

Integrating Education for Sustainable Development (ESD) Into Technical and Vocational Education and Training (TVET) in Sri Lanka

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Abstract: Society requires informed citizens, workers, and consumers to build a sustainable future. Education for Sustainable Development (ESD) can help everyone to acquire skills and knowledge, and cultivate right attitudes and values needed to make informed decisions, ensuring transformation into a sustainable society. TVET encompasses pre and in-service education, learning, and other forms of skill development activities relating to occupational fields, production, and livelihoods. By integrating ESD into TVET, TVET becomes greener, which can work as a powerful force to advance people into ecologically responsible citizens, workers, and consumers while meeting the needs of industries, and individual learners. TVET system in Sri Lanka produces 200,000 to 250,000 skilled workforces to the labor market annually. They can make immense contributions to take forward the country's sustainable development agenda if they are enriched with the right attitudes, skills, and knowledge. There is a significant research gap in this field in Sri Lanka. This research is aimed to understand the reality of integrating ESD into TVET, by assessing the level of knowledge and awareness of ESD among the TVET teachers, its integration with TVET curriculums, and the interest of students in green TVET and green jobs, taking the University of Vocational Technology as the case study organization. Questionnaires and discussion techniques were used to collect data. The analysis indicates strong awareness and interest among the teachers about ESD and the importance of its integration into TVET. Only 30 percent of respondents show less interest, which the study reflected due to poor attitudes. Sri Lanka's TVET sector is taking considerable effort to embed ESD by reorienting curriculums, and teacher training, but mostly focused on the environmental facet of sustainability. Training is not more practical oriented. Lack of knowledge and skills hurdle the big-picture integration of ESD. The emerging interest in green TVET and green jobs among students shows high potential. Resources allocation, in-service more practical-oriented training, institutional leadership by example, key stakeholder engagement, reporting & communication are important to transform Sri Lanka's TVET sector into a greener and more sustainability- successful.

Keywords: Sustainable Development (SD), Education for Sustainable Development (ESD), Green TVET, Green Jobs.

I. INTRODUCTION

1.1 ESD and TVET to foster Sustainable Development

Sustainable development (SD) paves the way to mitigate social, economic, and environmental challenges of development, and, therefore, the world should focus on a sustainable path for

development. Education is a prerequisite for sustainable development. However, until now reaching and teaching sustainability is a dominant challenge (UNESCO). Education empowers people with the knowledge, skills, confidence, and attitudes needed to shape a more stable and peaceful future. It is thus the key to building a greener and more sustainable society.

Sustainable development cannot be attained through technological solutions or financial instruments alone. Reaching sustainable development requires a change in the way people think and act (UNESCO ED/PSD/ESD/2012/P1/4). This can be attained;

- By systematically integrating ESD into all levels and settings of education and training, from early childhood to higher education and workplace learning,
- Advancing and greening Technical and Vocational Education and Training (TVET). TVET prepares skilled people for fields of different works and businesses many of which consume a vast amount of labor, water, energy, and raw materials and create huge quantities of solid and liquid waste. Greener TVET helps developing responsible workers who have the knowledge and skills to handle these resources in economically, socially, and environmentally responsible manner.

TVET institutions are the major supplier of the workforce who will be at the forefront in dealing with sustainable issues. Vocational education and training empower people to contribute to environmentally sound sustainable development through their occupations and other areas of their lives, which is outlined in UNESCO's recommendations on TVET (UNESCO and ILO, 2002, p.9) as among the central goals of vocational education.

With the launch of the Sustainable Development Goals (SDGs) in 2015, UNESCO (2015c) revised the goals of TVET to read;

- To empower individuals and promote employment, decent work, and lifelong learning,

- To promote inclusive and sustainable economic growth,
- To promote social equity,
- To promote environmental sustainability

These goals reflect the broader economic, social and environmental role that TVET is expected to play in society. According to Paryono (2017), TVET can address the issues of the Education Paradox for sustainable development, in which education can be seen as both a tool that brings hope for tackling SD issues and at the same time also a threat due to the overuse of resources after having better education, better employment, and improved lifestyles.

Through education and training, people will be more aware of SD issues, and can improve their daily practices that minimize the possibility of endangering the environment; at the same time by having better education people have a better chance of having a better job, the higher salary that eventually may use more resources thus increasing carbon footprints. This is the nature of human beings to be better off economically, and to live more comfortably which may increase the use of resources, the only hope is by minimizing the impact of the waste produced by this new richer lifestyle. This can be addressed by adopting green technology, such as a solar panel for energy, using environmentally friendly house designs and materials, green and energy-efficient vehicles, green information and communication technology, environment-friendly waste management, etc. and by economically and socially responsible practices.

TVET system should embrace or even innovate and expand these sustainable practices and technologies. With a better understanding and awareness of SD, people will act more wisely and responsibly.

1.1.2 Sri Lanka's SD issues, and Environmental Challenges

Ever since Sri Lanka obtained independence, poverty reduction and sustainable development have been the cornerstone of government policies and programs. Currently, although the Country has made considerable progress in many areas, it still faces many economic, social, and environmental challenges, which require concerted attention and combined effort from all facets, by all organizations and individuals with a long-term vision and target. This effort is required, not only to achieve sustainable development in the country in isolation but also to support in achieving global Sustainable Development Goals (SDG), which Sri Lanka also endorsed with all other UN member countries in 2105. In line with UN - SDGs, Sri Lanka has produced a comprehensive strategic plan "Sustainable Sri Lanka Vision 2030 and Strategic Path", as a policy paper to guide the national sustainable development agenda.

Sri Lanka has made some notable progress towards a middle-income country status. But it should ensure equity in development outcomes and that there is no over-exploitation of natural resources and environmental degradation. Due to the unsustainable core of development, other than the social and

economic challenges such as inequity in income distribution and regional development, poor family income, unemployment, and concerns of human rights, corruption, crimes, etc., Sri Lanka also faces a large number of environmental challenges. As highlighted in the Vision 2030 Strategic Plan, these concerns can be categorized as global, regional, and local. The Impacts of global environmental issues such as climate change and ozone depletion are heavily felt by the country. From the regional point of view, issues such as ocean pollution from plastics and hazardous substances create a significant impact leading to coastal inundation, damage to marine ecosystems, extreme weather conditions causing droughts, floods, and high winds impacting food production, and physical infrastructure. Local environmental issues of concern include deforestation, soil erosion, depletion of wildlife due to poaching and urbanization, loss of biodiversity, coastal degradation, increasing municipal solid waste generation and individual waste, haphazard waste disposal, pollution of freshwater resources, urban air pollution, and greenhouse gas emission. Sri Lanka's per capita fossil carbon dioxide (DO₂) emission in 1996 has been 0.47 tons, 10 years after in 2006, 0.65 tons, and in 2016 it was estimated as 0.88 tons. Environmental issues also impact socio-economic progress; health, education, food supply, family income, economic growth, and peace are the challenges of more concern.

1.1.3 TVET in Sri Lanka

TVET system can play a considerable role in managing those challenges and ensuring long-term sustainable development outputs. TVET sector is expected to play a significant role in realizing the Sustainable Sri Lanka Vision 2030.

Sri Lanka's formal TVET sector comprises about 635 public sector colleges, institutions, and training centers (Table 1) and 718 private and NGO training centers. A large number of non-formal TVET providers are also provide training and education in IT communication etc. These providers educate people of all ages, from secondary school leavers to working adults, parents, and others who have suspended their education for various reasons (Colin 2017). Sri Lanka has an integrated system of TVET (Daniel, Alluri, and Maller, 2008).

