

UNIVERSITY OF EDUCATION, WINNEBA

**An exploration of the integration of education for sustainable development in
Ghana's career technology curriculum**

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DECLARATION

Student's Declaration

I, Emmanuel Appiah, declare that this thesis, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

Signature:

Date:

Supervisors' Declaration

We hereby declare that the preparation and presentation of this work was supervised in accordance with the guidelines for supervision of thesis as laid down by the University of Education, Winneba.

Supervisor's name:

Signature:

Date:

DEDICATION

This study is dedicated to my treasured wife, Miss Mavis Gbedemah, for the steadfast support she gave me during my years of study.

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ABSTRACT

The social, economic, and environmental troubles nations are battling with has led to the adoption of education for sustainable development as a key driver for achieving sustainable development. Ghana, a member of the United Nations, has adopted same into its educational systems so that her learners can be educated towards sustainable development. The aim of this study was to explore how education for sustainable development goals is integrated into the Ghanaian career technology curriculum in the Dangme enclave in particular. The study employed a qualitative case study design for the exploration. Data to address the research questions so as to meet the purpose of the study were collected through documents, interviews, and observations. Participants involved in the study were sampled through the maximum variation purposive sampling technique. In all, 17 participants were sampled based on saturation. For the data analysis, a content analysis was conducted on the documents, career technology curriculum using keywords from the Global Schools Piloting Programme and related keywords. Again, 17 transcripts and 15 fieldnotes obtained from participants who teach career technology in the research area were coded and themed for analysis. The study finds a 13.3% coverage of education for sustainable development objectives in the official career technology curriculum. Secondly, participants perceive the curriculum with respect to its structure (integrated, iterative, and comprehensive) and focus (learner-centred, career-orientated, and practical-based). Pedagogies employed by participants to integrate the teaching of education for sustainable development in the classroom were talk for learning, project-based learning, role-play, active learning, collaborative learning, and some integration of ICT. Challenges encountered in integrating education for sustainable development are the participant teacher's fixation on examination, non-availability of teaching and learning resources, limited teacher proficiency, monetary issues, and poor classroom conditions. From the discussion of the findings, it is concluded that the official curriculum is developed towards sustainable development as it integrates some education for sustainable development goal objectives. Notwithstanding, pedagogies employed to integrate the objectives of education for sustainable development were not effectively practiced in the classroom, and coupled with the varied challenges, achieving the aim of sustainability through career technology is problematic in the Dangme enclave. Recommendations are made to include more education for sustainable development goals into the official career technology curriculum to make it more comprehensive for its aim. Also, educate teachers in the area on 21st-century pedagogies and sustainable development to make them more effective and tackle other issues squarely. Additionally, policies to guide the collection of money and decisions to aid practical should be taken seriously. Lastly, teaching and learning resources suitable for the curriculum should be identified and same provided to the schools. Since the study employed the qualitative approach in only the Dangme enclave, it is suggested that further studies should use the mixed methods be used to make the findings more statistically generalisable.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Nations across the globe, both developed and developing, are currently struggling with so many existential challenges like degradation of the environment, economic downturns, and social discrimination. These make them unsustainable for their current and future generations. According to Kotzé and Adelman (2023) and Hirschnitz-Garbers et al. (2016), the challenges are predominantly caused by people due to their preferences for resources, knowledge gaps, perspectives, technology, and prices of goods. These causal factors, if not immediately addressed head-on, could worsen, further compromising future generations' ability to meet their own needs in the world they are born into.

International bodies such as the African Union and the United Nations have ambitiously adopted and implemented intervention programmes to respond to these challenges. One such intervention is the Millennium Development Goals, which were adopted in the early 2000s to serve as a framework to address significant spheres of development globally. In 2015, the Millennium Development Goals were subsequently replaced by the Sustainable Development Goal Agenda, envisioned to address global development challenges by the year 2030 (UNESCO, 2017).

One central strategy to achieving the Sustainable Development Goals is education through the promotion of Education for Sustainable Development (UNESCO, 2017). The Education for Sustainable Development aims to adapt behaviour by equipping individuals, especially children and the youth, with relevant knowledge, skills, and attitudes to sustainable living (UNESCO).

In developed countries, education for sustainable development has been largely studied in higher institutions in recent years. For example, Kopnina and Meijers (2014) conducted a qualitative study to explore the challenges education for sustainable development poses to higher education as well as conceptualise education for sustainable development framework, taking into consideration the environment. The study found that education for sustainable development faces continuous criticism. The framework, Ecocentric and Anthropocentric Attitude Towards Sustainable Development scale, was found to be useful in testing the attitudes of higher education students. Acosta-Castellanos and Queiruga-Dios (2022) in their review of 198 literature sampled from Scopus, Science Direct, ERIC, and Scielo to understand the acceptance of education for sustainable development among researchers and universities, found that education for sustainable development is widely accepted after the declaration of the decade of education for sustainable development. With how education for sustainable development is perceived, Sinakou et al. (2018) sampled 56 teachers of teacher trainee institutions using the D-PAC methodology for comparative judgement. It was revealed from their study that, the teachers did not have a holistic view of the concept, and were biased towards the social and economic pillars. On the other hand, Gustafsson et al. (2015) interviewed 11 Swedish Upper Secondary School teachers on their views, beliefs and how they teach sustainable development. The study concluded that the teachers' views and teaching practices concerning sustainable development varied and could not give learners a common opportunity to understand sustainability.

In Africa, education for sustainable development is keenly adopted for implementation. Following Tikly (2019), it is revealed that the Agenda 2063 for African Development adopted both the visions of sustainable development and

education for sustainable development. Consequently, the likes of Botswana, Kenya, Malawi, Mauritius, and Zambia have integrated the aims of education for sustainable development into their technical and vocational education and training curricula and policies (UNESCO, 2010).

Ghana, through its recent education system reforms, adopted the education for sustainable development goals into its education system (Ministry of Education, 2018a), leading to the introduction of the Common Core Programme for its junior high school (NaCCA, 2020). The programme integrates learning areas like English Language, Mathematics, Science, Computing, Creative Arts and Design, and Career Technology. These learning areas are developed to educate learners with 21st-century competencies, skills, and attitudes for sustainable development (NaCCA).

However, as career technology aims to help learners who truncate their education at Grade 9 to enter the job market effortlessly (NaCCA, 2020), the integration of the education for sustainable development in the career technology in the Dangme enclave is not extensively explored. Given the enclave's unique social, environmental, economic, and cultural features and the predominate availability of single career technology teachers in schools, the integration of education for sustainable development into the curriculum in the area may be impacted.

1.2 Theoretical Framework

The theory that formed the foundation for the study is Ajzen's Planned Behaviour Theory. The theory postulates that people's behaviour is largely inspired by their intention, which is also influenced by attitude, subjective norms, and perceived behaviour control mechanisms (Ajzen, 1985). Ajzen described subjective norms as the influence a person's social circles have on her or his willingness to behave in a certain way. The social circle can be peers, family, teachers, and other people in a society. For

example, when parents frown on certain actions, the child will probably stay away from repeating such actions. Perceived behaviour control, on the other hand, is the freedom (ease) or limitation (difficulty) that motivates or demotivates a person to implement a behaviour. Lastly, attitude, according to Ajzen, is formed through the mind and emotional processes that inform a person to put up a behaviour. In the study, the theory will help explore how the learning of career technology in Ghanaian basic schools would prepare learners with cognitive, emotional, and psychomotor skills, which would in turn motivate them to behave sustainably by shaping their attitudes.

This theory is relevant to the study of education for sustainable development as it aims to ensure that learners change their behaviour towards sustainable development. To that effect, educating learners on sustainability to shape positive attitudes, promoting positive social norms, and building healthy perceived behaviour control strategies will likely help learners to adopt sustainable behaviours.

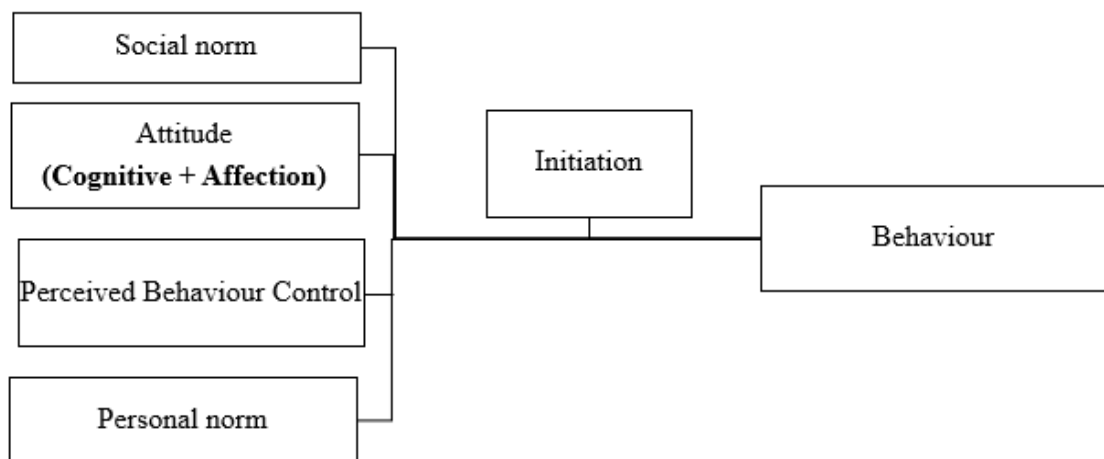


Figure 1. 1: An Instrumental Behavioural Change Model

Source: Adapted from Wals et al. (2008)

1.3 Statement of the Problem

Education has over the time been seen as a significant medium through which people gain knowledge, skills, and attitudes required for developing the individual and the larger society. This makes education an evolving phenomenon. The changing needs of individuals and societies, and the challenges the world faces in recent times have informed the adoption of education for sustainable development to focus education on the promotion of sustainability to correct global issues (UNESCO, 2017).

Ghana, a member of the United Nations, has since its 2017 education reforms committed to incorporating the education for sustainable development content and concepts into policies and curricula produced (Ofori-Birikorang et al., 2020; Pálsdóttir & Agyemang, 2023). This effort of adopting education for sustainable development into Ghana's education is expected not to make learners educated for life as in conventional education, but also for sustainable development. (UNESCO, 2017). However, it appears studies conducted since the education reforms in Ghana have focused on the standards-based curricula, educational policies, and primary school teachers and other settings other than the Dangme enclave. For instance, Addai-Mununkum and Setordzi (2023) studied the experiences of teachers in implementing 21st-century pedagogies. They sampled 21 participants at the primary school level. Their result revealed that twenty-first century pedagogies were used to implement the standard-based curriculum, though they were confronted with challenges like skill deficits and a lack of learning and teaching resources. Apau's (2021) study indicated that the concerns that teachers had in the implementation of the standards-based curriculum were mainly on lack of collaboration, focus, and proper management, all influenced by the teachers' age and experiences when he conducted a case study of

primary school teachers in the Effutu municipality. Ayebi-Arthur et al. (2020) also surveyed 127 teachers from five regions in Ghana and found that teachers responsible for teaching the standards-based computing curriculum had a positive attitude and were highly confident. Ofori-Birikorang et al. (2020) conducted a situational analysis study of the standards-based curricula used at the kindergarten and primary school grades. Their finding was that some objectives of the education for sustainable development programme are present in the various learning areas at that level.

Despite the significance of these studies, they all overlooked the common core programme, particularly career technology, which is designed to prepare learners for the world of work and continue learning (NaCCA, 2020) and the Dangme area, thereby leaving a knowledge, contextual, and population gap in the literature. These gaps if not addressed, can leave learners in the area ill-prepared for the 21st-century world of work and lifestyle if the curriculum is poorly integrated with education for sustainable development. It can further aggravate the already existing unemployment issues which are currently at 14.7% (Oduro-Mensah, 2024) with its attendant social, economic, and environmental difficulties like illegal mining, cyber fraud, and conflicts. Also, with about six years remaining until 2030, the literature indicates that Ghana is still confronted with challenges in meeting the sustainable development goals having achieved only goal 12 (Sachs et al., 2024). There is therefore the need to be more intentional about making education for sustainable development to work, particularly in the career technology curriculum and the Dangme area as it is struggling with sustainable issues now, coupled with the fact that learners can truncate their education at grade nine. Hence, this study is conducted to explore the integration of education for sustainable development goals in the career technology curriculum

by employing the qualitative case study to explore the curriculum and perspectives of career technology teachers in the Dangme area.

1.4 Purpose of the study

The purpose of this qualitative case study was to explore education for sustainable development goals integration in the career technology curriculum by career technology teachers in the Dangme enclave.

1.5 Objectives of the study

Specifically, the study sought to:

1. Explore the extent to which education for sustainable development objectives is integrated into the official career technology curriculum used in Ghana's Junior High Schools.
2. Explore how career technology teachers in the Dangme enclave perceive the official career technology curriculum in line with education for sustainable development.
3. Explore the strategies employed by career technology teachers in the Dangme enclave to implement the official career technology curriculum towards education for sustainable development.
4. Explore the challenges career technology teachers in the Dangme enclave encounter in the implementation of the official career technology curriculum towards education for sustainable development.

1.6 Guiding questions

The study was guided by the following questions drawn from the objectives above:

1. To what extent is education for sustainable development objectives integrated into the official career technology curriculum used in Ghana's Junior High Schools?
2. How do career technology teachers in the Dangme enclave perceive the official career technology curriculum in line with education for sustainable development?
3. What strategies do career technology teachers in the Dangme enclave employ to teach the career technology curriculum towards education for sustainable development?
4. What challenges do career technology teachers in the Dangme enclave encounter in the implementation of the official career technology curriculum towards education for sustainable development?

1.7 Significance of the Study

This study is significant for all individuals, institutions, or units responsible for and interested in education for sustainable development and career technology curriculum in Ghana. It clarifies education for sustainable development goals integration in the career technology curriculum by career technology teachers in the Dangme enclave. The findings of the study will first of all help the National Council for Curriculum and Assessment (NaCCA) and the District Education Directorates within the Dangme enclave to formulate policies and make decisions that will aid the effective integration of education for sustainable development into the official career technology curriculum and its processes. Also, the study will contribute to the already

existing body of knowledge by providing research-based evidence of how education for sustainable development is implemented through the career technology curriculum in Junior High Schools in Ghana. Lastly, the study will serve as resource material to guide other research works, particularly those that will be concerned about education for sustainable development and career technology in Ghana.

1.8 Delimitation of the Study

According to UNESCO (2019), several factors, including school improvement; curriculum leadership; school culture adaptation; and textbook revision are critical in the implementation of a new curriculum. However, this study focused solely on the integration of education for sustainable development in the official career technology curriculum used for learners in Ghanaian Junior High School in Grades 7 to 9, and also career technology teachers in the Dangme enclave. This decision was arrived at because curriculum and its practice by teachers are found to be fundamental in education (Haque & David, 2023; Palestina et al., 2020). Again, given the constraints of time and resources, focusing on these two factors enabled the researcher to engage in deeper exploration.

1.9 Organization of the Study

The study is organised into six chapters. The introduction of the study was captured in Chapter 1, which described the study's background, the theoretical framework, and the problem that the study sought to solve. The purpose, objectives, and guiding question, as well as the significance, delimitation, limitation, and key terms of the study, were included in Chapter 1.

Chapter 2 dealt extensively with the thematic review of relevant literature in relation to the topic under study. The methodology employed for data collection and

analysis, the research site, limitations of the study, methods of verification, sample and sampling techniques among others were discussed in Chapter 3 of this document.

In chapter 4, the outcomes from the data collected were presented as results in tables and themes generated were made on them thoroughly before proceeding to the discussion in chapter 5.

From Chapter 5, the study proceeded to the last chapter, Chapter 6 where conclusions made from the study and recommendations for stakeholders and fellow researchers were taken care of.

1.10 Definition of keywords

- **Sustainable development:** A holistic development that thinks of the future by paying equal attention to social, environmental, and economic issues.
- **Education for sustainable development:** An education programme meant to be used to educate people to adapt their behaviour towards sustainable development through the acquisition of relevant knowledge, competences, and attitudes.
- **Career technology:** A TVET-oriented subject taught in Ghana at the Junior High School level.
- **Career technology curriculum:** A document that contains career technology experiences to guide teachers to facilitate learners to learn them.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Overview

This chapter of the research project was set up to review relevant literature that is related to the research topic which is an exploration of the implementation of education for sustainable development in Ghana's career technology curriculum. The review was centred mainly on education for sustainable development and its components: social, environmental, and economic-related issues. Progress was then made in the implementation of education for sustainable development, where the issues of curriculum and education for sustainable development, the teaching of education for sustainable development, and pedagogies for implementing education for sustainable development were looked into.

Furthermore, challenges that might hinder the implementation of education for sustainable development were also reviewed in this chapter of the study. A review of the literature was also made to acknowledge the trend of career technology in the Ghanaian context. In the summary, critical highlights were composed to conclude the chapter.

2.1 Education for Sustainable Development

Major reforms have characterised recent developments, all geared towards making the world a better place for now and the future (Cordoba, 2023). Education happens to be one of the ways to implement these reforms of saving the world (Singh et al., 2022), therefore the concept of education for sustainable development (Clark, 2022). Education for sustainable development is a target of Goal 4 of the Sustainable Development Goals (UNESCO, 2017). The target is solely dedicated to using education to train and educate members of societies on the need for sustainable

development, but it must be acknowledged that education that is not designed to promote sustainable development cannot be termed education for sustainable development (UNESCO, 2017). Traditional education systems should therefore be transformed towards sustainable development goals before they can be conceptualised as Education for Sustainable Development if the concept of sustainable development is to be emphasised. According to Kioupi and Voulvoulis (2022), education for sustainable development is a vital innovation in education for environmental policies and sustainable development, and it is characterised by increasing access to quality basic education, reorienting education for sustainable development, organising learning towards sustainable development, and providing economic training for sectors.

Notwithstanding the lack of a distinct definition of education for sustainable development, Nurhayati (2022) has proposed that for education to achieve the aim of leading to the accomplishment of sustainable development goals, there is a need to further see it as education as sustainable development and not solely education for sustainable development. According to Concina and Frate (2023), education for sustainable development gives people information about sustainable development for them to change their attitudes towards sustainability, and education as sustainable development empowers people to be able to handle any form of sustainable development issue (Lazarevska, 2022). Similarly, Opoku et al. (2024) argued that environmental education is either the same as education for sustainable development or a part of it, depending on whether it is defined broadly to include social and economic issues or narrowly, if it is maintained in the environment only. However, there is limited knowledge on the descriptive meaning of education for sustainable development, especially from the perspective of teachers, as the explanations above

turn out to be more prescriptive in orientation. González (2021) has revealed that the majority of teachers who are aware of Education for Sustainable Development view it as an extracurricular activity rather than a curriculum activity.

In general, Glavič (2020) have described education for sustainable development as a holistic education that has its foundation on three pillars: social, environmental, and Economics, all geared towards achieving sustainable development. Each pillar of education for sustainable development is embedded with global issues such as climate change, gender equality, and poverty reduction that need rectification (Gorski et al., 2023; Albareda-Tiana et al., 2019).

2.1.1 Social Focus in Education for Sustainable Development

Social issues in education for sustainable development are aimed at informing and building the capabilities of people to understand themselves and others to foster peace, collaboration, and cooperation for sustainable development. Education based on social issues develops people to reflect critically to solve past, present, and future problems using problematic questions (Evans, 2021). In furtherance, Evans indicated that issues-based social studies are taught in history, government, geography, economics, and other related areas which focus on social issues.

In recognition, the National Council for Social Studies (NCSS) (2010) has espoused the aim of social education as “the promotion of civic competence—the knowledge, intellectual processes, and democratic dispositions required of students to be active and engaged participants in public life.” Based on the foregoing, the aim of social education does not make it clear how this aim leads to attaining sustainable development goals. However, ten themes espoused by the NCSS make social education oriented towards sustainable development goals. A look into it is as follows:

- i. **Culture:** The theme seeks to educate people on the role of people's culture in the development of their societies (NCSS). This theme of social education is clearly found in the United Nations Sustainable Development Goal 4, Target 7, which seeks to, among other things, promote culture, accept cultural diversity, and recognise the function of culture in sustainable development (UNESCO, 2017).
- ii. **Time, continuity, and change:** This theme, according to the NCSS, is concerned with seeing to it that people are educated on the history of institutions, the values and beliefs of people, and the influence that history has on development. The study of history can be critical to the achievement of sustainable development goals because, for example, the history of coups, if well learned, will make people more democratic, which is a requirement of Sustainable Development Goal 16 (UNESCO).
- iii. **People, places, and environment:** The interdependency of human beings and the world within which they exist is the focus of this theme (NCSS). The aim is to portray the fact that people and the environment co-exist to benefit each other. The relationships among people, places, and the environment are critical for the three if they are to be sustained for development. This theme, if well enacted, will help to realise sustainable development goals 4, 6, 10, 11, 12, 14, 15, and 16 (UNESCO) in one way or another.
- iv. **Individual development and identity:** The fourth theme in the learning of social studies is focused on the factors that influence people's identity and development (NCSS). The theme helps learners to understand and act in ways that will help them develop as individuals with a sense of

belonging. Learners will also develop intra-personal and inter-personal relationships to foster peaceful collaboration and cooperation. Relationships of this nature will certainly make developments sustainable, especially through Goal 16 of the United Nations Sustainable Development Goals (UNESCO).

- v. **Individuals, groups, and institutions:** The theme on individuals, groups, and institutions in social education as espoused by the NCSS matches with goal 16 of the sustainable development agenda: peace, justice, and strong institutions, which aim to “promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels” (UNESCO, 2017 p. 6). People are educated on how and why institutions are formed and the relationships within them. They are better able to use the right means to resolve conflict or channel their grievance, for example. They will also realise the need to be responsible in their actions and inactions. This is seen as a sustainable way of living.
- vi. **Power, authority, and governance:** This seeks to educate people mainly on governance, with an emphasis on democratic and non-democratic governance (NCSS). Treating this theme will in turn help attain peace and justice, which is the sustainable development goal of the United Nations (UNESCO).
- vii. **Production, distribution, and consumption:** Basically, the theme deals with the process of manufacturing and using produced goods and the chain of their distribution, as well as the negative impacts of production and consumption on people and nations’ economies (NCSS). Directly, the

theme reflects Sustainable Development Goal 12, which moves further to ensure that production, distribution, and consumption are organised in a responsible and, for that matter, sustainable way (UNESCO).

