD into formal and non-formal education therefore becomes a necessary undertaking. At the formal level, reorienting curricula at all levels is important and advocated for in various international documents such as *Agenda 21* and by agencies such as the United Nations Educational, Scientific and Cultural Organization. With this in mind, this study utilised a qualitative content analysis approach to undertake a preliminary exploration of ESD content in TVET curricula at the lower secondary level (grades 7–9) in Jamaica. Analysis of three of the subjects as taught in the TVET area of Resource and Technology revealed that though ESD issues, perspectives and skills are integrated into various components of the curriculum, many of the ESD issues, perspectives and skills the research sought to identify were not evident in the curricula. Additionally, based on the analysis, it was felt that the curriculum lacks alignment among the components (objectives, content, learning experience, assessment, teaching strategies) that reflected ESD content, and that there is need for integration of more such content in the curricula to ensure that TVET and ESD yield the relevant benefits.

Keywords: vocational education, curricula, sustainable development.

Introduction

Education for Sustainable Development (ESD) is a critical imperative for the global community and, in particular, for Small Island Developing States (SIDS) such as those in the Caribbean region which struggle with various social, environmental, and economic issues. The Caribbean island of Jamaica, the largest English speaking island in the region, is one such nation that grapples with a range of sustainability issues, including social problems such as high rates of crime and violence, poor educational performance, and increases in lifestyle related chronic diseases; environmental issues, for instance water pollution and waste management; economic issues including periods of poor economic

growth and unemployment amongst youth aged 15–24 years; and governance concerns such as inefficiencies in the nation's justice system and erosion of social trust (PIOJ, 2009). Education for Sustainable Development, with its two tiered focus on (i) reorienting education towards sustainable development and (ii) strengthening education and learning to support sustainable development is critical for the nation.

Technical and Vocational Education and Training (TVET) is a critical and growing area in Caribbean nations such as Jamaica. Given this growth, it is important that ESD is integrated into TVET; indeed, this is part of the mandate of *Agenda 21*, which speaks to its integration into vocational and other training programmes (UNCED, 1992). The United Nations Educational, Scientific and Cultural Organization (UNESCO) points out that “ESD and TVET are powerful forces that can help people to become active and ecologically responsible citizens, workers and consumers, able to address local and global challenges” (UNESCO, 2012). They further point out that there are overlaps between ESD and TVET including a focus on problem-solving, education for sustainable consumption and lifestyles, and entrepreneurial learning.

With this in mind, this research sought to address the following main research question: In what ways is ESD infused into TVET curricula of the National Standards Curriculum (NSC) in Jamaica? In particular, we focused on the following sub-research questions:

1. How is ESD manifested in the general philosophy of the NSC?
2. What ESD issues, values and skills are reflected in the TVET curricula of the NSC?
3. In what ways are these ESD issues, values, and skills integrated into the TVET curricula of the NSC?

Education for Sustainable Development

Sachs (2015) defines a good society (a sustainable society) as one which encompasses economic prosperity, social inclusion, environmental sustainability, and good governance. *Agenda 21*, a major document resulting from the 1992 United Nations Conference on Environment and Development (UNCED) outlines a global blueprint for achieving sustainable development with Chapter 36 specifically devoted to the role of education. In this Chapter, three programme areas are highlighted – the reorientation of education towards sustainable development, public awareness, and training. Education for sustainable development is a necessary precursor to the development of knowledge, attitudes, values, skills, and behaviour which align with sustainability. The UNESCO conceptualises ESD thus: “ESD empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society, for present and future generations, while respecting cultural diversity. It is about lifelong learning, and is an integral part of quality education. ESD is holistic and transformational education which addresses learning content and outcomes, pedagogy and the learning environment. It achieves its purpose by transforming society” (UNESCO 2014a, p. 12). Davis (cited in Pearson & Degotardi 2009, p. 98) articulates that formal ESD is intended “to promote more sustainable approaches to patterns of living and development in future generations.”

Further than this, ESD has as its focus two interrelated realms. The first is the integration of sustainable development into education and the second is the integration of education into sustainable development (UNESCO, 2014a). With respect to the first, the idea is that sustainable development issues and related content, as well as values

and skills, would be integrated into education at all levels – formal, non-formal, and informal – in order to equip individuals to live sustainably. In terms of the latter, the importance of the focus underscores that education itself is critical for societies to be sustainable. Indeed, education is implicit in all of the Sustainable Development Goals (SDGs) which now drive the international agenda.