Table -1: Recruitments and Completions in Public TVET Organizations in 2020

	No of Institutions	No. Students Recruited	No. Students Completed
DTET	39	24,950	10,114
Vocational Training Authority	238	24,604	18,675
NAITA	68	14,210	15,630
National Youth Services Council	40	13,232	1,224
NIBM	2	7,409	4,183
Port & Maritime Academy	1	3,946	3,936
National Youth Corps (NYC)	1	2,097	65

Ceylon German Technical	1	1,197	524
UIVOTEC	1	1,163	0
University Collages (UC)	6	741	124
Institute of Textile & Apparel	1	683	40
GJRTI	1	471	183
Other government Institutes	236	3,610	2,637
Total	635	98,313	57,335
Source: Labour Market Information Bulletin (December 2020), TERTIARY & VOCATIONAL EDUCATION COMMISSION of Sri Lanka			

One of the main architects of the Sri Lanka TVET system is the Ministry of Skills Development and Vocational Training, which has overall responsibility for formulating national policies and implementing youth development programs. The public sector TVET institutions are operating under the purview of the Ministry of Skills Development and Vocational Training, and several other lines and state ministries. Currently, the public sector TVET is delivered by around 13 organizations through colleges, training centers, and institutions, scattered throughout the island. In 2020, the public sector TVET institutions recruited 98,313 students and produced 57,335 skilled workers to the labor market with vocational education certificates, diplomas, and degrees related to over 15 industry sectors (Table -2).

Table -2: Training Performance of TVET Registered Public Sector Training Institutes by Industry Sector (Based on ISIC- Rev .04) in 2020		
	No. Students Recruited	No. Students Completed
Information and communication	19,032	11,214
Construction	18,278	8,380
Education	15,193	7,159
Manufacturing	11,508	8,028
Repair of motor vehicles and motorcycles	9,166	5,648
Other service activities	7,612	5,247
Professional, scientific and technical activities	6,563	3,354
Accommodation and food service activities	4,501	3,702
Agriculture, forestry, and fishing	2,403	1,127
Administrative and support service activities	2,142	1,713
Human health and social work activities	946	1,044
Transportation and storage	844	624
Activities of households as employers	70	22
Arts, entertainment, and recreation	30	48
Electricity, gas, steam and air cond. supply	25	25
Total	98,313	57,335
Source: Labour Market Information Bulletin (December 2020), TERTIARY & VOCATIONAL EDUCATION COMMISSION		

1.1.4 TVET for Sustainable Development in Sri Lanka

Poverty reduction and sustainable development have been the cornerstones of government policies and development programs over the last many decades. Nevertheless, questions still arise as to whether the country has made meaningful progress in this regard when considering the amount of social, economic, and environmental challenges that the country is facing currently. According to many international illustrations and research, mainstreaming sustainable development facets (Social, economic and environmental) and sustainable values, attitudes, knowledge, and awareness among all key stakeholder institutions, and individuals, is the key mitigate of these challenges and the enabler of the long-term prosperity of the nation.

As per the statistics of the Tertiary & Vocational Education Commission, both private and public sector TVET systems in Sri Lanka have recruited 124,419 persons for different educational and training courses in 2020. In 2018 and 2019, these numbers have been 250,690 and 176,080 respectively.

This is a significant number of a skilled and qualified workforce. Systematically integrating green competencies into TVET, can make momentous input in taking the country's sustainable development agenda forward while generating a green skilled workforce for the emerging green job market. According to an ADB study conducted in 2015, the energy sector in Sri Lanka largely agreed about the rising requirement for green skills and the lack of these skills, in sufficient quantities in the sector. 38 percent of energy sector respondents agreed that there was a lack of green skills in the sector while 50 percent agreed to the importance of emerging green jobs in the sector. Similarly, 33 percent of the respondents from the construction sector agreed with the lack of green skills in that sector. Nearly 25 percent of transport sector respondents agreed that there is a lack of green skills as well as the need for additional skills in environmental issues arising out of emission norms and environmental standards.

1.2 Research Gap

Given to understand of the importance of a sustainability-responsive TVET system for sustainable development, continuous research and studies are essential to assess how the TVET sector responds to these expectations. However, Sri Lankan context, research focused on this subject area is very limited except for very few studies undertaken by some international agencies. This research aims to fill this research gap to some extent in its capacity.

1.3 Research Objective

This study is focused to understand the initiatives and approaches being undertaken by the public TVET institutions in Sri Lanka to develop the workforce with green skills, knowledge, and attitudes to match the competencies required in the growing green job market. The research is aimed to;

- a. Assess the level of awareness and knowledge of the academic staff on the concept of ESD and sources of knowledge and training,
- b. Review the initiatives and approaches undertaken by the public TVET institutions in Sri Lanka to determine the level of integrating ESD into study programs,
- c. Assess students' awareness of SD and ESD and interest in green jobs.

1.4 Research Questions

The study emphasizes the following questions:

- a. Are the academic staff being knowledgeable about the concepts of SD and ESD?
- b. Are the academic staff competent and have received training on how to integrate ESD into technical-vocational curriculums?
- c. Have TVET curriculums enriched with sustainability aspects in the respective fields of studies, intending to develop environmentally, socially, and economically responsible workforce in the future?
- d. What is the level of students' interest in learning about SD and awareness about green job opportunities and the green job market?

1.5 Scope and limitations of the Study

ESD is a very large area of research, therefore this study was focused especially on the TVET as an area of ESD. In this research, I did not focus on the internal aspects of the organization, even though some of those aspects are addressed. In this study international articles, and studies were reviewed with the findings of this research, to be able to make general recommendations to organizations working in this field.

The study was limited to the curriculums, the number of teachers, and students at the UNIVOTEC, and the survey methodology that was used to collect data can be susceptible to bias and various errors in responses. In the study process, there were many practical difficulties to bring all the well-celebrated elements in determining ESD in the TVET system.

II. LITERATURE REVIEW

2.1 Sustainable Development (SD)

One of the most commonly used and acknowledged definitions of sustainable development is a 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs', which was presented by the World Commission on Environment and Development in the commonly referred 'Brundtland report' in 1987(Chapter 2.1). The concept of SD that argues for simultaneous resolution of the vast and complex issue of environmental deterioration and the equally vast and complex issue of human development and poverty reduction was explored in the Brundtland report as a way forward. With regard, Bansal Desjardine defines business sustainability as the ability of firms to meet their 'short-term financial needs without compromising their (or 'others') ability to meet their future needs" (Bansal &

Desjardins, 2014). However, there is confusion regarding the terminology set to describe business activities aimed at stakeholders and society at large- a confusion that encompasses both academic literature as well as corporate reporting.

UN experts' meeting adopted that "sustainable development is not affixed concepts; rather it is a culturally-directed search for a dynamic balance in the relationship between social, economic and natural systems, a balance that seeks to promote equity between countries, races, social classes, and genders. The interdependence of people and the environment requires that no single development or environmental objective be pursued to the detriment of others (UNESCO-UNEVOC, 2004c, p.8).

2.2 Education for Sustainable Development (ESD)

UNESCO defines ESD in these terms: "Education for sustainable development aims to help people to develop the attitudes, skills, and knowledge to make informed decisions for the benefit of themselves and others, now and in the future and to act upon these decisions" (UNESCO 2010). ESD allows every human being to acquire the knowledge, skills, attitude, and values necessary to shape a sustainable future. ESD means including key sustainable development issues in teaching and learning, for example, climate change, disaster risk reduction, biodiversity, poverty reduction, and sustainable consumption. It also requires participatory teaching and learning methods that motivate and empower learners to change their behavior and take action for sustainable development. ESD consequently promotes competencies like critical thinking, imagining future scenarios, and making decisions in a collaborative way (UNESCO, 2011) The UN declared 2005-2014 as the UN Decade of Education for

Sustainable Development (DESD). As the lead agency for DESD, UNESCO helps member countries to integrate SD into their education planning, policy, and practices. The UNESCO International Centre for Technical and Vocational Education and Training (UNESCO-UNEVOC) assists member states in greening TVET with special attention to TVET teacher education, curriculum development, learning resource development, and enhancing multi-stakeholder participation to integrate ESD in TVET.