- viii. **Science, technology, and society:** In an advanced society such as we have now, the need to leverage science and technology cannot be overemphasized. Social education has in its domain the need to make people aware of previous and current innovations to make life easier and more sustainable (NCSS). This is on the same tangent as Sustainable Development Goal 9, which deals with the need to invest in science and technology to drive development in a sustainable manner (UNESCO). The need to educate people on more efficient and sustainable technology and innovations and the need to shift from indigenous and unsustainable technologies are addressed in this theme.
- ix. **Global connection:** Global connection as a theme in social education also resonates perfectly with Sustainable Development Goal 4, Target 7, and Goal 17. The goals require education to train learners to become global citizens and the need to appreciate the interconnectedness of countries to complement each other in their development (UNESCO). Similarly, on this theme, social education seeks to educate learners on the interdependency among nations and the importance of partaking in global links (NCSS).
- x. **Civic ideals and practices:** Lastly, the object of the tenth theme of social education is to project to the learner the rights and responsibilities of citizens of nations (NCSS). It is geared towards educating learners to be active and responsible participants in the aim of education for sustainable

development. Through this, learners are able to understand their own rights and what is expected of them as citizens.

2.1.2 Environmental Focus in Education for Sustainable Development

According to Acosta-Castellanos and Queiruga-Dios (2022), environmental education, which focuses on protecting the natural environment, predates education for sustainable development. However, UNESCO (2017) views it as a part of the education for sustainable development agenda, and not the same or distinct from it. This claim has prompted a long-term war between environmentalists and apostles of sustainable development. The war is due to the fact that environmentalists view environmental education as a means of preserving the natural environment whereas believers of sustainable development think about using the environment and leaving some behind for future use. For example, Desi et al. (2021) considered environmental education as an education that seeks to conserve nature. Such an education would be dedicated to combating water and sanitation issues, promoting efficient use of resources, and protecting the ocean and the land which are a part of the sustainable development goals (UNESCO).

This notion is evident in Cheung (2024) that some environmental educationists accept the conversion of environmental education to education for sustainable development because they wish to include a social perspective in their description of environmental education. Thus, some perceive environmental education to be the same as education for sustainable development, while others think environmental education is entirely different from education for sustainable development (Acosta-Castellanos et al., 2024). Those with the latter perspective argue that environmental education is far more than education for sustainable development because it solely prioritises the environment or ecology (Kopnina, 2020). Education for sustainable

development has environmental concerns as an afterthought of social and economic considerations, while environmental education has ecology central to its course and hence cannot be said to be the same (Llopiz-Guerra et al., 2024; Kopnina, 2020). Kioupi and Voulvoulis (2022), highlighted by arguing that conservative environmentalists are against education for sustainable development because, rather than education on sustainable development to put the environment first to conserve it from destruction, it thinks of how we can use it for our social and economic gains and how we can leave some for the future generation to also use.

Those of the view that environmental education is the same as education for sustainable development also contend that the environment is there to benefit mankind and should thus be taken care of (Yaacob & Abdullah, 2023). Hence, the desire of those from this perspective to include social and economic factors makes it equivalent to education for sustainable development (Araújo, 2024). For a long time, this debate has been going on while the environment, economy, and society are rapidly deteriorating. Instead of claiming what should be (absolute conservation or wise use of the environment), it is rather important to find the best way to operate education for sustainable development, which is globally accepted to make citizens responsible towards sustainable development.

2.1.3 Economic Focus in Education for Sustainable Development

Economic growth has received lots of backlashes from environmentalists in particular, as it is deemed the main contributor to the environmental woes of nations (Gdad & Kademani, 2024). Human and ecological exploitation as well as inequalities are all because people, industries, and nations always desire to make economic gains (Susanti et al., 2022). This logic is affirmed by Ali and Rahman (2024) when they espoused that poverty causes environmental degradation through unsustainable

exploitation for survival. To that effect, it is necessary to always ensure that there is economic development, no matter the magnitude of the growth (Ahlerup & Olsson, 2023). Hasseen El-Bardisy (2023) and Polasky et al. (2019) further established that the achievement of the goals of sustainable development can only be made possible in the face of economic development. It is because of these reasons that the sustainable development goals focus much on the efficient utilisation of environmental resources by the current generation so that future generations can also benefit from them (Mohan et al., 2024).

From the ongoing conversations, the incorporation of economic issues into the sustainable development goals and, in extension, education for sustainable development for learners is crucial because social justice and coherence, as well as environmental conservation, cannot be realised without the sound economic status of the individual and society. That understanding is the reason for the existence of the concepts of socio-economics and environmental economics, or ecological economics (Spash, 2011).

The argument on the concepts of socio-economics and environmental economics therefore makes economics central to society and the environment, highlighting the need to know what economics is all about. The Economic Times (n.d.) defines economics based on how people behave with scarce resources. The behaviour of people towards resources that are limited may pose a sustainability threat through irresponsible exploitation of environmental resources like gold, timber, and water bodies, and these can put other humans and living things in difficult situations.

These three pillars of education for sustainable development, as explained above, are therefore critical for its conceptualization. Education for sustainable development can hence be considered to mean learning experiences that seek to make

people knowledgeable on the interrelatedness of social, environmental, and economic developments for them to behave in a responsible manner.

Therefore, education for sustainable development can be broadly understood as learning experiences that equip individuals with knowledge of the interrelatedness of social, environmental, and economic developments, prompting them to behave responsibly. It is important to note, however, that while social studies, environmental studies, and economics readily define their relevance to education for sustainable development, there is a notable lack of concise perspectives on how other important subjects, such as mathematics, creative arts, TVET subjects, and languages, relate to its goals. This shows a knowledge gap, as teachers' perceptions of their subject's connection to education for sustainable development influence its integration in practice. This study, hence, addresses this gap specifically by exploring how career technology teachers in the Dangme enclave perceive Ghana's career technology curriculum in relation to education for sustainable development.

2.2 The Concept of Career Technology

Career Technology is a programme related to Technical and Vocational Education and Training (TVET) studied in Ghana at the Junior High School level. It integrates fundamentals of technical and vocational experiences and activities to provide learners at that level with relevant knowledge, skills and attitude for the world of work, entrepreneurship and educational advancement in TVET related programmes at the higher levels of education. Career Technology provides an education that enables people to earn meaning living after exiting high school (Tague, 2023; Blackwell, 2023).

Meanwhile, McCharen and High (2010) have called for a redefinition of career and technology- related programmes to make them more meaningful for the

twenty-first century. The advocacy is concurred in modern times by the UNESCO when it had a series of meetings all geared towards re-orienting TVET programmes to include, particularly, education for sustainable development to advance the call for sustainable development (UNESCO, 2010). Consequently, Blackwell (2023) provided a view that this education equips people with relevant knowledge and practical skills for a specific career. For the purpose of making sustainable development explicit, UNESCO (2019) had conceptualised career technology as a programme of Technical and Vocation Education as a general education designed to provide experiences for occupational development for the world of work and produce responsible citizens for sustainable development (UNESCO, 2019). Consequently, in Ghana, the Ministry of Education (2018a) has reconceptualised any form of TVET education to include sustainable development goals. Therefore, career technology could be described as a learning area related to bridging the gaps between knowledge and skills and attitudes for competencies required for employment and promoting economic, social, and environmental development. This evident in NaCCA (2020) conceptualisation of career technology as a form of education that is provided to enhance the creativity, innovation, and skill set of learners so that they can be viable for available job opportunities.

2.3 Brief Trend of Career Technology Programme in Ghana

Formalised Technical and Vocational education commenced in modern Ghana as far as 1828 by the relentless efforts of the missionaries who came to the then Gold Coast (Oti-Agyen, 2023). Moving down the line, when the British took over the colonisation of modern Ghana, they also continued the implementation of Technical and Vocational education, where some Junior Trade Schools were established by Gordon Guggisberg between 1919 and 1956 (Oti-Agyen). The Junior Trade schools

were built purposely to provide people with knowledge and skills required for the economic growth of the country (Ansah & Ernest, 2013).

The accounts in “Vocationalisation of secondary education in Ghana” by Akyeampong established that technical and vocational education was not spared from Ghana’s basic schools, particularly junior high schools, from one, to three (now basic seven to nine), and at that level the emphasis was on career exposure, career exploitation, career choices, and also to make people attain skills needed for gainful employment (Akyeampong, 2005). According to Baiden (1996), the post-colonial era experienced a reform in 1987 where vocationalisation at the basic level was ambitiously championed at the Junior Secondary schools through the introduction of Pre-Technical and Pre-Vocational skills right from the onset making education at that level flexible to either be terminated or furthered. The aim of vocationalisation was to eliminate “elitist” grammar programmes to ensure practical-orientated individuals are produced to work in industries for the industrialisation aim of the nation to be met at that that (Osei, 2004).

The Pre-Technical and Vocational Skills subjects were implemented in all Junior Secondary Schools in Ghana until there was another reform in 2007. The reform at this time round saw an integration of Technical, Vocational and Visual Arts courses to form Basic Design and Technology (BDT) as a subject to replace Pre-Technical Skills and Pre-Vocational Skills. The intention of the BDT programme was to make learners technologically minded to pursue technical programmes at the advanced levels to make them suitable for the industrial growth of the country with its attendant economic benefits (Curriculum Resource and Development Division, 2007).

The rapid developments in the world led the BDT programme to be outmoded. The education space was not left of these developments paving the way for another

reform. At this time, the need to make technical and vocational education programmes sustainable was the main concern (Ministry of Education, 2018a). The current reform in the education sector which started around 2017 experienced another change in curricula used in the Junior High School. Accordingly, the BDT curriculum was replaced with the new career technology curriculum (a common core programme) to make it more suited for particularly the twenty-first century needs. It is important to note that career technology has been created to achieve the goals enshrined in the Education Strategic Plan (ESP 2018-2030) for TVET and its related courses (NaCCA, 2020). It is believed that when career technology is well implemented, the individual learner will have the competence of critical thinking, creativity, innovation and graphical expression of ideas (NaCCA) for sustainable development.

While career technology stems from various reforms and the recent inclusion of education for sustainable development goals into Ghana's school curricula in recent times, it is unknown whether the goals have been integrated into Ghana's career technology curriculum. This gap is addressed through research question one, which aimed to explore the extent of integration of the goals of education for sustainable development in Ghana's career technology curriculum.

2.4 Implementing Education for Sustainable Development

Education for sustainable development, as experiences developed by the United Nations aimed at changing the behaviours of people towards the world to make it available for the yet unborn, is meant to be used for all educational purposes in formal, non-formal, and informal settings (Pandey, 2024). In schools, education for sustainable development is taught either as an isolated curriculum or integrated with existing curricula (Anyolo et al., 2018). Whether education for sustainable development is taught as an isolated or integrated curriculum, its successful

implementation lies largely in the competence of the implementer (Wilhelm et al., 2019) and their affection for the environment and nature (Anđić & Mažar, 2023).

As a result, the implementation of education for sustainable development requires that there is a curriculum and a teacher who uses her or his content and pedagogical competencies, at least in the classroom.

2.4.1 The Curriculum and Education for Sustainable Development

Every educational endeavour is wrapped in the school curriculum. Through the school curriculum, the whole educational journey revolves around its aim (Addai-Mununkum & Setordzi, 2023). The curriculum provides relevant experiences through which learners learn what is intended for them (Addai-Mununkum, 2020). The school curricula do not serve an inherent purpose but to educate learners to meet their own needs, the needs of their societies, or the needs of a particular scholar (Schiro, 2013).

In recent times, societal needs have been prioritised in the school curricula through a social reconstructionism approach in the education sector (Melesse & Belay, 2022). To make the school curricula an effective tool to educate learners on relevant competencies required for modern living and a sustainable lifestyle, there was a need to create room for education for sustainable development in schools. As pointed out by Singh et al. (2022), education remains the most reliable medium through which sustainable development goals can be achieved. Therefore, a change in the way our education is organised is necessary if we want to empower learners with competencies for sustainable development (Leicht et al., 2018). This calls for the need to make education transformative (Granados-Sánchez, 2022). To that effect, Nilufar contended long ago that, a total change in the educational system before the documentation of education for sustainable development in schools' curricula (Nilufar, 2022). It is found that Ghana, having adopted and been willing to achieve the

sustainable development agenda, had reformed its policies and frameworks for its educational sector to include education for sustainable development (Ofori-Birikorang et al., 2020; Ministry of Education, 2018a). In the context of formal education, the goals, content, and experiences (education for sustainable development) could be documented as a curriculum (Su, 2012).

Education for sustainable development may be designed such that it will be taught as a separate subject, introduced into existing subjects taught in various grades, or introduced subjects into the context of education for sustainable development (Hariyono et al., 2024). The first may be rejected because, it is not the intention of education for sustainable development to be implemented as an “adjectival education” (Kminek, 2023). An adjectival education will take some contact hours, which are already limited in schools, and will make education for sustainable development more theoretical and uncomprehensive as required (Doychinova, 2023). The latter may also be dismissed because education for sustainable development is not a single study area into which other existing subjects can be collapsed (González, 2021). According to Hariyono et al., the most effective technique accepted by scholars is the second, where concepts and competences of sustainable development are integrated into existing school curricula and practices. An effective integration of education for sustainable development into existing subjects promotes holistic and comprehensive learning (UNESCO, 2019). Addai-Mununkum (2020) confirms this by positing that holistic and comprehensive learning of relevant knowledge, skills, values, attitudes, and competencies can lead to the correction of issues of societal concern. The most effective means to achieve holistic and comprehensive education is through the use of active learning approaches (Martínez-Casanovas et al., 2022) in democratic settings (Wall & Leckie, 2017).

The activity of integrating education for sustainable development into the existing school curricula is to be done thoughtfully so that the curriculum produced will be as useful as may be intended. This is because just combining subject areas together may overburden learners and limit their ability to learn in-depth experiences (Addai-Mununkum, 2020). In that regard, various scholars have helped by proposing approaches for curriculum integration. Examples of those approaches are the multidisciplinary, interdisciplinary, and transdisciplinary approaches (Hardy et al., 2021; Gürkan, 2021). Also, the contributive, additive, transformative, and social action approaches had been proposed by the Banks to guide the development of integrated curricula (Hixon, 2021). These approaches to integrating curricula will, at large, fall within either the embedded approach or the add-on approach to the integration of education for sustainable development into TVET-related courses (UNESCO, 2010).

2.4.1.1 The embedded approach to curricula integration

The Merriam-Webster (n.d.) an online dictionary related words like enroot, entrench, implant, ingrain, and lodge to the word embed. While these words differ in their own distinctive meanings, the common thing among them is that two or more parts put together to form a singular whole without any noticeable differences. The embedded approach to curriculum integration can then be said to be the blending of different experiences into a whole so that a lesson on it will expose learners to all experiences at the same time. According to Mansouri and Hamzaoui (2023), an embedded approach to curriculum integration enables learners to learn in a variety of situations and makes the teaching of twenty-first century capabilities or competencies possible (Oluwagbohunmi & Alonge, 2023; Drake & Reid, 2018). Similarly, Onyilo et al. (2019) have argued that using education as a means to achieve sustainable

development goals was better delivered when issues of sustainability are effectively embedded into educational systems.

Zguir et al. (2021), however, pointed out a disadvantage of the embedded approach to curriculum integration by mentioning that, materials that are embedded are mostly difficult to be assessed. Therefore, when this approach is employed in curriculum integration, efforts should be made to find possible means by which assessment will be carried out for the right judgements to be made in its implementation.

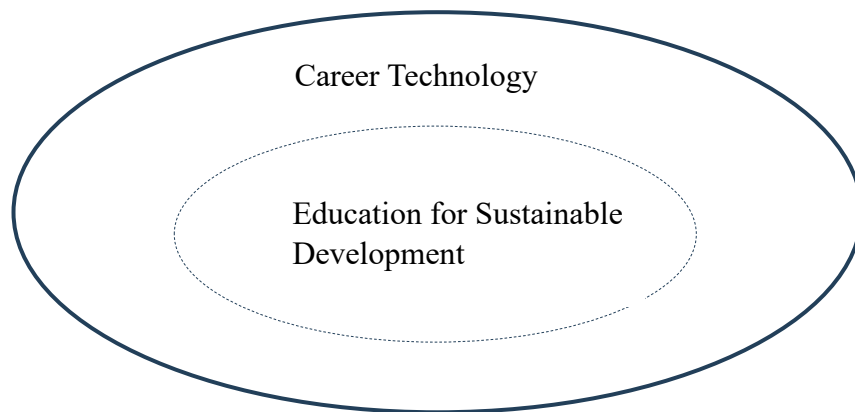


Figure 2. 1: Embedded approach to the integration of Career technology and Education for sustainable development

Source: Adapted from Roberts and Cantu (2012).

2.4.1.2 The add-on approach to curricula integration

Unlike the embedded approach, where two or more different curricula experiences are enveloped into each other such that the differences in them can no longer be noticed, the add-on approach to curricula integration implies a top-up to the original curriculum. Bentsen et al. (2020) have explained the add-on approach to integrating curricula as the laying of additional experiences and/or activities as an extra thing to the existing core curriculum for them to become one whole. In such a case, the original curriculum will not experience any change in its content (Clarke &

Kirby, 2022). It can be presumed then that in the add-on approach, compartmentalisation of the curriculum is a prevailing custom, making distinctions of experiences and activities integrated to be visible.

Issues with the add-on approach to curriculum integration are that it only leads to the education of the mind (Kolmos et al., 2016) and hence, it fails to ensure transformative education (Clarke, & Kirby, 2022). Nevertheless, Karadzhev et al. (2024) argued the add-on approach makes the core curriculum valuable because it integrates different independent subjects together to make learning meaningful and interconnected (Doyle & McDonald, 2022).

Figure 2.2 shows an illustration of an add-on approach to curriculum integration, showing career technology as the main curriculum and education for sustainable development as an addition to it, so that the course will be valuable in changing the behaviour of learners for sustainable development.

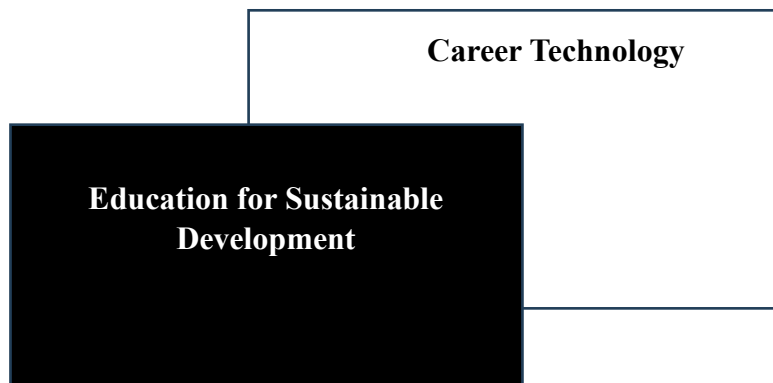


Figure 2. 2: An illustration of an add-on approach to curriculum integration with ESD and career technology

Source: Researcher's illustration

Given these integration strategies, it is expected that new curricula, especially Ghana's Common Core Programme for Junior High School, should effectively incorporate ESD goals to educate learners for sustainable development. The study,

through its research question one, will also find out the strategy used to integrate education for sustainable development goals into the career technology curriculum used in Ghana, as it is unknown the strategy of integration used in the Ghanaian context.

2.4.2 Teaching education for sustainable development in the curriculum

Apart from having curricula that incorporate education for sustainable development goals, there was the need for proper utilisation of the same by teachers before it can be said to have attained the aims of the curriculum. According to Shava et al. (2023), not all education can be said to be for sustainable development unless it fully incorporates education for sustainable development. Education for sustainable development is not limited to curriculum content only, but also the utilisation of pedagogies that create a conducive environment for learner-centred education (UNESCO, 2017). Hence, a shift towards using pedagogies suitable to implement education for sustainable development must be vital (García-Rico et al., 2021; Wilhelm et al., 2019). Anyolo et al. (2018) observed pedagogies for the implementation of education for sustainable development curricula in Namibia were predominantly teacher-centred. Addai-Mununkum and Setordzi (2023) also found that some primary school teachers in Ghana used twenty-first century pedagogies to implement the standards-based curriculum.

While it is difficult to explicitly tell the pedagogies that suit the implementation of education for sustainable development; Anđić and Mažar (2023) gave the characteristics of pedagogies that suit education for sustainable development implementation in the classroom: (i) it incorporates information and communication technology; (ii) it promotes experiential learning; (iii) it ensures learning is practical-based; and (iv) it ensures cooperation in learning. Such pedagogies are able to whip

learners' emotions for sustainability (Anyolo et al., 2018). For a better understanding of these characteristics of education for sustainable development pedagogies, the literature is reviewed on each of them.

2.4.2.1 Experiential Learning

Education for sustainable development is an approach adopted to change people's behaviour so as to correct the ills facing the world with respect to issues like gender inequality, climate change, and consumption patterns. These phenomena are real and confront our everyday lives. Learning through real-world experiences can be one of the most effective strategies for educating people on sustainable development because this process of education deals with learning from real-life situations (Koni, 2024). Learning from real-life situations is able to change people's behaviour (Amsari et al., 2024). Classically, Gentry (1990) explained experiential learning as a "participative, interactive, and applied" form of learning. This turns out to mean that experiential learning in education for sustainable development is about engaging people to actively involve them in collaboration to find solutions to existing problems and use the solutions to make the world a better place for all. It must, however, be emphasised that not all experiential learning is effective for educating people about sustainable development (Rodríguez-Zurita et al., 2024). Amrein (2023) has notified, therefore, that the experiential learning pedagogies employed should really promote "learning by doing" through one's own everyday experiences. To successfully implement experiential learning in the classroom, Kolb proposed four stages to go through: concreting the experience, reflective observation, abstract conceptualization, and active experimentation (Minute Tools Content Team, 2020). Effective pedagogies for experiential learning should therefore be able to take people through these stages. Gentry emphasised these stages by saying that pedagogies that are effective for

experiential learning include problem solving, case discussion, simulation games, laboratory exercises, group cases, and individual case write-ups. Nousheen and Kalsoom (2022) grouped these pedagogies as case studies, critical thinking, discussions, debates, and problem-based learning.

