



**TEACHING AS A VEHICLE FOR ACHIEVING SOME OF THE SUSTAINABLE
DEVELOPMENT GOALS: EXAMINING GEOGRAPHY TEACHING IN SECONDARY
SCHOOLS IN MALAWI**

By

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requirements for the degree of Master of Education in Teacher Education**

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Declaration

I declare that this thesis is the product of my own work and has not been submitted elsewhere for examination, award of degree or publication other than degree of Master of Education in Teacher Education at Mzuzu University. The research has been conducted in the Department of Education and Foundation Studies, under the supervision of Associate Professor V. Y. Mgomezulu. The works of other people have been acknowledged and referenced in accordance with the Mzuzu University requirements.

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Dedication

I dedicate this thesis to my mother who was lacking support when I was busy with the project. I appreciate her words of encouragement she was giving me throughout my study. I love her very much.

May God bless her.

Acknowledgements

First and foremost, I would like to thank the Almighty God for giving me strength and courage in carrying out this research. Special thanks should go to my supervisor, Associate Professor V. Y. Mgomezulu, for his commendable job in giving me guidance from the beginning of the study up to the end. His expertise and interest in the area of my study have positively contributed to the submission of my research report. May the good Lord continue blessing him with wisdom. I also thank my mother for the support she was giving me throughout my study. May the Lord give her long life.

Finally, I would like to express my gratitude to all the participants who took part in this research project. Sacrificing precious time off their daily schedules to take part in this study was something that humbled me so much. It is my hope that together we can assist in achieving the Sustainable Development Goals.

May the Lord bless.

Abstract

The aim of the study was to examine how some of the Sustainable Development Goals (SDGs) are achieved through Geography teaching in secondary schools in Malawi. It was specifically conducted in Shire Highlands Education Division (SHED). The following were the objectives: to assess how the success criteria in the Secondary School Geography Syllabi promote the achievement of SDGs; to examine the preparedness of Geography teachers in achieving SDGs; to assess how Geography teachers address SDGs; to investigate the teaching methods that secondary school Geography teachers use for the achievement of SDGs; and to explore how the achievement of SDGs through Geography teaching can be enhanced. Pragmatic paradigm was used in the study. Both quantitative and qualitative approaches were used. The interviews, questionnaires and document analysis were used as data collection methods and instruments. The researcher used the sample of 78 participants. Seventy six (76) were secondary school Geography teachers and one member from the inspectorate section. Another participant was an officer responsible for the development of Geography syllabus. The statistical formula was used to come up with sample and in some cases purposive sampling was used. Quantitative data was analysed using SPSS and qualitative data was analysed thematically.

The findings have shown that most success criteria in junior and senior secondary school Geography syllabi do not promote the achievement of SDGs because they use action verbs that only promote theory learning. Most Geography teachers were not trained about the SDGs. In terms of teaching and learning, most Geography teachers did not address the SDGs because they did not encourage learning through practice. For instance, the teaching methods that most Geography teachers used did not assist in promoting the achievement of SDGs.

The study will help Ministry of Education, Science and Technology (MoEST) to train Geography teachers on how they can achieve some of the SDGs through teaching. It can assist the Malawi Institute of Education (MIE) to revise the success criteria in Secondary School Geography Syllabus so that they should promote learning through practice. It would assist Geography teachers to start using the Transformative Learning Approach.

Key words: Sustainable Development Goals, Transformative Learning Approach.

Table of Contents

	Page
Declaration.....	i
Dedication.....	ii
Acknowledgements.....	iii
Abstract	iv
Table of Contents.....	v
List of Tables	x
List of Figures.....	xi
Definition of Operational Terms.....	xii
List of Abbreviations and Acronyms	xiii
CHAPTER ONE	1
ORIENTATION TO THE STUDY	1
1.1 Introduction	1
1.2 Background information	1
1.2.1 General Background to SDGs.....	2
1.2.2 Context of SDGs	3
1.3 Statement of the problem	5
1.4 Objectives of the study.....	7
1.4.1 General objective.....	7
1.4.2 Specific objectives.....	7
1.5 Theoretical framework.....	8
1.5.1 Transformative Learning Theory	8
1.5.2 Purpose of the study	10

1.5.3 Significance of the study	10
1.6 Chapter summary	11
CHAPTER TWO	12
LITERATURE REVIEW	12
2.1 Introduction	12
2.2 Importance of the success criteria in achieving some of the SDGs.....	12
2.3 Preparedness of Geography teachers in achieving the SDGs	13
2.4 How Geography teachers address SDGs	16
2.5 Teaching methods that are appropriate for achieving SDGs	20
2.6 Enhancing SDG achievement through Geography teaching.....	25
2.7 Conceptual framework.....	29
2.8 Chapter summary.....	30
CHAPTER THREE.....	31
RESEARCH METHODOLOGY	31
3.1 Introduction	31
3.2 Research paradigm.....	31
3.3 Research design	31
3.4 Research geographical area	33
3.5 Sampling strategies and sample size.....	33
3.6 Data Collection Methods and Instruments.....	36
3.6.1 Interviews.....	36
3.6.2 Questionnaire	36
3.6.3 Document analysis	37
3.7 Data analysis.....	37

3.7.1 Interview data.....	37
3.7.2 Document analysis	38
3.7.3 Questionnaire	38
3.8 Trustworthiness and credibility of research instruments	38
3.9 Validity and reliability of research instruments	39
3.10 Ethical considerations	39
3.11 Chapter summary.....	40
CHAPTER 4	41
PRESENTATION OF THE RESULTS.....	41
4.1 Introduction	41
4.2 Quantitative data.....	41
4.2.1 Demographic data of respondents	41
4.2.2 Assessing how the success criteria in secondary school Geography syllabi promote the achievement of SDGs.....	44
4.2.3 Preparedness of Geography teachers in achieving SDGs.....	47
4.2.4 Assessing how Geography teachers address SDGs through selected Geography topics.....	48
4.2.5 Teaching methods that Geography teachers use in the teaching of Geography.	51
4.2.6 How to enhance SDG achievement through Geography teaching	52
4.3 Qualitative data.....	55
4.3.1 Assessing how the success criteria in the Secondary School Geography syllabi promote the achievement of SDGs	55
4.3.2 Preparedness of Geography teachers in achieving the SDGs	56
4.3.3 How secondary school Geography teachers address SDGs through Geography teaching	58

4.3.4 Teaching methods that Geography teachers use in the teaching of Geography	59
4.3.5 How to enhance SDG achievement through Geography teaching	60
4.4 Chapter summary	62
CHAPTER 5	63
DISCUSSION OF THE RESULTS	63
5.1 Introduction	63
5.2 Assessing how success criteria in secondary school Geography syllabi promote the achievement of SDGs	63
5.3 Preparedness of Geography teachers in achieving SDGs	67
5.4 How secondary school Geography teachers address some of the SDGs through Geography teaching	68
5.5 Teaching methods that Geography teachers use in the teaching of Geography	73
5.6 How to enhance SDG achievement through Geography teaching	78
5.7 Chapter summary	83
CHAPTER 6	84
CONCLUSION OF FINDINGS AND RECOMMENDATIONS	84
6.1 Introduction	84
6.2 The research process	84
6.3 Key findings	85
6.3.1 How the success criteria in the Secondary School Geography Syllabi promote the achievement of SDGs	85
6.3.2 Preparedness of Geography teachers in achieving SDGs	85
6.3.3 How secondary school Geography teachers address some of the SDGs	86
6.3.4 Teaching methods that Geography teachers use in the teaching of Geography	86
6.3.5 How to enhance SDG achievement through Geography teaching	87

6.4 Research Limitations	87
6.5 Research Delimitations	87
6.6 Recommendations.....	88
6.7 Suggestions for Future Research	89
6.8 Conclusion.....	89
6.9 Closing remarks	90
APPENDICES	100
Appendix 1: Permission letter from the Faculty of Education	100
Appendix 2: Permission letter from the Education Division Manager in SHED	101
Appendix 3: Letter seeking permission from the EDM	102
Appendix 4: Consent letter for Head teachers	103
Appendix 5: Information sheet for the Head teachers	104
Appendix 6: Teacher's consent form	105
Appendix 7: Information sheet for teachers	106
Appendix 8: Document analysis of Junior Secondary School Geography Syllabus	107
Appendix 9: Document analysis of Senior Secondary School Geography Syllabus	114
Appendix 10: Questionnaire for teachers	119
Appendix 11: Semi-structured interview guide for a member from the inspectorate section	122
Appendix 12: Verbatim report of interviews with the inspectorate section	123
Appendix 13: Semi-structured interview guide for an officer responsible for the development of the syllabus	125
Appendix 14: Verbatim report of interviews with an officer responsible for the development of the syllabus	126

List of Tables

	Page
Table 1: Levels of Transformative Learning Model.....	9
Table 2: Summary of the sample used in the study.....	35
Table 3: Summary of document analysis of success criteria in Junior Secondary School Geography Syllabus.....	45
Table 4: Summary of document analysis of success criteria in the Senior Secondary School Geography Syllabus.....	46
Table 5: Extent to which Geography teachers in the Junior and Senior Secondary School Sections address SDGs through teaching.....	49
Table 6: Preferences of methods teachers use in the teaching of Geography.....	51
Table 7: Extent to which the achievement of SDGs can be improved through Geography teaching.....	53

List of Figures

	Page
Figure 1: Conceptual framework.....	29
Figure 2: Distribution of teacher respondents by gender.....	41
Figure 3: Percentage of respondents for each range of years of service.....	42
Figure 4: Percentage of highest qualification for respondents.....	43
Figure 5: Attendance of orientation training to SDGs.....	48

Definition of Operational Terms

Critical thinking : The intellectually disciplined process of actively and skillfully conceptualising, applying, analysing, synthesising and evaluating information gathered from observation, experience, reflection, reasoning, or communication, as a guide to belief and action (Halpern, 2001).

Recycling : A process of changing waste materials into new products to prevent waste of potentially useful materials, reduce the consumption of fresh raw materials, reduce energy usage, and reduce air pollution from incineration (Iyad, 2015).

Sustainable Development Goals: This is balancing the well being and improving lives of people globally in space and time, while at the same time preserving natural resources and ecosystems (Ruhil, 2017).

Transformative Learning : Learning that transforms problematic frames of reference to make learners more inclusive, reflective, open, and emotionally able to change (Mezirow, 2009).

Values Education : The attempt to craft pedagogies and supportive structures to foster the development of positive, ethical, pro-social inclinations and competencies in learners (UNESCO, 2017).

Waste management : The generation, prevention, characterisation, monitoring, treatment, handling, reuse and residual disposition of solid wastes (Ifegbesan, 2008).

List of Abbreviations and Acronyms

CDSS	: Community Day Secondary School.
CSC	: Conventional Secondary School.
FAO	: Food and Agriculture Organisation.
MDGs	: Millennium Development Goals.
MIE	: Malawi Institute of Education.
MoEST	: Ministry of Education, Science and Technology.
MoET	: Ministry of Education and Training.
OWG	: Open Working Group.
SDGs	: Sustainable Development Goals.
SHED	: Shire Highlands Education Division.
UN	: United Nations.
UNESCO	: United Nations Educational, Science and Cultural Organisation.

CHAPTER ONE

ORIENTATION TO THE STUDY

1.1 Introduction

The emerging issue of Sustainable Development Goals (SDGs) is very crucial as it is the international policy adopted by members of the United Nations (UNESCO, 2016). Ruhil (2017) defines SDGs as balancing the well being and improving lives of people globally in space and time, while at the same time preserving natural resources and ecosystems. It is about maintaining the natural environment and our planet resources, at the same time, developing wealth and well-being for a growing population (UNESCO, 2016). Some examples of SDGs are: No poverty; Zero hunger; Good health and well-being; Quality education; Gender equality and Climate action (United Nations, 2015). For the SDGs to be achieved, everyone needs to do their part, for example: education sector, private sector and every human being (UNESCO, 2016b). Therefore, the researcher was interested to carry out the study in order to examine how some of the SDGs were achieved through teaching Geography content in secondary schools in Malawi. The research was bounded to the SDGs related to the selected topics in the Junior and Senior Secondary School Geography syllabi as shown in Appendices 8 and 9 respectively (Pp. 102 – 113). The study included both Community Day Secondary Schools (CDSSs) and Conventional Secondary Schools (CSSs).

1.2 Background information

In this section, the researcher highlights the general background to SDGs, the context of SDGs in line with Citizenship Education Theory and Development Education Theory, and the integration of the SDGs in education system.

1.2.1 General Background to SDGs

The SDGs were viewed as an evolution of Millennium Development Goals (MDGs) and a post-2015 agenda to fight against poverty and hunger, while protecting the human rights of people and ensuring inclusive and Sustainable Development, and healthy lives (UNESCO, 2016). The SDGs carried forward the unfinished agenda of MDGs for continuity. Hulme (2009) explains that MDGs were not holistic as they left out social issues such as global inequality, gender-related and sustainability issues. Maier and Budke (2016) extend that MDGs focused on the developing countries only. Therefore, it was necessary for the world leaders to formulate the SDGs that would focus on both developed and developing countries, to work together in achieving them.

In 2012, world leaders came together in Rio De Janeiro (Rio +20 summit) in Brazil where they agreed to make a transition from MDGs to SDGs (UNESCO, 2016b). An Open Working Group (OWG) of UN member states was established in the Rio +20 outcome document “The Future We Want”. The group developed a set of SDGs and presented a proposal to UN General Assembly in 2014. A final document was published in August 2015, and the goals were adopted by UN General Assembly on 25th September, 2015 at the UN Sustainable Development Summit. The new development agenda was called “Transforming Our World: The 2030 Agenda for Sustainable Development” (United Nations, 2015). The SDGs have a broader agenda that include economic, social and environmental sustainability.

Although the Malawi secondary school curriculum was revised in 2013 when MDGs were in operation, it should be noted that the broader goals in MDGs are similar to SDGs which were launched in 2015 (UNESCO, 2017). For example, MDG 7: Environmental sustainability has similarities with SDG 15: Life on land which aims at protecting, restoring and promoting

sustainable use of terrestrial ecosystems, sustainably managing forests, combating desertification and halting biodiversity loss (UNESCO, 2016b). Therefore, there should be no concern that the researcher is examining the syllabus that was developed before the SDGs were crafted.

1.2.2 Context of SDGs

The SDGs can be viewed through the lens of Citizenship Education Theory and Development Education Theory (O’Flaherty & Liddy, 2017). Crick (1999) defines Citizenship Education as educating learners to become clear thinking and enlightened citizens who participate in decisions concerning society. The understanding is that people who undergo Citizenship Education will acquire a sense of individual and community responsibility. Further, that they will acquire knowledge and skills that are packaged in a manner that they can be applied in real life situations. It is therefore, important to understand that Citizenship Education emphasises on action and practice. It is noteworthy that SDGs also emphasise on action and practice as manifestations of transformational education.

McCloskey (2016) characterises Development Education as education that focuses on the potential social and personal development of the learner through engagement with global issues. Development Education can enable people to understand the world around them and to act to transform it (O’Flaherty & Liddy, 2017). Education is therefore, pivotal for the socio-economic development of the country. In many ways, Development Education is closely linked to promoting the SDGs. Education should therefore, include key sustainable development issues in teaching; for instance, climate change, biodiversity, poverty reduction and sustainable consumption (UNESCO, 2016). Teaching should transform learners to become active and responsible citizens in taking care of the environment, which is reflected in SDG 13: Climate

action and SDG 15: Life on land. The new vision of teaching should empower learners to assume responsibility for creating a sustainable future and contribute to the development of the nation (Bexell & Jonsson, 2016).

1.2.3 Integrating the SDGs in the education system

Education plays a foundational role in the process of achieving the SDGs. UNESCO (2017) encourages various countries in the world to integrate SDGs in their education systems. In reaction to this, the Ministry of Education and Training in Vietnam developed an Action Plan on Education Sector Response to Climate Change (UNESCO, 2016). The education system in the country assists learners to develop the abilities to think critically, move from awareness to action and develop an aesthetic response to the environment. The learners acquire knowledge about the connection between the destruction of the environment and climate change. Similarly, Seguin (2015) explains that in the education system of Germany, the shift to SDGs is taken as a priority whereby issues of environment and climate change are not left out. Therefore, the integration of SDGs in education has assisted the countries to contribute to the achievement of some SDGs, for instance, SDG 13: Climate action and SDG 15: Life on land.