Globally, ESD has been driven by the United Nations (UN), principally through UNESCO. Following on from the Decade of Education for Sustainable Development (DESD) from 2005–2014, during which activities in the field were intensified, UNESCO launched the Global Action Programme (GAP) on ESD at the UNESCO World Conference on Education for Sustainable Development held in Aichi-Nagoya, Japan, 2014. This was the result of a call for urgent action “to further strengthen and scale up Education for Sustainable Development in order to enable current generations to meet their needs while allowing future generations to meet their own, with a balanced and integrated approach regarding the economic, social and environmental dimensions of sustainable development” (UNESCO, 2014b, p. 1).

Importantly, ESD forms an important part of the SDGs, adopted by world leaders at the 2015 UN Summit. Under SDG Four, Target 4.7 calls for the following:

“By 2030 ensure all learners acquire knowledge and skills needed to promote sustainable development, including among others through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship, and appreciation of cultural diversity and of culture’s contribution to sustainable development” (The UN Open Working Group proposal on the Sustainable Development Goals).

Education for Sustainable Development and Curricula Development

As indicated, international blueprints such as *Agenda 21*, initiatives such as the DESD and the GAP, as well as global forums throughout the decades, have highlighted the need to reorient education to address sustainability. Part of this reorientation involves the review of curricula within formal education. As one of the activities outlined in Chapter 36 of *Agenda 21*, countries are advised that: “A thorough review of curricula should be undertaken to ensure a multidisciplinary approach, with environment and development issues and their socio-cultural and demographic aspects and linkages. Due respect should be given to community-defined needs and diverse knowledge systems, including science, cultural and social sensitivities” (UNCED, 1992, 36.5b).

A second component involves the integration or infusion of ESD content into curricula. The current GAP on ESD highlights ‘learning content’ as one of the key dimensions of ESD and advises that issues such as climate change, biodiversity, disaster risk reduction, and sustainable consumption and production be integrated into curricula as these are critical sustainability issues (UNESCO, 2014a). McKeown (2002) and UNESCO (2012) advise that the reorientation of curricula necessitates that ESD knowledge, issues, perspectives, skills, and values in the various spheres of sustainability (environment, society, and economy) have to be considered and incorporated. The UNESCO (2017) emphasises that this integration has to take place in curricula at all levels, identifying early childhood care and education, primary, secondary, and higher

education, and TVET. They further write that ESD “must become an integral part of teaching and learning of core subjects (e.g. math, sciences, social studies and languages”, that “learning objectives, teaching and learning methods and assessment measures are closely aligned so that they reinforce each other” and that “progressive learning objectives should be established, i.e. learning that builds competencies from level to level (scaffolding)” (UNESCO, 2017, p. 51).

Technical and Vocational Education and Training

The UNESCO (2010) defines TVET as those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupation in various sectors of economic life. This definition presents TVET as broad based and all-encompassing, reflecting dimensions that are also implicitly embedded. For example, such a definition presents TVET with an opportunity to raise critical consciousness through general education and the study of technology and related sciences (Chisolm, 2009).

Internationally, there is overwhelming evidence that shows the essential role of TVET in promoting economic growth of countries and socio-economic benefits for individuals, their families, and society in general (Maclean, 2011). Essentially, TVET can help to provide more choices for citizens and empower individuals who would otherwise be marginalised (Maclean, 2005). Commenting on the role of TVET, del Mar (2011) argued that TVET should be an integral part of general education, preparation for responsible citizenship and an instrument for promoting environmentally sound sustainable development. Furthermore, TVET forms the foundation for a sustainable good quality primary education (Morris, 2016).

According to Pavlova (2014), while many countries recognise the huge benefits to be accrued from TVET, there is a difference between developed and developing countries responses. Pavlova notes that while developed countries emphasise quality improvement, monitoring and evaluation of TVET systems and availability of national development plans, developing countries emphasise the cost of enrolment and implementation of TVET. Therefore, simply recognising TVET as important will not yield the benefits that it provides. A clear strategy for TVET at the macro, meso and micro levels must be established and acted upon to ensure that TVET yields benefits such as poverty reduction, increasing equality, responsible citizenship and responsible environmental practices. This will aid a country’s advancement towards social inclusion and cohesion. In addition to several initiatives and programmes such as Education for All that seek to ensure the benefits of TVET, the Bonn Declaration on Learning for Work, Citizenship and Sustainability (2004), states that countries need to ensure:

“... approaches to development that harmonize economic prosperity, environmental conservation and social well-being. We therefore call for responses to globalization that humanize rather than marginalize, and for applications of information and communication technology that narrow the digital divide” (p. 2)

Technical and Vocational Education and Training and Education for Sustainable Development

Though previously seen as second-class education in many countries, increasingly TVET has been gaining popularity as one of the critical means of achieving ESD. Education for Sustainable Development and TVET are critical for helping people to become more responsible citizens who are able to address both global and local challenges. Among the strategies used by countries to ensure TVET plays its role in ESD is reform in national TVET curricula.