As the sustainable development agenda is meant to tackle realistic problems like pollution of water bodies with plastic bags, the use of pedagogies that promote experiential learning is a perfect fit because instruction will be presented in a way that learners will be able to feel the problem as they are, think critically about it, devise strategies, and behave in a manner that will provide solutions to the problem. Esia-Donkoh et al. (2021) have specified that experiential learning has a direct relationship with environmental education, or, for that matter, education for sustainable development. Apart from that, scholars have found the experiential learning approach to be beneficial for a better understanding of issues, increases learners' willingness to adjust to change, boosts learners' ability to think, develops learners' leadership skills, encourages the spirit of cooperation among learners, and motivates learners into life-long learning (Saranee, 2024; Singha & Singha, 2024; Hanip et al., 2023). In spite of the enormous benefits that experiential learning can have in educating learners for sustainable development, limited knowledge of education for sustainable development and the lack of skills to use experiential learning might make the benefits void (Castillo & Harris, 2023). It is therefore important that teachers be educated to understand and play their role effectively when enacting experiential learning (Ajani, 2023). Such education should revolve around lesson preparation, learner involvement in activity planning, assessment, and pedagogy (Esia-Donkoh et al.).

2.4.2.2 Practical-based learning

Another characteristic of pedagogies useful for implementing education for sustainable development is that such pedagogies make lessons practically oriented (Anđić & Mažar, 2023). To make it clear what practical learning means, there is a need to define the two words: practical and learning. Practical, according to the Collins dictionary.com (n.d.) is the activity that leads to the production of things. The thing may be a tangible object, knowledge, or skill. Learning as a concept is also defined by Ambrose et al. (2010) as the process of going through various stages of activity or experiences to bring about change for meaningful living in the future. These two explanations put together will mean that practical learning is the change that occurs in people's knowledge, skills, and feelings when they are engaged in activities that lead to the production of things for them to perform better in subsequent performances. When learning is practically oriented, learners are highly motivated to actively involve themselves in the lesson, which helps to build understanding (Oman et al., 2022).

According to Hu et al. (2023), the successful implementation of practical-based learning is dependent on statements of clear objectives for practical, effective communication, and the availability of proper role models. Hadebe (2023) also noted a lack of linkage between theory and reality as a barrier to practical lessons. Notwithstanding the difficulty that may come with using pedagogies for practical learning, Singha and Singha (2024) have opined that practical-based pedagogies are effective for educating people on sustainable development. The majority of the seventeen sustainable development goals are real and can only be handled through real and practical actions.

2.4.2.3 Cooperation in Learning

The sustainable development agenda is a common good for all, even generations yet unborn. There is a need for all individuals to come together and contribute to the achievement of the agenda. In educating learners about sustainable development, it is important to use pedagogies that have the potential to enable them to work together so that they can appreciate the benefits of working together for development. Cooperation in learning and teaching has to do with the organisation of learners into groups so that they work together to attain a common objective formulated for a lesson (Esia-Donkoh et al., 2021). In cooperative learning, each of the learners is responsible for their own contributions to the task as well as the whole task that the group undertakes (Esia-Donkoh et al.). To that effect, learners are able to realise the need to be responsible for their actions and contributions as cooperative learning fosters positive interdependency and personal accountability (Hornby & Greaves, 2022)

As expected by the United Nations, every individual must learn to become a sustainable citizen to lead the established sustainable development goals (UNESCO, 2017). Cooperation in learning provides the opportunity for every individual, even those in disadvantageous positions, to learn, and it is better able to develop in them the competence of working in teams (Cobb, 2022). The ability to work together with other people is one of the required competencies needed for sustainability (UNESCO).

Another advantage of cooperative learning is that it can eliminate the existing conflict between education for sustainable development and environmental education, which some scholars have argued over for a long time. This is because, according to

Esia-Donkoh et al. (2021), cooperation in learning ensures that expected outcomes are met, not who or what does it; it therefore eliminates all forms of competition.

Other benefits of ensuring cooperation when enacting education for sustainable development are that it improves the spirit of caring in people, leads to better achievement, leads to strong partnerships, improves social competencies, and improves the self-esteem of individuals (Zinchenko et al., 2021). Building the spirit of togetherness or community in people will lead them to feel the plight of others, partner to find solutions to the causes of those plights, and implement those solutions to achieve a better life. Activities and actions that are found to curtail others' chances of life would also be halted if people were able to care enough.

Implementing cooperation in learning can prove to be difficult if care is not taken. Hornby and Greaves (2022) have posited that ensuring positive interdependence, proper seating arrangements for face-to-face interaction, and individual accountability are helpful for implementing cooperative learning. When there is no motivation to work in groups and feedback to enable learners track their progress, this may hinder the implementation of cooperative learning (Nguyen, 2024).

Esia-Donkoh et al. (2021) have identified three comprehensive strategies that will promote cooperation in learning in the classroom setting. Esia-Donkoh et al. indicated that when implementing cooperative learning, educators need to:

1. ensure that groups are organised with small numbers to ensure greater accountability of the individual learners.
2. ensure that a particular strategy of cooperative learning is used to match the task and the expected outcomes and not just group learners to work together.
3. ensure that cooperation in learning is used for complex tasks that foster problem-solving, creativity, critical thinking, and higher-order thinking skills.

2.4.2.4 Information and Communication Technology (ICT) integration in learning

ICT has permeated the boundaries of every endeavour in recent years. It has drastically changed educational and instructional practices. In Ghana, the Transforming Teaching, Education and Learning (t-tel) (2021) indicates that ICT integration has characterised the recent reforms as integral parts of education administration practices, teaching, and learning. Weber and Greiff (2023) have also opined that ICT in modern day education is important for the development of 21st century skills. The concept of ICT has failed to offer itself a single definition, as many scholars have defined it to suit how they view it. It has been viewed as a gadget, software, or network. In the rendition of Jha et al. (2023), ICT is a range of hardware and software that work together to enable communication, information generation, sending, storing, and management. Ratheeswari (2018) has also defined ICT as the use of technologies to access information through cable or waves. From these two perspectives, ICT can be said to be the use of the right software and hardware to create, save, manage, or access information using cable connections or waves. The adoption of ICT into the education space, particularly teaching and learning, has transformed it drastically, as mentioned earlier.

Islam et al. (2023) revealed that the inclusion of ICT in education is not only making it efficient, but it is also changing the practices of teaching and learning. For instance, ICT has helped to make education more accessible and affordable (Anastasopoulou et al., 2024; Zafar, 2019), reasonable for the “digital natives” (Lim et al., 2024), and makes knowledge highly available for all (Henderson, 2020). All these benefits are made probable because, according to Ugwu and Nnaekwe (2019), the introduction of ICT in education has supported the modern transition from teacher-

centred learning to learner-centred learning, with the curriculum also functioning differently from what it used to be. The findings of Ugwu and Nnaekwe on the change are tabulated below.

Table 2.1: Shift in the role of learners and the curriculum by ICT

Shift from	To
Learners' role changed from Passive learning	Active learning
Reproducer of knowledge	Creator of knowledge
Dependent learner	Independent or autonomous learner
Lone learner	Collaborative learner
Similarly, curriculum changed from facts	Inquiry based
Strict approach to teaching	Flexible approach to learning
Fixed time and space for delivery	Anytime, anywhere for delivery

Source: (Ugwu & Nnaekwe, 2019).

It is, however, necessary to point out that, despite these vital benefits of ICT in teaching and learning, it has been flawed in its implementation, with issues like a lack of knowledge and skills in the use of ICT tools (Kaur, 2023). Kaur further established that the absence of confidence and capacity to use ICT tools, together with the non-availability of ICT resources, are some barriers to the use of ICT in teaching and learning. Efforts should be made to curtail these problems of ICT integration through teacher continuing education in ICT and the provision of ICT tools.

2.4.3 Suitable Pedagogies for Education for Sustainable Development

Now that the characteristics of education for sustainable development goals are clear, a look into such pedagogies is appropriate. Issues concerning sustainable

development are so complicated that the acquisition of simple knowledge, attitude, and skills is ineffective to accomplish them until the development of relevant competencies is included (UNESCO, 2017). Typically, education for sustainable development intends to make people capable of considering their actions so that they can live responsibly for the current and next generations, both locally and worldwide, with an emphasis on society, economy, culture, and the environment (Gorski et al., 2023).

The word competence has broadly been described as the quality of possessing the desired characteristic, together with the knowledge, skills, and attitude that are required to behave appropriately in a given context (Helmold & Helmold, 2021). In education, the Ministry of Education (2018b) has defined competence as the development of learners through a blend of knowledge, skills, and attitudes upon which they can continuously build on their knowledge, how they reason, and their performances throughout their lives. Both conceptions of competencies agree on the combination of relevant knowledge, skills, and attitudes as the foundation for the development of competencies. The need to combine skills, knowledge, and attitude in the learning process cannot be met with simple pedagogies like brainstorming, lectures, and demonstrations alone. Adefila et al. (2023) have hence directed the use of integrated pedagogies for learning aimed at building competencies in learners. Integrated pedagogies, according to Esia-Donkoh et al. (2021), are those pedagogies that apply two or more suitable teaching techniques and strategies together with technological tools at the same time in a single lesson. With integrated pedagogies, facilitators are able to educate learners through the interconnection of knowledge, skills, attitudes, materials, and institutions (Yepikhina et al., 2023).

Yepikhina et al. further posited that integrated pedagogies are evolving and are thus developed when the need arises to teach a particular competence by either drawing from old and new pedagogies or entirely new pedagogies (Yepikhina et al., 2023). Some examples of integrated pedagogies found in the literature are service learning, problem-based learning, collaborative learning, experiential learning, active learning, guided discovery learning, enquiry-based learning and project-based learning (Nousheen & Kalsoom, 2022; Esia-Donkoh et al., 2021). Peña Miguel et al. (2020) added serious games in the case of online learning. These integrated pedagogies are considered suitable for learning in the twenty-first century as they develop competencies.

The suitability and effectiveness of these integrated pedagogies for competencies development in learners have been studied by various researchers. For instance, Lozano et al. (2017), Susanty et al. (2024), and Eswaran (2024) found problem-based and project-based learning, case studies, experiential learning, collaborative and cooperative learning, place-based learning and active learning to have the ability to educate learners on systems thinking, collaborations, critical thinking and communication competencies. Again, the use of transformative pedagogies based on the constructivist approach to learning is effective in teaching and learning education for sustainable development competencies (González-Salamanca et al., 2020). Similarly, Mahapatra and Vijayalatha (2024) indicated that through experiential learning, learners are able to acquire relevant competencies for the sustainability of their world rather than just the intake of knowledge which is a typical characteristic of conventional pedagogies. In the situation of e-learning where implementing integrated pedagogies may prove difficult, the use of serious games has

been found to be very effective in facilitating the development of sustainability competencies in learners (Peña Miguel et al., 2020).

The integration of education for sustainable development in the Ghanaian primary school curriculum has called for the use of integrated pedagogies. On that note, Addai-Mununkum and Setordzi (2023) have reported that twenty-first century pedagogies equally known as integrated pedagogies are being implemented by some Ghanaian primary school teachers in the classroom.

However, the extent to which these integrated pedagogies are utilised by Junior High School (JHS) career technology teachers in Ghana, especially those in the Dangme enclave for education for sustainable development integration in the classroom remains underexplored. This gap directly informs Research Question three of this study.

2.5 Challenges to Implementing Education for Sustainable Development

Effective curriculum implementation helps to achieve the intentions of the school curriculum (NaCCA, n.d.). The processes of curriculum implementation are influenced by a lot of factors which work together to make the whole enterprise a success or fail (Ansar, 2023). Due to the interdependence of the factors involved in curriculum implementation, it is most of the time met with challenges. The addition of education for sustainable development in curricula implementation has aggravated the issues of implementation as education for sustainable development in itself has numerous challenges to surmount (Weiss et al., 2021; Leal Filho et al., 2017). At the back of this, much research has been conducted in varied contexts to identify the hindrances to implementing education for sustainable development goals in educational settings. The findings from the research have been categorised as teacher-influenced barriers, curricula-influenced barriers, institutional barriers, and learners-

influenced barriers (Aslam et al., 2024). Addai-Munumkum (2020) stated factors that influence curriculum implementation are based on teachers who teach the programme for students learning, supervision required to ensure teaching and learning activities are effectively done, relevant resources needed to support teaching and learning, and interest groups who contribute to the whole teaching and learning processes.

Teachers influenced challenges are those limitations to education for sustainable development implementation that are contributed by teachers' level of knowledge, instructional capabilities, motivation and beliefs. According to Pasang and Najib (2022), the subject areas that teachers handle influence them in implementing education for sustainable development. Again, methodologies for teaching the content of some study areas tend to limit education for sustainable development implementation (Hariyono et al., 2024). In addition to these, the lack of information and understanding about education for sustainable development and the lack of pedagogical knowledge in education for sustainable development on the part of teachers also pose a threat to its implementation (Sadovets, 2023). Khadim et al. (2024) also found the absence of teacher commitment, discipline, proper planning and focus does challenge the process of implementing education for sustainable development in the classroom. Likewise, when teachers fail to make education for sustainable development lessons more practical and experiential, their motive of changing behaviour for sustainable development fails (Rampasso et al., 2019).

The education for sustainable development experiences in itself poses challenges for its smooth use in the education space. The whole agenda is how education for sustainable development is seamlessly embedded in or added to the already in-use curricula (UNESCO, 2010). One critical challenge posed by education for sustainable development curricula in its implementation is the lack of coherence in

its integration. It was found that some learning areas do not readily blend well with education for sustainable development experiences (Doss & Poursharif, 2023). In cases where the curriculum contents blend well, they end up bloating the curriculum and making it difficult to implement in an already limited available contact time (D'Eon, 2023). Sometimes too, what hinders the implementation of education for sustainable development as a curriculum is the uncertainty about its concept and goals making it difficult to implement (Thoriq & Mahmudah, 2023). Baishemirov (2024) as well as Raman et al. (2022) found that implementing education for sustainable development often fails because some teachers are not aware of it and have little concern for it. UNESCO (2010) accentuated this fact when it said there was the need to explicitly indicate the words Education for Sustainable Development in the official curriculum to inform teachers of its relevance. According to Gorni et al. (2024) communicating about a curriculum to stakeholders is critical to its implementation. To mitigate this challenge, implementors should be educated on education for sustainable development so that they can overcome the challenge and effectively implement it.

Another contributor to the challenges facing education for sustainable development implementation is the institution in which the implementation takes place and the role its leadership plays. Institutions play the role of providing a supportive environment, motivation and supervision, all aimed at ensuring effective curriculum implementation (Dalimunthe et al., 2024). Failure to provide relevant supporting curricula and technological gadgets highly limits the implementation of education for sustainable development experiences (Sadovets, 2023). Poor and inadequate supervision on the part of leadership has also been found to hinder the successful implementation of education for sustainable development (Alhazemi, 2024; Zainal Abidin et al., 2023). In addition, the literature revealed inadequate

learning facilities; distance to school; limited number of quality teachers; and poor condition of service as contributors to curriculum implementation failures (Fasinro et al., 2024; Istakri et al., 2024). Lastly, the time factor also impedes the implementation of the core curriculum in addition to education for sustainable development (Grauer et al., 2022).

The last domain that prevents the implementation of education for sustainable development in schools is the social and cultural influences in the implementation processes. According to Wals et al. (2008), a person's social sphere largely affects them in what they do. The orientation that a person has by her, or his social and cultural backgrounds can make or unmake the curriculum intentions (Pane & Aly, 2023; Rau, 2022). For example, cultural groups that revere men as the only source of power will find it difficult to approve of the need for gender equality when it appears in the curriculum. These social and cultural influences that challenge education for sustainable development implementation emanate from religion, community status, norms, the individual's social class, relatedness to the problem and ethical issues (Singh et al., 2023; Zheng et al., 2021). Mirroring Zheng et al. and Singh et al.'s findings, Khadim et al. (2024) have established that it is challenging for teachers to implement education for sustainable development when they do not find any inspiring examples around them. In another case, learners are influenced by the knowledge they receive through the media, family members and or religious groups (Fatonah & Astuti, 2024; Sartika et al., 2020). The information received by learners may act as mediating experiences to probably repudiate those from the school curriculum on education for sustainable development, making it difficult for the learners to learn what is intended in education for sustainable development.

Additionally, Leal Filho et al. (2021) have indicated that, poor people and countries largely prevents the processes of implementing the sustainable development goal four of which education for sustainable development is a target in. Truly, as it is literally said in Twi, a local language in Ghana, *one does not leave the stick unused for a dog to bite*. The need for survival leads people to exploit all means possible to earn a living. Evidence in the work of Zwolińska et al. (2022) showed that students are much interested in learning about sustainable development goal eight which dwells on work and economic related issues far more than they have for the environment and society. Peer influences too can largely impede education for sustainable development implementation because many scholars have shown that learners learn more among themselves (Suryadi, 2024; Shah et al., 2024). Learners as they move with peers learn several things, including copying others' behaviours. In the case where there is a behaviour opposite to what education for sustainable development teaches, learners are more likely to implement those behaviour more than what is taught through the curriculum.

Significantly, much of the existing literature reviewed on these challenges does not detail their manifestation within particular learning contexts, especially within the Ghanaian education system, for that matter, the Dangme enclave and among career technology teachers with respect to education for sustainable development within the enclave. These contextual and population gaps demand further exploration. Hence, Research Question 4 of this study is raised to explore challenges encountered by career technology teachers in the Dangme enclave in integrating education for sustainable development in the career technology curriculum.

2.6 Teachers and curriculum implementation

The whole enterprise of education cannot exist without the presence of an experienced person who governs and steers the affairs of the learning processes. In a formal education situation, the teacher is the experienced person who sets the pace for learning. Teachers are central when it comes to curriculum implementation; hence, there cannot be any curriculum implementation without the involvement of teachers (Manyama et al., 2024; Addai-Mununkum, 2020). In a similar vein, Katshuna and Shikalepo (2023) have noted that the successful attainment of quality education lies on the contribution of teachers in the curriculum implementation process. For teachers to succeed in implementing any curriculum, they must be able to better understand the aims of the curriculum and the role expected of them (Gulo, 2024; Ross, 2024). However, the understandings teachers make of the curricula and the role they are able to perform in the course of implementing the curricula are not independent of their beliefs, practices, and attitudes (Hodge, 2024). Teachers' resistance to change in the curriculum and its implementation may be due to their unwillingness to go against their beliefs. Saloviita and Almulla (2024) found that teachers' self-efficacy beliefs have a direct impact on the way they implement their curricula. Sabarwal et al. (2022) have highlighted that the success of curricula that are developed with the intention of reforming practices and behaviour is directly impacted by teachers' beliefs. Everything about teachers then can be said to have direct influences on the implementation of the school curriculum. Just as Fatoni et al. (2024) and Glatthorn et al. (2018) indicated that the successful curriculum implementation is achieved through the understanding of the curriculum and the help that is received for its implementation. Addai-Mununkum (2020) has therefore advocated for teachers to be educated continuously and given relevant motivation so that they will be able to

change to conform to the way a particular curriculum needs to be implemented. The modern-day qualified teacher is not the one who has gone through tertiary education to read education, but the one who possesses relevant characteristics for the needs of the twenty-first century. The National Teaching Council (n.d.) has hence established standards that are required for one to be in the classroom to teach in Ghana. These standards are professional values and attitudes, professional knowledge, and professional practice. This means that teachers implementing the common core programme should have adequate knowledge about their subject area so that they will be able to provide the right and relevant information to the learners with the appreciation of values to act for good outcomes. Esia-Donkoh et al. (2021) argue that the modern-day teacher's role has changed from that of the giver of knowledge to that of a passionate person who employs various measures to influence life and communities. For the effective implementation of any curriculum, the teacher, as the facilitator, remains important.

2.7 Summary of the Literature Review

The chapter extensively reviewed related literature to the topic of the study. The review started with the concept of education for sustainable development, where its uniqueness or relatedness to environmental education was discussed. Contentions had existed, particularly, on the concepts of education for sustainable development and environmental education. Environmentalists had long ago argued that for sustainable development to be achieved, environmental education was more important to concentrate on than education for sustainable development. The basis of their argument was that environmental education has its focus exclusively on the preservation of the environment for it to be safe from devastation (Cheung, 2024; Desi et al., 2021). Another thing that made environmental educationists consider the

environment more important than education for sustainable development was the fact that environmental education is more interested in the environment than education for sustainable education, which thinks more about how to use the environment and to leave some for future generations (Llopiz-Guerra et al., 2024; Kopnina, 2020). On the other hand, some environmental educationists who wish to include social perspectives in their conception of environmental education consider education for sustainable development appropriate for a time like the one we live in now (UNESCO, 2017). The meaning and importance of education for sustainable development and environmental education debate are based on the meanings the specialists in those fields make of them. In the same manner, social studies experts have perceived education for sustainable development as a programme to tackle social problems based on their tenets (NCSS, 2010). For the concepts of socio-economics and environmental economics or ecological economics (Spash, 2011) some also think of economic issues central to education for sustainable development. In this era, education for sustainable development is a prudent addition to the school curriculum that is to be implemented by the ordinary subject teacher. The literature was, however, absent on how individual subject teachers relate their subject area to education for sustainable development. Through this, the second research question, “How do career technology teachers’ perspectives of the career technology curriculum align with education for sustainable development?” was identified to be addressed.

