

A Document Analysis of the Visibility of Sustainability in TVE Teacher Education Programme: The Case of a Malaysian HEI

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ABSTRACT

There has been a global call for institutions of learning to engage in Education for Sustainable Development (ESD) by leading world organisations. Although scholars advocate for an interdisciplinary approach to sustainability, the research literature shows that majority of sustainability issues are addressed through fields such as environmental and developmental education. There has also been a call for the integration of Sustainable Development (SD) in Technical and Vocational Education and Training (TVET) programmes by various scholars and bodies such as the United Nations Education, Scientific and Cultural Organisation (UNESCO). The issue, however, is that Technical and Vocational Education (TVE) programmes are not yet embracing this call to integrate ESD into their programmes. Hence, it is imperative to reiterate the intersection between TVE and SD and how the former can contribute significantly to the SD agenda. Therefore, by completing a qualitative documentary analysis of a TVE programme, using a Malaysian Higher Education Institution (HEI) as a case study, this paper discusses the visibility of sustainability in TVE programmes as well as explores the overarching goal of ESD and why it is especially crucial for TVE. Findings reveal that the concept of sustainability is only barely reflected in the TVE teacher training curriculum. Recommendations for practice change and further research are presented and discussed.

Keywords: Education for Sustainable Development (ESD), ESD integration, qualitative document analysis, teacher training, Technical and Vocational Education (TVE)

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INTRODUCTION

At a time when climate change is altering the natural conditions of the earth, and at a time

when the world population index begins to rise exponentially, the survival of humanity for both present and future generations alike may be duly affected. According to Pavlova (2006), the world faces global challenges such as emission of greenhouse gases, global warming, rising ocean levels, destruction of the forests, an outbreak of wars as well as mass migration. Research literature suggests that human actions, activities and the relationships humans have with the natural habitat and environment led to this challenges and efforts to curb and reduce these effects are required (Armstrong, 2011; Egan, 2004; Fien & Maclean, 2000; Majumdar, 2009; Reid & Petocz, 2006; United Nations Educational Scientific and Cultural Organization, 2005). These efforts gave rise to the conceptualisation of Sustainable Development (SD).

Various definitions of the concept of Sustainable Development (SD) have been put forward. The most widely used definition of SD is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (United Nations Educational Scientific and Cultural Organization, 2005). This is, without doubt, the initiative and idea behind the SD agenda. Hence, SD was seen as a means to maintaining the delicate balance between the human need to improve living conditions, lifestyles and wellbeing on the one hand and the essential need to also preserve natural resources and ecosystems upon which both present and future generations depend on (Madhavi, Shailaja, Gopal, & Keren, 2007).

As a result, Sustainable Development Goals (SDGs) were formulated to serve as a map in the quest to curb the excesses of human activities that drastically affect the socio-economic and environmental aspects of development, leading to the improvement of living conditions (Madeley, 2015; Sachs, 2012). SDGs are merely intergovernmental aspirations and goals with specific targets aimed at transforming our world.

One of the SDGs emphasised by the United Nations (UN) was to ensure equitable access to quality education and promote lifelong learning opportunities for all. In an attempt to realise this goal by the year 2030, specific targets have been set; of those targets was the need to ensure access to quality Technical and Vocational Education (TVE) for all and the creation of decent jobs and entrepreneurship education.

Thus, it becomes evident that individuals need to develop knowledge and skills in particular vocations and occupations that will enable them to make progress in employment, become self-reliant and lead sustainable enterprises. However, such knowledge and skills also need to include an appreciation of SD principles to create awareness among individuals of the implications of their actions that impact the environmental, social and economic aspects of their nations negatively (Tilbury, 1995; United Nations Educational Scientific and Cultural Organization, 2008). Therefore, instructions and lessons emphasising a balance between economic and social issues as well as protection of the environment are thus required.

It also, therefore, becomes the goal of Education for Sustainable Development (ESD) to lead and inform this instruction by creating the needed awareness and educating people to become aware of the implications and consequences of living unsustainable lifestyles and engaging in unsustainable practices (Tilbury, 1995). In an attempt to juxtapose SDGs and ESD, a description of each is necessary. SDGs are broader world transformation goals, while ESD is a specific target with which these SDGs can be achieved. For example, UNESCO outlined 17 SDGs, and one of them was centred on quality education. To achieve the goal of quality education as a world transformation agenda, specific targets were set, of which ESD was one. Hence, it can be summarised that ESD is a subset of the SDGs.