The education system in Kenya was designed as a catalyst for the achievement of the SDGs (Republic of Kenya, 2015). This is in line with the African Union's Agenda 2063, which calls for action on catalysing education, and a skills revolution to build knowledge, human capital, capabilities and skills that promote the SDGs (African Union Commission, 2015). The National Education Sector Plan in Kenya provides a strategy for education and training to promote the SDGs with reference to the Global Action Programme (Republic of Kenya, 2015). It integrates issues about Climate Change and environmental conservation whereby the learners take part in activities for promoting SDGs, for example, tree planting projects. This concurs with Bekele

(2015) who explains that education system in Ethiopia encourages learners to take part in tree planting projects in order to combat Climate Change problem. This would promote SDG 13: Climate action because the transpiration process in trees would maintain the hydrological cycle and climatic patterns of the region.

In Malawi, the education system strives to achieve the SDGs, for example, SDG 4: Quality education (UNESCO, 2016). This goal ensures that all girls and boys complete secondary school education by 2030. It also aims to eliminate gender and wealth disparities with the aim of achieving universal access to quality education (UNESCO, 2016b). These are reinforced by the priorities quality and relevance, and access and equity that appear in National Education Sector Plan (MoEST, 2008). On the other hand, the education system integrates issues about population growth whereby the learners acquire knowledge about ways of controlling population growth (MIE, 2013b). The knowledge that they acquire assists them when they become adults to practice family planning methods. This would reduce the population growth and maintain food security, hence achieving SDG 2: Zero hunger and SDG 3: Good health and well-being (FAO, 2015). It would also reduce the number of people living beyond poverty line which enhances SDG 1: No poverty. The issues of Climate Change are also integrated in the education system. If all these are well implemented through teaching, they would assist in achieving the SDGs.

1.3 Statement of the problem

Many countries in the world have recognised education as an important tool for promoting SDGs because they are an instrument to capacitate people to improve the environment and national development (UNESCO, 2017). In other words, subjects taught in schools should include content and methods of teaching that address some of the SDGs. With regards to teaching, teachers are

expected to integrate SDGs content in order to transform learners so as to bring real change in the way they think about the environment and practice sustainable use of natural resources (Zhou, 2015). They are supposed to become facilitators of sustainable practices by integrating principles, values, and practices of SDGs into all aspects of teaching and learning (UNESCO, 2016). Reduced to a subject level, Geography teaching and learning are expected to be a vehicle for addressing the agenda of SDGs (Guo & Lane, 2018).

Despite the expectations of what SDGs can achieve, anecdotal evidence suggests that many secondary school Geography teachers in Malawi have limited knowledge and skills of how they can integrate SDGs in their lessons (Lotz-Sisitka, Tshiningayamwe & Urenje, 2017). They appear not to know well enough how to incorporate some of the critical issues of SDGs in the processes of teaching and learning. The style of teaching that they tend to use is usually transmissive and not transformative (Anita, Serbastian & Narayan, 2015). Secondary school Geography teachers undertaking Master of Education in Teacher Education studies at Mzuzu University concurred with the anecdotal evidence that they tended to use transmissive teaching so as to complete the syllabus as a way of preparing learners for examinations (Class discussion, 2018). Mtika and Gates (2010) observe that transmissive style of teaching is usually characteristic of an examination-oriented curriculum. A similar observation labels Malawi secondary school education as too university oriented (wikipedia, n.d). These observations translate to the fact that teachers and learners will engage in methods that will make them pass examinations but pay little attention to the application of knowledge. Therefore, it is questionable that the achievement of some of the critical goals of the SDGs can be realised with the kind of methods of teaching that are framed for examinations and sustainable development of the country. This study therefore, aims to examine how the selected SDGs can be achieved

through the appropriate selection of Geography teaching methods and proper formulation of success criteria that are framed to address sustainable development in Malawi.

1.4 Objectives of the study

The following are the objectives of the study:

1.4.1 General objective

The general objective of the study is:

- 1.4.1.1 To examine how some of the Sustainable Development Goals are achieved through Geography teaching in secondary schools in Malawi.

1.4.2 Specific objectives

The specific objectives of the study are as follows:

- 1.4.2.1 To assess how the success criteria in the secondary school Geography syllabi promote the achievement of some of the Sustainable Development Goals.
- 1.4.2.2 To examine the preparedness of Geography teachers in achieving some of the Sustainable Development Goals through Geography teaching.
- 1.4.2.3 To assess how Geography teachers address some of the Sustainable Development Goals through Geography teaching.
- 1.4.2.4 To investigate the teaching methods that secondary school Geography teachers use for the achievement of some of the Sustainable Development Goals.
- 1.4.2.5 To explore how the achievement of some of the Sustainable Development Goals through Geography teaching can be enhanced.

1.5 Theoretical framework

Below is the presentation of the theoretical framework that the researcher used in the study.

1.5.1 Transformative Learning Theory

The study was guided by the Transformative Learning Theory. This was developed by Jack Mezirow in the late 1900s (Mezirow, 1991). He was interested in peoples' worldviews and what leads people to change their particular view of the world. Transformative Learning is defined as learning that transforms problematic frames of reference to make them more inclusive, reflective, open, and emotionally able to change (Mezirow, 2009). In other words, Transformative Learning refers to learning that touches our deeper levels of knowing and meaning, which then influences our more immediate and concrete levels of knowing, perception and action (Sterling, 2011). Kagoda (2016) elaborates that Transformative Learning Theory involves a deep structural shift in the basic premises of thought, feelings and actions. It is a shift of consciousness that dramatically and permanently alters our way of being in the world. Such a shift involves our relationships with other humans and with the natural world.

Mezirow (1991) developed a model that entails three orders of Transformative Learning as shown in Table 1:

Table 1: Levels of Transformative Learning Model (Mezirow, 1991)

Orders of change/learning	Seeks/leads to	Can be labeled as
First order change:	Effectiveness/Efficiency	“Doing things better”
Cognition		Conformative
Second order change:	Examining and changing	“Doing better things”
Meta – cognition	Assumptions	Reformative
Third order change:	Paradigm change	“Seeing things differently”
Epistemic learning		Transformative

This model describes the “depth” of a learning experience. First order learning aims to increase efficiency by improving knowledge and making the learner realise how to “do things better”. Learning that occurs on this level does not alter the paradigm, as it still takes place within that same worldview. Second order learning goes so deep as to recognise the paradigm we are living in and it intends to examine assumptions, or to put it bluntly, “do better things”. Learning of the third order, which goes by the name of epistemic learning, is concerned with the acquisition of knowledge itself and aspires to help the learner to “see things differently”. It is this type of learning that is transformative and consequently, leads to a paradigm change (Mezirow, 1991).

The Transformative Learning Theory is important in guiding this study because to achieve the SDGs through the teaching of Geography, teachers are expected to use the methods that can change the thinking of learners on how they interacted with the environment (UNESCO, 2016). The teaching of Geography should assist learners to critically question their assumptions, beliefs,

and values about the environment (Odonoghue, 2015). This can assist them to be transformed, ‘see things differently’ and develop new values. The Transformative Learning Theory is therefore important for this study, because it provides a framework against which it will be possible to determine if secondary school Geography content and methods of teaching are in line with Transformative Learning. Further, the researcher will be able to measure if the practices in secondary education in Malawi are framed to address some of the SDGs.

1.5.2 Purpose of the study

The purpose of the study is to examine how the current practices of Geography teaching in secondary schools in Malawi try to achieve some of the SDGs. Further, the study will attempt to propose improvements in how Geography teaching and learning can achieve SDGs.

1.5.3 Significance of the study

The undertaking of this study would be a wake-up call to the Ministry of Education, Science and Technology (MoEST) to start enhancing the internationally agreed policy of incorporating SDGs in the education system, for example, through the teaching of Geography in secondary schools. It would assist the Ministry of Education and the curriculum developers to organise in-service trainings for Geography teachers on how they would integrate the SDGs in the process of teaching and learning. For instance, they would train them how the teaching of Geography content could incorporate inclusive and equitable education (SDG 4); gender equality (SDG 5); combat climate change (SDG 13); and protect and promote sustainable use of natural resources (SDG 15). The study would assist MIE to revise the success criteria in Secondary School Geography Syllabus so that they promote learning through practice. It would help Geography teachers to start using the Transformative Learning Approach in order to achieve the SDGs through Geography teaching.

1.6 Chapter summary

In this chapter, a brief introduction of the study was presented. The researcher narrated the general background information of the SDGs and highlighted the view of integrating SDGs in the education system. The problem statement, objectives of the study, theoretical framework, purpose and the significance of the study were presented in the chapter.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Presented in this chapter is a review of literature on how teaching can contribute to the achievement of some of the SDGs. Among other topics, the researcher examines the importance of success criteria in achieving some of the SDGs, how Geography teachers are prepared to achieve the SDGs in other countries, how Geography teachers address SDGs in their teaching and the teaching methods that are appropriate for achieving SDGs.

2.2 Importance of the success criteria in achieving some of the SDGs

The success criteria are the measures used to determine whether and how well learners have met the learning intentions (Grindsted, 2017). In secondary schools, the teaching syllabus for Geography is expected to have the success criteria that allow learners to have more practice on what they learn in class (UNESCO, 2017). This is supported by Citizenship Education Theory that emphasises on learning through action and practice (Crick, 1999). The study that Guo and Lane (2018) conducted in China found that the Secondary School Geography Syllabus had success criteria that required learners to have more practical activities, for instance, planting vegetative cover. The success criteria were well formulated in order to promote the achievement of SDGs, case in point, SDG 13: Climate action. Similarly, the study that Corney and Reid (2016) carried out in England found that the success criteria in Secondary School Geography Syllabus can assist in promoting SDGs through Environmental Education. The success criteria in the syllabus reflected learners as active co-constructors rather than passive recipients of knowledge within and outside the classroom.

The study conducted by Seguin (2015) in Germany revealed that the success criteria in secondary school Geography syllabus promoted value clarification and problem solving skills on issues related to sustainability. These promoted teaching which enabled learners to see relationships between the society, environment and individual citizens. In addition, some of the success criteria in the secondary school Geography syllabus in Germany have action verbs, for example, “demonstrate, apply, practice, analyse, design, create and evaluate”, (Grindsted, 2017). These action verbs are supported by Dale’s Cone of Experience which reveals that they would lead to high learning and retention (Davis & Summers, 2015). These would assist teachers prepare lessons that promote learning by doing, hence would lead to achieving some of the SDGs like SDG 15: Life on land. Taylor (2012) elaborates that learning by doing assists learners to be transformed and develop new values on how they would interact with the environment. The Transformative Learning Theory supports that teaching should transform learners to become active and responsible citizens in taking care of the environment (Mezirow, 2009). Therefore, the success criteria should be formulated in a way that would encourage learning by doing. This would assist in achieving some of the SDGs through teaching.

2.3 Preparedness of Geography teachers in achieving the SDGs

The teaching of Geography in secondary schools in the world is expected to promote the achievement of SDGs (Lotz-Sisitka, Tshiningayamwe & Urenje, 2017). For this to be effective, Geography teachers should be well prepared. UNESCO (2016) recognised that secondary school Geography teachers in Germany underwent training that equipped them with knowledge about the SDGs. This assisted them to acquire knowledge on how to incorporate the SDGs in the teaching of Geography topics. Seguin (2015) elaborates that a shift to SDGs is currently being addressed as a major priority in Germany education. Similarly, Guo and Lane (2018) found that

secondary school Geography teachers in China were being trained in colleges on how they could teach Geography in order to achieve the SDGs. The knowledge that they acquired assisted them to integrate local issues such as poverty, inclusive and equitable education, Climate Change and biodiversity loss. Therefore, this assisted in promoting the achievement of SDGs like SDG1: No poverty; SDG4: Quality education; SDG5: Gender equality and SDG13: Climate action.

The teacher training colleges in Canada included the SDGs in curricula aiming at equipping Geography teachers with knowledge and skills on how to achieve the SDGs through Geography teaching in secondary schools. Álvarez-García, Sureda-Negre and Comas-Forgas (2015) reported that secondary school Geography teachers in Canada indicated that the Environmental Education course in Geography provided them with new knowledge about SDGs. This assisted them to discover new teaching methods that encouraged learners to have more practical activities within the environment. This would transform learners to develop as responsible citizens in caring for the environment as emphasised by the Citizenship Education Theory (Crick, 1999). On the contrary, in a case study that was conducted in five Faculties of Education in Manitoba, Canada, it was noted that, despite relevant efforts made to equip secondary school teachers with the knowledge about SDGs, there was poor incorporation of SDGs in the secondary school Geography curriculum (Falkenberg & Babiuk, 2016). This was a drawback in achieving the SDGs through Geography teaching in secondary schools. Therefore, all the countries in the world including Malawi should make sure that their secondary school curricula for Geography incorporate the SDGs.

The United Nations Educational, Science and Cultural Organisation launched a project called Sustainability Starts with Teachers (SST) in 2017 (Lotz-Sisitka, Tshiningayamwe & Urenje, 2017). It was done with the aim of training teacher educators so that they would later on train secondary school teachers. UNESCO (2017) recommends the programme as very important in preparing secondary school Geography teachers on how they would enhance SDGs through Geography teaching. The project operates in Malawi, Botswana, Lesotho, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe. It aims at ensuring that by 2030, all learners acquire knowledge and skills needed to promote SDGs (UNESCO, 2016). It encourages secondary school teachers to use Transformative Learning approaches, for instance, action learning and futures thinking. This assists in producing citizens who would make positive contribution to society, peace and sustainable development. This is in line with the Development Education Theory which suggests that teaching should assist learners to acquire education that would assist them to understand the world and develop as citizens who can act and contribute to sustainable development (O’Flaherty & Liddy, 2017).

In Malawi, UNESCO organised a workshop at Chancellor College of the University of Malawi aiming at training teacher educators on how secondary school teachers can incorporate SDGs through education (UNESCO, 2017). It was hoped that this would assist teacher educators to start training secondary school Geography teachers about SDGs in various colleges. Lotz-Sisitka, Tshiningayamwe and Urenje (2017) encourage teacher educators to train teachers on how they would incorporate SDGs through the teaching process of subjects including Geography. Despite this, most secondary school teachers seem not prepared on how they can incorporate SDGs through teaching (UNESCO, 2016b). It is likely that teachers who are not well prepared cannot use proper methods in teaching the content. This cannot assist learners to be transformed on how

they interact with the environment. This is against the Transformative Learning Theory which believes that teaching methods should assist to transform learners on how they view and interact with the environment (Mezirow, 2009). Therefore, it is necessary for the MoEST officials to organise trainings aiming at equipping Geography teachers on how they would promote the SDGs, for instance, SDG 4: Quality education, SDG 5: Gender equality and SDG 13: Climate action.

2.4 How Geography teachers address SDGs

2.4.1 Tree planting

The Geography teachers have a great task of addressing SDGs through the teaching of Geography. Bekele (2015) noted that some secondary school Geography teachers in Ethiopia launched tree planting project whereby Geography learners and community members worked hand in hand in the project. For instance, a total of 6, 000 seedlings were planted at Yeka Wacho and Worgaja schools. These covered an area of 4.3 hectares of the school's land. Some of the tree seedlings were: Juniperusporous, Neem, Mango, Coffee, Suspanea, and Olea africana. This agrees with the Transformational Learning Theory which encourages learning through practice (Sterling, 2011). On a similar note, UNESCO (2016c) found that secondary school Geography learners in Japan took part in tree planting projects, for example, at Okazaki Secondary School. This was done with the aim of promoting sustainable and climate friendly schools. The planting of trees would assist in achieving some of the SDGs, for instance, SDG 13: Climate action and SDG 15: Life on land. This is because trees have a role to play in the hydrological cycle through transpiration process (Roberts, Vertessy & Grayson, 2008). This contributes to the formation of clouds that lead to precipitation which is vital in agriculture activities. Trees absorb carbon dioxide from the atmosphere through the process of photosynthesis. This is used for making

sugar, starch and complex molecules like cellulose and lignin (Chen, Zhang & Tang, 2011). The trees later on release oxygen that people use for breathing. This leads to the achievement of SDG 3: Good health and well-being because the oxygen that people breathe assist them to live healthy lives.