Again, while education for sustainable development has been adopted by member nations like Ghana, there was a need to integrate its content and concepts into the daily practices of schools to transform the attitudes of learners towards sustainable development. Ofori-Birikorang et al. (2020) have acknowledged that Ghana’s educational system has adopted education for sustainable development into its

practices in recent reforms. The literature has also shown two broad means by which education for sustainable development could be integrated into the school curriculum: embedded and add-on approaches (UNESCO, 2010). The literature, however, does not point out the extent that the content and concepts of education for sustainable development are effectively integrated into the Ghanaian schools' curricula at the junior high school level. By this, the research question one was set out to explore the extent that education for sustainable development objectives is integrated into the career technology curriculum used in Ghanaian junior high schools to close the gap.

Meanwhile, the essence of the school curriculum is for it to be used as an instrument to educate learners to act in a predetermined manner. Many scholars have addressed the need to forgo simplistic pedagogies for integrated pedagogies. Examples of integrated pedagogies found in the literature are problem-based learning, collaborative and cooperative learning, experiential learning, guided discovery learning, serious games, and project-based learning. These integrated pedagogies are found to be good for educating learners on sustainable behaviours such as critical thinking, the ability to communicate effectively, problem-solving skills, and systems thinking ability (Cobb, 2022; Peña Miguel et al., 2020; Esia-Donkoh et al., 2021). Findings in the literature show that mostly teachers use conventional methods of teaching to implement education for sustainable development in TVET-oriented programmes, and the barriers they face were extensively discussed in other African countries without any done in Ghana (UNESCO, 2010). While Addai-Mununkum and Setordzi (2023) found that teachers at the Ghanaian primary level are implementing integrated pedagogies in their classroom instruction, they did not extend their study to the junior high school to include, particularly, career technology teachers. This gave birth to research question three for this study which was to explore the

implementation strategies used by career technology teachers to implement the career technology curriculum in line with education for sustainable development goals. Answers to this question would help to identify the pedagogies that are being used to implement the career technology curriculum.

Lastly, the practice of curriculum in various places is faced with challenges. Several factors contribute to these challenges. For curriculum integrated with education for sustainable development, the literature has shown that mostly teachers face the difficulty of implementing that content and concepts. Some of the challenges found in other parts of the world are the complexity of the nature of education for sustainable development (Leal Filho et al., 2017); the subject area (Pasang & Najib, 2022); the lack of pedagogical knowledge (Sadovets, 2023); the lack of teacher commitment, discipline, and preparation (Leal Filho et al.); the lack of cohesion between education for sustainable development and subject areas (Doss & Poursharif, 2023); and time issues that highly impede the implementation of the core curriculum in addition to education for sustainable development (D'Eon, 2023). These findings were done in other jurisdictions and with different classes of teachers from those handling career technology in Ghana. In Ghana, the teachers had been re-educated in workshops and professional learning communities (PLC) to understand the curriculum and its practices. Based on this fact, research question four was included so that the challenges confronting career technology teachers in the implementation of the career technology curriculum could be explored. All the research questions listed to be answered were novel in the Ghanaian context because the career technology curriculum is new in the system, and so was education for sustainable development. In that regard, the case study design was used to address the research questions. Details of it are discussed in the next chapter.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Overview

This chapter outlines the methodology the researcher used to gather and analyse data to address the research problem. Based on the UEW School of Graduate Studies (2018), it describes the research design, participants, sampling technique, data collection instrument and procedure, analysis of data, the research site, the researcher's role, and ethical considerations. All these are geared towards addressing appropriately the purpose of the study which is to explore the education for sustainable development goals integration in the career technology curriculum by career technology teachers in the Dangme enclave. The purpose was achieved by answering the research questions:

1. To what extent is education for sustainable development objectives integrated into the official career technology curriculum used in Ghana's Junior High Schools?
2. How do career technology teachers in the Dangme enclave perceive the official career technology curriculum in line with education for sustainable development?
3. What strategies do career technology teachers in the Dangme enclave employ to teach the career technology curriculum towards education for sustainable development?
4. What challenges do career technology teachers in the Dangme enclave encounter in the implementation of the official career technology curriculum towards education for sustainable development?

3.1 The Research Paradigm

In scientific research, three broad paradigms exist. They include the positivist, interpretivist or constructivist and pragmatist paradigms (Creswell, 2013). The positivist paradigm focus research on numerical data which are analysed statistically before interpretation (Kusi, 2012). Knowledge in the realm of positivist is constant and independent of the researcher (Patten & Newhart, 2018). Contrast to the positivist paradigm is the interpretivist paradigm. This paradigm contend that knowledge is a construct of context. Hence it collects data with respect to how an individual relates to her or his environment (Kusi, 2012). Because the interpretivist paradigm is more explorative in nature, it collects data in the form of words, pictures, and videos (Patten & Newhart, 2018). While positivist and interpretivist paradigm are polarised, the pragmatist paradigm brings the two together. According to Creswell and Creswell (2018) the pragmatism paradigm focuses much on what works thereby mixing both the interpretivist and positivist paradigms. From the brief background on research paradigms the study employed the interpretivist paradigm. The researcher made this choice the study is exploratory (Denzin & Lincoln, 2018). Again, since data was collected from collected from its actual context and subjective meanings made of them, the interpretivist paradigm was appropriate (Creswell, 2013). Thus, the paradigm is perfect for achieving the research objectives through the research questions.

3.2 The Research Approach

In line with the interpretivism paradigm, the qualitative approach was adopted for the study due to the fact that it permits the collection of in-depth data in words (Creswell and Creswell, 2018). Also, Stake (2010) described the qualitative approach to research as research that is interpretive, experiential, situational, and personalistic.

In addition, Denzin and Lincoln (2011), posit that the qualitative approach is an appropriate method for textural analysis as well as investigating new pedagogies.

Since answers to the research questions for the study were centred on data collected from the classroom situation, participants' ways of teaching, and interpretations from their perspectives, as well as document analysis, the approach is deemed ideal for the study notwithstanding the fact that its findings cannot be generalized (Creswell & Creswell, 2018).

3.3 The Research Design

Kumar (2014) explained the research design as the plan that guides the conduct of good research. It is the procedure that a researcher follows in an inquiry process (Creswell & Creswell, 2018). For a qualitative work like this one, five distinct designs are available: ethnography, phenomenology, narrative, grounded theory, and case study (Creswell, 2013). Among the five, the study utilised the case study design because the interest lies in collecting in-depth data in its natural settings (Yin, 2011). In addition, because the phenomena (Education for Sustainable Development and Career Technology) under study was new in the Ghanaian context, a case study became useful in exploring it holistically (Kumar, 2014).

Given the fact that the researcher's focus is on education for sustainable development and its integration in the career technology curriculum use in Ghanaian Junior High Schools, an intrinsic case study in particular was carefully chosen so that a deeper exploration of the phenomenon can be achieved (Creswell, 2013; Kusi, 2012). The intrinsic case study was conducted in the career technology curriculum and the schools where its implementation was done.

3.4 Population, Sampling Technique and Sample Size

The population for the study was all career technology teachers in both public and private schools in the Dangme enclave. However, the target population was those who practice in one of the districts in the enclave described in detail in the research site section. The targeted population was chosen because of its proximity to the researcher (Kusi, 2012). Sampling participants from the target population was important because it can be very difficult to study the whole population (Patten & Newhart, 2018). For that matter, the purposive sampling, specifically, the maximum variation sampling technique (Shaheen & Pradhan, 2019) was used to sample participants from different backgrounds (Kusi, 2012) with respect to their qualification, sex, and number of years in practice as these can impact self-efficacy of teachers (Saloviita & Almulla, 2024).

The benefit of involving participants selected through the maximum variation technique was to help the researcher obtain data from all variations of teachers who were implementing the career technology curriculum. The different perspectives obtained from these varied participants involved in the study were deemed useful because they helped in building complexity in the data analysis (Creswell, 2015). Again, how each of the variations of participants integrated education for sustainable development into the career technology curriculum could be understood by highlighting the cross-cutting themes from the variations of participants (Hurst, 2023) to know what was happening on the ground in the different schools.

Participants involved in the study were selected by the researcher purposefully, as stated earlier. For each participant, the researcher identified the schools from which a possible participant with varied characteristics could be found by using a list of schools provided by the education directorate. Afterwards, the researcher visited the

schools on different days and times to see the headteachers to obtain permission for the study by using an introductory letter provided by the District Director of Education to involve the career technology teachers available in the schools. The headteachers who permitted it and career technology teachers who availed themselves were involved in the study. Kusi (2012) indicated that one of the things a researcher has to look for before selecting participants pertains to the ease at which participants could be reached. In that regard, all the participants for the study were sampled from easy-to-reach schools. The need to involve participants of varied backgrounds was, however, not compromised.

The sample size of participants was seventeen (17), gathered from fifteen (15) schools, was determined by saturation (Shaheen & Pradhan, 2019). Data collection was done by interviewing and observing participants one after another. After interviewing and observing twelve (12) participants consecutively, it was realised that the responses given and what was observed were similar. In addition to that, three other participants were interviewed and observed to check if other perspectives would suffice. Having realised those three (3) provided similar perspectives as the first twelve (12) participants, attention was shifted to private schools' teachers to gather their perspectives. After two (2) of those teachers were interviewed and observed, the data gathered were found to be similar to those perspectives gained from the qualified public school teachers, bringing the total number to seventeen. The sample size, seventeen (17), was deemed adequate for the study because additional participants were not bringing anything new to the table (Creswell & Creswell, 2018). The demography of the sampled participants is presented in Table 3.1 below.

Table 3. 1: Demography of Participants Interviewed and Observed

S/N	Pseudonym	No. of Years Practicing	Qualification
1	Sir Pope	17	Degree
2	Madam Roses	4	Degree
3	Sir White	8	Degree
4	Sir Blues	4	Degree
5	Sir Roy	12	Degree
6	Sir Kite	17	Degree
7	Sir Ike	7	Degree
8	Sir Just	8	Diploma
9	Madam Goodness	5	Diploma
10	Madam Cante	10	Degree
11	Madam Shezel	10	Degree
12	Madam Smart	17	Degree
13	Madam Bless	12	Degree
14	Sir Roni	22	Degree
15	Madam Shine	19	Degree
16	Sir Flowers	2	WASSCE
17	Sir Cross	3	Degree

Source: Fieldwork (2024)

3.5 The Research Site

The study was conducted in one of the districts in the Dangme enclave within southern Ghana. The researcher selected the area because of its varied population from different tribal groups and rapid socio-economic and infrastructural developments, coupled with its several environmental, social, and economic challenges. Again, school-going children within the area attended public or private schools and are taught by professional or nonprofessional teachers from different backgrounds. These characteristics were relevant in that education for sustainable

development sought to make learning inclusive and solve social, environmental, and economic problems. Also, the inclusive of private and public schools and teachers with varied background enabled the researcher to comparatively analyse how education for sustainable development is integrated into career technology in different education settings.

The benefits of the characteristics of the area and its proximity to the researcher (Kusi, 2012) made it an appropriate location to explore the practical integration of education for sustainable development through the career technology curriculum.

3.6 Data Collection Instrument

Data were collected to answer all the four research questions through documents, interviews, and observations (Bhattacharya, 2017). The document, which is a PDF copy of the career technology curriculum for all Grades (seven, eight, and nine), was obtained from the NaCCA's online site. It was analysed to explore its content for education for sustainable development goals using keywords from the Global Schools Piloting Programme document (Ofori-Birikorang et al., 2020).

Again, a semi-structured interviews and observations (Creswell & Creswell, 2018) were conducted to gain insight into how the career technology teachers perceived integrated education for sustainable development into the curriculum. The semi-structured interview and observation protocols were carefully developed by the researcher and reviewed by an expert faculty member to confirm their suitability for data gathering.

3.7 Data Collection Procedure

The data-collecting procedures used varied depending on the instrument used. The process commenced with the document analysis (Creswell & Creswell, 2018) of the career technology curriculum. According to Patton (2005), document analysis is conducted to search for excerpts or quotations from relevant documents. Having obtained the pdf copy of the Career Technology curriculum, keywords adopted by the Global Schools Piloting Programme (GSPP) (Ofori-Birikorang et al., 2020) for the purpose of analysing educational documents on Education for Sustainable Development goals together with words the researcher found appropriate were searched for, exclusively on strands, sub-strands, and indicators and not including the front matter. The front matter was deemed to be more of an introduction written for the use of the teacher to know about the curriculum and how it should be implemented. These keywords correspond to each objective for each of the seventeen goals. In the instance where special keywords were used in the Ghanaian context that were similar to the keywords provided, like ‘drinking water’ to mean ‘potable water’, those options were also explored. The explicit or implicit outcomes were then recorded for analysis. After the process had ended, it was repeated using some of the goals at random (especially those that were confusing) to confirm that what was done was credible, with the help of a colleague teacher.

After the document analysis, interviews and observations data collection followed. The process espoused by Bhattacharya (2017) for interviews was adapted for the interview sessions. Starting with, selected schools were visited one after the other and permission was sought with the help of an introductory letter signed by the District Director of Education. After permission was granted, the potential participants were engaged to familiarise myself with them. Through the familiarisation

engagement, the purpose of the study was made known to them, and scheduled dates were agreed upon for the collection of interview and observation data. Prior to the interview, the researcher read the questions several times to get used to them. On the day of the interview, the researcher visited the school early enough to meet the time agreed upon. Before the start of each interview, the participants were reminded of the purpose of the study prompting the interview and of the confidentiality of whatever they said (Tracy, 2020). The interviews were preceded with some ice-breaker questions and then zoomed in. During the interviews, responses to the questions were critically listened to and the necessary follow-up questions were asked. Responses to the interview questions were audio recorded and written at some points with participants' consent.

Lastly, observation data was collected in the classroom with the researchers acting as peripheral members (Bhattacharya, 2017). For each observation session, the researcher attended the classroom together with the participants when they had lessons as indicated on their timetables. With permission from the participants, the researcher introduced himself to the learners and briefed them on why he was in their classroom to free their minds so they could participate effectively in the classroom. The researcher then finds an appropriate place to sit and observed the lesson. With the semi-structured observation protocol, recordings were taken with consent of every activity that the participants did in the classroom, particularly the learning and teaching processes from start to finish usually for 100 minutes. The researcher was not particular about the words or behaviours put out by the participants. The success rate for the data collection exercise was very good.

3.8 Data Analysis Procedure

Data collected to address the research questions were analysed through four distinct stages: preparation, memoing, coding, and presentation (Edmonds & Kennedy, 2017). At the preparation stage, the data collected were gathered and organised to be ready for analysis. Extracts from the curriculum relating to particular objectives were organised into their various goals and domains (cognitive, socio-emotional, and behavioural) in Microsoft Excel. Each interview data was listened to twice to become familiar with it before transcription. The transcriptions were prepared manually with the aid of a Recorder application software developed by Google LLC obtained from the Google Play Store. For the observation data, the field notes taken were read through and reflected upon to make sure that they represented exactly what was encountered during the observations.

The second stage, memoing, was about the researcher getting abreast of the data collected (Creswell, 2013). A considerable amount of time was taken to revisit the phrases, clauses, or sentences that were deemed to relate an objective to the various goals. These outcomes were then read to ensure that they matched the domain into which they were categorized. Ideas and reactions that came to bear were noted. Similarly, the data transcribed from the interview recordings was read over and over again until it became familiar to the researcher. Major surprises and important points were noted for the next stage. With the observation protocol, memoing was done, and again, surprises and important points were also teased out.

From the memoing stage, the analysis of data proceeded to the coding stage. Coding was manually done with the aid of computer software called Taguette, where a word or group of words to represent the underlying meaning of the interview responses and the observations were sought (Creswell, 2015). The coding strategies

that were used are open coding and axial coding (Edmonds & Kennedy, 2017). Here, the researcher started by reading and making codes from every sentence or statement in the interview transcriptions and observation field notes. After that, the codes generated were used in context so that what they meant could be identified and grouped accordingly. These thorough engagements in these processes led to the formation of themes (Edmonds & Kennedy, 2017) appropriate for analysis.

Lastly, the findings were presented in tables and themes (Kusi, 2012). Findings for research question one was presented in tables using content analysis (Cohen et al., 2018). The content analysis provided the foundation to indicate the extent to which each education for sustainable development goal appeared in the curriculum before the level of extent was calculated for every domain (cognitive, socio-emotional, and behavioural) in percent. The formula used for the extent of coverage (E) is:

$$(E) = \frac{\text{number of objectives found for a domain}}{85} \times 100\%$$

Source: (Adapted from Ofori-Birikorang et al., 2020).

Each domain in the Education for Sustainable Development Goals document has eighty-five (85) objectives. This indicated that a hundred percent is the highest level of extent of coverage and zero is the least. For research questions two, three, and four, the findings were presented in preset and emerged themes (Kusi, 2012) and supported with evidence from participants' interview responses and observation field notes. The curriculum alongside interview transcripts and observation field notes were analysed to provide a better understanding of the integration of education for sustainable development into the curriculum and practices in the classroom.

3.9 Methods of Verification

The researcher views research as an empirical method of seeking knowledge for people's consumption and solving human problems. It is therefore imperative to always ensure that the findings of a study are validated (Creswell, 2013) to meet the trustworthy criteria for a qualitative study (Kusi, 2012). The trustworthiness of this study was founded on its credibility, transferability, and dependability (Merriam, 2009).

3.9.1 Credibility

The researcher used a data triangulation strategy (Tracy, 2020) to ensure the credibility of the study's findings. In all, three different sets of data were gathered: the career technology curriculum document analysis, semi-structured interviews, and classroom observations from diverse participants. The researcher took considerable time to conduct a detailed exploration of the career technology curriculum. Extracts were obtained through these exercises to draw a better conclusion on the curriculum with respect to education for sustainable development.

Furthermore, the flexible semi-structured interview used for varied participants helped to obtain responses from different perspectives, making it possible to tap more into evolved issues for further details. The observation exercise carried out in the classroom allowed for the real-time experience of the curriculum implementation, thereby providing more realistic evidence that complimented the findings obtained from the interview data. Findings from the interview transcripts from the varied participants and observation fieldnotes were analysed together for data and respondents' triangulations (Kusi, 2012), which involved the use of multiple responses from different participants to cross-verify each other and using interview and observation data before conclusions were made. These processes led the

researcher to make the findings of the study credible, as they provided a rich picture of the implementation of career technology based on education for sustainable development.

3.9.2 Transferability

For the transferability requirement to be met, a thick description (Creswell & Creswell, 2018) of the study site was clearly provided in the subheading on the research site. The detailed description provides a clear understanding of the environmental, social, and economic state of the geographical area, which may have an influence on the findings of the study.

In addition, the researcher provided an extensive account of how participants were sampled and their diverse characteristics provided without any breach of ethical issues (Kumar, 2014). These geographical and participant backgrounds can help in the use of its findings elsewhere (Creswell, 2013).

3.9.3 Dependability

The researcher took four separate steps to ensure that the findings of the study remained over time. The steps are elaborated as follows:

- i. For the content analysis of the career technology curriculum, the researcher used dictionaries to get the meanings of key words in the worksheet document by the Global Schools Pilot Programme. This was done to understand the keywords so that there were more contextual words relating to the key words for it to be more exhaustive. This was done to ensure a thorough analysis of the curriculum.
- ii. An audit trail (Hurst, 2023) was carried out in the course of the document analysis of the curriculum to confirm the findings from the exercise. The audit

was done by taking multiple looks at different times the extracts in conjunction with the specific objectives for education for sustainable development goals, particularly those that were confusing from the beginning. This activity was done using the same key words to check if the outcomes were still considered to be correct. Further, a qualified colleague was made to randomly check what had been done by the researcher. This check was to further scrutinise the document analysis process for an enhanced finding.

- iii. Another decision taken to ensure the dependability of the study's findings was to member-check (Creswell, 2015) the findings. This was done by sharing the findings of the study with some participants to cross-check if they related to it after themes had been developed from the interview scripts and field notes from observation. Feedback provided was used to refine the finding.
- iv. Data collection instruments, specifically the semi-structured interview and observation protocols designed by the researcher, were reviewed by a faculty member to ensure they were suitable to elicit the right data for answering the research questions but question one. These four decisions were taken to ensure the findings of the study remain true or will not substantially change even if it were to be conducted again.

3.10 Researcher's Role in the Study

Researchers' role in qualitative studies remains significant due to the interpretation of their findings (Creswell & Creswell, 2018). The researcher hence performed some significant roles from the commencement to the conclusion of the study. The researcher from the beginning decided on the research topic through engagements with the literature, which was then refined with the help of supervisors.

Also, interview questions, observation protocol, and the selection of participants for the study were at the discretion of the researcher.

At the stage of data collection, the researcher single-handedly conducted the document analysis. Again, the researcher carried out the interviewing of selected participants individually by asking questions, listening, taking notes, and recording. During classroom observations, field notes were taken by the researcher.

The data analysis for the findings of the study was also taken care of by the researcher. Thus, grouping of extracted quotes with their corresponding objectives into their respective domains (cognitive, socio-emotional, and behavioural). The researcher again did transcriptions, coding, and obtained themes reported in the study as well as their interpretation in the researcher's own understanding.

Although the researcher took on these roles, there were no attempts in any way made to intentionally influence the conclusions of the study. In that regard, the researcher was bracketing (Creswell & Criswell, 2018) and also exposed his reflexion to make the finding objective enough.

3.12 Positionality of the Researcher

The qualitative approach is cognisant of the critical role of the researcher in a particular study (Edmonds & Kennedy, 2017; Creswell, 2015). For this reason, it is important for individuals who undertake qualitative studies to highlight their self-reflexion (Denzin & Lincoln, 2018). The researcher of this study is a technical person who has a first degree in BSc. Construction Technology Education and teaches Building Construction and Technical Drawing at the senior high level. Prior to that, the researcher taught the then Basic Design and Technology curriculum in the basic school.