Moving forward with the ESD debate, who better to take up this challenge of educating citizens and students for sustainable development than teachers themselves? With this, the UNESCO declared ESD for teacher education the “priority of priorities.” With this, teachers are saddled with the responsibility of first learning and upgrading their knowledge and skills related to SD concepts and then translating these understandings into their teaching pedagogy (United Nations Educational Scientific and Cultural Organization, 2008). Environmental and developmental education have no doubt spearheaded the ESD goal of educating children for a sustainable future, and they do so more from a developmental and environmental perspective with little

attention to the social and economic dimensions of SD (Birdsall, 2014; Tilbury, 1995).

In the same vein, TVE, as well as engineering education, have been slow in responding to the charge of ESD. Some reasons attributed to this unresponsive or delayed zest for ESD in TVE institutions in the literature includes the notion that ESD is irrelevant to TVE held by some TVE educators, inadequate awareness, the question of what ESD learning outcomes to pursue, understanding SD to mean campus greening and use of energy efficiently only, the perceived notion that ESD is an expensive process and so on (Brundtland, 1987; Griggs et al., 2013; New Zealand Ministry of Education, 2015; Thienemann, 2014). Perhaps there is a need to reiterate why ESD is especially important to TVE and not just environmental education. Hence, this paper would attempt to shed light on the overarching goal ESD is supposed to achieve and why it is especially crucial to TVE. The study further explores the visibility of SD concepts in a TVE teacher education programme in Malaysia.

Research Questions

The following questions guided this inquiry:

- a. What is the overarching goal of ESD and why is ESD especially important to TVE?
- b. How visible are SD concepts in the TVE teacher training programme constituting the case of this analysis?

LITERATURE REVIEW

To provide answers to the first research question, “What is the overarching goal of ESD and why is ESD especially important to TVE?” the following concepts are discussed based on a review of the literature.

Sustainable Development and Its Core Dimensions

The term sustainable development has been conceptualised and defined in various ways, with most definitions attempting to depict ‘development that meets the needs of the present without compromising the ability and capacity of future generations to do the same’ (Brundtland, 1987, p. 41). Sustainable Development (SD) is an attempt and need to create equilibrium between the human need to improve lifestyles and wellbeing on the one hand and the environmental need to preserve ecosystems and natural resources on the other, upon which present and future generations depend. The goal of SD at this stage is not to juxtapose the various depictions and descriptions of the term; instead, it is to give a working definition to the term that can be consistently understood and used in the context of this paper. Hence, a more recent description of the term as redefined by an Australian academic is thus put forward.

Griggs et al. (2013) redefined Sustainable Development (SD) as “the development that meets the needs of the present while supporting Earth’s life

support systems, on which the welfare of current and future generations depends (p. 306)”. Griggs’ conceptualisation of SD takes into account the three major dimensions of sustainability as described by the UN, i.e., the environmental, social and economic dimensions of SD. Rather than conceptualise the environment as just the immediate environment, Griggs and colleagues chose to use Earth’s life support system in the definition. This is an all-inclusive term describing the ecosystem, natural resources, the environment and an interplay of several other factors that make up Earth’s life support system. Thus, SD can be implied to be continued economic growth and the protection of the quality of Earth’s life support systems, with each reinforcing each other.

Summarily, from most conceptualisation of SD, it can be concluded that SD aims at the following: (a) creating a desirable human condition i.e. a society that people want to sustain and protect because it meets their needs; (b) maintaining an enduring ecosystem that ensures its capacity to protect human life and others; and (c) maintaining a balance between present needs and the potential and capacity for future generations to do the same (Madhavi et al., 2007).

Education for Sustainable Development – Features and Intended Goals

Among all the sustainable development goals proposed by the UN, education appears

to be central to all. This is because education provides the means and the capacities by which people can learn to create and achieve these goals. Education provides not just the means to learn but also the system upon which one can develop holistically. Hence, Education for Sustainable Development (ESD) according to the Cloud Institute for Sustainable Development is defined as the “transformative learning process that equips students, teachers, and school systems with new knowledge and ways of thinking needed to achieve economic prosperity and responsible citizenship while restoring the health of the living systems upon which lives depend on” (Cloud Institute for Sustainable Education, 2016).

Similarly, the New Zealand Ministry of Education (2015) described ESD as learning to think and act in ways that will safeguard the future and wellbeing of people and our planet. It is thus evident that ESD has within its tenets, the primary goal of raising sustainability-conscious citizens to safeguard the future of our planet and the well-being of people. This no doubt has vivid implications for teacher education programmes because, in order for teachers to teach ESD principles and concepts effectively, they have to learn and develop their knowledge and understanding about SD; this evidently means teacher education programmes will have to be reoriented to account for SD vividly.