While TVET is recognised as critical to sustainability, policy makers and practitioners may have different views as to what TVET for sustainability should look like. Morris (2016) notes that key features must include a clearly established policy framework, industry relevance, urban-rural integration, social and economic responsiveness, career focus, and high-quality orientation. Additionally, since ESD is about changing the way people think and act, TVET for sustainability must be about using TVET as the means to equip individuals with the values, skills and knowledge needed for a sustainable future. Because TVET in its highest quality is about development, ensuring ESD through TVET is about ensuring that as individuals create and innovate and pursue an improved quality of life, they derive a balanced perspective on environmental, societal, and economic considerations as citizens (McKeown, 2002). This perspective is critical since one of the major challenges concerning TVET with respect to sustainable development is the greening of economies (Maclean, Jagannathan and Sarvi, 2013). To achieve ‘greening’ of the TVET curriculum, the application of the 6Rs – reduce, reuse, renew, recycle, repair and rethink perspectives – are integral along with generic skills such as adapting to varied situations, thinking critically and creatively, resolving conflict peacefully, and working honestly and responsively (UNESCO-UNEVOC, 2010).

The more workers are exposed to sustainability concepts and skills, the more they are likely to integrate these in their job functions and lifestyle. UNESCO-UNEVOC (2009) notes that it is best to teach these concepts before a worker starts his profession and then provide continuous up-skilling while the worker is in the profession. Integrating ESD in the TVET curriculum however is no easy undertaking. A study commissioned by UNESCO-UNEVOC (2010) to document cases studies of ESD in TVET curriculum in Botswana, Kenya, Malawi, Mauritius and Zambia revealed that while attempts at integrating ESD were taking place and its importance was recognised, there was limited understanding of the concept of ESD among most of the TVET educators, lack of expertise in ESD, lack of relevant learning materials, and lack of time to update courses. Achieving goals of ESD in TVET must therefore address the conceptual and practical dimensions of curricula as it is planned and executed at the macro, meso and micro levels.

The Jamaican Context: Curricula, Technical and Vocational Education and Training, and Education for Sustainable Development

Curricula and Technical and Vocational Education and Training

Within Jamaica, a centralised approach is used for the development and dissemination of curricula at the early childhood, primary and secondary levels of the education system. This means that education policy development and implementation in this country is led by the Ministry of Education, Youth and Information (MOEY&I) as the

central authority of the government. Through the MOEY&I, there have been efforts to develop curricula to respond to the specific needs of the Jamaican/Caribbean culture and people. To respond to these needs, the MOEY&I has developed a slogan which states “every child can learn, every child must”. Through this Ministry, several education policies have been articulated which gave rise to the development and implementation of curriculum policy by the Core Curriculum Development Unit (CCDU) within this Ministry. Education is a dynamic process, hence, as society and the needs of learners change our curriculum practices must change to meet these needs. The CCDU therefore has responsibility for the development and dissemination of curricula for pupils at the pre-primary to lower secondary levels of the education system.

According to Cuadra and Moreno (2015), the demand for high quality, relevant education is forcing education systems everywhere to respond and adapt. This is no different for Jamaica. Jamaica’s most recent curriculum reform initiative has been implemented in 2016. Referred to as the National Standards Curriculum (NSC), the reform has been developed and implemented at both primary (grades 1–6) and lower secondary levels (grades 7–9) of the education system. The development of the NSC is a response to the need for improvement in curricula offering that add value to the lives of students. It seeks to ensure a clear progression of students from each grade to the next, ensure students are well prepared to master examinations at the different levels, include an approach of continuous assessment, and create a greater focus on concepts, skills and competencies to balance the current over-emphasis on the acquisition of content. This, it is hoped, will allow students to transition better to the different levels and achieve the core competencies and outcomes relevant for each level.