As at the time the study was conducted, the researcher was on an M.Phil. programme that helped in acquiring knowledge in Curriculum, Social Change and Sustainable Development, Twenty-first Century Pedagogies, and Differentiated Inclusive Strategies for Learning.

Given this background, coupled with the fact that the researcher works in the research area, there were deliberate efforts to prevent any occurrence that could influence wrongly the conclusions of the study. However, it is believed that the background influenced the choice of the research problem, site for the study, interpretations of the findings, and also drawing conclusions. Notwithstanding, the findings of the study are all true as found from the analysis of data collected.

3.11 Ethical Considerations

Apart from making sure that the findings of research work are trustworthy, considerations leading to the protection of participants are of utmost concern in qualitative studies (Hurst, 2023). As a result, the researcher followed strictly ethical considerations critical to the conduct of the study. Considerations that were known to protect participants and promote the credibility of the research were followed thoroughly. Such considerations were:

1. Seeking permission from the district director of education in the area where the research took place through an introductory letter from the Ag. Head of Department for Educational Foundations, UEW, together with the developed data collection instruments. The permission letter given was used to obtain access to the schools that participated in the study.
2. Securing informed consent (Denzin & Lincoln, 2018) from all the participants of the study. The consent form clearly communicates the purpose of the study, assurance of anonymity, and confidentiality to the participants. Finally, the

form stated clearly that participants could opt out of the study after any suspicion without any consequence.

3. Seeking permission from the immediate head of the school visited to gather data using an introductory letter provided by the district director of education.
4. Introducing myself to the learners in every class I sat in to observe and gather data.
5. After the whole interview and observation data were collected from the participants in the various schools, an official letter was written to the District Director of Education to inform him of the end of the data collection exercise. The letter was also used to thank the director for the permission to conduct the study in the district.

3.13 Limitations of The Study

The study was limited in three areas. First, it used a small sample size as demanded by the qualitative approach to research. This prevented the findings of the study from being generalised. However, the sample size (17) helped in a deeper exploration of the problem.

Second, data was collected in May and June. During those months, there were heavy rains. Ways leading to two ‘hinter circuits’ in the district were consequently rendered very deplorable and unmotorable. Hence the teachers plying their trade there were not captured, which may result in biased conclusions. Notwithstanding, other hinterlands were used to ensure that balanced and varied views were captured.

Third, at the time data collection was ongoing, the Basic Education Certificate Examination was scheduled about a month ahead. Teachers who took care of only form three classes were excused from the study as, at that time, mainly solving past questions was the order of the day in our part of the world. However, teachers for

Forms one and two classes were effectively used. All observations were thus done on the form one and form two lessons.

3.14 Summary of The Research Methodology

The chapter explained the methodological framework used for the study. The study used the qualitative case study design of the interpretivist paradigm and collected data through document analysis, interviews, and observation. The interview and observation were administered to seventeen (17) career technology teachers who were sampled through the purposive maximum variation technique. Data collected from the career technology curriculum was analysed through qualitative content analysis techniques. Transcripts were also coded and further categorised into themes. The findings are presented in tables and themes and the methods used for their verification were triangulation (Tracy, 2020), thick description (Creswell & Creswell, 2018), member checks (Creswell, 2015), and audit trails (Hurst, 2023). As a qualitative requirement, the researcher exposed the reflexion vividly and also ensured that ethical issues were followed throughout the study. The findings obtained from the analysis of data are presented in tables and themes as indicated earlier in the following chapter.

CHAPTER FOUR

FINDINGS AND DISCUSSION

4.0 Overview

This chapter is devoted to the presentation of the findings of the study, which explored the integration of education for sustainable development goals into the career technology curriculum by the career technology teachers in the Dangme enclave. The presentations are organised chronologically based on the research questions as follows:

1. To what extent is education for sustainable development objectives integrated into the official career technology curriculum used in Ghana's Junior High Schools?
2. How do career technology teachers in the Dangme enclave perceive the official career technology curriculum in line with education for sustainable development?
3. What strategies do career technology teachers in the Dangme enclave employ to teach the career technology curriculum towards education for sustainable development?
4. What challenges do career technology teachers in the Dangme enclave encounter in the implementation of the official career technology curriculum towards education for sustainable development?

4.1 Findings presentation for all the research questions

First, the extent of coverage of education for sustainable development objectives in the official career technology curriculum in their respective domains is explored in percentages. From the exploration of the curriculum, it was discovered

that the extent to which education for sustainable development objectives are covered in the curriculum is averagely 13.33%. That of the various domains: cognitive, socio-emotional, and behavioural are indicated in their respective tables below.

Table 4. 1: Cognitive Learning Objectives in Career Technology Curriculum

Goals & Objective Numbers	Objective statements	Quote(s) from the curriculum
2.1	The learner knows about hunger and malnutrition and their main physical and psychological effects on human life, and about specific vulnerable groups.	“Discuss reasons for eating food; E.g., To satisfy our hunger, build body, provide heat energy, protect body from diseases.”
3.1	The learner knows conceptions of health, hygiene and well-being and can critically reflect on them, including an understanding of the importance of gender in health and well-being.	1. “Explain what is meant by staying healthy.” 2. “Explain what is meant by Environmental Health.” 3. “Discuss ways of maintaining personal hygiene.” 4. “Explain what is meant by food hygiene.”
3.2	The learner knows facts and figures about the most severe communicable and noncommunicable diseases, and the most vulnerable groups and regions concerning illness, disease and premature death.	“Transmission of diseases such as cholera, diarrhoea, dysentery, hepatitis A, typhoid, polio, Novel Coronavirus (COVID-19) and exacerbates stunting”

- 3.3** The learner understands the socio-political-economic dimensions of health and wellbeing and knows about the effects of advertising and about strategies to promote health and well-being.
1. “Explain what is meant by staying healthy. E.g. Staying healthy: physical, mental, and social wellbeing, and as a resource for living a full life—exercise the body, have enough rest, eat a balanced diet, avoid drug abuse and negative peer pressure.” 2. “Explain what is meant by Environmental Health. E.g., It is a way of protecting quality of life through the prevention and treatment of disease that relates to the natural and built environment that may affect human health and fosters healthy and safe communities.” 3. “Identify preventive measures of poor environmental health. E.g. Avoid polluting water bodies, avoid littering, avoid defecating indiscriminately.”
- 4.5** The learner understands that education can help create a more sustainable, equitable and peaceful world.
- “Examine own biases and beliefs, as a male or female, about some vocations. E.g. - Women are not to offer courses such as Building Construction, Mechanical Engineering, Carpentry, Plumbing etc. - Men are not supposed to study courses such as Food and Nutrition, Sewing, Home Management, Hair Dressing etc.”
- 6.1** The learner understands water as a fundamental condition of life itself, the importance of water quality and quantity, and the causes, effects and consequences of water pollution and water scarcity.
1. “Identify the factors (constituents/pillars) of environmental health, in groups E.g., Disease control, clean water, sanitation and hygiene.” 2. “Identify and discuss the causes of environmental health and other sources and report in class. E.g., Air, water and soil pollutions, chemical exposures.” 3. “Deforestation Causal factors—mining, bush fires Effects—polluted water bodies, global warming.”

- 6.4** The learner understands the concept of “virtual water”.
1. “Paper is made from wood; a tree is felled, broken into chips, chips are boiled in water and chemicals added to form pulp; the pulp is pressed with rollers. The more the layers, the thicker the paper i.e. card” 2. “Water for emulsion.” 3. “Boiling where the food absorbs the water—rice- Boiling where the water forms part of the food— porridge, soup- Boiling where the water is thrown away—yam, cassava.”
- 6.5** The learner understands the concept of Integrated Water Resources Management (IWRM) and other strategies for ensuring the availability and sustainable management of water and sanitation, including flood and drought risk management.
1. “Discuss ways of preventing poor sanitation in school and .”
- 7.1** The learner knows about different energy resources – renewable and non-renewable –and their respective advantages and disadvantages including environmental impacts, health issues, usage, safety and energy security, and their share in the energy mix at the local, national and global level.
1. “Discuss what happens when clean energy is used. E.g., They are more efficient, give off less emission and are safer than the traditional cook stoves or three-stone-fires.” 2. “Search and present in class, the various improved cookstoves and fuels using ICT tools and other sources. E.g., Gyapa, holy cook, gas stoves, pellets, briquettes, Liquefied Petroleum Gas (LPG).” 3. “Explain what is meant by clean energy. E.g., It is energy produced through means that do not pollute the atmosphere.” 4. “Identify improved cookstoves and fuels.”
- 7.2** The learner knows what energy is primarily used for
- “Demonstrate the uses of the following stoves, in groups. E.g. • improved cookstoves and fuels •

	in different regions of the world.	traditional stoves.”
7.5	The learner knows about harmful impacts of unsustainable energy production, understands how renewable energy technologies can help to drive sustainable development and understands the need for new and innovative technologies and especially technology transfer in collaborations between countries.	1. “Explain what is meant by clean energy. E.g., It is energy produced through means that do not pollute the atmosphere.” 2. “Discuss what happens when clean energy is used. E.g., They are more efficient, give off less emission and are safer than the traditional cook stoves or three-stone-fires.” 3. “Brainstorm the benefits of improved cookstoves and fuels, in groups and present in class. E.g., They save money, protect the cook and people around against illness.” 4. In groups, plan and organize a campaign to educate the school and the community on the use and benefits of improved cookstoves.”
11.1	The learner understands basic physical, social and psychological human needs and is able to identify how these needs are currently addressed in their own physical urban, peri-urban and rural settlements.	1. “Identify needs, wants and lacks within the environment which if not addressed can lead to problems.” 2. “Discuss the challenges observed in the situations, in groups.” 3. “Analyse the problems and state the extent to which they affect people’s lives in the community.” 4. “Write a report on the problem situation and write a suitable design brief to indicate solution to the problem.”
11.2	The learner is able to evaluate and compare the sustainability of their and other settlements’ systems in meeting their needs particularly in the areas of food, energy, transport, water, safety, waste	1. “Examine the selected design to identify parts that need to be modified.” 2. “Redesign the selected solution to obtain the final design.”

treatment, inclusion and accessibility, education, integration of green spaces and disaster risk reduction.

13.3	The learner knows which human activities – on a global, national, local and individual level – contribute most to climate change.	“Identify the causal factors and discuss the effects and preventive measures of desertification and deforestation, in groups. E.g. Desertification Causal factors—deforestation, urbanisation Effects—loss of plant species, climate change Prevention—afforestation, ruralisation”
Extent of coverage of cognitive objectives		17.0 %

Note: From Table 4.1, it is revealed that objectives on goals 1, 5, 8, 9, 10, 12, 14, 15, 16, and 17 do not have any representation of their cognitive objectives in the entire curriculum. Goals 2, 4, and 13 on the other hand has only one each of their objectives present. The goals which have most of their objectives covered are 3, 6, 7, and 11 with a minimum of two. This is an indication that learners would not have the opportunity to learn anything cognitively about poverty; gender issues; decent work and economic growth; industry, innovation and infrastructure; inequality issues; consumption and production challenges; life on land, and life below water; justices and institutional issues and partnerships. The learners would however learn much about health and wellbeing; clean water and sanitation; clean and affordable energy; sustainable cities and communities and very little on hunger issues; quality education; and climate change challenges.

Table 4. 2: Socio-Emotional Learning Objectives in Career Technology

Curriculum

Goal & objective number	Objective statement	Quote(s) from the curriculum
1.10	The learner is able to reflect critically on their own role in maintaining global structures of inequality.	“Develop a plan and organise a community education on addressing the issues of using measuring tools that are faulty or tampered with, in groups”
2.8	The learner is able to create a vision for a world without hunger and malnutrition.	“Discuss reasons for eating food; E.g., To satisfy our hunger, build body, provide heat energy, protect body from diseases.”
2.10	The learner is able to feel empathy, responsibility and solidarity for and with people suffering from hunger and malnutrition.	“Discuss reasons for eating food; E.g., To satisfy our hunger, build body, provide heat energy, protect body from diseases.”
3.7	The learner is able to communicate about issues of health, including sexual and reproductive health, and well-being, especially to argue in favour of prevention strategies to promote health and well-being.	1. “Explain what is meant by staying healthy. E.g. Staying healthy: physical, mental, and social wellbeing, and as a resource for living a full life—exercise the body, have enough rest, eat a balanced diet, avoid drug abuse and negative peer pressure.” 2. “Identify preventive measures of poor environmental health. E.g. Avoid polluting water bodies, avoid littering, avoid defecating indiscriminately.”

3.8	The learner is able to encourage others to decide and act in favour of promoting health and well-being for all.	<ol style="list-style-type: none"> 1. “Research the consequences of poor environmental health, in groups and present for class discussions.” 2. “Design posters to create awareness on the need to maintain a safe working environment, and post them around the school.”
3.9	The learner is able to create a holistic understanding of a life of health and well-being and to clarify related values, beliefs and attitudes.	<ol style="list-style-type: none"> 1. “Staying healthy: physical, mental, and social wellbeing, and as a resource for living a full life— exercise the body, have enough rest, eat a balanced diet, avoid drug abuse and negative peer pressure.”
4.8	The learner is able to recognize the intrinsic value of education and to analyse and identify their own learning needs in their personal development.	“Examine your interests, skills and values in the light of the career opportunities. E.g. What are your top skills? What interests you the most?”
4.9	The learner is able to recognize the importance of their own skills for improving their life, in particular for employment and entrepreneurship.	<ol style="list-style-type: none"> 1. “Demonstrate the appropriate techniques in using joining and assembling materials and tools in: Sewing— (stitching- temporary stitches), Food production— (cooking methods - boiling and stewing), Wood products—nailing, bolting, screwing, gluing, Metal products/Plastic—soldering, using bolts and nuts, screwing, using adhesives, bolts and nuts, Building —bonding of bricks, blocks and stones. - Paper work—gluing. 2. “Prepare a dish each using baking and grilling methods of cooking. E.g. Baking—bread, cake, abollo Grilling—plantain, fish, chicken.” 3. “Discuss the characteristics that lead to successful

entrepreneurship E.g., Opportunity seeking, goal setting, risk taking, perseverance and persistence, self-confidence, commitment to work, hardworking, planning, information seeking, and problem-solving skills.”

- 6.6** The learner is able to participate in activities of improving water and sanitation management in local communities.
- “Identify preventive measures of poor environmental health. E.g.- Avoid polluting water bodies; Identify the causal factors and discuss the effects and preventive measures of desertification and deforestation, in groups. E.g.- Deforestation
 Causal factors—mining, bush fires
 Effects—polluted water bodies, global warming
 Prevention—alternative livelihood (agriculture), greening the environment
 - Desertification
 Causal factors—deforestation, urbanisation
 Effects—loss of plant species, climate change
 Prevention—afforestation, ruralisation.”
- 7.6** The learner is able to communicate the need for energy efficiency and sufficiency.
- “In groups, plan and organise a campaign to educate the school and the community on the use and benefits of improved cookstoves.”
- 7.7** The learner is able to assess and understand the need for affordable, reliable, sustainable and clean energy of other people/other countries or regions.
1. “Discuss what happens when clean energy is used. E.g., They are more efficient, give off less emission and are safer than the traditional cook stoves or three-stone-fires.” 2. “Watch pictures and videos on improved cookstoves and fuels and traditional cookstoves and fuels and make comparison of them.”

7.8	The learner is able to cooperate and collaborate with others to transfer and adapt energy technologies to different contexts and to share energy best practices of their communities.	“In groups, plan and organise a campaign to educate the school and the community on the use and benefits of improved cookstoves.”
7.10	The learner is able to develop a vision of a reliable, sustainable energy production, supply and usage in their country.	“Discuss what happens when clean energy is used. E.g., They are more efficient, give off less emission and are safer than the traditional cook stoves or three-stone-fires.”
15.6	The learner is able to argue against destructive environmental practices that cause biodiversity loss.	“Identify the causal factors and discuss the effects and preventive measures of desertification and deforestation, in groups. E.g. - Deforestation Causal factors—mining, bush fires Effects—polluted water bodies, global warming Prevention—alternative livelihood (agriculture), greening the environment - Desertification Causal factors—deforestation, urbanisation Effects—loss of plant species, climate change Prevention—afforestation, ruralisation 2. Group Project: Research the causal factors, effects and preventive measures of desertification and deforestation and develop a folder.”

Extent of coverage of socio-emotional objectives **17.0 %**

Note: Concerning socio-emotional objectives in the career technology curriculum as shown in Table 4.2, goals 5, 8, 9, 10, 11, 12, 13, 14, 16, and 17 objectives were entirely not represented in the curriculum. The objectives of goals 2,

3, 4, and 7 were represented with each of them having at least two of their objectives. Also, goals 1, 6, and 15 had only a single each of their objectives represented in the curriculum. These suggest, when the curriculum is implemented, socio-emotionally, the learners would gain nothing about gender issues; decent work and economic growth; industry, innovation and infrastructure; inequality issues; sustainable cities and communities; consumption and production challenges; climate change challenges; life on land; justices and institutional issues; and partnerships. Yet, learners would learn more about hunger issues; health, and wellbeing; quality education, as well as clean and affordable energy concerns and little about poverty; clean water and sanitation; and life below water.

Table 4. 3: Behavioural Learning Objectives in Career Technology Curriculum

Goal & objective number	Objective statement	Quote(s) from the curriculum
3.11	The learner is able to include health promoting behaviours in their daily routines.	1. “Staying healthy: physical, mental, and social wellbeing, and as a resource for living a full life—exercise the body, have enough rest, eat a balanced diet, avoid drug abuse and negative peer pressure.” 2. “Identify the factors (constituents/pillars) of environmental health, in groups E.g., Disease control, clean water, sanitation and hygiene.” 3. “Identify preventive measures of poor environmental health. E.g. Avoid polluting water bodies, avoid littering, avoid defecating indiscriminately.” 4. “In groups, discuss ways of maintaining personal hygiene. E.g. Wash the body often, Clean the teeth at least twice a day, Wash hands after visiting the toilet.”
3.12	The learner is able to plan, implement, evaluate and replicate strategies that promote health, including sexual and reproductive health, and well-being for themselves, their families and others.	1. “Research the causal factors, effects and preventive measures of desertification and deforestation and develop a folder.” 2. “Design posters to create awareness on the need to maintain a safe working environment, and post them around the school.” "Discuss the procedures for reporting accidents and unsafe practices in the laboratory/workshop/site"
3.13	The learner has the capacity to perceive when others need help and to seek help for	1. Research and write on materials and strategies (ways) used for improving personal hygiene and discuss, in groups. 2. In groups, discuss ways of maintaining personal

	themselves and others.	hygiene. E.g. Wash the body often, Clean the teeth at least twice a day, Wash hands after visiting the toilet.
3.14	The learner is able to publicly demand and support the development of policies promoting health and well-being.	3. Research into food hygiene practices, in groups and report in class for discussion.4. Research the consequences of poor environmental health, in groups and present for class discussions. 5. Observe the workshop environment to identify the health and safety needs of the work."
7.13	The learner is able to analyse the impact and long-term effects of big energy projects (e.g. constructing an off-shore wind park) and energy related policies on different stakeholder groups (including nature).	1. "Discuss what happens when clean energy is used. E.g., They are more efficient, give off less emission and are safer than the traditional cook stoves..." 2. "Brainstorm the benefits of improved cookstoves and fuels, in groups and present in class. E.g., They save money, protect the cook and people around against illness."

Extent of behavioural objectives	6.0 %
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Note: Form Table 4.3, it can be seen that only two goals on the behavioural objectives were represented in the curriculum at all levels. Goal 3 has four of its behavioural objectives while goal 7 has only one. The curriculum did not cover any behavioural objective on goals 1, 2, 4, 5, 6, 8, 9, 10, and 11. Other goals that were absent are 12, 13, 14, 15, 16, and 17. This indicates that behaviourally, more would be learnt on health, and wellbeing and very little about clean, and affordable energy. Apart from these two goals, nothing would be learnt behaviourally on poverty; hunger; education; gender equality; clean water, and sanitation; decent work and economic growth; industry, innovation and infrastructure; inequality; sustainable

cities and communities; consumption and production; climate action; life on land; land below water; peace, justice and strong institutions.

Research Question Two

The research question two explored how the official career technology curriculum is perceived by career technology teachers in the Dangme enclave and its alignment to education for sustainable development. From the analysis of the interview transcripts, it was found that the career technology is perceived in two fundamental themes: (1) the structure of the curriculum and (2) the focus of the curriculum. The details of these themes generated are presented below.

Theme 1: The Structure of the curriculum

This theme reveals how participants perceived the organisation of the curriculum, irrespective of their sex, qualification, and years of service. The organisation is about the arrangements of various strands, and the manner of which they are taught. The theme is further grouped into three sub-themes: integrated structure, iterative structure, and comprehensive structure.

Theme 1.1: Integrated structure

The integrated structure of the curriculum is about how the career technology curriculum includes various subjects previously study as stand-alone subjects. Participants indicated that unlike past curricula which had options in Technical, Vocation, or Visual Arts; the career technology curriculum integrates Technical Skills, Vocational Skills, Visual Arts, and Science areas in a coherence style. The learners are to learn all the aspects holistically without specialising in only one learning area specified earlier. For instance, when Madam Shine was asked about how she perceived the curriculum, she smiled and said:

...So, previously we had home economics class, and then pre-technical skills class. That is after you completed JHS 1, moving to JHS 2, you choose what you'll be able to do to dwell in it. But now, it is from Genesis to Revelation. Meaning, when you start, the whole class, the whole class continues till they complete. No option.

Similarly, when Sir Flowers was asked the same question, he put forward suddenly after the researcher posed the question, "...Oh, to me, I'll say it is a combination of both the Pre-Tech and then the uh Home Econs. of the previous BDT as the new syllabus now". Also, Madam Goodness responded to the same question when she looked up, laughed and said: "...Oh, career technology, it's an integrated uh subject and it is comprised of um, technical, catering, sewing and science related subjects."