2.4.2 Bushfire control lessons

Since Australia lies between the tropics and is prone to bushfires, the Geography teachers in Australia prepare special lessons about bushfires (Hughes & Steffen, 2013). The teaching of the lessons assists learners to acquire knowledge on how they would control bushfires that would have devastating impact on the environment hence promoting the SDGs like SDG 15: Life on land. Keating and Handmer (2013) explain that the secondary school Geography learners in Australia carry out projects, for instance, constructing firebreaks surrounding their compounds and work together with their communities in controlling bushfires. Similarly, World Bank (2018) found that Geography learners in India were taught how to control bush fires that brought economic loss of US\$ 164 million per year. Case in point, they were given tasks by teachers to construct firebreaks surrounding their school compounds and woodlots. The practice would lead to the achievement of SDG 13: Climate action because trees that learners protected would assist in maintaining climate. Trees act as water filters and improve water quality (Muhammad, Tahir & Ayub, 2013). These promote SDG 6: Clean Water and Sanitation. Jackson (2017) explains that trees attract tourists who bring foreign currency that boosts the economic development of a country. These also provide canopy and habitat for wildlife that promote SDG 15: Life on land.

2.4.3 Practice in rainwater harvesting

Rainwater harvesting is one of the ways how Geography teachers address the SDGs. Helmreich and Horn (2009) define rainwater harvesting as the collecting, storage, usage and management of runoff through various schemes as sustainably as possible. In practice, this includes managing water in dams, shielding soils to prevent extensive evaporation, storing rainwater in tanks and collecting rainwater from rooftops. Rahimi (2018) recognised that secondary school Geography teachers in Afghanistan encouraged learners to practice rainwater harvesting from the rooftops in order to relieve water scarcity problems in their schools. They collected water into tanks that learners later on used for drinking and watering tree seedlings in times when rain was not available. This is not different from the findings by Kenya Rainwater Association (2014) that some Geography teachers encouraged learners to practice rainwater harvesting as a strategy to secure water resources in their schools. They used simple and low cost techniques that involved the capturing and storing of rainwater in tanks or dams. This corresponds to the Transformational Learning Theory which explains that learning cannot take place until learners are able to take actions in the environment that they live in responsible manners. UNESCO (2017) reveals that rainwater harvesting assists in promoting SDG 2: Zero hunger because the harvested water would be used for irrigating crops when rain stops. It would also promote SDG 12: Responsible Consumption and Production in the sense that water would be used to the maximum, instead of losing it through runoff.

2.4.4 Practice in Waste Management

Geography teaching in other secondary schools incorporate practice in Waste Management that promotes the achievement of SDGs. Ifegbesan (2008) defines Waste Management as activities

that include the collection, transport, treatment and disposal of waste, together with monitoring and regulation of waste management process. In a study that Adeolu (2014) conducted in secondary schools in Nigeria, he found that 70.6% of Geography teachers encouraged learners to practice Waste Management in their schools. Some of the activities included re-use or recycle of wastes rather than throwing them away. For instance, Geography teachers taught learners how to do paper recycling. Later on, the learners produced recycled papers that they sold and got money. Similarly, Iyad (2015) brought to light that 69.81% of secondary school Geography teachers in Palestine prepared practical lessons on the topic of Waste Management. Learners were encouraged to do paper recycling. They also constructed pits where they dumped inorganic waste. His study revealed that waste incineration was the largest school waste (21.12%), followed by organic waste (15.36%), then paper (13.44%). Waste Management would assist in promoting SDG 3: Good Health and Well-being in the sense that the school environment would be clean and learners would not easily suffer ill-health that may be caused as a result of mismanagement of waste. Further, the application of knowledge and skills that learners obtained in recycling waste would assist them to make money. For instance, through paper recycling, they would raise income for the development of their families in the life after school. This is in line with the Development Education Theory which emphasises that the new vision of teaching should empower learners to become active citizens who can contribute to development (Bexell & Jonsson, 2016).

2.4.5 Practice in sustainable land use

Practice in sustainable land use is an important aspect in the teaching of Geography in order to promote the achievement of SDGs (UNESCO, 2016). This is suitable in addressing the causes

and consequences of land degradation, desertification and climate change that lead to the achievement of SDGs. In line with this, FAO (2015) uncovered that secondary school Geography teachers in Germany prepared lessons that included activities for the Geography learners to practice sustainable land use. The learners practiced activities that ensured that no serious disturbance in the ecosystem was caused due to land use. In this case, they had pieces of land where they practiced agro-forestry. This would ensure sustainability of the resources in the environment, for instance, trees. Therefore, it would promote the achievement of SDG 15: Life on land in the sense that the ecosystem where plants and animals survive would be maintained. There would also be the promotion of SDG 13: Climate action. Bekele (2015) explains that trees assist in maintenance of climatic patterns of the region as they support the hydrological cycle through transpiration.

2.5 Teaching methods that are appropriate for achieving SDGs

2.5.1 Fieldwork

Fieldwork is one of the teaching methods that secondary school Geography teachers use in order to achieve the SDGs (Lotz-Sisitka, Tshiningayamwe & Urenje, 2017). This is the method of teaching that provides opportunities to learn through direct and concrete experiences, thereby enhancing the understanding that comes from observing real world manifestations of abstract geographical concepts and processes (Kagoda, 2016). The involvement of Geography learners in the learning process provided by fieldwork provides the learner with sound and concrete basis for conceptualisation and first hand information which makes learning more meaningful (Behrendt & Franklin, 2014). This would easily transform the minds of learners on how they view the environment. Consequently, they would start taking care of the environment, hence promoting the SDGs, for instance, SDG 12: Responsible consumption and production. This is in

line with Citizenship Education Theory which believes that education should assist learners to practice what they learn and become active and responsible citizens in caring for the environment (Crick, 1999). In a study that Benjamin and Wakhutu (2014) conducted about the methods used in teaching Geography in secondary schools in Kenya, they found that 56.2% of teachers used fieldwork. The findings were different from what Mohammed (2016) discovered in secondary schools in Ethiopia, where 87.4% disagreed that they did not use field trips in the teaching of Geography. This would not assist in the achievement of SDGs because learners would not easily be changed in their thinking. Behrendt and Franklin (2014) explain that field trips assist in increasing learners understanding and building interest, and care for the resources in the environment. In this case, if they develop interest and start taking care of trees, it would promote SDG 13: Climate action. This is because the transpiration process through the leaves of trees would assist in maintaining the hydrological cycle and climatic patterns of the region.

2.5.2 Lecture

Some secondary school Geography teachers use lecture method when delivering lessons (Benjamin & Wakhutu, 2014). In this method, there is one channel of communication whereby teachers are active and learners are passive (Thungu, 2008). Learners listen and take down notes in the course of the lesson. The study that Marie, Lindsay and Edlea (2017) conducted in secondary schools in the Philippines, but specifically in Zamale Division, the Geography teachers (52%) agreed that they used lecture method in the teaching of Geography. In reality, this method would not assist in achieving the SDGs because it would not transform the learners. Thungu (2008) explains that the method limits the learners' participation in the lesson and does not develop the learners' power of reasoning. Gitau (2015) argues that lecture method may be

useful for teaching a large class but it may not be effective in transforming the minds. There is a need to use the methods that would assist the learners to learn through practice, so as to transform their minds on how they interact with the environment.

2.5.3 Experiments

Experiments are very important in the teaching of Geography, especially in achieving the SDGs (UNESCO, 2017). These allow learners to ask questions, probe for answers, conduct investigations and collect data. Dermici, Kesler and Kaya (2015) in Turkey, found that only 25% of Geography teachers in secondary schools used experiments in a term. This was a drawback in the achievement of SDGs through Geography teaching. That was different from what Grindsted (2017) found in selected secondary schools in Germany, that Geography teachers (68%) used experiments in some Geography lessons. Mohammed (2016) explains that experiments in Geography lessons promote the development of thinking in learners rather than making them memorise the facts. For instance, in the topic “Environment”, learners would conduct an experiment about transpiration in trees by tying the leaves inside plastic bags. When they discover that there is water inside the bags after three hours, they would be transformed and understand that trees are very important. They would change their thinking and start planting more trees. This promotes the achievement of SDG 13: Climate action.

2.5.4 Action learning

In Southern Africa, UNESCO (2017) encourages secondary school Geography teachers to use action learning in order to achieve the SDGs through Geography teaching. Wals (2010) defines action learning as a process that involves groups of learners working on real problems, taking

action and learning as individuals. This stimulates transformation in the learners that assist to achieve the intended goals. In a study that was conducted by Odonoghue (2015) in selected secondary schools in South Africa, he observed that most Geography teachers (64%) used action learning in teaching Geography. The learners developed creative, flexible and successful strategies to pressing problems. For instance, after discovering that there was a problem of deforestation, they started taking action by planting trees that promoted the achievement of SDG 12: Responsible Consumption and Production. This agrees with the Citizenship Education Theory which emphasises that teaching should assist learners to become responsible citizens in conserving the environment (Bexell & Jonsson, 2016). On the contrary, the study by Marie, Lindsay and Edlea (2017) in secondary schools in Philippines indicated that most Geography teachers (96%) did not use action learning in the teaching of Geography. This would not assist in achieving the SDGs. In reality, if teachers use action learning in the teaching of Geography, learners would easily solve the environmental problems like bushfires, deforestation and soil erosion. This would promote SDG 13: Climate action and SDG 15: Life on land.

2.5.5 Case study

The case study is another vital method that teachers should use in the teaching of Geography in order to achieve some of the SDGs (UNESCO, 2017). This is a highly adaptable method of teaching that involves problem-based learning and promotes the development of analytical skills in learners (Gitau, 2015). The study that Dergirmenci and Ilter (2017) conducted in secondary schools in Turkey found that most Geography teachers (93%) did not use the case study but instead used the traditional methods. This would not assist in achieving SDGs in the sense that learners would not be able to analyse the problems in their local environments like water

pollution so as to find the solutions. On a different note, Kagoda (2016) brought to light that most Geography teachers (67%) in secondary schools in Uganda used case study in the teaching of Geography. This would promote the SDGs because case studies assist learners to think critically on the causes of environmental problems that affect their daily lives, and find ways of curbing them (Behrendt & Franklin, 2014). For example, the case study of floods in their local areas would assist them find the root causes, so as to find solutions like planting vegetative cover in flood prone areas. This would promote SDG 15: Life on land in the way that lives of people and animals will be safe if floods are controlled. It is likely that development activities cannot be disturbed in the environment that is free from floods.

2.5.6 Explanation

Some Geography teachers use explanation in the teaching of Geography. Gitau (2015) explains that explanation method is largely a passive process and does not arouse learners' interest. Thungu (2008) extends that retention by learners is often poor if Geography teachers use explanation method. This gives a clear picture that the method would not promote the achievement of SDGs because if it leads to poor retention, then learners' thinking would not be transformed. Mulemi (2014) observed that 69% of Geography teachers in Zambia used explanation method in the lessons. They did that with the aim of covering all the topics in the Geography syllabus. This concurs with the findings by Ng'eno (2015) who uncovered that most Geography teachers in Kenya used explanation method in the teaching of Geography. This would not lead to the achievement of SDGs. UNESCO (2017) recommends the use of teaching methods that would assist the learners have more practice so that they would be fully

transformed on how they would best interact with the resources in the environment. This would assist in achieving SDG 12: Responsible Consumption and Production.

2.6 Enhancing SDG achievement through Geography teaching

2.6.1 In-service trainings

Conducting in-service trainings for Geography teachers about SDGs would assist them to promote the achievement of SDGs (Lotz-Sisitka, Tshiningayamwe & Urenje, 2017). In line with this, UNESCO started training teacher educators to train secondary school Geography teachers in various colleges in Southern Africa including Malawi (UNESCO, 2017). In Germany, Walter and Brock (2018) found that secondary school teachers for various subjects including Geography attended trainings about the SDGs. This assisted them to acquire knowledge on how they would teach, with the aim of promoting the achievement of SDGs. The training about SDGs would assist teachers to understand the Earth as a system, key life supporting processes and how ecosystems function to support the diversity of life (Bexell & Jonsson, 2016). This would promote SDG 15: Life on land because teachers would have knowledge to equip the learners on how they would protect, restore and promote sustainable use of biodiversity in the ecosystem.

2.6.2 Use transformative pedagogies

Geography teachers should use transformative pedagogies in the teaching of Geography so as to achieve SDGs (Lotz-Sisitka, Tshiningayamwe & Urenje, 2017). Teaching should not be transmissive but transformative in order to avoid rote learning (Mezirow, 2009). Some methods are good for trying things out or acting things out while the other methods are good for enabling learners to work out issues. Teachers should know which method to use for a particular purpose. They should choose the methods that will change the learners thinking positively. In this case, teachers should choose the methods of teaching that would give learners an opportunity to try

things out by doing them (Davis & Summers, 2015). If the teacher is teaching the topic about deforestation, let the learners take action of planting trees. This would assist them to become changed citizens and it would be a lesson to the community members who may later on be transformed by the learners' actions on how they interact with the environment, hence promoting the SDGs.

2.6.3 Gender justice principles

Gender justice principles would be used by secondary school Geography teachers in order to achieve the SDGs. UNESCO (2017) encourages teachers to use gender justice principles in the teaching of various subjects including Geography in secondary schools. Both boys and girls should be given equal opportunities to participate in practical activities assigned to them. This would assist to change power relation structures, norms and values that hinder females from development activities. This implies that both males and females would develop values that can assist them to contribute to the development of the nation. Bekele (2015) recognised that Geography teachers in secondary schools in Ethiopia involved both girls and boys in tree planting projects. This would promote SDG 5: Gender equality because both males and girls were given equal opportunity to care for the environment. FAO (2015) supports that teachers should promote gender mainstreaming in all activities aiming at protecting the environment. Through Geography lessons that incorporate gender justice principle, learners would realise that males and females have roles and responsibilities to manage the environment in their societies. In true sense, gender justice principles are catalysts to achieving SDGs.

2.6.4 Values Education

Geography teachers would use Values Education as a way of promoting the achievement of SDGs. Lovat (2011) defines Values Education as a process of teaching and learning about the ideals that a society deems important. Through this, learners develop positive attitudes and behaviour on how they interact with the environment. This is supported by UNESCO (2017) which recommends that Geography teachers should use Values Education to empower learners to take responsible actions by keeping in mind environmental integrity and a just society, both for present and future generations. In this case, Geography teachers would give learners tasks that can assist them to think and value trees as deserving to be protected and managed in a sustainable manner. Values Education assists secondary school Geography learners to develop characters that lead to preservation of the environment from destruction by human activities (UNESCO, 2016). Teaching through Values Education would assist Geography learners to develop characters that lead to sustainability of the environment. For example, they may discover that if they cut down trees carelessly, the land will be bare. This would lead to soil erosion. The learners would realise that when rains fall, there would be siltation of rivers leading to flooding. This would assist them to develop the values of responsibility and self control relating to their environment. If this is done, SDGs are likely to be promoted.