At grades one to three, the NSC reflects a fully integrated approach to teaching and learning. Emphasis here is on early literacy and numeracy through the teaching of the following subjects: Civics, Drama, Information and Communication Technology, Language and Literature, Mathematics and Music, Physical Education, Religious Education, Resource and Technology (R&T), Science, Social Studies and Visual Arts. At grades one to four, the emphasis is on problem solving in context through discrete subjects such as Language and Literature, Mathematics, Science and Social Studies while using themes from Civics, Drama, Information and Communication Technology, Foreign Languages, Visual Arts, Religious Education, and R&T. At grades 7–9, the curriculum focuses on problem-solving through pathways. This is facilitated through discrete subjects such as Civics, Drama, Information and Communication Technology, English Language and Literature, Mathematics, Music, Physical Education, Religious Education, R&T, Chemistry, Physics, Biology, Social Studies, Dance, Visual Arts and Integrated Science (Ministry of Education Youth and Information Paper No. 47/16).

A critical component of the NSC is the mainstreaming of TVET since it is recognised as a necessary component for economic and sustainable development (Maclean, 2011). At the primary level TVET is reflected through the teaching of R&T while at the secondary level TVET is reflected through a combination of R&T areas for three years (grades 7–9) and specialisation in specific TVET subjects for two or three years (10–12 or 10–13). For the purposes of this study, TVET through R&T at grades 7–9 is emphasised.

Resource and Technology at grades 7–9 consists of four areas – Industrial Techniques, Consumer Management, Business Studies, and Agriculture. The aim of R&T at this level is to use the principles of Science, Technology, Engineering and Mathematics infused with the Technical Vocational standards to foster students’ awareness of founda-

tional technical skills and their relationship to future careers and occupations. Resource and Technology in the NSC is based on four strands: creativity and innovation, exploring methods and procedures, applying solutions and career pathways. Through project-based and problem-based learning, R&T aims to foster critical thinkers, problem solvers, confident, responsible and productive citizens, students who are adaptable to changes in the world around them, and who are aware of a range of future focused career options (Resource and Technology Guide, 2016).

But the establishment of the NSC is not Jamaica's first attempt at reforming curricula at the grades 7–9 levels to emphasise TVET. Prior to the establishment of the NSC curricula, the Reform of Secondary Education (ROSE) programme curricula was implemented in 1993. The aim of this curricula was to ensure a common curriculum for students in secondary schools across the island thereby ensuring equity, quality, and productivity. Similar to the components in the NSC, R&T formed an important component that ensured Technical Vocational Education was offered to all students and all genders. This provided a base for developing human resources with technological capability (Brown, Jennings, & Tucker, 1998).

Within Jamaica, the provision of TVET is aimed at imparting occupational and educational skills that are linked to the labour market (UNESCO-UNEVOC, 2015). The development and implementation of a national TVET policy during 2015–16 serves as the driver for achieving these aims. The implementation of this policy is part of the government's thrust to mainstream TVET and to integrate TVET as part of curricula offerings across all levels of the education system. The focus as articulated in the policy seeks to mainstream TVET, such that all students, irrespective of the level or type of school they attend, have an opportunity to pursue TVET subjects as part of curricula offerings across all levels of the education system.

Education for Sustainable Development

In Jamaica, ESD has gained prominence over the decades, the result of an evolving focus on environmental education, environmental education for sustainable development, and ESD in the nation – the terminology now at the forefront of the global community. Efforts to integrate ESD into education at all levels can be seen in curricula efforts including curricula developed under the Primary Education Improvement Project and ROSE, as well as the new curricula recently instituted – the NSC. Additionally, at the tertiary level, ESD has been incorporated into undergraduate and postgraduate courses at The University of the West Indies, as well as curricula in teachers' colleges. In addition to efforts such as these at the formal level, ESD is also integrated into non-formal and informal education.

At the national level, ESD supports the sustainable development goals of *Vision 2030 Jamaica*, the country's national sustainable development plan, including goals such as Goal #2 (The Jamaican society is secure, cohesive, and just) and Goal #4 (Jamaica has a healthy natural environment) (PIOJ, 2009). It also supports imperatives outlined in the country's *National Education Strategic Plan* and the *Education for All 2015 National Review Report: Jamaica*. Core values such as tolerance, respect, national pride, and love and care, are all called for by the MOEY&I (Ministry of Education, 2012).