According to Chen Chen Gu, T. Gomes, and Victor Samuel (2011), ESD is the approach that not only provides theoretical information to people about sustainability but also gives them practical tools which are used to move society towards sustainability. That is because theoretical knowledge may lead to merely having conversations about the topic but not having any impact by helping people adopt sustainability practices in their daily lives.

According to Vasilik & Dimitrios (2012), the idea of ESD has recently been at the forefront of the education field, since the world has so far failed to efficiently tackle the 'high growth-high carbon' trend and the use of natural resources. This failure of today's economies to efficiently address sustainability could be regarded as a failure of the current educational system,

which does not sufficiently provide people with innovative ways of thinking to become responsible citizens capable of critical thinking and able to seek new business opportunities that will achieve economic well-being while retaining the health of our planet. As result, a new pedagogy has to be introduced that will provide people with the key competencies to address sustainability.

Australia is one of the countries that has sown leadership in the area of ESD. In their national Action Plan for Education for Sustainability ESD is defined by the flowing principles:

- Transformation and change;
- Education for all and lifelong learning;
- Participation; and partnerships for change.
- Envisioning a beer future
- Critical thinking and reflection;
- Participation; and
- Partnership for change.

ESD is not about formal education but education for everyday life at home, work, and recreation as well. ESD is a life-long and continuous process (United Nations Conference on the Human Environment- UNCHE 2005).

The history of ESD can be traced back to the publishing of UN Agenda 21 in 1992. In Chapter 36 of Agenda 21 (UN 2009) on promoting education, public awareness & training for overreaching goals are stated;

- Promote and improve the quality of education,
- Reorient the curricula,
- Raise public awareness of the concept of SD
- Train the workforce

The first goal refers to promoting lifelong education by acquiring knowledge, and, values needed to improve people's quality of life. The second goal refers to reorienting the curricula from preschool to university to build a sustainable world. The third goal is self-explanatory and it is aimed to be carried out at the national and international levels. The fourth goal refers to the technical and vocational education of workers, especially those in trade and industry sectors for them to adopt sustainable models of production and consumption. It was at this moment that the importance of technical and vocational education was seen by the researchers as an important part of ESD.

2.3 *The Decade of Education for Sustainable Development*

Following up with the publishing of Agenda 21, UNESCO declared the decade from 2005 – 2014 as the Decade of Education for SD. The purpose of this initiative was to emphasize the importance of education for achieving SD. In the middle of the decade, a report was published sharing progress and challenges to generate possible actions from the lessons learned up to that point. In this report the importance of vocational education and workplace-based ESD was pointed out as an “emerging area”, meaning that not much work has

been done (Wals 2009). This report terms this kind of education as Technical and Vocational Education and Training (TVET)

2.4 *Technical and Vocational Education and Training (TVET)*

UNESCO thus defines TVET is to be understood according to as integral to education and lifelong learning and refers to all forms of learning of knowledge, skills, and attitudes relating to the world of work. TVET comprises education, training, and skills development activities relating to occupational fields, production, and livelihoods. According to UNESCO, Transversal skills, citizenship skills, and skills that enable lifelong learning are integral components of TVET. It can take place at secondary, post-secondary, and tertiary levels. TVET can include other programs leading to vocational qualifications and other skills development opportunities attuned to national and local contexts. TVET also encompasses continuing training and professional development undertaken as part of in-service arrangements or individual and collective initiatives. (UNESCO,2015, p.2). TVET programs and courses can be full-time or short and episodic. They can be provided by the government, non-government, public, private, for-profit, or not-for-profit organizations, employers, religious groups, donor organizations, or other providers. They can be delivered face-to-face, hands-on, computer-based, online, or blended teaching and learning. The programs and specific forms of provision depend upon the governing structures, consultation provisions, economic and social needs, stakeholder interests, and other prevailing circumstances in each particular country (Colin Latchm -2017).

Some researchers have observed that TVET is steadily rising to the top in global debates about, and government priorities for, education and national development and in the strategic and operational priorities of regional economic communities, but the sector's capacity to meet the demand being placed upon is often limited (Marope, Chakroun, and Holmes -2015). They suggest that simply scaling up TVET provisioning in its present forms is not only unlikely to be feasible but also unlikely to be an adequate response to meet demand. The nature and roles of TVET systems in contributing to more equitable, sustainable, and inclusive development, will require continuous transformation and expansion.

As described above, workforce training is now recognized as highly important while previously vocational education was seen as a” secondary-class” education (e.g compared to university education). However, there is concern that the skills necessary in this new century, especially those in new processes and services, are not yet available in generating education institutions (e.g. schools, universities), especially in the least developed countries (Fien, Maclean, and Park 2009). Thus TVET was also seen as a solution to poverty reduction and economic development

The UN's International Center for Technical and Vocational Education and Training (UNEVOC) highlights the importance

of TVET combined with ESD: “The changing nature of the world of work, especially due to globalization and technological change, demand that TVET develop a skilled, committed and motivated workers that understand how global changes impact upon local opportunities for business and industry and how these changes impact upon the quality of local social, economic and environmental conditions” (UNESCO-UNEVOC 2009)

2.5 TVET and Environmental Sustainability

According to Majumdar (2012), TVET is one of the major producers of the future workforce, and the sector is responsible for aligning education and training to enable future workers to take on responsibility for responding effectively to the principles that it is, therefore, incumbent upon TVET to develop knowledge, skills, and competencies for green occupations, economies and societies and the innovations needed to address climate change, preserve environmental integrity and assure the continued health of nature’s essential life support system.

The International Labour Organization (ILO) and many other researchers anticipate that climate change, the need to reduce carbon emissions, and the moves to cleaner energy will affect jobs in all sectors in developing and developed countries (The ILO 2011, Skoufias, Rabassa, Olivieri and Brahmhatt, 2011). A virtual conference held by UNESCO-UNEVOC in 2013, highlighted the importance of systematically integrating green competencies into TVET curricula, training regulations, and training programs in teacher training, in-company training, colleges, training centers, and training for the informal sector (Kastrup wineries- 2014). The participants concluded that it is important for learners not only to gain green qualifications that would meet the future labor market needs but also to make green skills, attitudes, and knowledge partners of work and life, to ensure sustainable development and corporate social responsibility, improve the competitiveness of companies and increase employment rates.

UNESCO (2015c) also sees it as incumbent upon TVET to foster a sense of environmental responsibility promote a critical understanding of the relations between society and the environment and contribute to the development of the innovatory method and technological solutions that are needed to address climate change and preserve environmental integrity.

Marope et al. (2015) examine the transformation of TVET through three overlapping “analytic lenses’: economic growth, social equity, and sustainability. They observed that it is now generally accepted that sustainability is an integral part of any meaningful notion of development and it, therefore, follows that well-functioning TVET systems have a crucial role to play in addressing the sustainability challenges identified at the Rio+20 summit (UN -2012). These include, creating clean and decent working conditions for all; producing clean and sustainable energy for all; ensuring that all people have access to the food, water, and nutrition necessary for their health and well-being; managing sustainable cities and building clean

transport systems; protecting the oceans; and building resilience in the face of natural disasters.

Marope et al. (2015) observe that in most cases, TVET systems are failing to contribute to the enormous transformational challenges of sustainability. They argue that TVET systems need to anticipate the rise of new environmental products and services, including renewable energy and green technologies, and to train people for new green jobs and the greening of many existing jobs. TVET needs to heighten awareness among learners of their ethical responsibility to avoid exhausting natural resources and harming the environment through resource use and to safeguard the environmental system for future generations (Marope -2015).