Education for Sustainable Development (ESD) and Technical and Vocational Education (TVE)

Some academics believe ESD should only apply to environmental education and those in the sphere of developmental studies (Sharma, 2009). Before we can come to such a conclusion, an understanding of what ESD aims to achieve is necessitated and also what TVE entails is thus required, and the potential intersection between the two if any should be discussed. The overarching goal of ESD has been broadly specified in the previous section; a focus on what TVE entails follows.

Technical and Vocational Education (TVE), according to Winer (2000), is aimed at developing skills, understanding, attitudes, work habits and appreciation encompassing knowledge and information needed by workers to enter and make progress in employment on a useful and productive basis. In other words, TVE involves training in a vocation or particular occupation, to develop skills and competency needed to carry out the duties and tasks of a vocation. TVET is also a major driver of human development and an enormous workforce supplier in the world (Hofmann & Strietska-Ilina, 2013; Marsden, Medhurst, & Irving, 2013; Sivapalan, 2016; United Nations Educational Scientific and Cultural Organization, 2002; Zolkifli, Kamin, Azlan, Yahya, & Awang, 2016). Therefore, if the

training of those in the ambit of vocational education who would take on roles as craftsmen, technicians and technologists in industry reflects the underlying principles of SD, it then implies that they would have developed competencies required to carry out their tasks in more sustainable ways that have little or less of a negative impact on the ecosystem.

With ESD, tasks and duties, which range from the use of materials and resources in the creative design and fabrication of models and products in small- and large-scale industries to the use of higher-order thinking skills, would be carried out with consideration of nature and our ecosystem. Furthermore, the introduction of ESD to TVE would mean vocational teachers would be able to train workers who will become conversant with the threat facing our ecosystem and, as a result, they would develop skills, knowledge and competency that are needed to tackle environmental issues, develop sustainable attitudes for relating with nature, develop and redesign work processes to reduce consumption and waste, emphasise recycling and reuse of materials, develop alternative sources of energy and so on. The benefits are without doubt enormous and significantly impactful. Since TVET is a major supplier of the total distribution of the workforce for many nations, it can reach out to so many workers about these issues through formal, informal and non-formal education, if and only if vocational educators are well trained to

develop an understanding of SD that they can, in turn, apply in their pedagogy.

It has become necessary that TVE educators begin to change their orientation about who and what ESD applies to. The UN through its agency, UNESCO, has emphasised that ESD requires an interdisciplinary and multidisciplinary approach; hence, various disciplines must adapt ESD goals and discover how they can solve environmental, social and economic issues in ways that create a balance among these systems without endangering and compromising the capacity of future generations to do the same. Therefore, it is apparent that ESD goals can also be better achieved through TVE because TVE teachers are responsible for the education and training of vocational professionals. Hence, educating vocational professionals about SD issues would help equip workers within the industrial ambit of nations with skills for sustainability, thereby contributing to transitioning the world towards a sustainable future.

MATERIALS AND METHOD

This study utilised the Qualitative Documentary Analysis (QDA) approach in ascertaining the visibility of sustainability in TVE teacher education programmes. A Malaysian Higher Education Institution offering the Bachelor of Education programme in Technical and Vocational Education was used as a case study to explore this visibility by analysing

elements of sustainability in the curriculum document of the programme. According to (Bowen, 2009), “document analysis is a systematic procedure for reviewing or evaluating documents – both printed and electronic (computer-based and Internet-transmitted) material. Like other empirical research methods, they require that textual data contained in relevant documents be examined and interpreted in order to elicit meaning, gain understanding, and develop empirical knowledge.”

A curriculum according to Tanner and Tanner (2007) is the planned and guided learning experiences and intended outcomes, formulated through the systematic reconstruction of knowledge under the auspices of the school for the learner’s continuous and willful growth in personal social competence. This makes it a suitable document for exploring the extent to which sustainability has been embedded in the TVE teacher education programme. Hence, a document analysis would enable the researcher to take a scientific position of the case being explored and discuss the overlying implication.