The fact that participant teachers had used words like "it is a combination", and "it is a combination of" followed by a list of aspects or if you like learning areas suggest they viewed the curriculum in terms of its organisation or build up to as an integrated curriculum.

Theme 1.2: Iterative structure

Most of the participants perceived the career technology curriculum as one that is organised in an iterative style. They observed that, the strands and sub-strands in the official career technology curriculum document are repetitive throughout all the levels of learning at an increasing level of difficulty. This can be seen in Madam Roses' narration when she posited with a gesture of curling the right hand repeatedly:

...With the core curriculum [career technology], we have the Basic 7 to 9 which they use the same let me say topics. Whatever topics they have in form one, it runs through form two, and then form three; just that little things are added to it.

This explanation given by Madam Roses was succinctly said in a calm voice by Madam Smart as follows, "...So now you teach this small area in uh this term, another year, you are going to teach that small area, another year you're going to..." [*with voice diminishing and gesture made to show continuity*]

Given the statements of the participants and their gestures, it was crystal clear that the curriculum was perceived to have recurring experiences or topics at the various levels (Basic seven to nine). Having the topics recurring at all the levels made the curriculum an iterative one in terms of its organisation.

Theme 1.3: A comprehensive curriculum

Another interesting perspective that several participants showcased about the career technology curriculum is that, it entails more than the previous curriculum and is very comprehensive in its build-up. The participants recounted that, more topics has been added and are supposed to be treated into more detail. Although the participants had negative attitudes toward the comprehensiveness of the curriculum, they still perceived it as good. Like Madam Shine, laying back in her seat and with an attentive visage, said:

...but this curriculum, I think the previous BDT topics, some have been joined and renamed and old Vocational Skills topics, some are brought back into the curriculum. So, this one is heavier than the previous one. This curriculum is more-heavier than the previous one.

Another participant, Sir Blues with a worrying look posited, "...The structure of the programme de33 it is okay, but it seems like it's too loaded. The curriculum itself is too loaded. It's too loaded". Furthermore, Madam Smart also shared her view of the curriculum by saying this "...It is too what, the volume is too much. They have added so many things to the new curriculum, that previously, we were not doing it."

These participants description of the curriculum as being “heavier” and “too loaded” or “voluminous” suggest that a lot of experiences are brought together not only in terms of the learning areas but also the depth various learning experiences are supposed to be treated.

Theme 2: The Focus of the curriculum

Apart from the participants perceiving the official career technology curriculum in the sense of its organisation, all the participants involved in the study also perceived it from the viewpoint of its focus or its overall aim. The viewpoints held by the participants about the curriculum are: career focused curriculum, learner-centred curriculum, curriculum for the development of competencies, and practical-based curriculum.

Theme 2.1: Career Focused curriculum

This theme meant that the curriculum is developed to ensure learners are educated to acquire relevant skills for them to enter the job market without any limitation. All the participants perceived, the curriculum is developed to educate learners to acquire relevant knowledge and skills for them to be self-employed in the immediate future. These participants alluded that the name of the curriculum alone is in the sense of helping learners to gain from employment opportunities in the near future, even if they truncate their education at that level. In an emphatic voice, Sir Pope made his declaration, “...So not what you should achieve by the end of the lesson, but, for career technology, it is just projecting the child towards a career in the future.” Sir Ike gave a similar view from his remark, “Oh, I can say that the main aim is to guide the kids, so that they will fit into the job market, even after JHS”. Madam

Shezel further commented, "...and it prepares them for their future and career opportunities when they finish the school."

It appears from the statements of the participants quoted that, they agreed to the aim of career technology, as a curriculum that educates learners for the world of work irrespective of their qualification, sex, or race.

Theme 2.2: Learner Centred curriculum

All most all the participants thoughts about the curriculum were that, career technology was developed with the learner at the centre of everything. They described that the activities in the curriculum are meant to be done by the learners, with the teachers only serving as facilitators so that the learners take charge of their own learning. This idea of the curriculum was mostly championed by Sir Pope throughout his submissions. One of them was, "... But the teaching, like the way of teaching it, as I said, it ought to be placing the child at the centre, you only direct or guide..." Sir Blues after describing a lot about the curriculum, added "... And it is child centred; the child is going to do everything. It is child centred; the teacher, you are just the facilitator. You are guiding the child to do." A similar view was aired by Madam Roses, "...with this curriculum [career technology] it gives the room for students to explore."

Expressions like "ought to be placing the child at the centre" and "the child is going to do everything" from the participants quoted, meant that the curriculum aims to make learners take charge of their own learning. Teachers were just to serve as facilitators to support learners while they learn.

Theme 2.3: Curriculum for the development of competencies

The curriculum was perceived as a standards-based curriculum that requires that learners are educated in a manner that, they would be better able to develop competencies that would enable them to live their lives well in this twenty-first century era. Some of the participants narrated that how the learners could be helped to develop competences and attitudes to do better things for themselves was the focus of the curriculum, rather than just the attainment of the curriculum content. For example, Sir Ike saw the curriculum to be good, as he said looking up:

... The requisite skills that the child will acquire when he or she acquires those skills, can he use those skills to function well in society? Can those skills help him to be financially independent? Can those skills help him to function well among his peers? So, I think these are some of the things that I think it makes the curriculum good to me.

Still on how the curriculum was perceived to be focused on the twenty first century skills and competencies for better lifestyle, Madam Bless stated, “The curriculum has been designed in a way that the children will be able to think and then do things on their own...”

Paying attention to the statements made by the participants in the quotes above, a clear picture is portrayed about the career technology curriculum. The picture painted suggests not only was the curriculum propagated for the skills development alone but also for competency development. These competencies, such as “critical thinking” and “... function well among his peers” were those needed for this current century.

Theme 2.4: Practical-based curriculum

The last thing that was found on the theme, curriculum focus, was that the curriculum is oriented towards practical activities. The majority of the participants were of the perception that, the curriculum was developed to engage learners on hands-on activities to help them to learn several things at the same time. Those participants posited the practicality was to equip learners with skills for their future. Just as Sir White puts it in a loud voice, “As I said earlier the subject itself is practical-based” Also, Sir Flowers posited, “The curriculum now is all about application. This is practical base....”. Furthermore, Madam Shezel in her elated self, wanting to show a practical lesson she had done with her learners on pastries said, “So, it's a practical.... You see that the subject is full of practical work.”

On the contrary, it was surprising to find out that one of the participants perceived the whole curriculum change effort as a means of a means of making money by politicians. This is what Sir Just have to say when asked about how he perceived the official career technology curriculum. “...From the onset, I saw it as a means of making money.”

Notwithstanding that view however, the hands-on focus of the curriculum was clearly ascribed by the almost all the participants. They used the word “practical” in their description of the curriculum. This proved that the curriculum was to be taught without forfeiting practical lessons, making it practical-based indeed.

These perspectives shared by the participants indicate that, the perception about the curriculum is positive. This could go a long way to help proper implementation of the curriculum if these views are harnessed.

Research Question Three

This research question explored the pedagogies employed by career technology teachers in the Dangme enclave to implement the career technology curriculum towards education for sustainable development. From the analysis of the interview transcripts and observation fieldnotes, the recommended pedagogies for education for sustainable development that the participant teachers were found to be use for the curriculum implementation included:

1. Collaborative learning

The collaborative learning that some participants claimed to have been using was achieved through group work. Some of the participants said they assemble learners into groups to work together on a project and other activities. According to Sir Pope, he usually put the learners he teaches in groups for them to learn together as he narrated "... most often we put them [*learners*] in groups..." Madam Roses also said smiling, "...My teaching method is the groupings as I said. I always group them or sometimes uh, yeah. When I group them, we get a leader..." Again, Sir Kite from a relaxed mood indicated that, he used groupings for learners to discuss together as he said "...And sometimes I engage them in groups to discuss too..."

The running word "group" can be found to have occurred through all that the participants quoted had said. When learners are organised in groups for them to learn together, they are said to be learning collaboratively, a strategy to imbibe into learners, team spirit and good human relations.

2. Project-based learning

Project-based learning was another recommended education for sustainable development pedagogy that was used by some of the career technology teachers who participated in the study from the transcripts. With project-based learning, it suggests

that learners were engaged in the production of articles. Through the activity, the learners are made to learn so many things. Project-based learning was mostly used when teaching strands like design processes, as indicated by Sir Pope:

... Sometimes, we use clay or somethings to, even these cards, to make certain artifact or whatever it is and bring it to you. You look at it. So, some of these things [*pointing at some models*] go and use just eerh any material in your environment to design something and bring it.

According to Madam Roses, some strands demand that they use projects and gave example like ‘assembling and joining’. She further posited that the curriculum in itself gave more room for projects when she said “...Now with this one [*career technology*] is the project work that is, say, they are giving the children the chance to operate on their own”. Another female participant, Madam Shezel also said “...So, like I said, we do a lot of practical work”.

Indication that learners are made to produce artefacts from materials in their environment and the other two participants openly mentioning “practical work” as a means of making learners do some hands-on activities qualified the assertion that a project-based learning approach was used.

3. *Talk for learning*

Again, from the interviews conducted, it appeared all the participants use talk for learning in the teaching of the career technology curriculum. The transcripts indicated that, oral questioning and answering, discussions, presentations, and the think-pair-share were used frequently in the classroom by the participants. These strategies encouraged learners to talk in the learning process. For example, Sir Pope in a high stressed tone declared, “... I ask them probing questions, and they themselves will come up with the idea; then they will learn.” In like manner, Madam Smart also

said immediately after the question, "...I use discussion." Again, to Sir Ike, he uses talk for learning through presentations. With gestures he narrated, "...I give them some questions for each group to be working on. Then, when I finish, I let them come group by group to come do their presentations."

Talk for learning is an approach where learners are engaged to talk through varied means so that they can learn. "Discussion", "probing questions" and then "presentations." This give the impression that learners were invited through those means to talk for their learning.

4. Active learning

Active learning was also featured in the pedagogies aligning with education for sustainable development that were used by a few of the teachers who participated in the study. The participants mentioned that since the curriculum is learner-centred and with their belief that no learner is a tabula rasa, they make sure they engaged learners in various activities to make them learn on their own while they, the teacher, provide the necessary guidance. On the back of learners not as tabula rasas, Madam Roses alluded, "... So, I always engage them to do things on their own. I just help them or I just guide them to what they should do." Another female participant, Madam Shezel, described:

...So, the main lesson too, where there is an activity, sometimes we engage them to do the activity. For instance, like keeping the kitchen, how to arrange things in the kitchen. So sometimes, I think this place is you can see is not far. So, sometimes I normally allow them to bring some of the equipment. Okay? And then ask them to come and arrange it assuming this is the kitchen. Arrange it in a certain way.

Again, Sir White described how he taught some lessons using active learning. He remarked, "... I just give them the situation and ask them to write the design brief,

what they will do to solve the problem, then the learners will be coming up with ideas that they will use to solve the problem.”

From the quotes of participants produced above, meaning can be made that learners are made to focus their attention on learning through varied experiences provided. Learners made to focus their attention on an activity through which they are able to learn for themselves without being spoon-fed is active learning. Writing ‘briefs from situations’ and ‘arranging kitchen items’ are all means to make learners take charge of their own learning.

5. *Role play*

Role play is yet another acceptable approach that a margin of the participants mentioned that they used in the implementation of the career technology curriculum. They indicated that playful activities were used for certain sub-strands to help the learners to learn. From Madam Smart, after she interjected after answering the question on strategies used to implement the curriculum, “...Something like role play, depending on what I am teaching.” Another participant, Sir White put forward that “I am using what you call a roleplay. Make others come and then exhibit their talent in the particular topic, what they understood about what is introduced.”

These participants were explicit on this. They said they used “role play” which was about making learners to perform a particular role or activity. These roles performed by learners help them learn certain concepts on their own with some guidance from the teacher.

6. Information and Communication Technology (ICT) integration

Another interesting twenty first century approach to teaching career technology for education for sustainable development as indicated by some of the participants was the use of ICT in the learning and teaching process. These ICT tools they said were used for research and also to show certain experiences far away for learning. Sir Just relaxed in his seat professed, "... but when we can't find anything, usually I use the phone a lot. Yes, if we can't find it around [*that is those experiences which cannot be found in the immediate environment*], I google, get the pictures, we take it around and they watch." Sir Ike provided a similar narrative, "If it is anything that is, that they have not seen before, since I'm using a laptop, I open it to [*them to*] see that, this is what I'm referring to."

Laptop and mobile phone were mentioned. The participants said experiences that were not readily available or unique were shown to learners through the use of the laptop or mobile phones in the classroom. These tools were used to show videos, pictures, or other relevant experiences to facilitate learning. The incorporation of ICT into classroom activities is appreciated to promote sustainable development.

Table 4.4: Pedagogic Approaches Participants Used when Observed in their Respective Classrooms

Teachers' pseudonym	Sub-strand treated	Pedagogies used	ICT Integration
Sir Pope	Adhesive	Talk for learning, Lecture	Unused
Mad. Roses	Food Preservation	Talk for learning, Collaborative learning, Lecture, Active learning	Unused
Sir White	The Design Process	Talk for learning, Lecture, Active learning	Unused
Sir Blues	Oblique drawing	Talk for learning, Active learning, Demonstration	Unused
Sir Roy	Oblique drawing	Lecture, Demonstration	Unused
Sir Kite	Structures	Talk for learning, Active learning, Lecture, Demonstration	Unused
Sir Ike	Crocheting	Lecture, Talk for learning, Demonstration	Used
Sir Just	Plane figures	Talk for learning, Collaborative learning, Lecture, Active learning	Unused
*Mad. Goodness	x	x	x
*Mad. Cante	x	x	x
Mad. Shezel	Table setting	Talk for learning, Role play, Lecture, Demonstration	Unused
Mad. Smart	Orthographic projection	Lecture, Demonstration	Unused
Mad. Bless	Sewing workshop cutting tools	Talk for learning, Lecture	Unused
Sir Roni	Plane figures	Talk for learning, Lecture, Active learning	Unused
Mad. Shine	Seams	Lecture, Collaborative learning, project-based learning	Unused
Sir Flowers	Isometric drawing	Lecture, Demonstration, Active learning	Unused
Sir Cross	Career pathways & opportunities	Talk for learning	Unused

Source: Researcher's observation fieldnotes (2024).

*These teachers did not offer themselves for the observation section of the study due to reasons including the organisation of mock examination in the schools.

Note: It can be observed from Table 4.4 that the majority of pedagogies used by the teachers were talk for learning and lecture. Also, only one teacher was found to

use ICT in the learning process. Other important pedagogies used are collaborative, projective-based, active learning. These confirm finding on implementation strategies used for career technology implementation from the interview transcripts.

Research Question Four

The question focused on the challenges that career technology teachers encounter in implementing the career technology curriculum towards education for sustainable development. From the interview transcriptions, the varied participants were found to have challenges in the following themes in the course of implementing the career technology curriculum:

1. The teachers' fixation on examinations

Overfocusing on the end of terms examinations or the Basic Education Certificate Examination (BECE) by participants was one of the hindrances to the implementation of career technology in line with education for sustainable development. From the transcripts, some of the participants made clear their concerns as to how they were worried and confused about how the curriculum could be effectively implemented. This was mainly because they lacked an idea of the format examinations were going to take. They were thus trying to implement the curriculum according to their expectations of the format of examinations without paying attention to competencies development as demanded. Rattling through his description of the curriculum as practical-based, Sir White declared "... practical-based but if you take the practical aspect into consideration, that wouldn't be what will be examined at the end of the day. When you look at the examination trend, it talks more about theory." Madam Shezel interjected her examination concern after complaining about the lack of textbook, "...And then when you look at so far, the terminal exam that they wrote,

you see that some questions, you don't know where they brought them from. They are not... some of them are not in the textbook.” Another concern about examination came from Sir Blues:

So, we are just using the form threes as an experimental group. When we started, we said oh this is how is going to be, you know. First, we are not having, we have the curriculum, but when the textbook came, we are seeing some things over there. When we bought the questions and we went through, we saw somethings. It meant that no, we had to structure it this way.

The three quotations made describe the participants as those who tried their best to teach the learners in line with an examination format. The concerns on the lack of a clear format and variations in examination format from what they expected meant if they had the opportunity of knowing the format of examinations, they would have implemented it in that fashion. This could threat the curriculum aim of educating learners for sustainable development, which is not tied down to meeting objectives but for competencies.

2. The non-availability of money for practical activities

Some participants believed practical lessons in the curriculum could be taught if money was available. Their claim was that money was required to purchase materials, tools, or ingredients for the various practical activities needed to be done. Yet the policy that frowns on the collection of money from learners, and the inability to raise money from other sources made it difficult to implement practical lessons. From a disturbed visage, Madam Cante answered when she was asked about the challenges she faced. She claimed, “...Like the practical aspects, because, some of the topics are more or less like practicals. But the issue here is also that um, financially, we're not getting money to do more practicals.” In a similar tangent, Sir Just also lamented, “...And then we are supposed to do uh practical, this Friday... and we need

some materials, but these students, you tell them to contribute something small to buy the materials, it becomes a problem.” Madam Roses also complained about how collecting money could get the headteacher into trouble when she asserted, “...So, if it continues like that, today you are doing practicals; tomorrow, you are doing this, it brings problems to the head not to the teacher but to the head.”

It is clear from the quotes that the participants are willing to implement practical lessons, but for the lack of funds. And since they do not want to get themselves or the headteacher into trouble, they would rather forgo it. This turns to prevent the effective implementation of the career technology curriculum aligned with education for sustainable development.

3. Limited teacher proficiency for all strands in the curriculum

Teacher proficiency is deemed critical for every curriculum to be meaningfully implemented. However, the majority of the participants who solely handles the curriculum decried about how they were not able to fully teach all the things in it. They said, now apart from their area of specialisation, it is demanded of them to also teach other aspect they are not proficient in. From Madam Shezel, showing signs of worry declared, “...But when it comes to lesson delivery, sometimes, if I don't have experience in those aspects, it means, like I said, I'll be lacking, or the children will be lacking.” In a similar sense, the surprised Sir Kite said, “.... and also, when you are not fortunate to have people from these three aspects to handle the course, you realize that you are wasting the children’s time.” Again, Sir Flowers sincerely declared, “Okay, I'm facing a lot of difficulties, because, uh, I have no idea about career technology now, but because I taught BDT before it’s assumed like it is the same thing.”

These succinct proclamations by the quoted participants made it clear how their limited knowledge with a strand or two in career technology hindered them in the implementation of the curriculum. It is then more likely that, what is known would be taught and what is unknown would be left out, or ineffectively taught. This can affect the attainment of competencies for sustainable development.

4. Unconducive classroom conditions

Classroom situations including furniture, number of learners in the classroom, and ambient temperature were concerns enumerated by a few of the participants to be challenging the effective implementation of the curriculum. These factors they said made the room uncomfortable for learning. Turning himself on his seat with his palms opened, Sir Pope indicated, “When you go to some schools, the modern schools, they sit on round tables. But here, you put them in a group, somebody's back is facing you.” Sir Kite pointing at the school block with his left hand spoke with a loud voice, “... and like I said, we are not having a standard classroom facility. The classroom block is not standard not to talk about modern one.” Sir Roy, who practiced in a school with nice building also mentioned, “And more so, this school too, we don't have the desks, that is another problem.”

These evidences meant the teachers are discouraged about the context of the curriculum implementation. This discouragement can prevent them from giving out their best and/ or utilising the right pedagogies. The phenomenon may lead to the failure of the curriculum's intention of educating learners for sustainable development.

5. Non availability of standardised Teaching, and Learning Resources

From the curriculum point of view, all the participants complained desperately about the lack of approved textbook and other resources for use to teach the learners. They posited that books available on the market were not consistent with the demands of the curriculum. This made it difficult for them in the implementation. They acknowledged that they were asked to use the internet to search for information for lessons, yet some of the information they do get from the internet were some of the times out of the Ghanaian context and that the provision of relevant and appropriate materials for learning purpose would be good for them. When asked the challenges she faced implementing the curriculum. Madam Smart suddenly pause, and breathed before she spoke; “Hmmm! One, the challenge, we don’t have textbook. And then the textbooks are all different...” When the same question was asked, Sir Cross quickly responded, “...teaching materials are not available. That's the major problem now. We don't have teaching materials. Let me talk about the textbooks. They are not in the system.” Madam Shine also replied to the same question with some reluctance as if to say I am tire of you people, “... Textbooks to teach the subject are not there. Textbook that matched with the curriculum are not there.”

Looking through the quoted statements, it is obvious the participant really had issue with the lack of a standardised textbook to help them do the implementation smoothly. The nonexistence of such was certainly why claims like “the major problem now”, and “the challenge”, and “that matched with the curriculum are not there” as indicated from the participants statements made.

6. The non availability of facilities for practical works

Another challenge that was found from the interview transcripts pertained to facilities for practical works. Facilities was referred to as the environment, tools, equipment,

and materials that are necessary for hands-on learning. The majority of the participants were not happy as to how a curriculum focused on practical lesson did not come with the facilities to help in its implementation. Madam Shezel pointing to her school's makeshift old corrugated aluminium sheet walled classroom and mentioned:

...You know as I'm saying, you need to have equipment but look at the structure. If we even have the equipment, where are we going to keep them? The office is small, there's no place to keep them so, we are managing. Yeah!

According to Sir Kite, he was not doing anything entirely different for the lack of relevant facilities. "...the methodology has not been improved because of lack of the facilities, and the needed resources to improve the ways of teaching.... and also, resources for practical lesson are not there." With a sweating face in the school computer laboratory, Madam Roses recounted the unconducive state of her classrooms to support practical work, especially on cooking, as she lamented, "We don't even have a place. So, if you will cook then it should be their classrooms, and here too, our classrooms are already oven for you to add another fire."

These condition as indicated by the participants quoted meant that, hand-on learning activities could be boycotted due to the lack of materials, tools, equipment and even conducive place for such activities. When such activities are boycotted, the aims of the curriculum would not be met, making the case of the lack of facilities for practical a true challenge to the implementation of the curriculum towards sustainable development.