2.6.5 Use critical thinking skill

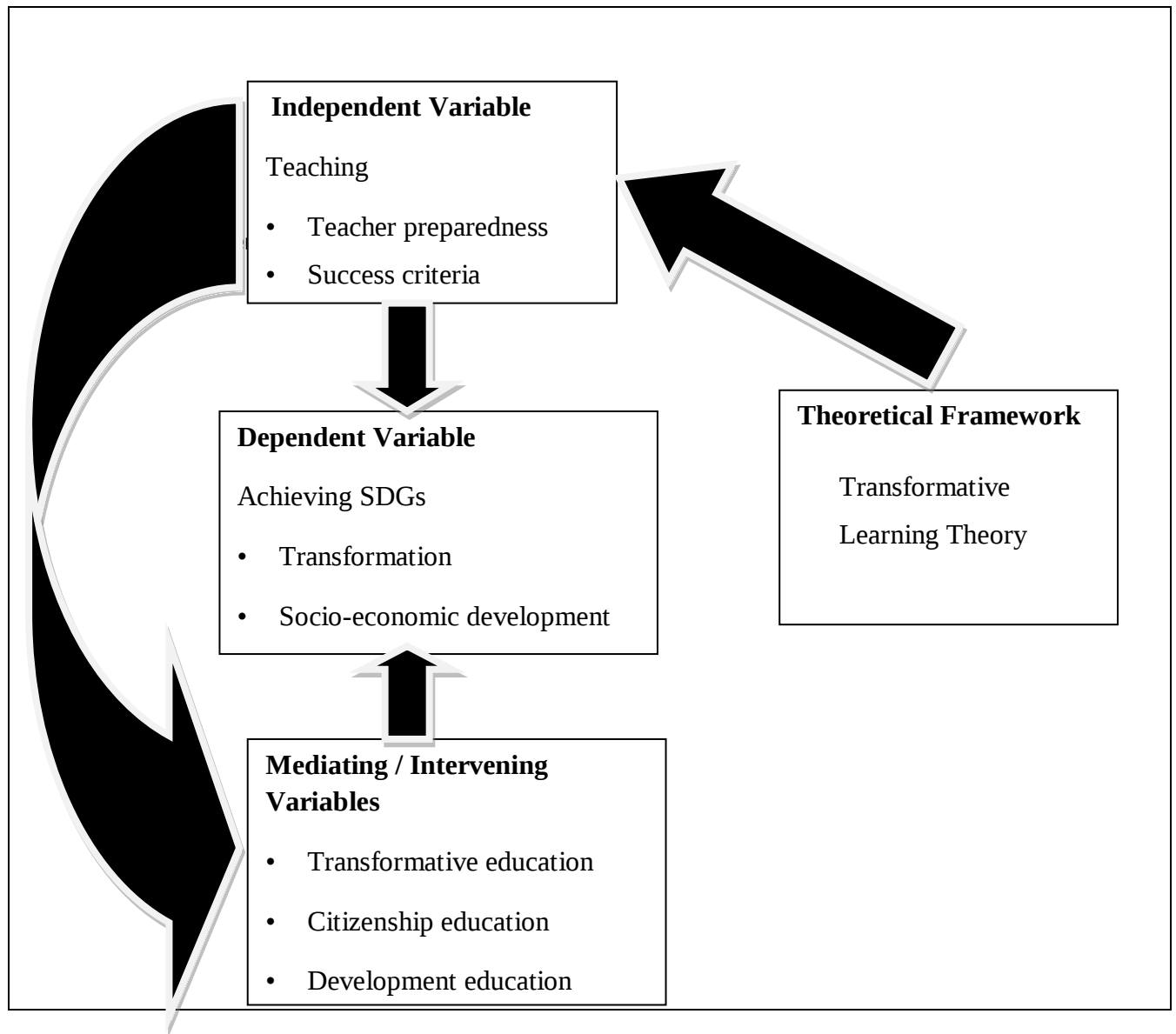
In some countries, for example China, teachers emphasise using the skill of critical thinking when teaching Geography topics (Falkenberg & Babiuk, 2016). Halpern (2001) defines critical thinking as the intellectually disciplined process of actively and skillfully conceptualising, applying, analysing, synthesising and evaluating information gathered from observation,

experience, reflection, reasoning, or communication, as a guide to belief and action. Learners would think of the environmental challenge of deforestation and link it with SDG 2: Zero hunger. They would think and discover that if trees are cleared, there would be the disturbance of water cycle, hence regular rain patterns would be affected (Roberts, Vertessy & Grayson, 2008). If this happens, agriculture activities would be affected negatively leading to possible reduced agricultural produce and consequent reduction in food availability and agro-based industry. In this case, learners would discover that deforestation can be a barrier to achieve SDG 2: Zero hunger. This would transform them on how they think about the environment. According to UNESCO (2016b), critical thinking method must be designed with an end-goal of learners developing the ability to assess, analyse, synthesise and evaluate a problem independently, and with confidence in the accuracy of their thinking. There is little doubt that SDGs would be promoted if Geography teachers in other countries including Malawi emulate the strategy of critical thinking as being practiced by Geography teachers in China.

2.7 Conceptual framework

Figure 1 below shows the conceptual framework or synthesis of literature review.

Figure 1: Conceptual framework (synthesis of literature review)



The conceptual framework in Figure 1 synthesises the literature review. In the study, teaching is an independent variable. It is the teaching that affects the achievement of SDGs. If the Geography teacher is well prepared and the success criteria are well formulated, it is likely that

SDGs can be achieved. In the conceptual framework, achieving SDGs is a dependent variable because it depends on the teaching as reflected in the topic of study. In the process of achieving SDGs, transformation and socio-economic development are some of the indicators. Further, the conceptual framework contains mediating variables which are difficult to measure. These are caused by independent variables and cause dependent variables. From the literature review; transformative education, citizenship education and development education are mediating variables. These are caused if the Geography teachers are well prepared and use better methods for achieving SDGs. The mediating variables are the indicators of an improved process of teaching and learning. The overall impact will be the achievement of the dependent variable which is the achievement of the SDGs which will lead to socio-economic transformation of the country. On the other hand, the Transformational Learning Theory directly impacts the independent variable which is teaching. If the teacher applies this theory in the teaching of Geography, better methods of teaching are likely to be prepared that can transform learners on how they interact with the environment. This can lead to the achievement of SDGs.

2.8 Chapter summary

In this chapter, the researcher has presented a review of literature in connection to the study. The literature about the success criteria for secondary school Geography syllabi has been presented. Further, the review of the preparedness of Geography teachers in achieving the SDGs and how they address issues of SDGs through Geography teaching have been included in the chapter. The researcher has presented the review of the teaching methods that secondary school Geography teachers use for the achievement of SDGs. The review of literature on how to enhance SDG achievement through Geography teaching has been presented. In the chapter, the researcher has also presented the conceptual framework or synthesis of literature review.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The purpose for conducting the study was to examine how some of the SDGs are achieved through Geography content and teaching in secondary schools in Malawi. Presented in this chapter are research paradigm, research design, research geographical area, sampling techniques, data collection methods and instruments, methods for data analysis, trustworthiness and credibility of research instruments (qualitative research instruments), validity and reliability of research instruments (quantitative research instruments) and ethical consideration.

3.2 Research paradigm

In the study, the researcher used pragmatic paradigm. Creswell (2014) explains that this paradigm does not commit to one system of philosophy and reality. It gives researchers the freedom to choose the methods, techniques, and procedures of research that best meet their needs and purposes. Pragmatists do not see the world as an absolute unity. Cohen, Mario and Mourisson (2007) extend that the use of pragmatic paradigm opens the door to multiple methods, different worldviews, and different assumptions, as well as different forms of data collection and analysis. Therefore, the application of this paradigm was important because mixed methods and different forms of data collection were used in the study.

3.3 Research design

Research design is defined as a strategic framework or plan that guides research activity to ensure that sound conclusions are reached (Durrheim, 2006). The research process or practice becomes purposeful, meaningful and systematic exercise if it is carried within the realms of a

distinct and a definable mode of investigations called research design (Cohen, Mario & Mourisson, 2007). The mixed methods of both quantitative and qualitative were used in the study. Creswell (2014) explains that mixed methods provide a more complete understanding of a research problem than either quantitative or qualitative data alone. The design assisted in providing complementary, deeper and meaningful information.

The quantitative approach in the research assisted in answering the ‘how many’ questions by simply measuring or counting attributes. Flick (2004) explains that quantitative approach in a study assists in transforming data numerically for easy analysis. The researcher used the SPSS software package for analysing quantitative data. The study used the computer excel software package for drawing graphs, tables and pie-charts.

In qualitative approach, the researcher asked questions in order to find out how Geography teachers were prepared to achieve some of the SDGs through Geography teaching. This approach assisted to explore the ideas and knowledge that Geography teachers had on issues about achieving the SDGs through the teaching of Geography topics. Creswell (2014) asserts that qualitative approach assists to generate rich descriptive data that helps to understand experiences and attitudes of respondents. Therefore, the approach assisted respondents to tell their stories that gave the researcher an opportunity to probe and seek clarifications. It was also easy to collect data that was not quantified. Cohen, Mario and Mourisson (2007) support that qualitative approach assists researchers to collect data that cannot be quantified.

3.4 Research geographical area

This research was conducted in thirty eight secondary schools within the Shire Highlands Education Division (SHED) in the Southern Region of Malawi. The study took place in schools found in Phalombe, Mulanje, Thyolo, and Chiradzulu districts. The researcher chose the site considering the fact that the environment in the area was at threat due to the presence of tea estates. The chemicals that were applied in estates led to land and water pollution. This was against the universally agreed SDGs, for instance, SDG 14 “Life below water” and SDG 15 “Life on land”. Some youths in the area dropped out from school and started working in estates. This hindered them from having access to quality education (SDG 4). Therefore, by conducting the research in this geographical area, it assisted in finding solutions that Geography teachers would use when teaching the subject with the aim of achieving the SDGs. For example, Geography teachers in this area would be equipped with skills that would assist them to transform the thinking of learners about issues of sustainability.

3.5 Sampling strategies and sample size

In a quantitative study, the researcher used the sample of seventy six Geography teachers from thirty eight schools. To arrive at the sample of thirty eight schools, the researcher found out first, that there were eighty eight secondary schools in SHED. Then later on used the statistical

formula: $n = \frac{n_0}{1 + \frac{n_0 - 1}{N}}$ whereby the level of confidence = 90%, P value = 0.5 and E = 10%. This

was then calculated as $n = \frac{67.650625}{1 + \frac{67.650625 - 1}{88}}$. After the calculations, it gave the total sample of thirty

eight schools in the division. To find the sample of schools per district, the researcher used the

formula $\frac{\text{number of schools in the district}}{\text{number of schools in the division}} \times 38$. Therefore, in Phalombe the sample of schools was

$\frac{15 \times 38}{88} = 6$; in Thyolo, the sample of schools was $\frac{28 \times 38}{88} = 12$; in Chiradzulu, the sample of schools was $\frac{18 \times 38}{88} = 8$; while in Mulanje, the sample of schools was $\frac{27 \times 38}{88} = 12$.

The researcher used purposive sampling in the selection of specific schools where the study was conducted per district. This was done to give chance to both CSSs and CDSSs to take part in the study. There were only seven CSSs in SHED; therefore, purposive sampling assisted to include them all in the research. Out of the six sampled schools in Phalombe district, five were CDSSs while one was CSS. In Thyolo, out of twelve sampled schools, ten were CDSS while two were CSSs. In Chiradzulu, out of the eight sampled schools, six were CDSSs while two were CSSs. In Mulanje, out of the twelve schools, nine were CDSSs while three were the CSSs.

To come up with the sample of seventy six Geography teachers, the researcher used purposive sampling whereby two teachers were selected from each of the thirty eight sampled secondary schools. This was to ensure that each school had one teacher from junior section and another teacher from senior section. Cohen, Mario and Mourisson (2007) explain that purposive sampling involves selecting participants based on the researcher's judgment about certain characteristics being sought to meet the objectives of the study. In line with this, purposive sampling assisted in selecting teachers with not less than three years of teaching experience. These were teachers in possession of diploma or degree in education. The choice of experienced teachers was necessary as Loughran, Berry and Mulhall (2008) assert that so much of the knowledge of teaching is implicit in experienced teacher's teaching. Three years of teaching experience is deemed enough for one to develop experience of teaching Geography.

Below is the summary table for the sample that was used in the study:

Table 2: Summary of sample used in the study

District	Target number of schools	Target population (Geography teachers)	Sample (Geography teachers)
Chiradzulu	8	25	16
Mulanje	12	30	24
Phalombe	6	18	12
Thyolo	12	32	24
Total	38	105	76
Other participants			
Officer			Sample
An officer from inspectorate section of MoEST			1
An officer responsible for developing Geography syllabus at MIE			1
Total			2

3.6 Data Collection Methods and Instruments

Below is the presentation of data collection methods and instruments that the researcher used in the study.

3.6.1 Interviews

The researcher used semi-structured interviews for collection of data about the preparedness of Geography teachers in achieving the SDGs through Geography teaching. Tayie (2005) defines semi-structured interview as a qualitative research method that combines a pre-determined set of open questions with the opportunity for the interviewer to explore particular themes or responses further. Cohen, Mario and Mourisson (2007), extend that semi-structured interview is an effective method for providing reliable and comparable qualitative data with different participants, even given different interviewers. The flexible structure of this interview allowed the researcher to prompt or encourage the interviewee in order to get more information. The semi-structured interviews were recorded using audio recorder. This instrument had an advantage of recording the whole interview and provided complete data for analysis.

3.6.2 Questionnaire

Seventy six questionnaires were administered to seventy six selected Geography teachers in seven CSSs and thirty one CDSSs in SHED. The researcher personally visited 38 secondary schools. The school heads permitted to distribute the questionnaires to teachers. Respondents were given 15 minutes to answer the questionnaire. Both close and open ended questions were presented in the questionnaire. Fraenkel and Wallen (2009) assert that open ended questions allow respondents to give information in great depth by expressing themselves fully about what they know on the questions being asked. In connection to this, Geography teachers were open to express themselves on how they addressed issues of SDGs through Geography teaching. The

closed questions, on the other hand, assisted respondents to provide definite answers with regard to their knowledge on a particular phenomenon.

3.6.3 Document analysis

Document analysis was another method that the researcher used in the process of data collection. O’Leary (2014) defines document analysis as a systematic procedure for reviewing or evaluating documents either printed or electronic material. This method assisted in assessing how the success criteria in both Junior and Senior Secondary School Geography Syllabi helped in promoting the achievement of SDGs. The use of document analysis assisted the researcher to draw upon multiple sources of information by seeking convergence and corroboration through the use of different data sources and methods. Bowen (2009) supports the use of document analysis that it assists to triangulate information which provides a confluence of evidence that breeds credibility of research.

3.7 Data analysis

Below is the description of how the researcher analysed the data that was collected from interviews, document analysis and questionnaires.

3.7.1 Interview data

The researcher analysed interview data by transcribing verbatim following the order of the interview schedule. The audio recorder was replayed several times to ensure accuracy in the transcription process. Cohen, Mario and Mourisson (2007) explain that replaying audio several times assists the researcher to transcribe the right information and maintain its accuracy. The researcher coded and grouped the key points into categories.

3.7.2 Document analysis

The researcher analysed thematically the data that was collected from the success criteria in both Junior and Senior Secondary School Geography syllabi. Thematic analysis is a form of pattern recognition within the data, with emerging themes becoming the categories for analysis (Fereday & Muir-Cochrane, 2006). The process involves a careful, more focused re-reading and review of the data. In this case, the reviewer took a closer look at the success criteria in the Junior and Senior Secondary School Geography syllabi on how they assisted in promoting the achievement of the SDGs. The researcher performed coding and category construction based on the data's characteristics in order to uncover themes pertinent to a phenomenon. Like other analytical methods in qualitative research, document analysis requires that data be examined and interpreted in order to elicit meaning, gain understanding, and develop empirical knowledge (Corbin & Strauss, 2008).

3.7.3 Questionnaire

In quantitative study, the researcher analysed the data using the SPSS computer software. This assisted the researcher to produce tables and find the percentages of respondents who answered various questions (Creswell, 2014). The information was necessary in the interpretation of results. The computer excel software was used for drawing pie charts and the graph.

3.8 Trustworthiness and credibility of research instruments

The researcher considered the issues of trustworthiness and credibility of research instruments on the part of qualitative study. Cohen, Mario and Mourisson (2007) describe trustworthiness and credibility as establishing, transferability, conformability and dependability. In qualitative study, the researcher used semi-structured interview guides. To ensure trustworthiness and credibility of the research instruments, the supervisor checked them and gave advice where to make

corrections. The researcher prepared interview guides for an officer from inspectorate section and for an officer responsible for developing secondary school Geography syllabus. This was done in order to triangulate data which would ensure trustworthiness and credibility of the information collected.

3.9 Validity and reliability of research instruments

Validity of research instruments refers to the extent to which the instrument measures what it is supposed to measure (Flick, 2004). To achieve this, the researcher conducted a pilot study to test the questionnaire. This was split into halves so as to determine the reliability estimate. A sample of six Geography teachers was used in the pilot study. The Spearman Brown prophecy formula

was used so as to determine the reliability coefficient. The formula was $r_{11} = \frac{2r_{\frac{1}{2}\frac{1}{2}}}{1+r_{\frac{1}{2}\frac{1}{2}}}$. After the

pilot study, the reliability coefficient was 0.8; so the questionnaire was valid and reliable.

3.10 Ethical considerations

Creswell (2014) explains that ethical consideration is concerned with the creation of a trusting relationship between those who are researched and the researcher. In the study, the participants were assured that the information they provided would be treated with complete confidentiality. Participants were assured that they were free to stop participating in this study any time they felt necessary. The right to privacy of the teachers and their schools would be respected. The researcher got a permission letter from the office of the Dean in the Faculty of Education. The Education Division Manager of SHED provided the permission letter to conduct the study in the selected secondary schools. The researcher gave consent letters to the Head teachers in secondary schools where the study was conducted. Each participating teacher signed a consent form to accept participation in the study.

3.11 Chapter summary

In this chapter, the researcher has presented the pragmatic research paradigm that was used in the study. The research design, research geographical area, sampling techniques, data collection instruments, methods for data analysis, trustworthiness and credibility of research instruments (qualitative research instruments), validity and reliability of research instruments (quantitative research instruments) and ethical consideration for the study have been presented in the chapter.