2.6 Green TVET and Green Job

Green jobs are Jobs that reduce the environmental impact of enterprises and economic sectors, ultimately to sustainable levels, and are termed green jobs. This comprises works in agriculture, industry, services, and administration that contribute to preserving or restoring the quality of the environment while also meeting requirements of decent work-adequate wages, safe conditions, workers’ rights, social dialogue, and social protection (R. Maclean, S. Jagannathan & B. Panth-2017).

Green TVET described the efforts of fostering the culture of sustainable practices in TVET and facilitating the transition to climate-resilient societies, greater resource efficiency, and a circular economy. TVET is expected to play a key role in preparing learners for emerging green jobs and providing them with green skills and competencies. As highlighted by UNESCO, this transition has the potential to make a considerable impact on the global labor market in the near future (<https://unevoc.unesco.org/bilt/BILT+-+Greening+TVET>)

Green TVET not only supports sustainable development but also enhances employability in rising green economies. According to ILO, the transition to green economies will potentially create 24 million jobs in the world by 2030, while 1.3 billion current jobs will also be affected in terms of the green skills needed (ILO,2018). Green jobs contribute to preserving or restoring environmental quality, while also ensuring adequate wages, safe working conditions, and workers’ rights and green jobs must be decent and accessible to all. Green jobs can be found in all sectors- agriculture, industry, services, and administration. They include jobs that protect ecosystems and biodiversity: reduce energy, material, and water consumption through high-efficiency strategies; decarbonize the economy, and minimize waste and pollution (UNESCO).

III. METHODOLOGY & CONCEPTUAL FRAMEWORK

3.1 Research Design

This study was guided by Maxwell’s Qualitative Research Design. This model was chosen because Maxwell’s Model for Research Design suggests a systemic, interactive continuous

approach. It allows continuous reflection during the research process and results. This model illustrates the fact that collecting and analyzing information, developing theory, defining the research question, and ensuring validity is a process that occurs iteratively and simultaneously. With the help of this method, we can answer different questions by the role of each selected method which can bring something new to the findings (Maxwell 2005,3) Figure-1.

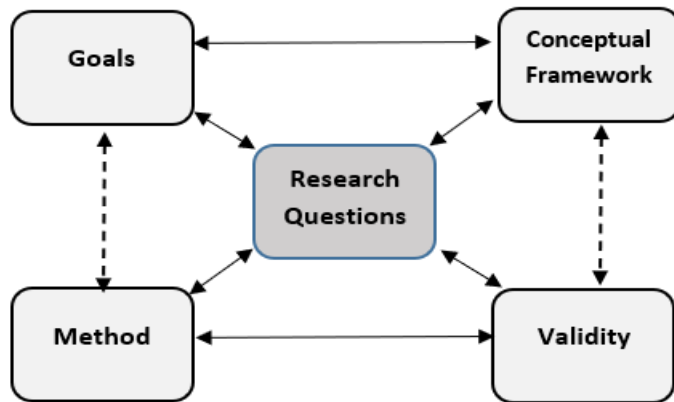


Figure -1: Interactive Model of Research Design

Source: An Interactive Approach (Maxwell 2005)

3.2 Research Methods

The research method applied in this study included:

- a. Content analysis,
- b. The survey questionnaire, and
- c. Discussion with the case study organization staff.

3.3 Research Population

The data population used in this research is consist of the public TVET institutions that are operating in Sri Lanka, under the purview of the Ministry of Skills Development and Vocational Education and Training, and several other line and state ministries. Currently, the public TVET system is delivered by around 13 organizations including the University of Vocational Technology (UNIVOTEC), through over 630 colleges, training centers, and institutions, scattered throughout the island. In 2020, the system has recruited over 98,000 persons as students, and out of them, around 57,000 persons completed educational and training courses-Table (1.1). Over 41,000 persons have received their NVQ certificates in 160 occupational categories and 14% of the national NVQ certificate holders got their certificate through recognition of prior learning. Data for the population size have been collected from all the disclosed information on the respective websites and published documents.

3.4 Research Sample

For this study, the UNIVOTEC was taken as the sample to assess the level of integration of ESD into curriculums, teachers' knowledge, and students' awareness. The UNIVOTEC established in 2008, under the University of Vocational Technology Act Number 31 of 2008, has the same

legal and academic status as any other national university in Sri Lanka. The degrees awarded by the UNIVOTEC are treated as equivalent to degrees awarded by any other universities under the purview of the University Grants Commission of Sri Lanka, and the universities listed in the Association of Commonwealth Universities.

The general objective of the UNIVOTEC is to provide progressive upwards movement to the students in the technical education and vocational training system, based on their aptitudes and abilities, to acquire a university education. The specific objectives of the UNIVOTEC are,

1. to provide pedagogical training up to degree level for trainers serving in the vocational education sector industry,
2. to provide courses of study for middle-level technical personnel, with qualifications acceptable for admission to UNIVOTEC, up to degree level, and
3. to provide courses of study for those with National Vocational Qualifications to upgrade their competencies and acquire degree-level qualifications and
4. to provide extensive courses on continuous professional development.

Presently, UNIVOTEC operates 14 departments under 4 faculties; The Faculty of Education offers undergraduate programs related to Training Technology. They include pedagogical training and technical training. Teaching staff in the TVET sector and the industries are provided the opportunity of obtaining academic qualifications through the programs offered by the Faculty of Education. In addition, the Faculty offers degree programs in Education and Training & Language Studies.

Faculty of Engineering Technology offers undergraduate programs in specialized areas of Civil construction, Mechanical & Manufacturing Technology, Electrical & Electronic Technology, and Building Service technology. The faculty of Information Technology offers undergraduate programs in Information & Communication Technology. The faculty of Industrial Technology offers undergraduate programs in specialized areas of Agriculture and Food Technology, Management, Quantity surveying & Film, and television industries.

In 2020, the UNIVOTEC has got 1,165 admissions for different vocational degrees and diplomas. Currently, the student population is about 3,500, and the academic staff is around 60 lecturers and assistant lecturers.

IV. DATA COLLECTION, ANALYSIS, AND FINDINGS

4.1 Data Collection

4.1.1 Content Analysis

Content analysis was done to collect secondary data, and to have a deeper understanding of the concepts of ESD and TVET, and their applicability to each other and interactions between

them, to answer the research questions. Various sources of the reviewed literature included scientific articles and journals, books, conference reports, research studies, and websites related to the research. The main sources of the research at this point of the study were: the UN's International Center for Technical and Vocational Education and Training (UNESCO-UNEVOC) documents and documents from the 2nd International Congress on Technical and Vocational Education, held in Seoul, 1999 and various other UN publications on ESD & TVET and Sri Lanka Sustainable Development Vision 2030.

4.1.2 Survey Questionnaire

The questionnaire method was used to collect primary data. A structured questionnaire was made available to all 60 lecturers who were in the academic year 2021 in all four faculties in the case study organization- UNIVOTEC. The questionnaire was aimed at assessing;

- a. Teachers' Knowledge and awareness of ESD and SD,
- b. Whether the sample organization teaches about the concept of SD and ESD with the current curriculums and if so, what are the areas and initiatives undertaken,
- c. Student interest in SD and green jobs,

Representing all four faculties and departments, 43 lecturers responded with completed questionnaires. It is noteworthy to mention that some respondents completed the questionnaire with high interest, taking more time for compiling their comments.

4.1.3 Discussion with the Staff

Telephone discussions were held with five members of the academic staff at the case study organization, representing all four faculties. They are a part of industry experts with extensive experience and knowledge about the TVET system in Sri Lanka.