Methodology

To undertake our preliminary exploration of the curricula, we chose to undertake a basic qualitative content analysis to gain insight into its content. In using this approach, we had several considerations in mind. Firstly, Neuman (2000) advises that content analysis can be utilised for research problems that involve a large amount of text and for the exploration of messages in a text that are difficult to see with casual observation. Thus, we saw content analysis as a useful approach for exploring the curricula documents for the presence of ESD content and its nature. Hence we characterise our approach as qualitative content analysis. Secondly, we drew on the definition used by Hsieh and Shannon (2005), that content analysis is “a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns” (p. 1278). In this sense, content analysis aided us with ascertaining the frequency of particular ESD values, perspectives or issues.

In carrying out the content analysis we slightly modified the outline of steps shared by both Hsieh and Shannon (2005) and Schreier (2012), and thus proceeded as follows:

- Formulated the research questions to be answered.
- Selected the sample to be analysed.
- Defined the coding frames and the associated categories to be applied.
- Implemented the coding process.
- Determined trustworthiness.
- Analysed the results of the coding process.

After formulating the research questions to be answered (previously outlined), we purposively selected the following three subject areas for our exploration: (i) Business Management; (ii) Industrial Techniques; and (iii) Consumer Management. We examined all Units in each of these three subjects at the three grade levels. This does not represent all of the TVET curricula subjects, however, as this is a preliminary exploration, we took the decision to start with these three areas for our first phase and to include the other R&T subject – Agriculture- in our subsequent phase. Additionally, whilst our primary focus was on the manifest content of the curricula – the ‘physically present’ elements, we did note latent content (which cannot be objectively measured but can be discerned) (Neuendorf, 2017) as well.

In defining our coding frame and the associated categories, we drew on the ESD literature and identified specific ESD values, issues, and skills for exploration in the curricula documents. In particular, we drew heavily from the values, issues and skills outlined in the ESD Sourcebook (UNESCO, 2012). We focused on these areas as we examined the philosophy of the R&T curriculum, the learning objectives, content, learning experiences, assessment, teaching strategies, and resources outlined in the curricula documents (see Appendix One for the template used). We then coded the documents using the coding frame and categories, discussed our coding as a team, and analysed the results of the coding.

We must make several caveats at this point. Firstly, we acknowledge that the absence of content from curricula does not mean that it is not taught within a classroom. Indeed, we speak to this in our recommendations for future research as we note that this content analysis should be complemented by interviews with teachers and students and observation of what takes place in the classroom. Secondly, we also acknowledge that we did not engage in intercoder reliability for this preliminary exploration. However,

to strengthen credibility, we did engage in discussion and reflection upon our findings as a team. Finally, we wish to emphasise that our concern was not on the quality of the curricula but specifically on the ESD content within the curricula.

Findings

Manifestation of Education for Sustainable Development in the General Philosophy of the National Standards Curriculum

The Introduction to the NSC characterises the new curricula as “learner centred” and emphasises that “Children or learners are also given some measure of control over the learning process as they work together with others to experiment, in safe ways, with creative solutions to problems” and that “In the learner-centred environment displaying the right attitudes and developing appropriate values are emphasized as much as acquiring skills and understanding concepts” (MOEY& I, 2016, p. 2). Thus, skills such as problem-solving, collaboration, and creativity are outlined from the onset.

The NSC framework document that outlines the vision, philosophy, aims and principles of the new curricula of which R&T is a component was examined to ascertain the manifestation of ESD principles. From this analysis, themes that were explicitly reflective of ESD values, issues and skills were evident. The ESD values reflected included *respect for human life in its diversity* and *promotion of the rights of all without discrimination*. The only ESD issue reflected was *technology* while ESD skills included *oral and written communication, systemic thinking, critical thinking, the ability to use multiple perspectives to understand a person’s viewpoint, co-operation and collaboration*, and *the capacity to develop an aesthetic response to the environment and the arts*. These themes were reflected in the values, philosophy and aims of the NSC. One can therefore conclude that the general philosophy of the NSC was aimed at ESD integration.

Education for Sustainable Development Issues, Values and Skills Reflected in the Technical and Vocational Education and Training Curricula

Before sharing some of our substantive findings, we should reiterate that our task in this research was to identify the ESD themes reflected in the curriculum and not to critique the layout or design of the curriculum. As researchers, however, the layout of the document posed a challenge in analysing its various components. Another observation was that the components as outlined prescribed the exact projects that teachers and students should be producing. In some instances, it was difficult to tell the difference between statements that were objectives and content or objectives, content and learning experiences. However, as a team, given our individual expertise we met and clarified our understanding then proceeded.