CHAPTER 4

PRESENTATION OF THE RESULTS

4.1 Introduction

Presented in this chapter were the results of the study that was conducted in Shire Highlands Education Division (SHED) in Chiradzulu, Mulanje, Phalombe and Thyolo. The researcher presents both quantitative and qualitative data following the order of specific objectives.

4.2 Quantitative data

Below is the presentation of results from quantitative data:

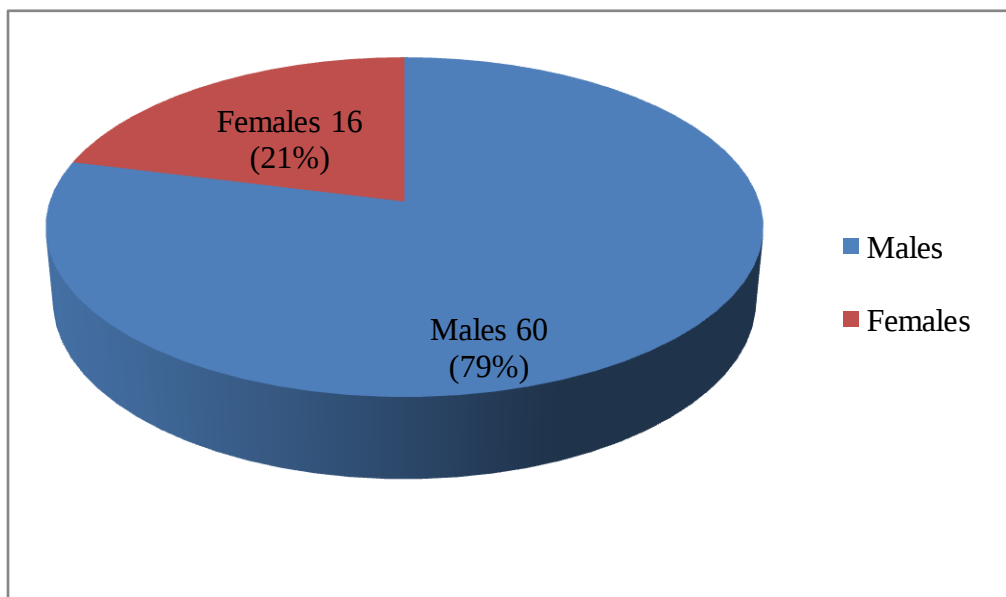
4.2.1 Demographic data of respondents

The demographic data for the respondents is shown below:

4.2.1.0 Distribution of teacher respondents by gender

Figure 2 below shows the distribution of teacher respondents by gender:

Figure 2: Distribution of teacher respondents by gender

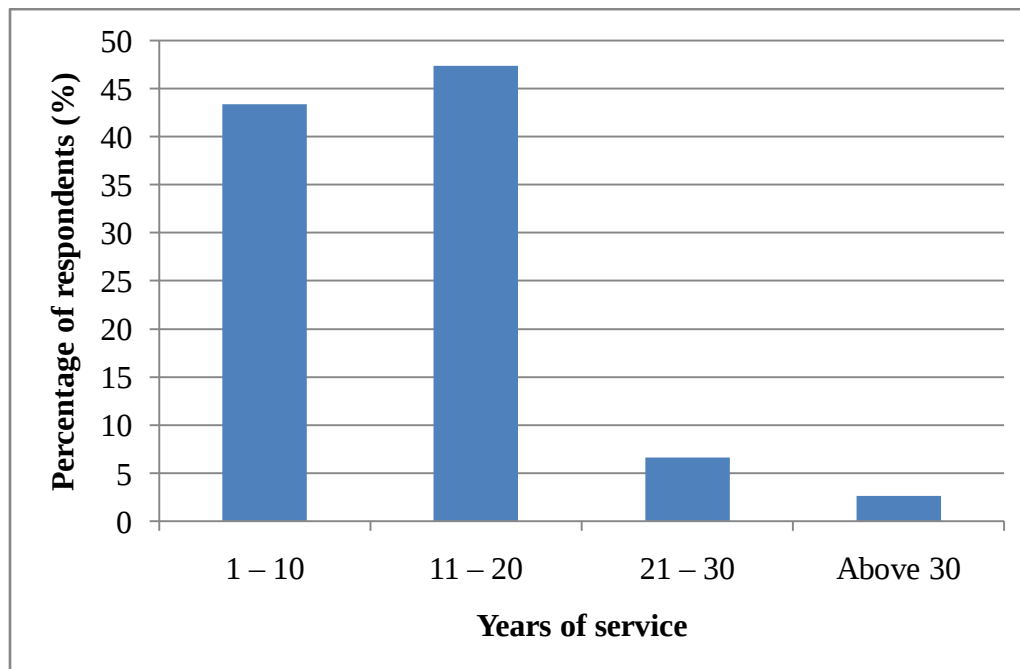


Data on the gender of respondents indicated that 60 Geography teachers (79%) were males as shown in figure 2 above. On the other hand, 16 Geography teachers (21%) were females. The percentage of males was higher than that of females because in most schools, there were no Geography female teachers. This disparity would have an impact on the responses, especially on the suggestion that teachers should use gender justice principles in the teaching of Geography as part of promoting SDG 5: Gender equality. Either male or female teachers would have different views on this based on their sex.

4.2.1.1 Years of service for respondents

The Geography teachers were asked to indicate the range of years they had been teaching.

Figure 3: Percentage of the respondents for each range of years of service



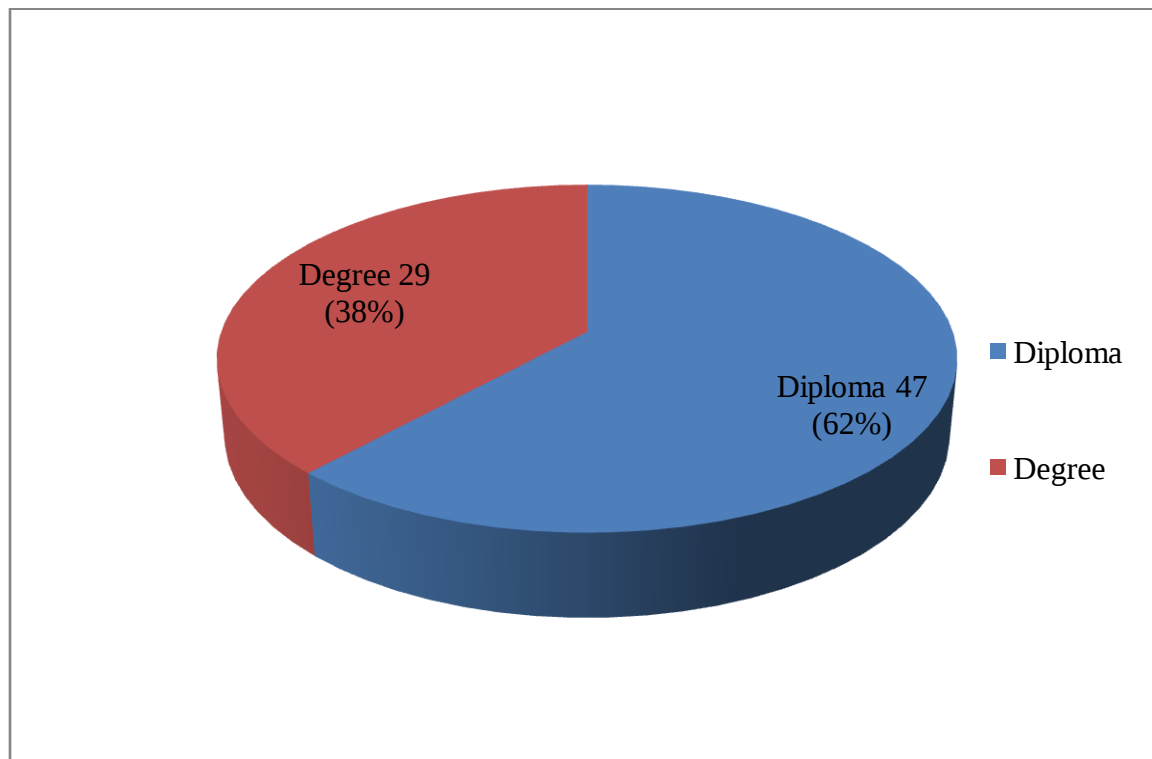
From the results in figure 3 above, the highest percentage of respondents (47.4%) had taught for a period of between 11 and 20 years. This was followed by 43.4% of respondents who indicated that they taught between 1 and 10 years. Next, 6.6% of the respondents indicated that they taught

within the range of 21 and 30 years. Finally, 2.6% of the respondents indicated that they worked for more than 30 years. Therefore, the results indicated that most Geography teachers had adequate teaching experience. This could be considered adequate for them to have knowledge and skills on how best they would teach Geography so as to achieve the SDGs. Mulhall and Berry (2008) assert that so much of the knowledge of teaching is implicit in experienced teacher's teaching.

4.2.1.2 Highest qualification for respondents

The Geography teachers were asked to indicate their highest qualifications.

Figure 4: Percentage of highest qualification for respondents



Data in Figure 4 above shows that 47 teachers (62%) were diploma holders while 29 teachers (38%) were degree holders. Therefore, all the teachers had the required qualifications to teach

Geography in secondary schools. However, the diploma holders who were in majority might lack deeper knowledge and skills on how to teach Geography, especially with the aim of achieving SDGs. Therefore, this would have an impact on the results obtained from the study.

4.2.2 Assessing how the success criteria in secondary school Geography syllabi promote the achievement of SDGs

The researcher analysed the success criteria in five selected topics in Junior Secondary School Geography syllabus and five selected topics in Senior Secondary School Geography Syllabus. These are shown in Table 3, P. 45 and Table 4, P. 46. These originated from Appendix 8, P.107 and Appendix 9, P. 112.

Table 3: Summary of document analysis of success criteria in Junior Secondary School

Geography syllabus

Junior Secondary School Geography Syllabus content	Success criteria address SDGs	Success criteria do not address SDGs	
Selected topics	Frequency (<i>f</i>)	Frequency (<i>f</i>)	Total frequency (<i>f</i>)
Hydrosphere (SDG 2; SDG 3; SDG 13; SDG 14)	1	3	4
Population of Malawi (SDG 1; SDG 2; SDG 3; SDG 4; SDG 13)	1	4	5
Environment (SDG 6; SDG 11; SDG 12; SDG 13; SDG15)	1	3	4
Fishing in Malawi (SDG 1; SDG 3; SDG 12)	2	3	5
Energy (SDG 7; SDG 11; SDG 13)	0	3	3
Total	5	16	21

Success criteria address SDGs = 23.8%; Success criteria do not address SDGs = 76.2%

The researcher selected the topics in Table 3 from the Junior Secondary School Geography Syllabus using purposive sampling technique. This was done in order to choose the topics that were related to some of the SDGs as indicated against the topics.

The findings in Table 3 which were the summary of document analysis of success criteria in Appendix 8 indicated that most success criteria (16) representing 76.2% of the total frequency of

success criteria in the sampled topics do not address the SDGs. Most action verbs that were used in the success criteria do not encourage the learners to learn through practice in different activities, hence would not assist to transform their minds. For instance, the action verb “explain” is frequently used in the success criteria which would not assist the learners to think critically and be transformed in their minds. This would not assist in achieving the SDGs.

Table 4: Summary of document analysis of success criteria in Senior Secondary School Geography Syllabus

Senior Secondary School Geography Syllabus content	Success criteria address SDGs	Success criteria do not address SDGs	
Selected topics	Frequency (<i>f</i>)	Frequency (<i>f</i>)	Total frequency (<i>f</i>)
Climate Change (SDG 2; SDG 3; SDG 11; SDG 13)	1	2	3
Waste Management (SDG 3; SDG 6; SDG 13; SDG 15)	0	4	4
Wildlife in Malawi (SDG 13; SDG 15)	1	3	4
Irrigation Farming (SDG 1; SDG 2; SDG 3)	0	3	3
Wetlands in Malawi (SDG 2; SDG 15)	0	3	3
Total	2	15	17

Success criteria address SDGs = 11.8%; success criteria do not address SDGs = 88.2%

The topics shown in Table 4 were selected from the Senior Secondary School Geography Syllabus using purposive sampling technique. This was done in order to select the topics that would assist in achieving some of the SDGs as indicated against the topics. It also assisted to select topics belonging to both physical and human Geography.

The results in Table 4 which were the summary of document analysis of success criteria in appendix 9, indicated that most success criteria (15) representing 88.2% of the total frequency of success criteria in sampled topics, do not address the SDGs. Most success criteria do not assist the learners to learn by doing, hence would not change their thinking to develop new values on how they view the environment. Most success criteria have the action verb “explain” which do not promote critical thinking and creativity in the learners. This would not assist in achieving the SDGs.

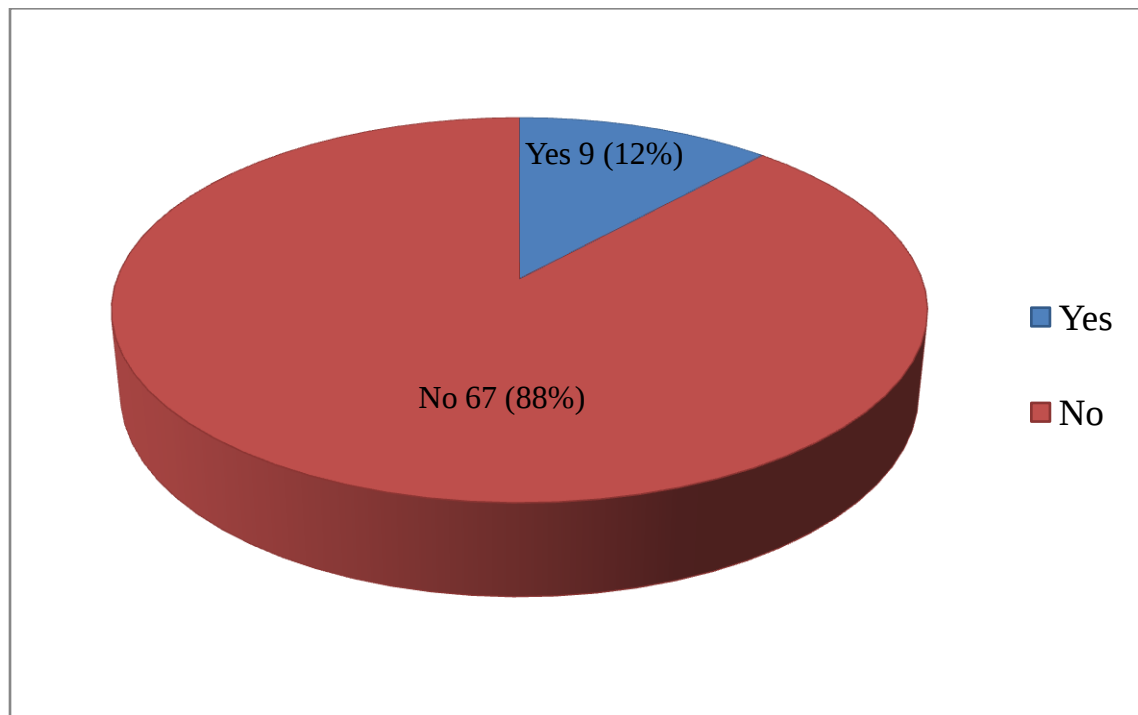
4.2.3 Preparedness of Geography teachers in achieving SDGs

The second specific objective of the study was to examine the preparedness of Geography teachers in achieving some of the SDGs through Geography teaching.

4.2.3.1 Attendance of training on how to promote the achievement of SDGs

The Geography teachers were asked if they attended training on how to promote the achievement of SDGs through Geography teaching. The findings were presented in Figure 5:

Figure 5: Attendance of orientation training to SDGs



From the results in Figure 5 above, 67 Geography teachers (88%) never attended the training while only 9 Geography teachers (12%) attended the training.

4.2.4 Assessing how Geography teachers address SDGs through selected Geography topics

Geography teachers were asked to agree or disagree if they assist learners to put into practice the activities in the selected topics. This is shown in Table 5, P. 49.