The purpose of the interviews was to ask them their thoughts about the strength and weaknesses of the sample organization and other public sector TVET institutions, ESD, and TVET curriculums and initiatives and to learn about the current realities.

4.2 Data Analysis and Findings

4.2.1 Discussion with the Sample Organization Staff Awareness of ESD

The discussion with the academic staff members of the sample organization revealed a strong level of knowledge and interest in ESD.

All the members with whom discussed over the phone were able to describe the three pillars of sustainability and explain the significance of ESD to the TVET industry. Some focused more on the environmental aspect of sustainability. The majority showed an advanced understanding of the connections between social, environmental, and economic sustainability with ESD. The contenders mostly have learned about sustainability from

self-studies and in-service training from external sources. One had gathered knowledge from his professional associations.

Application of ESD

While the conversed staff members' understanding of ESD is fairly uniform, the extent to which they have applied this understanding in their faculties and departments found significant disparities. All lecturers discussed outlined changes that had been made in their curriculums. But very little has been made in the organizational environment to make it more of an environment for learning about sustainability in practice. They emphasized the barriers to making changes to the physical environment of the institution: the most commonly stated were insufficient funding, difficulty in finding the time and resources, and lack of strategic direction. Nevertheless, they all emphasized the importance of organizational leadership by example, for inculcating sustainability skills, values, culture, and attitudes among all members of the staff and students.

Application of ESD in the Industry

The lecturers discussed are senior members of the sample organization and also experts with extensive knowledge about the TVET industry in Sri Lanka. As per their knowledge, only a few public TVET institutions including UNIVOTEC have done some work for greening TVET education and their facilities. Of the majority of the institutions that have done some greening efforts, ESD has concentrated more on environmental sustainability, and little coordinated work have been done to mainstream issues related to social, and economic sustainability. As per the discussion what understood was, it has much to do with the level of teachers' interest and involvement in ESD since it is teachers rather than administrators who are typically the leaders of ESD initiatives.

The experts identified several common barriers to the integration of ESD into TVET: insufficient teacher education and training; teachers' workload; and insufficient funding to purchase relevant tools and infrastructure for learning about ESD in practice. All lecturers discussed said that very limited teachers have received training or professional development in the area of ESD. This training gap is accompanied by a lack of relevant curricular materials that would enable teachers to make changes to their in-class- practices. Some experts who discussed suggested the importance of developing relevant policies for integrating ESD into TVET.

4.2.2 Analysis of Data from the Questionnaire Survey

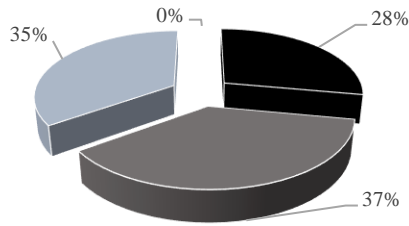
4.2.2.1 Awareness of ESD

Are you familiar with the concept of ESD?

Out of 43 academic staff members who responded to the questionnaire survey, a notable 28 percent said that they know the concept "very well" and 37 percent of the respondent said that they have some detailed knowledge of the concept. 35 percent said they had "heard of the concept, but no detailed knowledge of it.". but this group was also aware of the concept

to some extent. No one responded that they have “no knowledge at all” of the concept of ESD” (Figure 2).

Figure-2: Are you familiar with the Concept of Education for Sustainable Development (ESD)



- I know the concept very well
- I have some detailed knowledge of it
- I have heard of the concept, but have no detailed knowledge of it

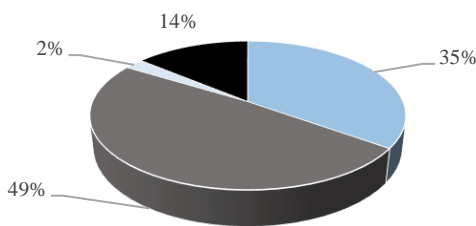
The survey results revealed that almost 100 percent of the academic staff of the case study organization is familiar with the subject of ESD. This is a strong foundation for the successful integration of ESD to TVET in Sri Lanka.

Have you read about or received training on how to incorporate ESD into the TVET?

As per the analysis, a remarkable 14 percent of respondents had said that they “have received training in it externally”, and only 2 percent had gotten university in-house training. Notable 49 percent had “read about it”, gathered their knowledge by self-studies, - shows high interest in the subject matter among the teacher. Nevertheless, a considerable 35 percent had mentioned that “not read about or received training in it” (Figure 3). This could be due to poor attitude in part or lack of interest or knowledge on the other part.

Nevertheless, over two-thirds of respondents have received knowledge of ESD from self-studies, and internal and external training.

Figure-3: Have you read about or received training on how to incorporate ESD into TVET?



- I have not read about or received training in it
- I have read about it
- I have received training in it through my university
- I have received training in it external.

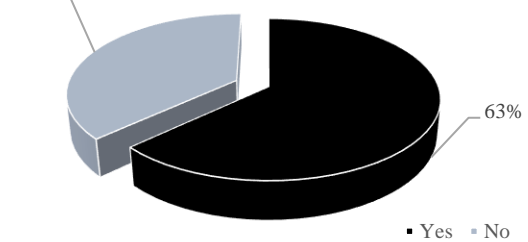
4.2.2.2. Application of ESD in the Class Room

Do you teach Economic, Social, and Environmental Responsibility to Students as a part of their TVET Education?

The responded lecturers in the survey did indicate a commitment to incorporating SD into their teaching practice: two-thirds (63 percent) indicated that they do teach students about social, environmental, and economic responsibilities. 37 percent indicated that they don’t teach (Figure 4).

Of those who responded positively, however, the majority described lessons that focused on environmental issues, particularly recycling and renewable energy. They have noted that they discuss the benefits of hydro, wind, and solar power and energy-efficient appliances. As per the comments, sustainable and environmentally friendly building practices, are sustainable.

Figure -4: Do yo teach Environmental, Social and Economic Responsibility to Sudent as a part of TVET education



building designs, environmentally friendly construction management, waste management, control of air pollution, application of labor law, human rights and entrepreneurship for sustainable development, etc. are incorporated into teaching modules and discussed in the classroom.

Only one respondent demonstrated a more sophisticated understanding of sustainability, in his/her subject area of Industrial Management - engagement with its social and economic aspects, with particular attention to workers’ consideration, safety equipment, resources efficiency, calculation of carbon footprint, sustainable production flow, sustainable supply chain management, etc. (Figure-5). One has noted, that they teach sustainable practices in the food industry, organic versus non-organic food, composting, etc. Most of the comments in support of “yes”, show that majority of in-class ESD teaching relates to the environmental pillar of sustainability. Lecturers are well familiar with the three R’s (recycling, reducing, and reusing), and with issues like sustainable resource use, pollution, and clean energy. A substantial number of comments reinforce their high interest in the concept of sustainability, and green TVET, but are unable to relate it more concretely to the work for which they are preparing students.

Although there are acknowledged limitations to their familiarity with education for sustainable development, academic staff feel that they can apply some (70 percent of respondents) or most (21 percent of respondents) of what they do know. In keeping with this, nearly half of the respondents

had made changes in their curriculums based on their knowledge of ESD.

Figure -5

Yes..... teach best practices for sustaining the world through Industrial Management. Specify.....

- Operation Management – how to select the most renewable raw materials..., how to calculate carbon footprint of products,
- Design the production flow, system and green delivery based on maximum usage of resources by minimizing leakages and waste.
- Logistic and supply chain management .. the ways of integrating supply chain with green and sustainable supply.. to reduce Co2 and green house gases (GHG) for environment.
- Sustainable waste management
- Best consumer practices for sustainable 7-R (Reject, Re use, Resources transfer, Replace with Renewable, Reverse logistic and Recycle of Resources)

4.2.2.3 Student Interest in Sustainable Development

Do students raise SD-related questions in class?