Document analysis has been used as a complementary research method to other established research methods for triangulation purposes (Bowen, 2009). However, several scholars have made cases for document analysis as a legitimate research method and as one that can also be used as a stand-alone research method

in social science research as well as other research contexts (Ahmed, 2010; Bowen, 2009; Gregg, 2011). Ahmed (2010) argued that documentary research is an important research method and should be utilised by social scientists with full confidence. He also explained that it is a scientific method that requires rigorous adherence to research ethics. Similarly, some scholars also explained that document analysis is particularly applicable to qualitative case studies, i.e. intensive studies aimed at producing rich descriptions of a single phenomenon, event, organisation or programme as is the case of this study (Bowen, 2009; Stake, 1995; Yin, 1994). Hence, the qualitative document analysis is utilised in this study as a stand-alone research method for ascertaining the visibility of sustainability in the TVE teacher training programme because it provides an avenue for critically examining and analysing TVE programme features contained in the curriculum in an attempt to gain an understanding of how well sustainability is reflected.

Data Analysis

In order to provide a detailed analysis and critique of sustainability in the TVE programme, an audit framework was developed by the researcher to serve as a template and structure for the analysis. Figure 1 shows the audit framework utilised in this study.

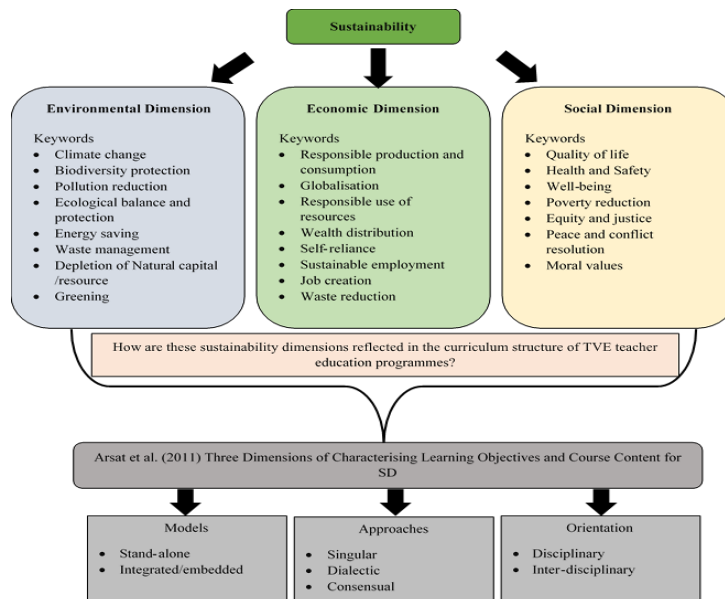


Figure 1. Sustainability qudit Framework for assessing SD visibility in TVE teacher education programmes

In designing the framework, the researcher first separated sustainability into its three main dimensions – environmental, economic and social dimensions, each representing significant categories to be used in the analysis. After this, specific keywords depicting each sustainability dimension were chosen as indicators representing sub-categories used in the analysis. The keywords selected do not entirely represent all the possible keywords that could represent each sustainability dimension, as such as a list would be too long. Instead, they represent the commonly used terms and phrases in the sustainability discourse as represented in the literature. For this analysis, the specific keywords/phrases in the sustainability discourse were used as search items, but the researcher was also open to emerging themes contained in

the curriculum not represented among the list of keywords/phrases represented in the framework.

The next phase in the analysis utilised the work of Arsat, Holgaard, and De Graaff (2011), who pointed to three dimensions for characterising courses for sustainability in engineering education to categorise how the identified sustainability courses/elements were embedded into the TVE programme. Identified course elements in the TVE programme curriculum were categorised either as models (stand-alone or integrated), approach (singular, dialectic or consensual) and orientation (disciplinary or interdisciplinary).

To ensure that rigour and explicitness are achieved in the analysis, the researcher utilised Gregg (2011) document analysis procedures, which were initially designed

by Lincoln and Guba (1985). Firstly, the researchers read and reread the entire TVE curriculum programme document, searching through programme outcomes, learning outcomes and specific course synopses for elements of sustainability. By doing this, the researchers gained a sense of what the programme was all about and what the program mainly aimed at exposing students to. Secondly, we engaged in data reduction process to simplify the information for ease of analysis, storage and dissemination. Ahmed (2010) argued that there is too much information in texts and as a result, their richness precludes analysis and inference without some form of reduction. Hence, the purpose of data reduction is to reduce the data without any significant loss of information. To achieve this, bits and sections of the curriculum were copied into Wordle to gain an overall picture of the information contained in the data.