Table 5: The extent to which Geography teachers in Junior and Senior secondary school sections address SDGs through selected topics

		Agree		Not sure		Disagree			
Item	Selected topic and concerned SDGs	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	Total (f)	Total (%)
1	Practice in Waste Management (SDG 3; SDG 6; SDG 11)	32	42.1	2	2.6	42	55.3	76	100
2	Practice in controlling bushfires (SDG 13; SDG 14)	22	28.9	1	1.3	53	69.7	76	100
3	Exercising tree planting (SDG 13)	27	35.5	2	2.6	47	61.8	76	100
4	Practice in water harvesting (SDG 1; SDG 2).	25	32.9	5	6.6	46	60.5	76	100
5	Practice in sustainable land use (SDG 2, SDG 14; SDG 15)	36	47.4	3	3.9	37	48.7	76	100
6	Practice in using clean energy (SDG 7)	34	44.7	7	9.2	35	46.1	76	100

7	Practice in controlling soil erosion (SDG 13; SDG 15).	33	43.4	6	7.9	37	48.7	76	100
Average percentage (%)			39.3		4.9		55.8		100

Key: *f* = frequency; % = Percent

The topics in Table 5 were selected from both Junior and Senior Secondary School Geography Syllabi using purposive sampling technique. This was done in order to select the topics that would assist Geography teachers to plan lessons whereby learners would practice activities that would assist in achieving some of the SDGs as indicated against the selected topics.

The findings in Table 5 showed that an average of 55.8% of the teachers admitted that they did not teach or encourage application of knowledge through practice in the selected topics, hence they did not address the SDGs related to the topics. Specifically, the majority of the respondents (69.7%) responded that their teaching did not encourage learners to have practice in controlling bushfires, (61.8%) indicated that their teaching did not encourage learners to exercise tree planting, 60.5% indicated that they did not teach learners to practice water harvesting and 55.3% responded that their teaching did not encourage learners to practice waste management. The data also indicated that 48.7% of teachers did not encourage learners to practice sustainable land use. From the results, the absence of teaching learners to learn through practice would not lead to the achievement of the SDGs related to the selected topics because the learners would not easily be transformed to develop new values for achieving the SDGs.

4.2.5 Teaching methods that Geography teachers use in the teaching of Geography

The Geography teachers were asked to agree or disagree to the teaching methods that they used.

Table 6: Preference of methods teachers use in the teaching of Geography

		Agree		Not sure		Disagree			
Item	Teaching method	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	Total (<i>f</i>)	Total (%)
1	Experiments	13	17.1	3	3.9	60	78.9	76	100
2	Case study	25	32.9	2	2.6	49	64.5	76	100
3	Fieldwork	26	34.2	1	1.3	49	64.5	76	100
4	Action Learning	28	36.8	0	0.0	48	63.2	76	100
5	Explanation	38	50.0	5	6.6	33	43.4	76	100
6	Inquiry-based learning	31	40.8	5	6.6	40	52.6	76	100
7	Lecture	47	61.8	6	7.9	23	30.3	76	100
8	Dictation	35	46.1	2	2.6	39	51.3	76	100

Key: *f* = Frequency; % = Percent

The results in Table 6 indicate that most teachers (78.9%) did not use experiments in the teaching of Geography, 64.5% did not use case study, 64.5% did not conduct field work, 63.2% did not use action learning, 61.8% used lecture method and 52.6% did not use inquiry-based learning. This is an indication that most Geography teachers do not use teaching methods that would assist in promoting SDGs. For example, if 78.9% of Geography teachers did not allow their learners to conduct experiments, they would not discover things on their own and would not be transformed on how they think about the environment.

4.2.6 How to enhance SDG achievement through Geography teaching

The respondents were asked to indicate the extent to which the achievement of SDGs through Geography teaching can be enhanced. The data is shown in Table 7:

Table 7: Extent to which achievement of SDGs can be enhanced through Geography teaching

		Agree		Not sure		Disagree			
Item	How SDGs can be achieved	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	Total (f)	Total (%)
1	MoEST should conduct in-service trainings about SDGs.	61	80.3	0	0.0	15	19.7	76	100
2	Teachers should use Transformative Learning Approaches.	54	71.1	2	2.6	20	26.3	76	100
3	Teachers should use Action Learning Approach.	51	67.1	5	6.6	20	26.3	76	100
4	Teachers should use gender justice principle when conducting practical activities.	50	65.8	2	2.6	24	31.6	76	100
5	Teachers should assign learners activities that promote Values Education.	47	61.8	4	5.3	25	32.9	76	100

6	Teachers should give learners activities that promote critical thinking.	46	60.5	3	3.9	27	35.5	76	100
7	Teachers should encourage learners to practice local technologies and innovations.	42	55.3	2	2.6	32	42.1	76	100
8	MoEST should supply more Geography sourcebooks.	41	53.9	4	5.3	31	40.8	76	100
9	MIE should revise the success criteria in the Geography syllabi.	39	51.3	4	5.3	33	43.4	76	100

Key: *f* = Frequency; % = Percent

The data in Table 7 showed that the majority of the teachers (80.3%) agreed that there was a need for in-service trainings for Geography teachers on issues of SDGs. This is followed by 71.1% of respondents who agreed that Geography teachers should use Transformative Learning approaches. Next, 67.1% of respondents agreed that they should use Action Learning Approach, 65.8% agreed that they should use Gender justice principles when teaching Geography, 61.8% agreed to use Values Education and 60.5% agreed that Geography teachers should give learners activities that promote critical thinking. These would assist the teaching of Geography to help in achieving the SDGs in the sense that if used properly, learners would acquire a lot of knowledge and skills that they would apply for the sustainability of their lives and environmental resources.

4.3 Qualitative data

This section presents qualitative data that was collected through interviews. The researcher conducted the first interviews with one member in the inspectorate section on 13th May, 2019 (Respondent A). The other interviews were conducted with an officer responsible for the development of Geography syllabus on 15th May, 2019 (Respondent B). Both interviews were conducted to verify if what teachers responded to through questionnaires was a true reflection of what was happening in the schools. They also assisted in establishing if MoEST and MIE officials appreciate the need to include SDGs' related content and methods of delivery in the secondary school Geography syllabus.

4.3.1 Assessing how the success criteria in the Secondary School Geography syllabi promote the achievement of SDGs

Both respondents A and B were asked to explain how the success criteria in Geography syllabus promote the SDGs.

Respondent A:

“I should say that the success criteria in most of the topics that appear in both Junior and Senior Secondary School Geography Syllabi address the SDGs. For example, the success criteria that are found in the topic “Environment” in Junior Secondary School are likely to address SDG 13: Climate action and SDG 15: Life on land. However, for the success criteria to assist in achieving the SDGs, teachers should give learners tasks that will assist them to think critically, be creative and change behaviour on how they interact with the environment”.

Respondent B:

“The success criteria in both Junior and Senior Secondary School syllabi promote the achievement of SDGs as different topics are related to SDGs. For example, the success criteria in the topic about Climate Change assist in addressing SDG 13: Climate action as we are in the time when we are facing problems due to Climate Change. When developing success criteria for the Secondary School Geography syllabus, we looked at the current issues. This is a current policy at international level that guides us when developing success criteria for Geography syllabus”.

From the responses above, Respondents A and B revealed that the success criteria in both Junior and Senior Secondary School Syllabi promote SDGs. Respondent A explained that most success criteria that appear in both Junior and Senior Secondary School Syllabi address the SDGs. He gave an instance of the topic “Environment” in Junior Secondary School Syllabus that the success criteria in that topic address SDG 12: Climate action and SDG 13: Life on land. Respondent B concurs with Respondent A that the success criteria in Junior and Senior Secondary School Syllabi address the SDGs. He elaborated that when developing success criteria, they consider the current issues like SDG 13: Climate action that would be addressed by the success criteria in the topic about Climate Change.

4.3.2 Preparedness of Geography teachers in achieving the SDGs

Both Respondents A and B were asked to explain how teachers were prepared in order to achieve the SDGs through Geography teaching.

Respondent A:

“We carry out training workshops and secondary school Geography teachers in all the educational divisions were oriented about SDGs, for example, SDG 13: Climate action. It is through these workshops where Geography teachers acquire knowledge on how they can achieve SDGs through Geography teaching”. However, MoEST fails to train all the Geography teachers about SDGs which are current issues due to lack of financial resources. This is really a general problem that is hindering us from organising training workshops for all the secondary school teachers”.

Respondent B:

“Some secondary school teachers attended the training about SDGs but the main focus was on the topic about Climate Change which addresses SDG 13: Climate action. However, only few teachers attended the training due to insufficient funding. There is still a need to organise more trainings so that teachers should gain knowledge that would assist in achieving SDGs through their teaching”.

Respondents A and B have revealed that not all the Geography teachers attended the training workshops about SDGs. Only a few teachers were trained due to lack of financial resources to support the training. Therefore, the majority of Geography teachers were not prepared to teach with the purpose of achieving the SDGs.

4.3.3 How secondary school Geography teachers address SDGs through Geography teaching

Respondents A and B were asked to explain how Geography teachers address issues of SDGs through Geography teaching in selected topics.

Respondent A:

“In Senior Secondary School Syllabus, there is a topic Waste Management which would address SDG 3: Good health and well-being. Teachers discuss with the learners different ways how waste can be managed. They also explain to the learners how Waste Management is important in the environment that they live. This assists the learners to prevent diseases, so this promotes the attainment of SDG 3: Good health and Well-being. If we talk of Climate Action which is SDG 13, we have a topic called Climate Change in both junior and senior classes. In this topic, teachers explain to learners the concepts of Climate Change. Still in the topic Climate Change, learners discuss the causes of Climate Change and what should be done to control it”.

Respondent B:

“It is unfortunate that a good number of teachers just teach the theory and do not give learners tasks to practice what they learn in class. For example, when teaching the ways of controlling soil erosion, let learners conduct practical activities like planting grass on bare land. If they link theory to practice, the learners would be transformed positively in the way they interact with the environment. This would assist the teaching of Geography to address the SDGs, for example, SDG 15: Life on land”.

From the above statements, Respondent A gave examples of the topic in Waste Management and Climate Change in Senior Secondary School Syllabus that address the SDGs. However, his response did not indicate teaching that encouraged learners to practice what they learnt in class like planting vegetative cover. What was required was to link theory to practice. Similarly, Respondent B said that a good number of teachers did not give learners tasks to practice what they learnt in class. He gave an example, that when teaching about soil erosion, learners should practice planting grass on bare land. This would assist to address SDGs, for instance, SDG 15: Life on land.

4.3.4 Teaching methods that Geography teachers use in the teaching of Geography

Both Respondents A and B were asked to explain the methods that Geography teachers use in order to promote the achievement of SDGs.

Respondent A:

“There are many teaching methods that Geography teachers can use in the process of promoting the achievement of SDGs. It is unfortunate that most Geography teachers frequently use lecture method where they drill the content to learners as they claim that the content in Geography syllabus is large to be covered within limited time. This promotes rote learning and cannot lead to achievement of the SDGs. Teachers can use a variety of teaching methods, for example, group work whereby learners could be given tasks in groups to discuss and present to the whole class. They can also use pair work, question and answer and class discussions. If the teachers could use these methods properly, the SDGs would be achieved”.

Respondent B:

“It is necessary that teachers should use learner centred methods when teaching. However, most teachers do not use these methods claiming that their classes are large. They prefer using lecture method which also assists them to cover a lot of content within the limited time. Geography teachers need to use methods that are effective in equipping skills and knowledge in learners, for example, Action Learning”.

From the statements, Respondent A was worried that most Geography teachers frequently use lecture method claiming that the content in Geography syllabus is large to be covered within the limited time. Therefore, this would not promote the SDGs because if teachers only drill the content to the learners, they cannot be transformed on how they view and interact with the environment. Respondent B, explained that teachers prefer using lecture method than learner centred methods with the claim that their classes were large. He suggested that teachers should use methods that are effective in equipping skills and knowledge in learners, for instance, Action Learning. If they use such kind of methods, SDGs would be achieved.

4.3.5 How to enhance SDG achievement through Geography teaching

Both respondents A and B were asked to explain how the achievement of SDGs through Geography teaching would be enhanced.

Respondent A:

“MoEST should be in a position to organise more in-service trainings for Geography teachers. We need to train them in different topics of Geography so that they should improve in their teaching and assist in promoting SDGs. We should also train them to prepare teaching and learning materials. The Geography inspectors should go into schools and where they find that they are facing problems; they should sit down and give

them advice that will assist them to improve. Then they are going to promote SDGs and would have quality teaching. Geography teachers need not to give only simple tasks to the learners. They need to give them tasks that would assist to promote the skill of critical thinking. Let them do the activities on their own. If they do this, they would be in the right path of promoting the SDGs”.

Respondent B:

“Teachers should be trained on how they should deliver the content not like focusing on the examinations as what some teachers do. Learners should be taught in such a way that they should be able to apply the knowledge when they go out after finishing secondary school education. Geography teachers should use Transformative Learning Approach if SDGs are to be achieved. Give learners the tasks that would assist them to think about how they would solve environmental problems. Let them find solutions on their own rather than just telling them what to do. Teachers need to give real life examples so that when learners go home, they should practice what they have learnt”.

“Teachers should not be the masters of content in class. They need to change this, and should focus on activities that promote critical thinking and creativity. Give them content and concepts, but should be creative on their own. If the teacher stands in front of class being the master of everything, then they are killing creativity in learners. That is why we see most of our learners not applying what they have learnt in class when they go back to their homes. If teachers let them create things on their own, I hope they would be moving towards the right direction and are likely to achieve the SDGs”.

From the findings, both Respondents A and B emphasised the need for MoEST to organise in-service trainings for Geography teachers to have knowledge on how they would promote SDGs through Geography teaching. Respondent B added that Geography teachers should use Transformative Learning Approach. He also said that they should focus on activities that promote critical thinking and creativity in learners. All these would assist to promote the achievement of SDGs in the sense that learners would change positively in the way they interact with the environment.

4.4 Chapter summary

In this chapter, the quantitative and the qualitative data were presented. The presentation of the findings was guided by the order of objectives of the study. The results have shown that most success criteria in both Junior and Senior Secondary School Geography syllabi do not address the SDGs. The data in this chapter has indicated that most Geography teachers never attended training about the SDGs. It has also shown that the teaching of Geography by most secondary school Geography teachers does not address the SDGs because learners do not learn through practice. The results have revealed that most Geography teachers do not use the teaching methods suitable for promoting the achievement of the SDGs. The data analysis has shown that most respondents agree that MoEST should organise in-service trainings for Geography teachers on how they would promote the achievement of the SDGs through teaching.

CHAPTER 5

DISCUSSION OF THE RESULTS

5.1 Introduction

In this chapter, the results outlined in Chapter 4 will be discussed. The researcher combines both qualitative and quantitative data in the discussion.

5.2 Assessing how success criteria in secondary school Geography syllabi promote the achievement of SDGs

From the findings in Tables 3 and 4, most success criteria (76.2%) in Junior and (88.2%) in Senior Secondary School syllabi respectively, do not address the SDGs. Despite this, the nature of all the topics seems to have the possibility of addressing the SDGs if the success criteria would be well formulated. The success criteria are not of good quality because the action verbs that are used do not encourage learners to practice different activities in achieving the SDGs. This was different from the findings by Guo and Lane (2018) who recognised that the secondary school syllabus in China had the success criteria that required learners to have more practical activities. UNESCO (2017) recommends learning through practice in order to achieve the SDGs. Therefore, it would be necessary for the Junior and Senior Secondary School Geography syllabi in Malawi to have the success criteria that would allow learners to learn through practice. This would be in line with the Transformational Learning Theory in the sense that if teachers allow the learners to practice what they have learnt in class, they would easily change their values and become responsible citizens in their environment (Mezirow, 2009). This would lead to achievement of SDGs like SDG 15: Life on land, because learners would be responsible in caring for wildlife.

In the topic “Waste Management”, as shown in Appendix 2, there is no success criterion that requires learners to have practice in managing waste. For instance, the success criterion “*Learners must be able to explain ways of managing different types of waste*” cannot assist learners to be transformed to start managing wastes. In this case, learners would not put to practice what they learn and are likely to forget, hence cannot assist in achieving the SDGs. It would be necessary to have the success criterion “*Learners must be able to practice ways of managing different types of waste*”. This can assist teachers to prepare practical lessons for the learners to dig pits for dumping in waste materials, like papers. This can transform them and do the same activities when they go back to their homes. This agrees with the Development Education Theory which proposes that people should understand their environment and take action to transform it (O’Flaherty & Liddy, 2017). The practice in Waste Management would promote the achievement of SDG 3: Good Health and Well-being because learners would create a clean environment that would be free from diseases. If they live in good health, they are likely to enjoy their education and become productive citizens in the development of the country.