With specific focus on the TVET component of the NSC as reflected through the three R&T areas examined, the curriculum document revealed that five ESD values, four statements reflective of ESD issues and seven statements reflective of the development of ESD skills were primarily evident (See Table One). The documents revealed that statements reflective of the ESD issue of technology was common to all three R&T areas and references that indicated the ESD value to *promote conservation of resources* was common among all three grade levels, while statements that reflected ESD issues regarding

awareness of *solid and hazardous wastes and sewage* was common between Business Management and Industrial Techniques. Additionally, references that indicated the ESD value of *care for interdependent life* was common for both Industrial Techniques and Consumer Management while the development of the ESD skill of *the capacity to develop an aesthetic response to the environment and the arts* was common for Consumer Management and Industrial Techniques. Furthermore, though there was evidence of other generic skills such as observing, analysing, collaborating, making judgements, and researching mentioned in the general aims of the Business Management curriculum, there was no evidence of a clear focus on the development of ESD skills in this curriculum document.

Table 1
ESD Content Reflected in R&T Curricula

ESD Content	R&T Area	Grade Level	Curriculum Component
Values			
Are there references that indicate:			
Respect for human life in its diversity	Consumer Management	7	Objectives
Care for interdependent life (animals, humans)	Consumer Management	7	Objectives
	Industrial Techniques	8	Learning Experience
Promote conservation of resources	Business Basics	7, 8	Objectives, Content, Learning experience, Teaching strategy, Assessment
	Industrial Techniques	8, 9	Learning experience, Teaching strategy
Promote the rights of all without discrimination	Consumer Management	7	Learning experience
Promote a culture of tolerance, nonviolence and peace	Consumer Management	7	Learning experience
Issues			
Are there statements about/show recognition/awareness of			
Technology	Business Basics	7	Objectives, Assessment, Teaching strategies
	Consumer Management	7	Learning experience
	Industrial Techniques	7	Content
Atmosphere	Business Basics	7	Content, Learning experience, Assessment, Teaching strategy
Solid and hazardous wastes and sewage	Business Basics	7, 9	Learning experiences, Assessment, Teaching strategy
	Industrial Techniques	8	Content
Protecting and promoting human health	Business Basics	7, 9	Objectives, Content, Teaching strategies, Assessment

Sequel to Table 1 see on the next page.

Sequel to Table 1.

Skills	Industrial Techniques	8	Learning experience
	Industrial Techniques	7	Assessment, Objectives
Are there references to the development of			
Systemic thinking	Industrial Techniques	8	Assessment
Ability to think in terms of time – to forecast, to think ahead, and to plan	Consumer Management	7	Objectives
Ability to use multiple perspectives to understand another person's viewpoint	Industrial Techniques	8	Learning experience
Values analysis and clarification	Consumer Management	7	Learning experience
Action orientation	Industrial Techniques	8	Teaching strategy
Co-operation and collaboration	Industrial Techniques	8	Learning experience, Assessment
	Industrial Techniques	7	Learning experience, Assessment
Capacity to develop an aesthetic response to the environment and the arts	Consumer Management	7	Learning experience
	Industrial Techniques	8	Content, Assessment

There were also other ESD themes that the researchers sought to identify in the curriculum documents but there was no evidence that showcased their inclusion. The ESD issues, values, and skills integrated in the TVET curricula of the NSC as reported were therefore evidenced in the objectives, content, learning experiences, teaching strategies, and assessment. These components in any curriculum provide information on what should be achieved according to the area of focus, suggested content, how it should be taught, the suggested experiences that could facilitate the focus and suggestions on how to judge attainment of what should be achieved. Not all curriculum components of each R&T area and grade level reflected ESD themes, but the ESD value to *promote conservation of resources* and the ESD issue that showed awareness and recognition of *technology* and *promoting and protecting human health* were reflected in five of the curriculum components of the Business Management curriculum. Additionally, though to varying levels in each R&T curriculum, ESD content was most frequently evident in the learning experience component of the curriculum documents.