Furthermore, because this analysis focussed on three dimensions of sustainability, i.e. the environmental, economic and social dimensions, identified sustainability elements were coded according to the sustainability dimension they best represented, while also classifying them based on the model, approach and orientation with which they were embedded in the TVE programme. Hence, sustainability courses or elements reflecting each dimension of sustainability were coded as follows: EDM₁= environmental dimension with a stand-alone model, EDM₂= environmental dimension with an integrated model, EDA₁= environmental dimension with a

singular approach, EDA₂= environmental dimension with a dialectic approach, EDA₃= environmental dimension with a consensual approach, EDO₁= environmental dimension with a disciplinary orientation, EDO₂= environmental dimension with an interdisciplinary orientation, ECM₁= economic dimension with a stand-alone model, ECM₂= economic dimension with an integrated model, ECA₁= economic dimension with a singular approach, ECA₂= economic dimension with a dialectic approach, ECA₃= economic dimension with a consensual approach, ECO₁= economic dimension with a disciplinary orientation, ECO₂= economic dimension with an interdisciplinary orientation. Finally, for the social dimension of sustainability, codes such as SOM₁= social dimension with a stand-alone model, SOM₂= social dimension with an integrated model, SOA₁=social dimension with a singular approach, SOA₂= social dimension with a dialectic approach, SOA₃= social dimension with a consensual approach, SOO₁= social dimension with a disciplinary orientation and SOO₂=social dimension with an interdisciplinary approach were utilised.

RESULTS AND DISCUSSION

The Visibility of SD concepts in the TVE Teacher Education Programme

The TVE teacher education programme for this analysis comprised four areas of specialisation under the TVE umbrella namely, Bachelor of Tech. with Education (Electric/Electronics), Bachelor of Tech.

with Education (Living Skills), Bachelor of Tech. with Education (Building Construction) and Bachelor of Tech. with Education (Mechanical Engineering). A documentary analysis was carried out to ascertain and explore the visibility of sustainability in a TVE teacher education programme using a Malaysian HEI as a case study. By visibility of sustainability, we mean how integrated the concept of sustainability in the TVE teacher education programme is.

The result of the analysis revealed that the concept of sustainability was implicitly rather than explicitly reflected in the TVE teacher education programme. To give a detailed overview of the visibility of sustainability in the TVE teacher education programme, the findings are discussed in tandem with the three dimensions of sustainability and under specific sub-headings depicting the way and manner with which sustainability is reflected in the TVE programme. First, an analysis of the program objectives and learning outcomes will be presented.

TVE Program Outcomes and Learning Outcomes

All four areas of specialisation under the TVE programme had similar programme outcomes and learning outcomes, with each relating to the specific area of study. Although no programme objective specifically aimed at developing student teachers' understanding of sustainability issues, they, however, did implicitly imply elements of economic and social sustainability. For

instance, it was stated that at the end of the programme, students "should be able to develop the ability to identify, develop and explore business and job opportunities as well as develop the ability to draft a business plan and create self-employment." This depicts economic sustainability although not in its entirety and probably not consciously recognised as an element of economic sustainability. Similarly, it was also stated that students "should be able to practice high ethics and integrity in teamwork and collaboration with peers," encouraging social integration, ethics and equity among all teacher trainees, thus reflecting social sustainability implicitly.

Models, approaches and orientation of sustainability in the TVE programme.

Elements of sustainability were reflected in seven different courses in the TVE teacher education programme. These courses only minutely reflected the elements of sustainability. They included Basic Invention, Workshop Safety and Management, Industry and Technical and Vocational Education, Entrepreneurship, Basic Commerce, Family Resource Management and Principles of Environmental Engineering. The course, Basic Invention, for instance, as explained in the course synopsis, aimed at developing teacher trainees' capacity "to find solutions to the needs and problems of their societal environment. Knowledge and skills acquired from this course can enhance or redesign the existing products or solutions." According to Arsat et al. (2011), dimensions for characterising courses for sustainability. The

course reflects elements of economic and social sustainability, indicating a dialectic approach. Arsat et al. (2011) described the dialectic approach to sustainability as one that reflects two dimensions of sustainability at the same time. The model utilised for this course was an integrated model, in which the elements were only slightly integrated into the course, Basic Invention, which specifically aimed at developing students' design creativity and innovation. Course orientation was also disciplinary.