The document analysis for both Junior and Senior Secondary School Geography Syllabi in Appendices 8 and 9 respectively, has shown that the success criteria in most topics have the action verb “*explain*” which cannot promote critical thinking and creativity in the learners. The Dale’s Cone of Experience reveals that the action verb “*explain*” leads to little learning and retention, hence would not assist in the achievement of SDGs (Davis & Summers, 2015). On a different note, the success criteria in the Secondary School Geography Syllabus in Germany have the action verbs, for example, demonstrate, apply, practice, analyse, design, create and evaluate (Grindsted, 2017). These would assist the learners to learn by doing, hence promoting the SDGs. Therefore, action verb “*explain*” which is frequently used in the success criteria needs to be

changed because it would not assist in transforming the minds of learners, as it leads to little learning and retention (Davis & Summers, 2015). To exemplify, in the topic “Climate Change”, the success criterion “*Learners must be able to explain Climate Change mitigation and adaptation measures*” cannot transform the learners to develop new values that would lead to the achievement of SDGs. It would be necessary to have the success criterion that would assist learners to study their local environment and discover the changes on their own. Through this, they can discover that their area does not have trees due to deforestation. They can also observe drought to be common in their local area unlike in the past before deforestation. This can transform their values and start taking action by planting trees in their area. This corresponds to Development Education Theory that expects teaching to transform learners to become active and responsible citizens in taking care of the environment and contribute to the development of the nation (Bexell & Jonsson, 2016). This would assist in achieving some of the SDGs. In this case, SDG 13: Climate action would be achieved in the way that the Geography learners would start planting trees to replace those that have been harvested. This would assist to maintain the hydrological cycle through transpiration process that leads to cloud and rain formation. Therefore, the climatic patterns of the region would be maintained.

Through interviews, Respondents A and B were asked to explain how the success criteria in the Junior and Senior Secondary School Syllabus lead to the achievement of SDGs. Respondent A said “*I should say that the success criteria in most of the topics that appear in both Junior and Senior Secondary School Geography Syllabi address the SDGs. For instance, the success criteria that are found in the topic “Environment” in Junior Secondary School can address SDG 13: Climate action and SDG 15: Life on land*”. Similarly, Respondent B said that the success criteria contribute to the achievement of SDGs because they address the topics that are related to

SDGs, case in point, SDG 13: Climate action. He responded: *“The Success criteria in both Junior and Senior Secondary School Syllabi promote the achievement of SDGs as different topics are related to the SDGs. For example, the success criteria in the topic about Climate Change assist in addressing SDG 13: Climate action”*.

Although both respondents A and B agreed that the success criteria address the SDGs, their responses seem not to be true because what they said would have been reflected in the success criteria. Perhaps, what came into their minds was that the nature of Geography topics in the syllabi had the possibility of addressing the SDGs. The reality is that most success criteria are of low order and do not promote learning by doing, hence cannot lead to the achievement of SDGs. For instance, in the topic “Hydrosphere”, the success criterion *“Learners must be able to explain the term hydrosphere”* cannot assist in transforming the minds of learners, hence cannot assist in achieving the SDGs. Taylor (2012) explains that learning by doing assists the learners to be transformed and develop new values on how they would interact with the environment. UNESCO (2017) recommends learning through practice in order to achieve the SDGs. This agrees with the Transformative Learning Theory in the way that if teachers encourage learning through practice, learners are likely to change their world view and start doing things better in their environment (Mezirow, 2009). This also concurs with the Citizenship Education Theory in the way that the teaching of Geography through practice would assist learners to become active and responsible citizens in taking care of the environment (Bexell & Jonsson, 2016). Therefore, there is a need to modify the success criteria from theory to practice. This can assist in achieving some of the SDGs like SDG 15: Life on land. It can also help to produce productive citizens for the development of the country.

5.3 Preparedness of Geography teachers in achieving SDGs

The Geography teachers were asked through the questionnaire whether they were trained on how to promote the achievement of SDGs through teaching or not. The findings in Figure 4 have shown that 67 Geography teachers (88%) did not attend any training about integrating SDGs in Geography teaching. This was different from the findings by Guo and Lane (2016) who observed that secondary school Geography teachers in China were being trained in colleges on how they would teach Geography in order to achieve the SDGs. The knowledge that they acquired assisted them to integrate local issues such as poverty, inclusive and equitable education, climate change and biodiversity loss. This assisted in promoting some of the SDGs, for instance, SDG 1: No poverty, SDG 4: Quality education, SDG 5: Gender equality and SDG 13: Climate action. The findings in secondary schools in Malawi are also different from what Álvarez-García, Sureda-Negre and Comas-Forgas (2015) brought to light that secondary school Geography teachers in Canada were trained about SDGs through the Environmental Education course in various colleges. If teachers apply the skills and knowledge that they can acquire from training, Transformational Learning takes place whereby learners gradually change their beliefs and values about the environment, and make the world better (Sterling, 2011). Therefore, it is necessary to train secondary school Geography teachers in Malawi on how they should teach in order to achieve the SDGs.

Respondents A and B were asked through the interviews how the secondary school Geography teachers were prepared in order to promote the achievement of SDGs through Geography teaching. Respondent A said: *“We carry out training workshops and secondary school Geography teachers in all the educational divisions were oriented about SDGs like SDG 13:*

Climate action. It is through these workshops where Geography teachers acquire knowledge on how they can achieve SDGs through teaching". In another statement it was said: *"However, MoEST fails to train all the Geography teachers about SDGs which are current issues due to lack of financial resources"*. This was similar to what respondent B said: *"Only a few teachers attended the training due to insufficient funding"*. The responses from both respondents correspond with the findings in the questionnaire as shown in Figure 4 which indicated that 67 Geography teachers (88%), did not attend the trainings. This is against UNESCO (2017) which encourages the training of teachers of different subjects including Geography, so that they acquire knowledge and skills that can assist their teaching to promote the achievement of SDGs. It is therefore, necessary that MoEST should train more secondary school Geography teachers on how to promote the achievement of SDGs through teaching. UNESCO (2016) explains that if teachers apply the skills and knowledge gained from the trainings, they are likely to transform the minds of learners and help them to develop proper values for protecting their environment. This is supported by the Citizenship Education Theory which states that teaching should assist learners to become responsible and active citizens in participating in global issues like controlling biodiversity loss and ensuring sustainable consumption (McCloskey, 2016). If they develop as responsible citizens in caring for environmental resources, they would assist in achieving the SDGs, for instance, SDG 12: Responsible Consumption and Production.

5.4 How secondary school Geography teachers address some of the SDGs through Geography teaching

The Items 2, 3 and 4 in Table 5 indicate that 69.7% of Geography teachers did not encourage learners to have practice in controlling bushfires, 61.8% did not encourage learners to exercise tree planting, 60.5% did not teach learners to practice water harvesting, respectively.

Specifically, Item 2 in Table 5 indicated that 69.7% of Geography teachers did not encourage learners to have practice in controlling bush fires. The result would be like that because some schools were located in urban areas where they do not have bushy land. However, most schools in SHED are located in the rural areas where bushes are commonly found, but teachers do not encourage learners to have practice in controlling bushfires. This would not promote the SDGs because learners would not develop knowledge and skills on how to take care of the environment. This was different from the findings by World Bank (2018) that Geography teaching in secondary schools in India encouraged learners to control the bushfires that bring an economic loss of US\$ 164 million per year. Similarly, Keating and Handmer (2013) explain that the secondary school Geography teachers in Australia encouraged learners to control bushfires in their communities. This concurs with the Citizenship Education Theory which encourages teaching learners to become responsible citizens by participating in Global issues and transforming the world to become a better place to live in (Crick, 1999). The practice of controlling bush fires promotes the achievement of SDG 13: Climate action, because the trees that the learners protect from bushfires assist in maintaining the climate. The transpiration process by trees in the forests has an important role because it assists in the formation of clouds that lead to rainfall.

The practical lessons about controlling bushfires assist in promoting SDG 15: Life on land, in the way that wildlife becomes safe from destruction (World Bank, 2018). If the teachers encourage learners to take part in protecting wildlife from bushfires, they are likely to be transformed and contribute to the development of the country and achieve the SDGs, for example, SDG 1: No poverty. This is because wildlife attracts tourists who bring foreign currency for the economic

development of the country (Jackson, 2017). Therefore, Geography teachers in secondary schools in Malawi should make sure that their Geography learners practice controlling bushfires, for example, in the topic “Environment”, they should slash the grass in the woodlots and make firebreaks around their school compounds. This can assist in achieving the SDGs.

The result in Item 3 of Table 5 indicated that 61.8% of Geography teachers did not encourage their learners to exercise tree planting. This would be due to lack of financial resources to support the exercise. Msiska (2013) reveals that the secondary school subsector receives insufficient funding to support the educational activities. In reality, if teachers do not conduct practical lessons in tree planting, it would not lead to the achievement of SDGs like SDG 13: Climate action. Learning by doing would be effective in promoting some of the SDGs because it would transform the learners on how to interact with the environment. In line with this, the interviews with Respondents A and B revealed that teachers did not encourage learners to learn by doing. Respondent A said *“In the topic Climate Change, teachers ask learners to discuss the causes of Climate Change and what should be done to control it”*. Respondent B said: *It is unfortunate that a good number of teachers just teach the theory and do not give learners tasks to practice what they learn in class*. These statements do not indicate teaching that encourages learners to learn through practice. This is contrary to Transformational Learning Theory because learners would not be transformed if they do not practice what they learn (Sterling, 2011).

The exercise in tree planting can assist in achieving some of the SDGs, for instance, SDG 13: Climate action and SDG 15: Life on land (Bekele, 2015). This is because trees have a role to play in the hydrological cycle through transpiration process. Trees absorb carbon dioxide from

the atmosphere through the process of photosynthesis. This is used for making sugar, starch and complex molecules like cellulose and lignin (Chen, Zhang & Tang, 2011). The trees later on release oxygen that people use for breathing. This leads to the achievement of SDG 3: Good Health and Well-being, because the oxygen that people breathe assist them to live good health.

Item 4 in Table 5 indicated that 60.5% of Geography teachers did not encourage their learners to practice water harvesting. This would be due to inadequate knowledge and skills in teachers on how to harvest water. This cannot promote the achievement of SDGs, for example, SDG 2: Zero hunger. This was different from the findings by Kenyan Rainwater Association (2014), which revealed that some secondary school Geography teachers in Kenya encouraged Learners to practice rainwater harvesting using low cost technologies. It involved capturing and storing rainwater in tanks and dams. This is supported by the Transformation Learning Theory which states that learning cannot take place until learners are able to actively take actions that acknowledge their new values and that teachers should provide opportunities for learners to act on new perspectives (Sterling, 2011). Therefore, the teaching of Geography in secondary schools in Malawi, like on the topic of Climate Change, should give chance to learners to practice water harvesting. This would not only promote the achievement of SDG 2: Zero hunger but also SDG 13: Climate action, because the water that is harvested would be used in the time when there is drought (Rahimi, 2018).

Items 1, 5 and 6 in Table 5 indicate that 55.5% of Geography teachers did not encourage learners to practice Waste Management, 48.7% did not encourage learners to practice sustainable land use and 46.1% did not encourage learners to have practice in using clean energy,

respectively. However, there were marginal differences in the percentages of the Geography teachers who agreed and those who did not agree on the specific items.

The result in Item 1 of Table 5 shows that 55.3% of secondary school Geography teachers did not encourage learners to practice Waste Management. This would be due to inadequate knowledge of teachers on how to manage waste using various methods, for example, recycling. This cannot assist in achieving the SDGs because if teachers teach theory only, learners cannot change their values on how they view waste in their environment. These findings do not concur with the results in a study that Adeolu (2014) conducted in secondary schools in Nigeria where it was observed that 70.6% of Geography teachers encouraged learners to practice Waste Management in their schools. Similarly, Iyad (2015) uncovered that 69.81% of secondary school Geography teachers in Palestine prepared practical lessons on topic Waste Management. Case in point, at Al-Shoka Secondary School, Geography learners were able to recycle papers. They also constructed pits where they dumped organic waste.

The teaching of learners to practice Waste Management would assist in promoting SDG 3: Good Health and Well-being in the sense that the school environment would be clean and learners would not easily suffer from different diseases (Bexell & Jonsson, 2016). Learners who have good health are likely to become productive citizens who could contribute to the development of the country. This is supported by Development Education Theory which suggests that teaching should assist learners to acquire education that would assist them to understand the world and develop as citizens who can act and contribute to Sustainable Development (O’Flaherty & Liddy, 2017). The practice in Waste Management can also promote SDG 6: Clean Water and Sanitation,

because learners would practice proper waste disposal hence, preventing land and water pollution. Therefore, it is vital that the teaching of Geography on Waste Management should be in the way that would assist learners learn through practice.

The results in Item 5 of Table 5 indicated that 48.7% of Geography teachers did not encourage learners to practice sustainable land use, while 47.4% agreed that their learners practiced sustainable land use. There was a marginal difference between those who agreed and those who disagreed, because some schools did not have enough land while other schools, especially in rural areas, had enough land to practice the sustainable land use.

5.5 Teaching methods that Geography teachers use in the teaching of Geography

In Items 1, 2, 3, 4 and 6 of Table 6, the results indicate that 78.9% of Geography teachers did not use experiments, 64.5% did not use case study, 64.5% did not conduct fieldwork, 63.2% did not use action learning and 52.6% did not use inquiry-based learning, respectively.

In specific to item 1 of Table 6, most Geography teachers (78.9%) responded that they did not conduct experiments in Geography lessons, hence did not assist in achieving the SDGs. They might think that experiments would only be done in subjects like Biology and Chemistry, which was wrong. Similarly, Dermici, Kesler and Kaya (2015) observed that most Geography teachers (75%) did not use experiments in the teaching of Geography in a term. These findings do not correspond with the recommendation by UNESCO (2017), which emphasises that teachers should use experiments in the teaching of Geography, so as to enhance the achievement of SDGs. Mohammed (2016) explains that experiments in Geography lessons promote the

development of critical thinking in learners rather than making them memorise the facts hence promote some of the SDGs.

The Geography teachers in secondary schools in Malawi should strive to use experiments in the lessons. For instance, in the topic “Environment”, learners can conduct an experiment about transpiration in trees by tying leaves of trees inside plastic bags (Chen, Zhang & Tang, 2011). When they discover that there is water inside the bags after some hours, they would understand that trees lose water through transpiration, which is necessary in the hydrological cycle for the formation of clouds and rains. They would later change their values on environment and start planting more trees. This is supported by the Transformational Learning Theory which explains that teaching should assist learners to change their values on how they view the world and interact with the environment (Sterling, 2011). In this case, if learners change their values after the experiment and start planting trees, they can assist in achieving SDG 13: Climate action, because trees absorb carbon dioxide from the air which would lead to global warming and climate change (Odonoghue, 2015).

Item 2 of Table 6 indicated that 64.5% of Geography teachers did not use case study in the lessons. Gitau (2015) notes that most teachers prefer using the traditional methods of teaching unlike using the case study method. This concurs with the results in a study that Dergirmenci and Ilter (2017) conducted in secondary schools in Turkey where they discovered that most Geography teachers (93%) did not use case study, but instead, used traditional methods. This would not assist in achieving the SDGs in the sense that learners would not be able to analyse problems in their local environments, like water pollution, so as to find solutions. On a different

note, Kagoda (2016) discovered that most Geography teachers (67%) in secondary schools in Uganda, used case study in the teaching of Geography. If Geography teachers in secondary schools in Malawi use this method in the teaching of Geography, it would assist in achieving the SDGs. This is because case studies assist learners to think critically on the causes of environmental problems that affect their daily lives and find ways of curbing them (Dergirmenci & Ilter, 2017). For instance, the case study about floods in the topic “Natural Disasters” in Junior Secondary School Geography Syllabus would assist learners to find the root causes so as to find the solutions like planting vegetative cover in flood prone areas. This would promote SDG 15: Life on land, in the way that lives of people and animals will be safe if floods are controlled.

In Item 3 of Table 6, the result indicates that 64.5% of Geography teachers did not conduct fieldwork in the teaching of the subject, which would not lead to the achievement of SDGs. This concurs with the findings in a study that was conducted by Mohammed (2016) observed that the majority of secondary school Geography teachers (87.4%) in Ethiopia did not use field trips in the teaching of Geography. On the contrary, Benjamin and Wakhutu (2014) conducted a study about methods used in teaching Geography in secondary schools in Kenya where they found that more teachers (56.2%) used field work. Lotz-Sisitka, Tshiningayamwe and Urenje (2017) explain that field work is a very important method in the teaching of Geography that assists in promoting the achievement of SDGs. Behrendt and Franklin (2014) extend that field work provides the learner with sound and concrete basis for conceptualisation and first-hand information. This makes learning to be more meaningful. Case in point, in the topic “Wildlife in Malawi”, it would be necessary for the learners to visit either the national park or game reserve. Learners would realise that if poaching and deforestation takes place, the tourists will not be

attracted to Malawi, hence foreign currency would be lost (Jackson, 2017). The values that they develop from field trips would assist in enhancing the achievement of SDG 15: Life on land, because they would start taking care of animals and plants by avoiding poaching, deforestation and bushfires. This corresponds to the Transformational Learning Theory because learners may not easily forget what they see and are likely to develop new values on how they interact with the environment (Mezirow, 2009). This may lead to achieving SDG 15: Life on land. It is therefore necessary for secondary school Geography teachers to use fieldworks in order to achieve some of the SDGs.