Do students express interest in learning SD skills?

Do students express interest in finding Green Jobs?

Data from the teachers’ survey suggest that student interest in the subject of sustainable development is very high. Over 73 percent of respondents agree students do raise SD-related questions as above, in the classes, but at different measures. This is a strong indicator, that students beginning to explore sustainable development in their lives and work (see Figure 5).

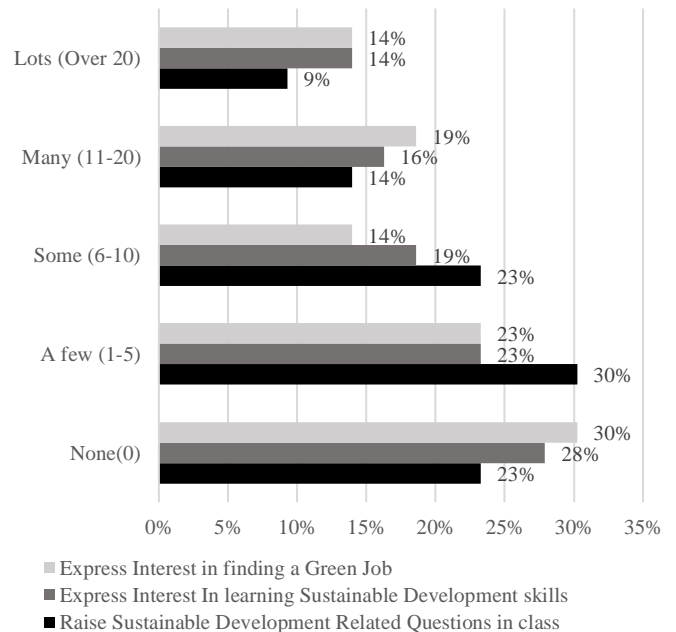
When asked “how many of your students have raised SD-related issues in the classroom?” 30 percent answered “A few”, 23 percent indicated “some”, 14 percent “many” and 9 percent “lots”. Only 23 percent have cited that no students have raised these types of questions.

Out of the respondents, 77 percent said that their students have expressed interest in learning SD skills or otherwise competencies that could make their future work more environmentally, economically, or socially responsible; of which “a few” 23 percent, “some” 19 percent, “many” 16 percent, and “lots” 14 percent.

For the question, “whether students show any interest in finding a green job?”, 70 percent of respondents have said yes; of which 23 percent said “A few”, 14 percent “some”, 19 percent “many” and 14 percent said “lots”. These findings illustrate strong interest among students to learn about SD. TVET institutions should take initiative to transform this interest into a powerful force to leverage the country’s SD agenda forward.

More importantly, students’ interest in learning SD-related skills is to advance their knowledge in the subject in general, and not for finding a green job in particular. This interest is important to strategize the ESD in the TVET sector in Sri Lanka, because as emphasized by S, Majumdar 2016, ESD focuses more on learning than on teaching. Therefore, it emphasizes the importance of active participatory techniques of teaching rather than passive one-way instruction from the teacher.

Figure-6: Student Interest in Sustainable Development



However, the survey illustrated that teachers themselves are unsure about what constitutes “green jobs”. When asked about likely future opportunities for green jobs in Sri Lanka, nearly half of the respondents indicated that they were unsure of the definition of green jobs or where the opportunities might be; other responses, likely: “in agriculture”; anything related to environmental studies”; and “trades” were vague.

A few respondents were more specific, and identify ecotourism and renewable energy as potential sectors for green jobs for their students. However, only one respondent had made “green job” work placements available for students (in electrical generation alternatives, and construction and building trades).

V. DISCUSSION

The purpose of this chapter is to review the findings of the analysis to learn about the current realities of TVET through the lens of a successful TVET for sustainability.

UNESCO, in its mid-decade report of the Decade of Education for Sustainable Development (DESD), the importance of bringing the concepts of Education and Sustainability together was highlighted (Wals 2009). Since then, this topic has been on the agenda of the UNESCO TVET Program for over a decade

(UNEVOC 2010, 5). This quote reflects that integrating ESD concepts into TVET is not an easy task.

The findings of this research also reveal a substantial gap between TVET and ESD. More than a gap there is a disconnection, as both topics are still mentioned as separate areas, and they are not usually put together under the same context. In other words, TVET is not functioning up to societal expectations in support of a sustainable future.

5.1 *The key aspects of a successful TVET for Sustainability*

By going through the literature no direct definition was found to mean what could be a successful TVET for sustainability. Literature comes across several characteristics that determine what could be a “successful TVET for sustainability”. More importantly, Chen Chen Gu, T. Gomes, and V. Samuel (2011) emphasized that the development of a workforce skilled for sustainability by emerging Knowledge, Skills, and Attitude (KSAs) are the key to successful TVET for sustainability. They highlighted the key aspects of a successful TVET for sustainability by presenting a definition of “success”, followed by four key aspects;

TVET develops a workforce skilled for sustainability by...

- ... Embedding TVET with sustainability knowledge, skills and attitudes;
- ... adopting relevant pedagogical approaches;
- ... partnering with key stakeholders and
- ... leading by example.

5.1.1 *Sustainability knowledge, skills, and attitudes (KSA)*

While reading literature, I many concepts related to sustainability KSA came a crossed. A TVET for sustainability prepares the new generation of workers and the existing ones with sustainability skills, knowledge, values, and attitudes that support sustainable development. The development of KSAs as a whole is an important aspect of TVET due to the nature of it being practical. Coincidentally in ESD, the development of KSA is a common topic (Chen Chen Gu, T. Gomes, and V. Samuel -2011). Australian government defines KSA as “Skills for sustainability, also known as green skills, are the technical skills, knowledge, values, and attitudes needed in the workforce to develop and support sustainable social, economic and environmental business, industry and community” (COAG 2009).

Knowledge is important to teachers and students to understand sustainability with the big picture of its challenges and opportunities and to be able to make informed decisions about which actions to take in support of SD and analyze green jobs market and employment opportunities (Chen Chen Gu, T. Gomes, and V. Samuel -2011). According to them, skills, in a general combination of hard and soft skills necessary; for example a combination of communication skills and technical skills. Skills are generally practical skills that TVET should

deliver to students for them to overcome the sustainability challenges in their particular workplace or profession. Accordingly, the skills that will help support SD are many and vary from profession to profession.

In ESD, promoting attitudes should be an integral part. Having knowledge and skills for sustainability is not enough. Attitudes towards reaching sustainability need to be advanced both by teachers and students themselves. Attitudes are based on values as the society view which an individual carries on through his/her life. As stressed by Fien, Maclean, and park (2009), TVET programs should encourage students to reflect upon their values, how they affect lifestyle choices and social, economic, and environmental impacts

The analysis of this research, from the discussion as well as the questionnaire survey, it was found an advanced understanding and knowledge among the teachers about ESD and its importance to TVET, even though, some focus more on the environmental aspect of sustainability. Out of the respondent, 28 percent said they are thorough about the concept of ESD and 37 percent said they have some detailed knowledge of it. 35 percent say, they are aware of the concept of ESD but have no detailed knowledge of it. This group pretends to say that they are interested to learn.

Over 16 percent have had in-service training on ESD internally and externally. 49 percent have got knowledge and familiarity with the concept by reading and self-study. This group, over 65 percent of respondents, have interest and the right attitude- a reflection of the values on which they make decisions, basic to understand why they do things and they have understood the benefits of moving towards sustainability.

Out of the respondents, 35 percent say, “they have heard about the concept but no detailed knowledge of it”. On the other side, the same group (35 percent) says “they have not read about or received training on it”. This is a clear reflection of a poor attitude. At the same time, around 35 percent (actual 37 percent) of respondents say “they do not teach social, economic and environmental responsibility to the students at part of their TVET”, and around 30 percent say that “students do not have interest on SD and make inquiries about green jobs” this is a clear reflection of an “attitude gap” about ESD among around 30 percent of academic staff.