Notwithstanding these concerns by the participant teachers, more than half of them, averaging 70.6%, accepted the curriculum was relevant for the current crop of learners. These participants said so because, to them, learners could benefit from its wide range of experiences for their career in the near future. Narrating how she had benefited from the curriculum, Madam Shine concluded, "... career technology is

good. It opens your mind." Similarly, Madam Roses also explained how curriculum such as career technology may perhaps help produce all-round learners "... So, with the career technology for me, I think it is a good course." In a delightful mood, Sir Cross reported:

...it is good that it's been introduced into the system. Because I noticed, it is helping the student, even myself as a teacher. It helped me. Because I remember recently, I did certain things myself in the house. So, for me, my view and the perspective of it is that it's very good.

These descriptions of the career technology by the participant were a clear indication that, among them, the curriculum was not detested.

4.2 Summary of the findings

The chapter presented the findings arrived at to answer the research questions in tables and themes. From the content curriculum analysis, interview transcripts, and observation fieldnotes, it was found that the career technology curriculum to some extent covered education for sustainable development goals. The behavioural, cognitive, and socioemotional domains had six percent, seventeen percent, and seventeen percent of coverage respectively, averaging 13.33% in all.

It was again found through the interview transcript that the participants perceived the career technology in terms of its buildup. They said it was built up to combine more than two learning areas as well as the repetition of the various strands running through all the levels at an increasing level of difficulty. Scope was also included with how they perceived the curriculum as in the depth and breadth of coverage. Lastly, the participants viewed the curriculum relating to its aim as career focused, practical focused, twenty-first century focused, and centred on the learners.

Moreover, for research question three, pedagogies used to implement the career technology curriculum consistent with education for sustainable development were found from both interview transcripts and observation fieldnotes, to be active learning, collaborative learning, project-based learning, role play, talk for learning, and ICT integration.

Challenges that were found to be affecting the smooth implementation of the career technology curriculum were dominated by the participant teachers' fixation on examinations and classroom settings. The non-availability of money for practicals, non-availability of standard teaching and learning materials, non-availability of facilities, and proficiency of the teachers were also found to hamper career technology implementation in the research area. These findings, having answered the various research questions, are thoroughly discussed in the next chapter.

4.3 Discussion

The discussion is presented to address the purpose of the study, which is to explore education for sustainable development goals integration in the career technology curriculum by career technology teachers in the Dangme enclave. The discussion is systematically done based on the research questions framed for the study, having in mind the underpinning theory: the theory of planned behaviour (Ajzen, 1985) and insights from reviewed related literature in the chapter two of the document.

4.3.1 Research Question One: *To what extent is education for sustainable development objectives integrated into the official career technology curriculum used in Ghana's Junior High Schools?*

The content analysis conducted revealed that the career technology curriculum integrates education for sustainable development objectives to some extent at approximately 13.33%. This finding corroborates with the finding of Ofori-Birikorang et al. (2020) which discovered that Ghana's Kindergarten and primary school curricula have some coverage of education for sustainable development goals. It also confirms the assertion of the Ministry of Education (2018a) that education for sustainable development has been adopted into the education systems in Ghana. However limited the coverage may appear, the curriculum's potential relevance to helping adapt learners' attitudes for twenty-first century behaviour towards sustainable development cannot be downplayed. This is so because, the literature has made it clear that education for sustainable development organises learning towards sustainable development (Kioupi & Voulvoulis, 2022). Hence the little if properly implemented can go a long way to help ensure sustainable development. Meanwhile, the little coverage particularly, the behavioural domain (6%) leaves much room to worry about as that can impede the exhibition of practical behaviour consistent with sustainable development. On the contrary, the increased coverage for cognitive and socioemotional domains at 17.0% each, if harnessed thoroughly could help achieve sustainability through behaviour adaptation as attitude, which is informed by an individual's cognitive and emotional functioning, initiates behaviour (Ajzen, 1985).

The analysis also revealed that there is no mention of goals five, eight, nine, ten, twelve, fourteen, sixteen, and seventeen in any of the domains. The absence of goals five, ten, sixteen, and seventeen however, is not too much of a surprise, given

the overall intent of career technology as an education provided to enhance the creativity, innovation, and skill set of learners so that they can be viable for job opportunities (NaCCA, 2020). With goal five, it can be argued that the curriculum as a whole has catered for it in a way following the provision made to permit both girls and boys to acquire knowledge and skills from all the aspects. The blatant non-coverage of these can be adduced to the fact that, the curriculum is TVET related, and has the sole aim to provide learners with knowledge and skills required for the economic growth of the country (Ansah & Ernest, 2013). This meant that the absence of those goals in the career technology curriculum is because of its centrality on hard skills acquisition over soft or social skills. Surprisingly, however, is the absence of goals eight, nine, twelve, and fourteen. According to Akyeampong (2005), TVET at the basic level, in extension, career technology, is about career exposure, career exploration, career choices, and also to make people have the required skills needed for gainful employment. The obvious absence of goal eight leaves much to be desired because, for learners to make decision concerning their career, they certainly needed to know about decent work and economic growth having in mind innovations, and technology available as well as the environment. Knowledge of responsible consumption and production can also play a critical role. It must be acknowledged, however, that the intent of career technology has some implicit niche for goals eight—decent work and economic growth.

The study again found that education for sustainable development goals one, two, three, four, six, seven, eleven, thirteen, and fifteen (thus 9 out of 17) has some objectives explicitly and/or implicitly represented in the career technology curriculum. These goals run across either social, economic, or environmental issues. This discovery is enough evidence to argue that the curriculum is created for

sustainable development for the reason that, Glavič (2020) has described education for sustainable development as a holistic education that includes social, environmental, and economic factors towards achieving sustainable development. Having some objectives of the nine goals listed above integrated into the curriculum is a step in the right direction for Ghana's attainment of the sustainable development dream. This is so because, following González (2021) most teachers who are aware of education for sustainable development consider it as an extracurricular activity rather than a formal curriculum activity. Hence having objectives of education for sustainable development goals in career technology could facilitate the implementation of education for sustainable development goals and career technology experiences seamlessly without any temptation of avoiding any. According to UNESCO's (2017) acknowledgement of education for sustainable development as a precursor to the promotion of sustainable development makes it probable to reason that, career technology is suitable for educating learners towards sustainable development since it has education for sustainable development goal in it. And the embedment of different subjects into one whole makes the learning for sustainable development achievable as it will help learners to gain 21st century competencies (Oluwagbohunmi & Alonge, 2023).

4.3.2 Research Question Two: *How do career technology teachers in the Dangme enclave perceive the official career technology curriculum in line with education for sustainable development?*

This question was answered through interview transcripts of the seventeen (17) teachers who participated in the study. Generally, the teachers' perception of the curriculum was positive although, only one of them, Sir Ike, plainly used the words "sustainable development" in the submission. Apart from that, all other participants

perceived the career technology curriculum in a peripheral outlook without mentioning sustainable development, although they were told that was central to the study. One of the findings on the participants perspective of the curriculum was the view that the curriculum is integrated, comprising of areas like technical skills (e.g. carpentry, masonry, metalwork); vocational skills (e.g., catering, sewing); creative art; and even science. Their posture was that the areas had been mixed up or embedded into each other. The curriculum was thus going to empower the learners to be able to perform in any area of vocation, and they are better able to appreciate where their interests are and pursue that course. The learners, irrespective of their sex, pursuing this curriculum all together, consequently, turn to remove the conventional stereotyping of technical and vocational skills subjects as for only males and females, respectively. The most important thing is earning a living irrespective of what males or females do, and this is the essence of career technology; an education that enables people to earn meaningful living after exiting high school (Tague, 2023, Blackwell, 2023). NaCCA has intended career technology to provide experiences that develop learners to be creative, innovative, and skilled for the twenty-first century world of work (NaCCA, 2020). This is clearly an indication that career technology is a subject in line with education for sustainable development, due to its responsive to gender equality, reducing inequality, and no poverty of the sustainable development goals.

Following Onyilo et al. (2019), the best means to succeed with sustainable development goals is to embed sustainability concepts into educational systems. From this background, it can be said that having a curriculum like career technology that embeds not less than three learning areas, together with education for sustainable development as a single curriculum makes it suitable to educate learners towards sustainable development. This is so because, when education for sustainable

development is integrated into existing subjects, then there is the promotion of holistic education (UNESCO, 2019). This could mean that the career technology curriculum is viable to promote sustainable development in the sense that holistic and comprehensive learning of relevant knowledge, skills, values, attitudes, and competencies helps to correct issues of social concern (Addai-Mununkum, 2020). The scope of the curriculum, as the finding exposed, being deep and broad will help provide such holistic education for competency development, a requirement for sustainable development.

The participants also revealed that the strands and sub-strands are arranged iteratively and comprehensive. A few of the participants frowned on the iteration because, to them, it was “kind of confusing, and the learners are not happy with it.” The dislike may be due to the inadequacy of capabilities on the part of those teachers to implement the curriculum. This supports the assertion of Wilhelm et al. (2019) that successful curriculum implementation is dependent on the competences of implementers. Notwithstanding, the iterative style in which the curriculum is organised will help to consolidate learning experiences to make the learning of career technology more meaningful to engender deeper understanding as Drake and Reid (2018) have mentioned, learning from varied situations promotes the teaching of twenty-first century competencies. Therefore, by the time learners have finished learning the career technology, they would have learnt what they were supposed to in almost all situations, and repetitions of the learning experiences would have helped them gain in-depth understanding and application of ideas. This is due to the fact that, in-depth learning helps learners to gain relevant knowledge, skills, values, attitudes, and competencies, which are requirements for amending societal problems (Addai-Mununkum, 2020).

The finding also showed that participants regarded the career technology curriculum as career-orientated, learner-centred, practical-based, and responsive to twenty-first century needs. These descriptions provided by participants are consistent with education for sustainable development and key to it as UNESCO (2017) makes clear that education for sustainable development is not limited to curriculum content but also the employment of pedagogies that create conducive environments for a learner-centred education. Also, Ali and Rahman (2024) have identified poverty as the core cause for environmental degradation. In addition, Polasky et al. (2019) established that achieving the goals of sustainable development is only possible with economic growth. In furthering, Andić and Mažar (2023) have said implementing education for sustainable development is better done with pedagogies that are practical-based. Lastly, Concina and Frate (2023) posited that for education to achieve the aim of sustainable development goals, there was a need for it to give people information about sustainable development. This expanded literature framework demonstrates that, the participants perceptions of the curriculum make it consistent with education for sustainable development. The views of the participants meant that the curriculum is about making learners study on their own by using activity-based pedagogies to make them worthwhile for the job market. Also, they will be responsible to the demands of the twenty-first century. These positive perspectives put forward by the teachers shows that, if they are supported, they can contribute to the attainment of sustainable development through education.

4.3.3 Research Question Three: *What strategies do career technology teachers in the Dangme enclave employ to teach the career technology curriculum towards education for sustainable development?*

Having analysed both the interview transcripts and observation fieldnotes of the participants, it was found that the teachers used some integrated pedagogies including collaborative learning, talk for learning, project-based learning, role play, and the use of ICT tools. The result aligns with Addai-Mununkum and Setordzi's (2023) finding that some teachers in Ghana used twenty-first century pedagogies to implement the standards-based curriculum. Education for sustainable development has it that learners be educated to have competence in systems thinking, collaborative skills, anticipatory skills, etc. (UNESCO, 2017). In line with that, Lozano et al. (2017) found that integrated pedagogies educate learners on systems thinking, collaborative, critical thinking, and communication competencies. This stance was supported by Yepikhina et al. (2023) that the objective of pedagogies of integration was to facilitate the learning of the interconnection of knowledge, skills, attitudes, materials, and institutions. This meant that the participants are in tune with the implementation of education for sustainable development by educating the mind and the heart.

However, observations of participants in their respective classrooms showed that they were really not sure what they were doing with those pedagogies. For instance, the talk for learning approach used by the participants was without any control and mostly used as an assessment tool rather than to elicit learning. Similarly, learners were grouped for collaborative learning. Yet, the learners did not work together on the same activities but worked individually without sharing their results with their group members or partners. The limitation of the use and essence of integrated pedagogies implies that achieving the education for sustainable

development goals could be difficult because the lack of pedagogical knowledge in education for sustainable development on the part of teachers poses a threat to its implementation (Sadovets, 2023). It was therefore important to educate and train teachers in the research area to improve their practices for better implementation, which will culminate in achieving education for sustainable development. Glatthorn et al. (2018) indicated that successful curriculum implementation is achieved through the understanding of the curriculum and the help that is received for its implementation. The assistance given could be in the form of continuous education and motivation so that the teachers would implement the curriculum as it ought to be (Addai-Mununkum, 2020). The reason being that, the assistance (continuous education and motivation) can improve the self-efficacy of the teachers so that they become very confident and efficient to implement the curriculum, as teachers' self-efficacy is found to have a direct impact on curriculum implementation (Saloviita & Almulla, 2024).

It was again revealed that the participants' use of ICT in lessons observed was woefully inadequate. Anđić and Mažar (2023) have characterised suitable education for sustainable pedagogies as those which integrate ICT. This indicates that what the participants did leaves much to be desired, given that they, but one, did not make any use of the ICT tool in the classroom. According to Leal Filho et al. (2017), the lack of use of technological gadgets negatively affects the implementation of education for sustainable development. In this era, without ICT, learning cannot be effective because of the shift to active and collaborative learning, independent learning, and practical-based learning (Ugwu & Nnaekwe, 2019). ICT use in the classroom should therefore be encouraged by providing necessary supports such as electricity, computers, and training for teachers who need it.

4.3.4 Research Question Four: *What challenges do career technology teachers in the Dangme enclave encounter in the implementation of the official career technology curriculum towards education for sustainable development?*

Having to implement a curriculum without facing any implementation hindrances may be related to a fictitious tale because of the many factors that play together (Addai-Mununkum, 2020). The challenges revealed through the interview transcripts and support from observation fieldnotes are multifaceted, i.e. fixation on examination, non-availability of facilities for practical learning, non-availability of standard textbooks, limited teacher proficiency, etc. These findings align with earlier literature, like Rampasso et al. (2019) finding that lessons short of practical activities cannot be used to achieve sustainable development; Fasinro et al. (2024) and Istakri et al. (2024) assertion that lack of facilities makes education for sustainable development unattainable. Some of the participants portrayed that the most important thing was to teach so that the learners pass their examinations, leading to emphasis on content delivery over competencies development. Whereas that equally is important, those participants may have harboured that anxiety for examinations because they were not aware of the need for education for sustainable development. According to Leal Filho et al. (2017), teachers' unawareness of education for sustainable development often led to the failure of its implementation. This unawareness may have been the reason those participants were interested in examinations because prior curricula had been about examinations and not competency development. The participants complained the learners were not learning and that even people from the education directorate had been going around to advise and motivate them to learn for the examination (BECE). Happenings of this sort may have influenced those teachers to be so concerned about examinations rather than sustainable development as a person's social circle is found

to largely affects how she/ he behaves (Wals et al., 2008). The mindset if not taken care of can ruin the intent of the curriculum. To take care of this hindrance to implementing the curriculum successfully for sustainable development, there should be clear communications about it (Addai-Mununkum, 2020). The need to therefore indicate explicitly the words education for sustainable development in the official curriculum and training programmes to inform the implementors on its relevance is necessary. This will help to moderate examination concerns and factor in competencies for sustainable development.

The participants also revealed, the conditions in their classrooms does challenge the curriculum implementation for sustainable development. The conditions had to do with the dilapidated classroom block, large class size, and limited furniture. These conditions certainly can have a toll on sustainable development because, it will be difficult to effectively facilitate lessons in a space like that. The successful implementation of a curriculum is only feasible when relevant resources are available to support the learning process (Addai-Munumkum, 2020). Poor classroom infrastructure may demotivate teachers and learners alike to use the school curriculum effectively, which will end up educating them on sustainable development. In order to ensure effective implementation of education for sustainable development, Nilufar (2022) emphasised the need to ensure a total overhaul of the educational system. The overhaul should not end up in policies but also classroom facilities like desks should be looked at. This was required so that the teachers could find every reason to do what was expected of them.

The literature has it that, communication challenges, lack of proper role models, the lack of linkage between theory and reality (Hadebe, 2023), and the lack of clearly stated objectives for practical lessons (Hu et al., 2023) limit the benefits of

practical learning. However, this study also revealed that the non-availability of money is another factor that can impact practical activities. The lack of practical activities affects the successful implementation of education for sustainable development. This suggests that learners' understanding of sustainable issues would not be deepened (Hu et al.).

The finding of the study again suggests that the lack of facilities for practical work derailed the effective practice of the curriculum for sustainable development. The lack of laboratory equipment, tools, as well as a conducive place for practical work were barriers to the implementation of education for sustainable development through the career technology curriculum. This is confirmed by Fasinro et al. (2024) and Istakri et al. (2024) that, inadequate learning facilities affects the implementation of education for sustainable development. The lack of relevant facilities in the schools may be because of the huge burden it may pose on the government or immediate leadership. As Leal Filho et al. (2021) have indicated, the poverty level of individuals and countries largely prevents the processes of implementing Sustainable Development Goal 4, of which education for sustainable development is a target.

Limited teacher proficiency was found to be another challenging reason limiting the implementation of the career technology curriculum in line with education for sustainable development. The participant teachers' concerns were that the curriculum was too bulky and included areas that were alien to them. The alienation appeared to challenge them in the successful implementation of the curriculum. This confirms the statement of Pasang and Najib (2022) that subject areas that teachers handle influence them in implementing education for sustainable development. Also, the result shows that only a single participant had mentioned sustainable development openly in the submission of how the career technology curriculum is viewed. The remaining sixteen

did not mention sustainable development. This was an indication that those participants had no clue about it and that would negatively impact them in its implementation. This clearly falls in line with the literature, which says the lack of information and knowledge about education for sustainable development and pedagogical knowledge in education for sustainable development on the part of teachers poses a threat to its implementation (Sadovets, 2023).

Finally, the major challenge faced revealed by all the participant is the non-availability of standardised textbooks consistent with the curriculum. Textbooks used by the teachers who participated in the study varied. The inconsistency is found to be a challenge to education for sustainable development as they can lead the teachers astray. Doss and Poursharif (2023) have explained that course contents that do not readily blend well with education for sustainable development experiences make it difficult to implement the goal. It is however surprising that the teachers complained about textbooks having been admonished on many occasions to research on their own for lessons. This implies that until standardised textbooks and other learning materials consistent with the curriculum are provided, the implementation of education for sustainable development is going to be a mirage. Following Glatthorn et al. (2018) assertion that, successful curriculum implementation is achieved through the understanding of the curriculum and the help that is received for its implementation, providing these will make the curriculum implementation process successful.

4.4 Summary of the Discussion

The discussion highlights some coverage of education for sustainable development, predominantly on cognitive and socioeconomic domains. This implied that the career technology curriculum was relevant to changing learners' attitudes and consequently their behaviour towards sustainable development, though it has little

behavioural coverage. The perspectives of the participants were found to be positive and consistent with education for sustainable development, though only one of them had made mention of sustainable development. This indicates that the participants had a positive understanding of the curriculum, which can be leveraged for an excellent implementation of the curriculum for sustainable development.

The use of the right pedagogies to implement education for sustainable development was not effectively done from the results. The participants were found to have used some integrated or twenty-first century pedagogies, yet they were found to be lacking the skills and understanding for their use. This could cause the aim of the curriculum designed for sustainable development not to be met.

The implementation of the education for sustainable development goal through the career technology curriculum to change behaviour towards sustainable development is met with challenges, including fixation on examinations, limited teacher proficiency, and the lack of teaching and learning resources. These challenges pose major threats to education for sustainable development and the subsequent attainment of sustainable development in the near future and even beyond.

The next chapter of the document is the final, and it will present the summary, conclusion, and recommendations for policies, practices, and further research.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Overview

This study is purposed to explore education for sustainable development goals integration in the career technology curriculum by career technology teachers in the Dangme enclave with its related questions. Research questions answered are:

1. To what extent is education for sustainable development objectives integrated into the official career technology curriculum used in Ghana's Junior High Schools?
2. How do career technology teachers in the Dangme enclave perceive the official career technology curriculum in line with education for sustainable development?
3. What strategies do career technology teachers in the Dangme enclave employ to teach the career technology curriculum towards education for sustainable development?
4. What challenges do career technology teachers in the Dangme enclave encounter in the implementation of the official career technology curriculum towards education for sustainable development?

To address the questions, the qualitative case study was employed. By this approach, 17 participants were sampled and involved in the study for interviews and observations through a maximum variation sampling technique. Three instruments were used to collect data and they include document, interview, and observation. Collected data were analysed through content and thematic analysis techniques from which findings obtained and discussion done in chapters four and five respectively.

These were done while ensuring that the study is ethical and the findings are trustworthy.

This concluding chapter summarises the major findings, and the conclusions drawn from the study. Again, recommendations are made for policy decisions, training and re-education purposes. Lastly, suggestions for further research are presented in this chapter.

5.1 Summary of findings

Through content analysis of the official career technology curriculum, interviews, and observations of participants and analysis of the same, the findings realised were:

1. The official career technology curriculum covers education for sustainable development goals to some extent, averaging 13.33%. Specifically, it covered 17% of the cognitive objectives, 17% of the socio-emotional objectives, and 6% of the behavioural objectives. Some education for sustainable development goals, whose objectives were found, included goals 1, no poverty; 2, zero hunger; 3, good health and wellbeing; 6, clean water and sanitation; 7, affordable and clean energy; and 13, climate action. The career technology curriculum having comparatively less coverage of the behavioural domain is surprising. This can be attributed to Ghana's over reliance on grammar education, which is much concentrated on cognition, as compared to skill acquisition.
2. The participants' perspectives of the career technology curriculum are positive and align with the aim of education for sustainable development, though only one participant explicitly mentioned sustainable development in the submission. Generally, the curriculum is perceived based on its focus—*career*

development, learner-centred curriculum, twenty-first century education and training, and practical activities; and structure—integrated, iterative; and its scope. Notwithstanding the alignment of these findings to education for sustainable development, only one out of the seventeen participants mentioned ‘sustainable development’ in the submission. Furthermore, it was surprising to find that a participant perceived the curriculum as a means to making money by leaders. These may emanate from the over politicization of happenings in the Ghanaian society and limited understanding of the whole curriculum change enterprise.