As reflected in each Unit of the R&T areas across the three grade levels, there were three instances where references of ESD values were reflected in the objectives, and five instances in the learning experiences. Regarding ESD issues in the curriculum components, there were four instances where learning experience and teaching strategies showed awareness or recognition of such issues while there were five instances where ESD issues were evident in the suggested assessment. It was observed that regarding ESD skills development, these were evident in one instance in the component of objective, content, and teaching strategy, four instances in the assessment and five instances in the learning experience. Table Two offers specific examples of the ESD values, issues, and skills identified in Industrial Techniques as an illustration.

Table 2
Examples of ESD Content Reflected in Industrial Techniques

ESD Content	Comments		
	In what ways are these included in the objectives, content, learning experiences, assessment, teaching strategies, resources (Include the evidence using the wording from the curriculum guide)		
	Content	Learning Experience	Assessment
Values: Are there references that indicate			
Care for inter-dependent life (animals, humans)		In learning the project students will learn: Environmental considerations relating to the selection and use of common physical resources	
Issues: Are there statements about			
Protecting and promoting human health	Waste Handling and Management • Disposal • Recycling • Health safety and the environment		Evaluating students' competence in the: practice of health, safety and environmental protection habits
Skills: Are there references to the development of			
Capacity to develop an aesthetic response to the environment and the arts	Decorating and Finishes • Use of lines and symmetry • Form and Function • Preparation of surfaces and materials • Application and procedures • Colour and lighting • Aesthetics appreciation	Apply the most suitable/cost effective finishing application to the assembled project to add aesthetic value to the project	Portfolio gives evidence of agreed criteria for: • Finishing and decoration • Evaluating, critiquing and modifying work individually or in peer groups • Finishing given tasks to approved standards

Discussion

The challenge posed by the document regarding the structure and layout of its components raises questions regarding teachers' own understanding of the document. Fullan (2007) notes that the difficulty with which implementers perceive a change can affect its successful implementation. Hence, the level of difficulty experienced in understanding the layout of the curricula documents could affect teachers' interpretation of what and how they are expected to teach and assess. Furthermore, the challenge experienced regarding the structuring of the components of the three curricula suggests disconnect between the philosophy that underpinned the curriculum and the prescriptive nature

articulated as the components were presented. Given the philosophy and constructivist nature of the NSC, a prescriptive curriculum that states what projects students and teachers should emphasise deprives teachers and students of their imaginative and creative manipulation of resources in problem-solving. In Jamaica, school and community contexts are extremely diverse hence allowing teachers to derive their context specific projects based on their home and community life becomes more realistic and align better with the philosophy of the NSC.

The curriculum designers must be applauded for attempts at ESD integration. However, the integration of ESD values, issues and skills lacked consistency across R&T areas and components for most of the ESD content explored. A lack of consistency suggests that there was lack of alignment between curriculum components and would require a teacher who is ESD conscious to ensure such. Curriculum components need to be aligned so that they reinforce each other (UNESCO, 2017). While we recognise that appropriately designed curricula is needed to help teachers emphasise the development of these ideals, this finding underscores the need for adequate training of teachers in how to infuse ESD principles especially where curriculum documents are lacking. Having an adequately trained teaching staff would ensure that where curriculum documents fail to provide guidance on the integration of ESD, the teacher's own ESD consciousness would propel him/her to integrate ESD principles.

The fact that the ESD value of *care for interdependent life* was common for both Industrial Techniques and Consumer Management and the ESD skill focussing on the development of the *capacity to develop an aesthetic response to the environment and the arts* was common for Consumer Management and Industrial Techniques suggests that there was reinforcement for achieving this theme and, as a result, should be more easily achieved. Additionally, the focus across three grade levels on raising student's awareness and recognition about *promoting conservation of resources, technology, solid and hazardous wastes and sewage*, and *protecting and promoting human health* suggest repetition in helping students to retain learning regarding these themes and building ESD competencies from one level to the next.

Recognising that TVET is largely about development and technology is critical to development and operating in the 21st century; all curriculum areas included students using and learning about technology. This is a positive for the R&T curricula since one of the challenges facing TVET is the 'greening' of economies (Maclean, Jagannathan and Sarvi, 2013). Additionally, raising *awareness about solid and hazardous wastes and sewage* in the areas of Industrial Techniques and Business Management suggest that the curriculum developers recognised the link between business development and the environment. This should therefore help students to be more environmentally conscious as they use and manipulate resources.