The poor knowledge of the subject is indicated by the comments given by two respondents in this group that “this subject is not relevant to the subject that he/she is teaching.” ESD is common to all TVET subjects and all professions but at different scales. It is the right attitude, that drives people to gather knowledge through self-study or training. As described by the lecturers themselves, at discussions, poor attitudes, incomplete knowledge, and lack of capacity on the part of educators are significant barriers to mainstreaming ESD into technical–vocational programs.

Attitudes are based on values and the societal view that an individual carries on throughout his. /her life. Given the

scarcity of resources, 100 percent training is practical to be expected.

5.1.2 Pedagogical approaches;

As largely analyzed before, society expects TVET to be reoriented to address the challenges that the world faces to achieve sustainability. As emphasized in the UN's Barcelona Declaration (2004), the links between all different levels of the educational system, the content of courses, teaching strategies in the classroom, teaching and learning techniques, research methods, training of trainers, evaluation and assessment techniques, are all aspects that need to be reviewed in support of ESD.

According to UNESCO's pedagogical interpretation of ESD in the strategy for the SESD, ESD at TVET should follow two approaches; (UNESCO, 2009):

1. ESD as a means to transfer the appropriate sets of knowledge, attitudes, values, and behavior;
2. ESD is a means to develop people's capacities and opportunities to engage with sustainability issues so that they can determine alternative ways of living.

What is crucial is that TVET should develop learners to be better prepared for coping with the rapid technological changes in the new green economy and simultaneously enable individual transformational change towards sustainability, whether it is by refocusing education on the acquisition of knowledge, skills, and values or building capacity (Chen Chen Gu, T. Gomes, and Victor Samuel -2011).

The current TVET approaches at the case study organization integrating sustainability in the programs show that more emphasis needs to be given to delivering the concepts that provide a concrete definition of what sustainability means. As per the comments given by the survey respondents, the currently used pedagogical approaches showed some strength in this area but focused on simply reducing the environmental impacts and not on the big picture of the sustainability challenges. The discussion with teachers highlighted teachers received no training or professional development in all the areas of ESD even though a considerable number of people have participated in general. They noted that this training gap is accompanied by a lack of relevant curricular materials that would enable teachers to make changes to their in-class practice.

5.1.3 Partnering with key stakeholders

Building partnerships with key stakeholders is an essential component in implementing sustainable development principles (Chinen 2003). The synergy between TVET institutions and industry and the various other economic sectors, to foster the development of generic sustainable competencies, the work ethic, technological and entrepreneurial skills, and for conveying human values and standards for responsible citizenship, are important. This

embraces shared values, shared curriculum, shared resources, and shared outcomes (UNESCO 1999).

The discussion with the teachers highlighted the significant need for improvement in this aspect taking international examples from developed and regional countries.

5.1.4 leading by example

Organizational leadership by example is one of the important elements of successful ESD. Leading by example means that what is being taught is not just words but is reflected in actions. The case study institution is only focusing on regular measures for the reduction of environmental impacts which is no real show of being a leader.

According to the discussion with the teachers, the case study organization does not have an in-house sustainability development program of its own, with strategies and action plans, and follow-ups. Therefore, effort needs to be put into showing the leadership of TVET institutions in following and implementing sustainability practices- is an important tool to proliferate sustainable values, attitudes, and the learning culture among the teachers, students, and all staff.

5.2 Barriers, Challenges, and Opportunities

Based on the discussion, results of the analysis, and the comments given by the survey respondents the following can be identified as interlinked barriers, challenges, and opportunities for the improvement of capacity in the sample organization,

- a. Lack of big picture understanding of SD – caused by lack of knowledge and leadership by example.
- b. Lack of staff expertise - need for training, professional development, and institutional leadership.
- c. Lack of relevant course materials and resources – the need for funding, resource allocation, ministerial policy support, communication, reporting, and regular stakeholder engagement is important.
- d. Lack of time to update courses - need staff interest, positive attitudes, internal administrative policy supports, and institutional commitment.
- e. Lack of institutional drive and commitment – more opportunities for in-house SD development- need strategic vision, mission, goals, planning, and supported internal sustainability policies and governing structures.
- f. High interest in the subject among the teachers – the key to future development and progress with strategic drive and direction.
- g. Strong interest among the students – opportunities for training and new courses.
- h. Weak partnering with stakeholders – need organizational commitment to identify training opportunities.
- i. Lack of awareness & stakeholder engagement – need regular key stakeholder engagement, communication, and sustainability reporting (reporting on

sustainability policies, initiatives, goals, achievements, and plans).

VI. RECOMMENDATIONS

- a. The TVET institutions should provide curriculum resources that indicate how sustainability can be incorporated into the technical-vocational curriculum. This was the most common request that was implied from the questionnaire responses and comments.
- b. Some respondents have noted that the concept of sustainability is not relevant to the subject that is teaching. Nevertheless, the concept of SD is relevant to all courses and hence should be emphasized in all curricula modules to impart the appropriate knowledge, skills, and attitudes. TVET organizations should be encouraged to develop new curricula for all TVET courses, ensuring that sustainable outcomes continue to be created for each course.
- c. Students should be trained in pedagogy for an effective learner-centered teaching and learning process. The teacher staff needs skills, such as guidance and counseling, and life skills to be able to overcome obstacles to the implementation of ESD.
- d. TVET institutions should provide continuous in-service training on ESD that is specific to technical-vocational teachers, around 60 percent of survey respondents indicated a desire for such training. Many researchers highlight that lecturers who involve in teaching sustainability aspects of different subject areas have become interested in ESD as a result of such in-service training and professional development.
- e. Substantial percentage of funds that are provided to public sector TVET institutions should be allocated for SD-related professional development of teachers. Suggest providing in-service training to teachers on ESD, with concrete examples of how ESD can be integrated into specific technical and vocational programs/courses. Increase the number of professional development opportunities in ESD that are available to technical-vocational teachers and administrators.
- f. TVET institutions should work with industry sector chambers, employers, and employee associations, both those that traditionally hire graduates of TVET programs and prospective employers and associations in new “green” industry sectors, to identify emerging demands for green jobs.
- g. TVET institutions should, in consultation with industry sector chambers, employers, and employee associations, undertake research directed at identifying emerging demand for sustainability-related skills and potential barriers to the development of a “green collar” workforce. Several specific sectors have been identified in Sri Lanka’s sustainable development policy paper “Sustainable Sri Lanka Vision 2030 and Strategic Path” as key to economic development. TVET organizations should work to ensure that students are acquiring the necessary skills to meet demand in those specific sectors.
- h. The institutions should provide academic staff with information on ‘green’ technical-vocational jobs and “green” career opportunities in the Country. Based on the analysis, there is an interest among students in learning more about “green jobs” (14 percent of respondents says this), The lecturers do not have the capacity to educate students about these opportunities. TVET institutions can collect information through industry partnerships and publish it through their websites.
- i. Suggest TVET institutions promote and partner with “green” industries and trades in the Country to offer internships to technical-vocational students interested in lea
- j. Organizational leadership by example is one of the important elements of successful ESD. Having a strategic plan with a clear sustainability vision, mission, and goals with strategic and operational level governing committees is a boost to the implementation of sustainable development within the institution. Fostering SD should be an integral part of the organizational vision. Organizational leadership with all key stakeholder partnerships (academic and non-academic staff, students, and community) is vital to harness the learning environment for sustainability.
- k. One of the areas where the TVET sector can show leadership is in the adoption of measures to improve waste management, use, conservation, and reuse/recycling of natural physical resources including electricity, fuel, water, and land. Measures that minimize the need for transport by workers and clients should also be introduced by promoting the use of low-carbon and/or public transportation and by the use of technologies like teleconferencing, online training, and collaboration. Sustainable procurement practices can be adopted or give preference to suppliers of products and services to the TVET sector who demonstrate a commitment to a sustainable society and low-carbon economy.
- l. TVET institutions should take necessary steps to include all disadvantaged people in society including disabled TVET programs, through online or distance education, in support of promoting the social facet of SD.
- m. Involvement with the local community in environmental and social development programs can showcase institutional leadership in the social facet of SD.
- n. Today society at large expects sustainability-oriented TVET, and the development of a responsible workforce with capacities to handle economic, social, and environmental challenges in their business,

industry, or personal life with new and innovative approaches, techniques, and enabling environment, is important to engage with this societal interest. TVET institutions should provide information to society with transparency, by communicating and reporting what they did, what they do, how they do it, and what are their plans. How the information is delivered is crucial to assess the success of TVET in fostering sustainability transformation. In this regard, periodic sustainability reports will be an important tool to engage with this societal expectation