Similarly, an aspect of the course, Workshop Safety and Management, as detailed in the course synopsis, aimed at developing students' capacity "to be able to identify potential hazards particularly in the workshop, and plan strategies to improve safety practices as well as school workshop management." This depicted an aspect of social sustainability that emphasises health and well-being. Industry & TVE was also another course that had elements of sustainability as it aimed at inculcating students with the capacity to "be able to discuss the role of TVE in the human development plan to meet present and future needs." This reflects elements of economic sustainability now and for future generations as human development was the epicentre and focus of the course. However, there was no clear evidence that described whether the course was carried using a consensual approach. Entrepreneurship and Basic commerce were also courses that had little elements that reflected the economic and social dimensions of sustainability. Students were exposed to instruction and

lessons that enabled them to create viable businesses while improving the standard of living.

Family Resource Management and the Principles of Environmental Engineering were courses that reflected economic, social and environmental sustainability independently. While Family Resource Management aimed at developing students' capacity for making informed decisions in the management of resources to meet family goals and maintain a healthy living condition, the Principles of Environmental Engineering was concerned with exposing students to pollution and its control, water management, air quality as well as waste management. All the courses that reflected elements of sustainability only did so dialectically or as a singular approach. Arsat et al. (2011) explained that a singular approach to sustainability is one that focusses only on one aspect or dimension of sustainability, e.g. the environmental dimension, while the dialectic approach focusses on two aspects of sustainability, e.g. economic and social dimensions. No course was, however, stand-alone and aimed at addressing sustainability issues while considering a balance between the three dimensions, i.e. economic, social and environment (consensually).

It was also observed that courses only slightly reflected elements of sustainability as small units or as topics in those particular courses and modules. While integration is a suitable approach to sustainability, it should also be explicitly done, so that students are consciously exposed to these

sustainability issues, which are now a major concern for the world we live in. Sterling and Scott (2008) recommended that integration should be carried out holistically and not just as add-ons to courses. This he explained that although stand-alone courses on sustainability were needed to explicitly and consciously expose students to environmental, social and economic issues, integration of sustainability courses should be structured into core courses, minor courses and electives.

Overall, among all the seven courses identified to reflect only slightly some elements of sustainability, it was observed that economic and social sustainability were better reflected, while only one course had elements of environmental sustainability. The issue with this, however, is that most of these identified courses were elective and minor courses, meaning that not all TVE students would enrol in them. The implication of this is that not all TVE students would undertake courses reflecting sustainability in the TVE programme. Sustainability courses need to form an integral part of the learning experiences students in TVE programmes are exposed to; as a result, core courses should be designed as a stand-alone, with a consensual orientation that attempts to balance all three dimensions of sustainability, giving all TVE students equal opportunity to learn about sustainability, while also integrating other courses as minors and electives.

Other courses in the programme should also be made to visibly reflect more sustainability dimensions and issues, as

embedding sustainability throughout the fabric of majority of the courses in the programme would better prepare TVE students for the challenging role of educating for sustainable development when they take on job roles as teachers in various technical and vocational colleges.

Recommendations

The following recommendations are made in line with the objectives of this study:

- a. A working framework or model is needed for TVE to synchronise SD principles and initiatives. This model should be ideally problem-solving. That is, it should attempt to address the problem of guiding TVE programme developers, policy makers and concerned stakeholders in developing and reorientating TVE programmes to ensure sustainability is more visible in theory and practice. This calls for more collaborative research efforts between relevant TVE stakeholders aimed at addressing this problem of ESD integration.
- b. More awareness is needed to drive the ESD agenda in TVE. The practical benefits of engaging in this initiative may not be seen in the short term, but TVE administrators and educators must realise that they do not need to wait until it becomes apparent that TVE can help change and impact people's knowledge and attitudes towards living a more sustainable lifestyle before they begin to act. The consequence may be that too

much damage may have already been done to our ecosystem. Hence, more awareness programmes are needed in the form of workshops and seminars to get more TVE stakeholders in the decision-making process to be aware of ESD and promote actions to integrate ESD in TVE further.

CONCLUSION

The paper discussed the intersections between SD and TVE, while also exploring some SD and ESD models, as well as ascertain the visibility of sustainability in a TVE programme. The discussion makes it clear that TVE teachers are central to the advancement of ESD in TVE as TVE teachers can reach out to the many future workers whom they train in their classrooms every day. Findings from the study also established that the concept of sustainability had not been fully integrated into TVE teacher education programmes. There were no stand-alone courses that were explicitly aimed at treating sustainability issues consensually, i.e. in the balance between the three dimensions of sustainability. Therefore, a guiding framework is needed to guide action towards refocussing TVE curriculum to account for more ESD. Recommendations for practice change were also made in this paper; it was suggested that a collaborative effort between all relevant TVE stakeholders is needed to drive the ESD agenda forward in TVE institutions.

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