Missing Education for Sustainable Development Content from the Resource and Technology Areas

Given UNESCO's (2012) charge that ESD and TVET are critical to creating active and ecologically responsible citizens, workers and consumers, we believe that there is need for the R&T curricula to integrate additional ESD principles. This is critical given Jamaica's socio-economic challenges and the power that resides in the curriculum to influence individual's consciousness. If TVET is to provide the opportunity for more

choices for citizens, improve socio-economic status and empower individuals who would otherwise be marginalised (Maclean, 2005), then a re-conceptualisation of the R&T curricula is needed. Additionally, given the increased levels of crime and violence within Jamaica, TVET provides an opportunity to raise critical consciousness (Chisolm, 2009). To create social cohesion within Jamaica and reduce inequality in all its forms, the R&T curricula components need to emphasise ESD principles such as respect for human life in its diversity, support for participation, justice, peace and sustainability, highlight poverty as a social, ethical, and environmental imperative, promotion of a culture of tolerance, non-violence and peace, land use, indigenous people, climate change and action orientation to name a few.

In creating the instrument to analyse the curricula documents we took a holistic view to education. We believe a holistic view is needed in reshaping the curricula so that students are not only focussing on content unique to each R&T area but there is emphasis on the development of competencies that cut across all R&T areas. This was the charge given to countries as outlined in Chapter 36 of *Agenda 21*. We believe that this is the only way in which TVET will result in the benefits for families and society.

Conclusion

The aim of this research was to explore the ways in which ESD was infused in the TVET curricula of the NSC in Jamaica. The R&T component of the NSC represents TVET at the lower secondary levels of the education system in Jamaica. Our analysis of three of the R&T components revealed: that ESD themes are integrated in the general philosophy of the curricula, are integrated in various components of the R&T curricula subjects, the integration of ESD values, issues and skills lacked consistency across R&T areas and components, the curriculum lacked alignment among the components (objectives, content, learning experience, assessment, teaching strategies) that reflected ESD themes, and there is need for integration of more ESD themes in the R&T curricula to ensure that TVET and ESD yield the relevant benefits. Though we recognise that the field of curriculum is a site for contestation and is therefore open to one's interpretation, we believe that this preliminary analysis is an opportunity for dialogue, practice and policy to intertwine thereby leading the way for curriculum change. We believe that TVET represents a unifying force for reducing subject matter boundaries and awakening the critical consciousness of learners towards sustainable development. However, for this to occur the R&T curriculum must be re-oriented towards the deliberate inclusion of additional ESD themes.

Recommendations for Future Research

Building on the findings of this research, there needs to be a second phase of content analysis that focuses on Agriculture as the other R&T subject area in the lower secondary curricula. This is in order to provide curriculum developers and teachers, as well as academics in the area, with a balanced overview of ESD in all R&T areas. Additionally, as stated previously, curricula content alone is not an indication of the development of ESD knowledge, skills and action orientations. What is actually taught in the classroom and the methodology utilised to teach is also important and should be an avenue for inquiry as follow-up to this study. Thus, observations and interviews should be incorporated into future research in this area.

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Appendix One

Content Analysis Coding Frame and Template

ESD Themes	Comments	
	Yes	No
In what ways are these included in the objectives, content, learning experiences, assessment, teaching strategies, resources (Include the evidence using the wording from the curriculum guide)		
	Objectives	Content
	Learning Experiences	Assessment
	Teaching Strategies	Resources
Values		
Are there references that indicate:		
Respect for earth		
Respect for human life in its diversity		
Care for interdependent life (animals, humans)		
Support for participation, justice, peace and sustainability		
Promote conservation of resources		
Highlight poverty as a social, ethical and environmental imperative		
Promote gender equality and equity		
Promote the rights of all without discrimination		
Promote a culture of tolerance, nonviolence and peace		
Issues		
Are there statements about/show recognition/awareness of		
Agriculture		
Technology		
Atmosphere		
Biodiversity		
Changing consumption patterns		
Climate Change		
Deforestation		
Fresh water		

Sequel to Appendix One see on the next page.

Sequel to Appendix One.

Desertification and drought
Gender equity
Urbanisation
Indigenous people
Land use
Solid and hazardous wastes and sewage
Oceans
Poverty
Protecting and promoting human health
Population growth
Skills
Are there references to the development of
Oral and written Communication
Systemic thinking
Ability to think in terms of time – to forecast, to think ahead, and to plan
Critical thinking
Ability to use multiple perspectives to understand another person's viewpoint
Values analysis and clarification
Action orientation
Co-operation and collaboration
Capacity to develop an aesthetic response to the environment and the arts