VII. CONCLUSION

From the analysis of the survey responses, it was evidenced that the sample institution has awareness and is taking efforts to integrate ESD into TVET by embedding aspects of SDs into curriculums. Out of 43 respondents, 16 percent said that they have received training on integrating ESD into TVET. Over 63 percent of the respondents say that they teach students about environmental, social, and economic responsibility as part of their technical and vocational training. However, this happening not with a clear understanding, principles, vision, and right direction. As per the comments, it is evidenced that the majority of initiatives are based on simply environmental aspects and not focusing on the big picture of the sustainability challenges. Sri Lanka's vision for sustainability 2025 has a good definition of sustainability in line with the global definition, which can be incorporated into TVET to point inwards in a clear and right direction.

As per the survey it was found, the pedagogical approaches used for the ESD in the TVET curriculums are more elementary. TVET is a very practical type of education, awareness, knowledge, and skills in the concept of sustainability are needed to reorient it with the broad concept of sustainable development.

TVET sector organizational leadership and commitment by example, are crucial to refocus TVET for achieving the Country's desired goals towards a sustainable future. The implication for this is that the transition for the TVET organization to support ESD does not require major changes. What is required is good vision and the necessary actions to reach that vision.

Future research

The field of TVET is one where there are many more aspects to consider when integrating sustainability. Future research is recommended to continue to research what are the easiest and most viable ways to integrate sustainability into TVET programs from specific fields of training like construction, tourism, transport, carpentry, etc.

Since the researched organization is already taking efforts to move sustainability forward, research can be done in organizations that have not taken steps to move in this direction and find out what opportunities they have to do so.

Validation and confidence in results

Due to time constraints and not receiving positive responses from the selected experts to my request for support for this research, I was not able to validate the findings on the key aspects of the study.

I am conscious that, a lack of previous research knowledge in the TVET and its academic area, could have hindered me from deepening my analysis covering different facets of TVET. But I am confident that this research may contribute to TVET organizations that are in transition or want to start their path toward a greener and sustainable TVET.

A case study with reference to the University of Vocational Technology (UNIVOTEC)

REFERENCES

- [1] ADB - Case Study of Sri Lanka- ADB Study/UNESCO-UNEVOC Website Material/Maclean, Jagannathan and Panth/Page 216 <https://www.worldometers.info/co2-emissions/sri-lanka-co2-emissions>
- [2] Cosmas K. Lambini, Angelina Goeschl, Max Wäsch, and Martin Wittau -Achieving the Sustainable Development Goals through Company Staff Vocational Training—The Case of the Federal Institute for Vocational Education and Training (BIBB) INEBB Project
- [3] Chinen, Chris. 2003. Skills to Last. A Technical Research Report for Human Resources Development Canada, Winnipeg: University of Manitoba.
- [4] Chen Chen Gu, Telma Gomes, Victor Samuel Brizuela (2011) "Technical and Vocational Education and Training in Support of Strategic Sustainable Development" School of Engineering Blekinge Institute of Technology Karlskrona, Sweden
- [5] Colin Lachen 2017 -Using ICTs and Blended Learning in Transforming TVET- UNESCO and COMMONWEALTH OF LEARNING, 2017 UNESCO ISBN 978-92-3-100212-0 COL ISBN 978-1-894975-85-8 This publication is available in Open Access under the Attribution-ShareAlike 3.0 IGO (CC-BY-SA 3.0 IGO) license (<http://creativecommons.org/licenses/by-sa/3.0/igo/>).
- [6] COAG. Council of Australian Governments. 2009. Green Skills Agreement. Available from <http://www.deewr.gov.au/Skills/Programs/WorkDevelop/ClimateChange/Sustainability/Pages/GreenSkillsAgreement.aspx> (accessed 07 February 2011).
- [7] Daniel, J., Alluri, K., & Mallet, J. (2008). Tertiary TVET: Pathways for pioneers. Guest Address at the University of Vocational Technology (UNIVOTEC), Sri Lanka. Retrieved 22 May 2016 from <http://oasis.col.org/handle/11599/1003>
- [8] Dordrecht: Springer Paryono I- The importance of TVET and its contribution to sustainable development, SEAMEO VOCTECH Regional Centre Bandar Seri Begawan, Brunei, Green Construction and Engineering Education for Sustainable Future, AIP Conf. Proc. 1887, 020076-1–020076-14; DOI: 10.1063/1.5003559, Published by AIP Publishing. 978-0-7354-1570
- [9] Fien, John, Rupert Maclean, and Man-Gon Park. 2009. Work, Learning and Sustainable Development: Opportunities and Challenges
- [10] Kastrop, J., & Winzier, D. (2014). Greening TVET: Qualifications needs and implementation strategies. Report of the UNESCO-UNEVOC virtual conference, 12 to 26 November 2013. Bonn: UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training. Retrieved 22 May 2016 from www.unevoc.unesco.org/fileadmin/up/greening_tvete_forum_report_2013.pdf
- [11] Marope, P. T. M., Chakroun, B., & Holmes, K. P. (2015). Unleashing the potential: Transforming technical and vocational

- education and training. Paris: UNESCO. Retrieved 22 May 2016 from <http://unesdoc.unesco.org/images/0023/002330/233030e.pdf>
- [12] Majumdar, S. (2012). Developing a greening TVET framework. Berlin: UNESCO-UNEVOC International Centre. Retrieved 22 May 2016 from www.unevoc.unesco.org/fileadmin/user_upload/docs/Greening_TVET_Framework-Bonn-Final_Draft.pdf
- [13] R. Maclean, S. Jagannathan & b. Panth-2017. Education and Skills for inclusive growth, green jobs and greening of economies in Asia – Case study summary of India, Indonesia, Sri Lanka, and Viet-Nam
- [14] Renner, M., S. Sweeney, and J. Kubit. 2008. Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World. UNEP/ILO/IOE/ITUC. Available from: http://www.unep.org/labour_environment/features/greenjobs-report.asp (accessed 09 April 2011)
- [15] Skoufias, E., Rabassa, M., Olivieri, S., & Brahmabhatt, M. (2011). The poverty impacts of climate change, Economic Premise, No. 51. Retrieved 22 May 2016 from http://siteresources.worldbank.org/EXTPREMNET/Resources/EP51_v4.pdf
- [16] S. Majumdar 2016 (Prof.), “Integrating Sustainable development in TVET curriculum” 2016 Director General, Colombo Plan Staff College, Manila, Philippines,
- [17] Vasiliki Brinia & Dimitrios Halkiotis - Special Issue "Vocational Education and Training for Sustainable Development
- [18] Wals, Arjen. 2009. Review of Contexts and Structures for Education for Sustainable Development 2009. Paris: UNESCO