3. The implementation strategies used by teachers who participated in the study were mostly consistent with education for sustainable development. They include collaborative learning, project-based learning, role play, active learning, talk for learning, and the integration of ICT. The effective use of these pedagogies to promote sustainable development by the participant was however limited. A large proportion of the participants, however, did not mention they use ICT tools in the delivery of lessons. This can be the result of limited skills in the use of ICT in lesson, unfavourable classroom for ICT, and class size.
4. Challenges found to be hindering the integration of education for sustainable development into the career technology curriculum are the teachers’ obsession on examinations, monetary issues for practical activities, poor classroom conditions, non-availability of standard teaching and learning resources, lack of facilities for practical work, and then limited teacher proficiency.

It must be acknowledged that, as it were, there appeared to be paucity of knowledge as to how the official career technology curriculum introduced into the

Ghanaian education system integrates education for sustainable development to educate learners in Ghanaian Junior High Schools towards sustainable development. This study has hence contributed to knowledge as its findings has illuminated the extent to which education for sustainable development objectives were covered into the official curriculum document. The perspective participant teachers have about the official career technology curriculum are also made known. Insight into the implementation strategies applied, in addition to the challenges faced in the curriculum implementation in line education for sustainable development in the research area are also provided.

The findings had also confirmed some findings of other studies in Ghana, like that of Ofori-Birikorang et al. (2020), finding that education for sustainable development objectives was adopted into Ghana's standards-based curriculum, and that of Addai-Mununkum and Setordzi (2023), finding that some teachers had adopted and used integrated pedagogies in their lesson deliveries.

5.2 Conclusions

The Findings of the study indicates that the integration of education for sustainable development in the official Ghanaian career technology curriculum has been done, but its integration into classroom lessons remains limited with substantial challenges. Specifically, the official curriculum shows clear efforts to integrate education for sustainable development objectives based on the cognitive, socio-emotional, and behavioural domains. This indicates an awareness of the need to educate learners for sustainable development in Ghana through the Ghanaian career technology curriculum. Additionally, participants perspective of the curriculum remains positive and consistent with education for sustainable development goals. This is a solid foundation for the integration of education for sustainable development

in the classroom to solve environmental, social, and economic problems facing humanity.

However, according to the findings, the potential to achieve sustainable development through education for sustainable development integration into classroom lessons remains problematic. Even though participants employed pedagogies that aligns with education for sustainable development, they were not consistently applied. due to limited understanding and use of pedagogic strategies for implementing education for sustainable development. There is therefore a gap between the official Ghanaian career technology curriculum with regards to education for sustainable development and the integration of same in the classroom. This is also due to challenges like non-availability of teaching and learning resources, money for practical work, limited teacher proficiency, and poor classroom conditions as cited by participants. Addressing these issues should be taken seriously to ensure the effective integration of education for sustainable development through the curriculum for sustainable development in Ghana.

5.3 Recommendations

On the basis of the study's findings and conclusions, the following recommendations are made for policy, practice, and education and training programmes:

1. While the curriculum integrates some education for sustainable development, other goals including 5, 8, 9, 10, 12, 14, 15, 16, and 17 are entirely absent in the official curriculum. Goals 1, 2, and 4, though represented, are woefully inadequate. Therefore, NaCCA, the body responsible for curriculum development in Ghana, should consider improving on the curriculum by including more of the education for

sustainable development goals, particularly goals 8 and 9. This would make it more suitable towards sustainable development. Goal 8 because the career technology curriculum is focused on educating learners about their career and has to have some excerpts of knowledge on decent work and economic development. Including Goal 9 objectives would also help to make learners responsible in the use of innovative strategies to improve industry and infrastructure.

2. Participants perspectives of the curriculum remained positive. Their views were also aligned to education for sustainable development. However, there were some excesses. The teachers should be educated through professional learning community meetings on the intention of the curriculum and its relevance to twenty first century education. The education should highlight education for sustainable development and its integration in the career technology curriculum.
3. Though participants employed suitable pedagogies like collaborative learning, role play, talk for learning etc. understanding of their use is limited. Hence integrating education for sustainable development into classroom practices became problematic. The District Director of Education, Human Resource Manager, and the TVET coordinator should, as a matter of urgency, organise continuous orientation and professional development programmes for career technology teachers in the district. The programme should concentrate on helping the teachers to better understand the suitable pedagogies used for the implementation education for sustainable development in the career technology curriculum.

4. The study found that the implementation of practical lessons of the curriculum for sustainable development is largely prevented by the lack of facilities and money. The Education Directorate therefore is entreated to enact policies that will facilitate practical activities in the curriculum. The policies should address practicable modalities on ways to conduct practical lesson, specifically, monetary wise and harnessing available artisans.
5. The non-availability of standardised textbook is largely considered as a hinderance to the curriculum implementation. The Director should therefore ensure to identify and provide adequate teaching and learning resources to aid the career technology teachers in the district to go about the implementation smoothly. The resource should include textbooks aligned with education for sustainable development.

5.4 Suggestions for further studies

1. The use of a small sample size, a characteristic of qualitative research, limited the study for broader generalisation. Further studies should use a larger sample size to explore the integration of education for sustainable development in career technology using approach like the mixed method to make it generalisable.
2. Other researchers should focus on conducting the study in nuance areas, preferably hinterlands, and cities as this study only focused on fairly developing area.

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APPENDICES

A: INTERVIEW PROTOCOL

Semi-structured Interview protocol

Date.....

Time.....

The purpose of this qualitative case study was to explore education for sustainable development goals integration in the career technology curriculum by career technology teachers in the Dangme enclave.

Ice breaker questions

How has teaching been going since the reform?

How long have you been teaching?

Main interview questions

1. How do you see the new career technology curriculum, particularly on education for sustainable development?
2. What new changes do you see in the new career technology curriculum that were not in the past basic design and technology curriculum?
3. Can you describe what you like about the changes within the new career technology curriculum?
4. How do you approach the implementation of the new career technology? (Talk about what your classroom practice in the implementation is like.)
5. What pedagogies (teaching methods) do you employ to teach the new career technology curriculum for effective implementation?
6. How do the learners respond to the new introductions that are in the career technology curriculum?
7. Tell me about the difficulties you face when implementing the career technology curriculum?

B: OBSERVATION PROTOCOL

Observation protocol

Date.....

Time.....

Number of learners present.....

Arrangement of the class during the observation

Main classroom observation		Surprises
Starter		
Plenary		
Conclusion		

Adapted from lesson preparation format by NaCCA

C: KEYWORDS FOR THE CURRICULUM ANALYSIS

The keywords that were used was adopted from the Education for Sustainable Development work sheet mapping exercise by the Global Schools Programme. Synonymous keywords used in the context of Ghana that were added by the researcher are in *italics*.

SDG Goal # & Theme	Objective code #	Objective code keyword
1 NO POVERTY	1.1	The learner understands the concepts of extreme and relative poverty and is able to critically reflect on their underlying cultural and normative assumptions and practices.
	1.2	wealth inequality
	1.3	poverty, <i>poor</i>
	1.4	wealth inequality
	1.5	poverty, wealth inequality, <i>poor</i>
	1.6	charity, donation, financial support, assistance, aid, <i>alms, help</i>
	1.7	solidarity, civic engagement, participation, community, <i>empathy</i>
	1.8	poverty, <i>poor</i>
	1.9	poverty, wealth inequality, <i>poor</i>
	1.10	solidarity, civic engagement, participation, community, <i>empathy</i>
	1.11	poverty, <i>poor</i>
	1.12	economic justice, development
	1.13	economic justice, development, charity, donation, financial support, assistance, aid
	1.14	economic justice, development
	1.15	poverty, <i>poor</i>

2 ZERO HUNGER	2.1	hunger, malnutrition
	2.2	hunger, malnutrition
	2.3	hunger, malnutrition
	2.4	sustainable agriculture
	2.5	hunger, malnutrition, sustainable agriculture
	2.6	sustainable agriculture
	2.7	sustainable agriculture
	2.8	hunger, malnutrition
	2.9	hunger, malnutrition
	2.10	hunger, malnutrition
	2.11	hunger, malnutrition
	2.12	sustainable agriculture
	2.13	hunger, malnutrition, sustainable agriculture
	2.14	hunger, malnutrition, global citizen
	2.15	hunger, sustainable agriculture, production, consumption
3 GOOD HEALTH & WELL-BEING	3.1	health, hygiene, well-being
	3.2	illness, disease, communicable diseases, noncommunicable diseases, premature death
	3.3	health, well-being
	3.4	mental health, emotional well-being, xenophobia, discrimination, bullying, alcohol, tobacco, drugs
	3.5	physical health, sexual and reproductive health, <i>mental health</i>
	3.6	illness, <i>sickness</i>
	3.7	health, sexual and reproductive health
	3.8	health, well-being
	3.9	health, well-being
	3.10	health, well-being
	3.11	health, well-being
	3.12	health, sexual and reproductive health
	3.13	health, well-being
	3.14	health, well-being

	3.15	health, well-being, medicine, public interest and private interest, pharmaceutical industry
4 QUALITY EDUCATION	4.1	education, lifelong learning
	4.2	education, lifelong learning, human right, public good
	4.3	education, lifelong learning, gender equality
	4.4	culture
	4.5	education, <i>learning, schooling, training</i>
	4.6	quality education
	4.7	quality education
	4.8	quality education, learning, personal development
	4.9	education, skill, employment, entrepreneurship
	4.10	personal development
	4.11	quality education
	4.12	education, gender equality
	4.13	free, equitable, quality education, educational facilities
	4.14	education, empowerment
	4.15	lifelong learning
5 GENDER EQUALITY	5.1	gender, gender equality, gender discrimination, <i>gender bias</i>
	5.2	freedom from exploitation and violence, reproductive right, <i>child abuse, domestic violence, girl child</i>
	5.3	gender, gender equality, gender discrimination, <i>gender bias</i>
	5.4	gender equality, legislation, governance, <i>law, affirmative action</i>
	5.5	gender equality, education, technology
	5.6	gender role, <i>gender responsibility</i>
	5.7	gender discrimination, empowerment, <i>gender bias</i>

	5.8	gender equality, gender discrimination
	5.9	gender identity, gender role
	5.10	gender expectation, gender role
	5.11	gender discrimination, empowerment
	5.12	gender equality
	5.13	gender discrimination, violence
	5.14	gender discrimination, <i>gender bias</i>
	5.15	gender equality
6 CLEAN WATER & SANITATION	6.1	water quality, water quantity, water pollution, water scarcity, <i>potable water, drinking water, water</i>
	6.2	water, system
	6.3	water distribution, safe drinking, sanitation facilities
	6.4	virtual water, <i>water</i>
	6.5	integrated water resources management, sanitation, risk management
	6.6	water, sanitation management
	6.7	water pollution
	6.8	water use
	6.9	sanitation, hygiene
	6.10	safe drinking, sanitation facilities, gender disparities
	6.11	water self-sufficiency
	6.12	resource management
	6.13	save water
	6.14	water quality and safety
	6.15	water pollution
7 AFFORDABLE & CLEAN ENERGY	7.1	energy resources, renewable, non-renewable, <i>energy</i>
	7.2	energy distribution, <i>energy</i>
	7.3	energy efficiency, energy sufficiency, <i>energy</i>
	7.4	energy production, supply, demand, usage, <i>energy</i>
	7.5	unsustainable energy production, renewable

		energy technology, <i>energy</i>
	7.6	energy efficiency, energy sufficiency, <i>energy</i>
	7.7	affordable, reliable, sustainable and clean energy, <i>energy</i>
	7.8	energy technology, <i>energy</i>
	7.9	energy production, supply, demand, usage, <i>energy</i>
	7.10	reliable, sustainable energy production, <i>energy</i>
	7.11	energy efficiency, energy sufficiency, <i>energy</i>
	7.12	renewable energy, <i>energy</i>
	7.13	energy project, energy policy, <i>energy</i>
	7.14	energy production, supply, demand, usage, <i>energy</i>
	7.15	energy solution, energy supplier, <i>energy</i>
8 DECENT WORK & ECONOMIC GROWTH	8.1	economic growth, productive employment, decent work, <i>employment, job</i>
	8.2	formal and informal employment, unemployment
	8.3	employment, economic growth
	8.4	wage, labour force, profits, <i>pay, salary</i>
	8.5	innovation, entrepreneurship, <i>technology, novel</i>
	8.6	economic models, <i>economic plan, economic ideas</i>
	8.7	fair wage, equal pay, labour right
	8.8	working condition
	8.9	individual right, <i>right</i>
	8.10	economic life, competency
	8.11	sustainable and inclusive economy, decent work
	8.12	wage, working condition
	8.13	innovation, entrepreneurship
	8.14	entrepreneurial project, <i>business plan</i>
	8.15	responsible consumption
9 INDUSTRY, INNOVATION & INFRASTRUCTURE	9.1	sustainable infrastructure, industrialization
	9.2	sustainable infrastructure, industrialization
	9.3	infrastructure, spatial planning

RE	9.4	infrastructure
	9.5	sustainability innovation, resilient infrastructure, industrial development
	9.6	sustainable, resilient and inclusive infrastructure
	9.7	infrastructure, industrial development
	9.8	infrastructure, industrial development
	9.9	infrastructure, industrial development, personal demand
	9.10	infrastructure
	9.11	green infrastructure, resilient infrastructure
	9.12	industrialization
	9.13	industrialization
	9.14	financial service, <i>loan</i>
	9.15	sustainable infrastructure
10 REDUCE INEQUALITY	10.1	inequality, <i>inequal, uneven, imbalance</i>
	10.2	inequality, <i>inequal, uneven, imbalance</i>
	10.3	inequality, <i>inequal, uneven, imbalance</i>
	10.4	process that hinders equality
	10.5	ethical principles
	10.6	awareness of inequality
	10.7	inequality, <i>inequal, uneven, imbalance</i>
	10.8	inequality, ethical principles
	10.9	inequality
	10.10	just and equal world
	10.11	inequality
	10.12	inequality
	10.13	causes for inequality
	10.14	reduce inequality
	10.15	reduce inequality
11 SUSTAINABLE CITIES & COMMUNITIES.	11.1	urban, peri-urban and rural settlements, <i>need</i>
	11.2	settlement system, <i>need</i>
	11.3	settlement pattern, sustainable system
	11.4	sustainable planning and building

	11.5	sustainable settlement
	11.6	sustainable settlement
	11.7	sustainable settlement, community
	11.8	sustainable settlement, identity, culture
	11.9	sustainable settlement
	11.10	sustainable settlement, social impact, individual lifestyle
	11.11	sustainable settlement, community
	11.12	sustainable settlement, community
	11.13	sustainable settlement, community
	11.14	sustainable community
	11.15	low carbon approaches
12 RESPONSIBLE CONSUMPTION & PRODUCTION	12.1	individual lifestyle, <i>way of life, behaviour, taste</i>
	12.2	consumption pattern
	12.3	sustainable production and consumption
	12.4	sustainable production and consumption
	12.5	sustainable production and consumption
	12.6	sustainable production and consumption
	12.7	sustainable production and consumption
	12.8	sustainable development
	12.9	sustainable lifestyle
	12.10	sustainable lifestyle
	12.11	sustainable lifestyle
	12.12	sustainable lifestyle
	12.13	sustainable production and consumption
	12.14	sustainable production and consumption
	12.15	sustainable production and consumption
13 CLIMATE ACTION	13.1	greenhouse effect
	13.2	greenhouse effect
	13.3	climate change
	13.4	climate change
	13.5	disaster response, disaster risk reduction

	13.6	ecosystem dynamics
	13.7	climate change
	13.8	climate change
	13.9	climate, global perspective
	13.10	climate change
	13.11	climate change
	13.12	climate change
	13.13	climate change
	13.14	climate-protecting public policies
	13.15	climate-friendly economic activities
14 LIFE BELOW WATER	14.1	ecology, ecosystem
	14.2	sea
	14.3	climate change
	14.4	ocean system
	14.5	marine resources
	14.6	sustainable fishing
	14.7	ocean system
	14.8	ocean products
	14.9	dietary habit, limited resources, <i>food</i>
	14.10	fishing practice
	14.11	sea
	14.12	fishing practice
	14.13	marine resources
	14.14	overfishing, <i>irresponsible fishing</i>
	14.15	marine reserves
15 LIFE ON LAND	15.1	global ecosystem, biodiversity
	15.2	biodiversity
	15.3	ecosystem services
	15.4	regeneration, poor farming, forestry practice
	15.5	conservation strategy
	15.6	biodiversity loss, environmental practice, <i>environment</i>
	15.7	ecosystem services
	15.8	nonhuman life, <i>plant, animal</i>
	15.9	nature
	15.10	nature
	15.11	biodiversity conservation
	15.12	wildlife, wildlife corridors, agro-environmental schemes, restoration ecology

	15.13	biodiversity, nature conservation
	15.14	erosion of soil
	15.15	endangered species, wild fauna and flora
16 PEACE, JUSTICE & STRONG INSTITUTIONS	16.1	justice, inclusion, peace
	16.2	legislative and governance systems
	16.3	justice
	16.4	justice, inclusion, peace
	16.5	international human rights
	16.6	justice, inclusion, peace
	16.7	justice, inclusion, peace
	16.8	injustice
	16.9	justice, inclusion, peace
	16.10	justice, humanity
	16.11	justice, inclusion, peace
	16.12	justice, inclusion, peace
	16.13	injustice, conflict
	16.14	injustice
	16.15	conflict
17 PARTNERSHIPS OF THE GOALS	17.1	interconnectedness, interdependency, <i>cooperation</i>
	17.2	global partnership
	17.3	global governance, global citizenship
	17.4	technology, innovation, knowledge sharing
	17.5	measure progress
	17.6	global partnership
	17.7	global partnership, governments' accountability
	17.8	SDG, <i>sustainable development goals, sustainable development</i>
	17.9	sustainable global society
	17.10	common humanity, human right
	17.11	SDG
	17.12	global partnership
	17.13	global partnership
	17.14	cooperation
	17.15	SDG, global partnership

D: PARTICIPANTS' CONCENT FORM

Informed Consent Form

I. Title of the study

An Exploration of The Integration of Education for Sustainable Development in Ghana's Career Technology Curriculum

The purpose of the study

The purpose of this qualitative case study was to explore education for sustainable development goals integration in the career technology curriculum by career technology teachers in the Dangme enclave.

Procedure

The study will entail analysing the career technology curriculum. Apart from that, interviews and non-participatory classroom observation will be done by the researcher on the participants purposefully selected.

II. Risk

This study is strictly conducted for research reason and not for any ill motive. There is therefore no risk involved in partaking in the study.

III. Anonymity and Confidentiality

The identity of all participants in the study will be concealed so that they cannot be identified by any other person. Individual participants will be assigned pseudonyms for the purpose of reporting findings obtained from the interviews and observation. Apart from reporting in the study document, no information gathered from participants will be exposed to any other person or reused for other purpose(s) without the concern of the participants.

IV. Benefits of partaking in the study

There is no monetary benefit to be accrued for partaking in the study. Notwithstanding, the outcomes of the study will be beneficial as it is going to

inform policy and practices for better learning towards sustainable development.

V. Compensation

Except when the researcher deems it appropriate to compensate any participant, there will not be any compensation for participants in the study.

VI. Withdrawal from the study

Participants are free to withdraw from partaking in the study anytime they feel to do so without any penalty.

If any participant wants to withdraw, she or he will only need to inform me verbally.

By signing the space below, you indicate your acceptance to partake in the study and the researcher is bounded to ensure the above indicated rules governing the research.

Sign.....

Sign.....

Researcher

Participant

Date.....

Date.....

E: PERMISSION LETTER FOR AN INTRODUCTORY LETTER TO THE SITE

Ada Senior High Technical School
Private Mail Bag
Sege- Ada.
1st April, 2023

The Head of Department
Educational Foundations
University of Education, Winneba
Winneba.

Dear Sir,

APPLICATION FOR INTRODUCTORY LETTER

I write to apply for an introductory letter from the Department to aid me seek for permission to gather data for my M.Phil. thesis work. I am an M.Phil. Candidate reading Curriculum and Pedagogic with Index Number 8232090002.

The topic I am studying is: AN EXPLORATION OF THE INTEGRATION OF EDUCATION FOR SUSTAINABLE DEVELOPMENT IN GHANA'S CAREER TECHNOLOGY CURRICULUM.

As a requirement, I need to conduct interviews and non-participatory observation in a school and I would be happy to be given the introductory letter to facilitate my data collection process.

Please find attached is a copy of my designed interview and observation protocols.

I count on your usual cooperation. Thank You.

Yours Sincerely,

.....
Emmanuel Appiah

**F: LETTER FOR INFORMING THE END OF DATA COLLECTION &
APPRECIATION**

Emmanuel Appiah
C/O P.O. Box 25
Department of Education Foundation, UEW
Winneba, Ghana.
July 10, 2024.

The District Director of Education
PMB.

Dear Director,

END OF DATA COLLECTION IN THE DISTRICT

I refer to your letter referenced (**ref. number omitted**) and dated 13th May, 2024 for the permission to collect data in the schools in your district for the research topic “AN EXPLORATION OF THE INTEGRATION OF EDUCATION FOR SUSTAINABLE DEVELOPMENT IN GHANA’S CAREER TECHNOLOGY CURRICULUM”. I write to officially inform you that I have ended the data collection exercise with immediate effect.

I also extend my utmost appreciation for your kind consideration that had helped me to obtain data to help in the answering of the research questions on the topic above. In due time, I will furnish your office with the outcome of the study for your perusal and training purpose.

Thank you.

Yours faithfully,

.....
Emmanuel Appiah