Item 4 of Table 6 indicates that 63.2% of Geography teachers did not use Action Learning in their teaching. This would be due to inadequate knowledge of teachers in using this method. This finding corresponds with the study by Marie, Lindsay and Edlea (2017), who brought to light that 96% of secondary school Geography teachers in Philippines did not use Action Learning in the teaching of Geography. This would not promote the achievement of SDGs because Geography learners would not be stimulated to achieve the intended goals. On a positive note, Odonoghue (2015) recognised that most Geography teachers (64%) in selected secondary schools in South Africa used Action Learning in the teaching of Geography. The learners were creative and flexible in finding solutions to pressing problems. For instance, after discovering the problem of soil erosion, teachers would encourage learners to take action of planting vegetation on bare land in order to control the problem. This is supported by the Citizenship Education Theory which encourages learners to take action in solving environmental problems in order to promote the sustainability of resources (Crick, 1999). Through controlling soil erosion, it is likely that land degradation and biodiversity loss would be reduced, hence promoting the

achievement of SDG 15: Life on land. Therefore, Geography teachers should be encouraged to use Action Learning in order to achieve some of the SDGs.

On the other hand, Item 7 of Table 6 indicates that the majority of teachers (61.8%) agreed that they used lecture method in the teaching of Geography. This finding is similar to what respondent B said in an interview, that most Geography teachers used lecture method, claiming that the content in Geography syllabus is large. This was what he said: *“It is unfortunate that most Geography teachers frequently use lecture method where they drill the content to learners as they claim that content in Geography syllabus is large. This promotes rote learning and cannot enhance the achievement of SDGs”*. Thungu (2008) explains that lecture method limits learners’ participation in the lesson and does not develop the learners’ power of reasoning. Despite this, Gitau (2015) argues that this method would assist Geography teachers when teaching a large class. In reality, this method would not assist in promoting the achievement of SDGs because it cannot assist learners to be transformed on how to interact with the environment. This is against the Transformative Learning Theory which suggests that teaching should assist to transform learners to develop new values on how they view the world and interact with the environment (Mezirow, 2009). For example, in the topic “Irrigation Farming” there is a need to use the methods that would assist learners to learn through practice so as to transform their minds. The learners should be allowed to irrigate crops in their school fields. This would assist in addressing SDG 2: Zero hunger if they continue practicing this in their communities. If there is enough food in the country, people are likely to work and assist in the development of their country.

5.6 How to enhance SDG achievement through Geography teaching

The Items 1, 2, 3, 4, 5, 6, 7, 8 and 9 in Table 7 indicate that 80.3% of Geography teachers agreed that MoEST should conduct in-service trainings, 71.1% of Geography teachers agreed to the need to use Transformative Learning Approach, 67.1% of Geography teachers agreed that it would be necessary to use Action Learning, 65.8% of Geography teachers agreed that they should use gender justice principles when teaching, 61.8% of Geography teachers agreed that there is a need to use Values Education, 60.5% of Geography teachers agreed that they should give learners activities that promote critical thinking, 55.3% agreed to encourage learners to practice local technologies and innovations, 53.9% agreed that MoEST should supply more Geography sourcebooks and 51.3% agreed that MIE should revise the success criteria in Geography syllabi. Teachers agreed to all these items with the hope that they would assist in enhancing the achievement of some of the SDGs.

In the specific Item 1 of Table 7, most Geography teachers (80.3%) agreed that MoEST should conduct in-service trainings about SDGs. This would assist them to gain knowledge and skills on how to enhance the SDGs through teaching. This is supported by both respondents A and B through interviews, who suggested that MoEST should organise in-service trainings for Geography teachers on SDGs. In line with this, Walter and Brock (2018) noted that secondary school Geography teachers in Germany attended trainings about the SDGs. If MoEST provides training about SDGs, it would assist Geography teachers to understand the Earth as a system, key life supporting processes and how ecosystems function to support the diversity of life (UNESCO, 2016b). If they apply the gained knowledge and skills in their teaching, they can assist in transforming the learners as supported by the Transformational Learning Theory, which explains

that teaching should assist learners to understand the world and develop new values and beliefs about the environment (Mezirow, 2009). In this case, learners would understand the importance of the ecosystem and can change their values in order to maintain it. This would assist in achieving the SDGs like SDG 15: Life on land. Therefore, if teachers attend in-service trainings, it is likely that their teaching can assist in achieving some of the SDGs.

In Item 2 of Table 7, the result shows that 71.1% of Geography teachers agreed that there was a need for teachers to use Transformative Learning Approach in the teaching of Geography. This concurs with what respondent B commented through the interview that Geography teachers should use Transformative Learning Approach in the teaching of Geography. This was what was said: *“Geography teachers should use Transformative Learning Approach in the teaching of Geography if SDGs are to be achieved. Give learners the tasks that will assist them to think about how they would solve environmental problems. Let them find solutions on their own rather than just telling them what to do”*. UNESCO (2015) supports that the approach for teaching should be transformative and not transmissive. O’Flaherty and Liddy (2017) extend that the principles, values, and practices of Sustainable Development should be integrated into all aspects of learning so as to transform the minds of the learners. If Geography teachers in secondary schools use Transformative Learning Approach, the learners can develop positive attitude towards the environment (Bekele, 2015). This can assist them to start caring for the environment that enhances SDGs, for instance, SDG12: Responsible consumption and production.

Item 3 of Table 7 indicates that 67.1% of Geography teachers agreed that it would be necessary to use Action Learning when teaching the subject so that they can enhance the SDG

achievement. Wals (2010) explains that Action Learning assists learners to identify the problems and solve them in practice. Benjamin and Wakhutu (2014) observed that 54% of secondary school Geography teachers in Kenya used Action Learning when teaching learners. Through this method, it is necessary for teachers to give chance to learners to investigate the problem themselves and justify that there is a problem (Kagoda, 2016). For instance, in the topic “Fishing in Malawi” which is found in Junior Secondary School Syllabus, learners would discover that there is loss of fish species in the lake. After that, teachers would encourage them to investigate the causes of the problem by asking people who would give the necessary information (UNESCO, 2016b). Next, learners should have value analysis by looking into the benefits that may be obtained from the action that may be taken. They may decide to take an action of civic educating fishermen on the better fishing methods. This can lead to the achievement of SDG 14: Life below water, because the fishermen may stop overfishing.

If there is no overfishing in the lake, fish species would not be lost (Bari, 2009). As a result, fishing industries would continue operating, hence assisting people to get jobs and earn money for the development of their families and communities. This implies that Geography learners who are encouraged by teachers to use proper fishing methods also contribute to the development of the country. This is supported by the Development Education Theory which explains that teaching should transform learners to become active and responsible citizens to participate in activities that would lead to development of their country (O’Flaherty & Liddy, 2017). Therefore, Action Learning should be encouraged in the teaching of Geography in order to achieve the SDGs.

In Item 4 of Table 7, the result shows that 65.8% of Geography teachers agreed that they should use gender justice principles when teaching. This can assist both boys and girls to equally take

part in practices aiming at enhancing the SDGs. Similarly, Bekele (2015) recognised that Geography teachers in secondary schools in Ethiopia used gender justice principles. Both boys and girls equally participated in tree planting projects. This would promote SDG 5: Gender equality, because both males and females were given an opportunity to care for the environment. FAO (2015) supports that teachers should use gender justice principles in all activities aiming at protecting the environment. Therefore, Geography teachers in secondary schools in Malawi should use the same principles in the teaching of Geography so as to achieve the SDGs. This would assist to change power relation structures, norms and values that hinder females from Sustainable Development activities, hence achieving SDG 5: Gender equality. In reality, gender justice principles are catalysts to achieving SDGs.

Item 5 of Table 7 indicates that 61.8% of Geography teachers agreed that there is a need to use Values Education as a way of promoting the achievement of SDGs. This is supported by UNESCO (2017), which recommends that teachers should use Values Education in the teaching of different subjects including Geography. This empowers learners to take responsible actions by keeping in mind environmental integrity and a just society both for present and future generations (Lovat, 2011). Case in point, Geography teachers would give learners tasks that can assist them to think and value trees as deserving to be protected and managed in a sustainable manner. Through Values Education, Geography learners would be able to develop characters and values that lead to sustainability of our environment (UNESCO, 2016b). This is supported by the Transformational Learning Theory which suggests that teaching should assist learners to understand the world and develop new values and beliefs about the environment (Mezirow, 2009). For instance, learners may discover that if they cut down the trees carelessly, the land will

be bare leading to soil erosion. In the end, when rains fall there will be siltation of rivers leading to floods. After discovering this, they are likely to develop the values of responsibility and self control relating to their environment. This may lead to the achievement of SDG 14: Life below water, because if the learners develop values of taking care of trees, siltation of rivers and lakes would be reduced, hence aquatic animals would enjoy life in water.

In Item 6 of Table 7, the result indicates that 60.5% of Geography teachers agreed that learners should be given activities that promote critical thinking. This was similar to what Respondent A said in an interview, that Geography teachers should make sure that learners are given activities that promote the skill of critical thinking. This was what Respondent A said: *“To achieve SDGs, Geography teachers need not to give only simple tasks to the learners. They need to give them tasks that would assist to promote the skill of critical thinking. Let them do the activities on their own. If they do this, they would be in the right path of promoting the SDGs”*. Falkenberg and Babiuk (2016) explain that Geography teachers in secondary schools in China emphasise using the skill of critical thinking when teaching Geography content. Learners develop the ability to assess, analyse, synthesise and evaluate the problem independently with confidence in the accuracy of their thinking. For example, learners would think of deforestation as environmental challenge and link it with SDG 2: Zero hunger. They would think and discover that if trees are cleared, there would be disturbance of the water cycle, hence little or no rains. If this happens, agriculture activities would be affected negatively leading to hunger. In this case, learners may discover that deforestation can be a barrier to achieve SDG 2: Zero Hunger. In the end, they can be transformed positively on the way they think about the environment. Therefore, secondary

school Geography teachers in Malawi should make sure that their teaching promotes the skill of critical thinking.

5.7 Chapter summary

In this chapter, the researcher discussed the findings of the study. That was guided by the order of the specific objectives. During the discussion, it was established that there is a need for MIE to revise the success criteria in both Geography syllabi so that they should promote learning through practice. MoEST should train Geography teachers about SDGs as the findings indicate that most Geography teachers never attend such kind of training. It has been revealed that the teaching of Geography by most secondary school Geography teachers do not address the SDGs because they do not encourage learning through practice. Therefore, there is a need for the teaching of Geography topics to promote learning through practice in order to transform the minds of learners. Finally, it has been recommended that Geography teachers should use teaching methods suitable for promoting the achievement of the SDGs.

CHAPTER 6

CONCLUSION OF FINDINGS AND RECOMMENDATIONS

6.1 Introduction

In this chapter, the researcher presents the conclusion of findings and recommendations. The topics presented are: the research process, key findings, limitations and delimitations of the study, recommendations, suggestions for future research, conclusion of the study and closing remarks.

6.2 The research process

The study aimed at examining how some of the SDGs are achieved through Geography teaching in secondary schools in Malawi. The following were the objectives: to assess how the success criteria in the Secondary School Geography Syllabi promote the achievement of SDGs; to examine the preparedness of Geography teachers in achieving SDGs; to assess how Geography teachers address SDGs; to investigate the teaching methods that secondary school Geography teachers use for the achievement of SDGs; and to explore how the achievement of SDGs through Geography teaching can be enhanced. The researcher used pragmatic paradigm whereby both quantitative and qualitative approaches were used. The interviews, questionnaires and document analysis were used as data collection methods and instruments. The sample of 78 participants was used. Seventy six (76) were secondary school Geography teachers and one member from the inspectorate section. Another participant was an officer responsible for the development of Geography syllabus. A statistical formula was used to sample participants in the study and in some cases purposive sampling was used. Quantitative data was analysed using SPSS and qualitative data was analysed thematically.

6.3 Key findings

In this section, the researcher presents the key findings of the study following the order of specific objectives.

6.3.1 How the success criteria in the Secondary School Geography Syllabi promote the achievement of SDGs

The first objective of the study was to assess how the success criteria in the Secondary School Geography Syllabi promote the achievement of some of the SDGs. The findings indicated that most success criteria (76.2%) in Junior and (88.2%) in Senior Secondary School Geography Syllabi do not address the SDGs. The success criteria do not have good quality because the action verbs do not encourage learners to practice different activities that would assist in achieving the SDGs. Despite this, the nature of all the topics seems to have the possibility of addressing the SDGs if the success criteria would be well formulated to encourage learning through practice.

6.3.2 Preparedness of Geography teachers in achieving SDGs

The second objective was to examine the preparedness of Geography teachers in achieving some of the SDGs through Geography teaching. The study revealed that most Geography teachers (88%) did not attend any training about achieving SDGs through teaching. A member from the inspectorate section explained through interviews, that MoEST failed to train Geography teachers about SDGs due to lack of financial resources. Therefore, it would be necessary for MoEST to source funds for training Geography teachers on how they would promote the achievement of SDGs.

6.3.3 How secondary school Geography teachers address some of the SDGs

The next objective was to assess how Geography teachers address issues of some of the SDGs through Geography teaching. From the results, the way how most Geography teachers taught the subject would not address the SDGs because the learners would not learn by doing. The findings indicated that most Geography teachers (69.7%) did not practice how to control bush fires. This would not address SDG 13: Climate action and SDG 15: Life on land because the learners would not develop skills on how to take care of the environment. Next, the results had shown that 61.8% of Geography teachers did not allow their Geography learners to exercise tree planting. This would not assist in addressing SDG 13: Climate action. The results indicated that 60.5% of Geography teachers did not practice water harvesting. This would not address SDG 2: Zero hunger, because there would be no water to irrigate crops during drought.

6.3.4 Teaching methods that Geography teachers use in the teaching of Geography

Another objective was to investigate the teaching methods that secondary school Geography teachers use for the achievement of some of the SDGs. The findings had shown that most teaching methods that secondary school Geography teachers use cannot assist in achieving the SDGs. Most Geography teachers (78.9%) responded that they did not conduct experiments in Geography lessons. This would not assist in promoting SDGs because the learners would not discover things on their own. This was followed by 64.5% of Geography teachers who indicated that they do not use case study in the teaching of Geography. This would not assist in achieving the SDGs because learners would not be able to analyse the problems in their local environments in order to find solutions. The results indicate that 64.5% of Geography teachers do not conduct field work and 63.2% do not use action learning. Consequently, learners cannot be transformed on how they value the environment, hence would not promote the achievement of the SDGs.

6.3.5 How to enhance SDG achievement through Geography teaching

The last objective was to explore how the achievement of SDGs through Geography teaching would be enhanced. From the findings, most respondents (80.3%) agreed that MoEST should conduct in-service trainings for Geography teachers. This was followed by 71.1% of respondents who agreed that teachers should use Transformative Learning Approach in the teaching of Geography. Next, 67.1% agreed that it would be necessary for teachers to use Action Learning. This was followed by 65.8% of respondents who agreed that teachers should use gender justice principles in the teaching of Geography. Then 61.8% of respondents agreed that Geography teachers should use Values Education Approach. All these would assist in achieving the SDGs through Geography teaching.

6.4 Research Limitations

There were some factors that limited the study. Some respondents were viewing the questionnaire with political minds hence were reluctant in filling it. Some took about two hours before they started filling in the questionnaire. The reluctance might have negatively affected the validity of their responses. The researcher conducted an interview with the member of inspectorate section but was giving the answers in a hurry because he was preparing for an emergency meeting. This might have affected the quality of data that was collected.

6.5 Research Delimitations

The study would be conducted in many types of schools but it was delimited to the Community Day Secondary Schools and the Conventional Secondary Schools. These were chosen in the interest of the researcher. The study did not focus on all the seventeen SDGs but only those that were related to the selected Geography topics in the Junior and Senior Secondary School Geography syllabi as shown in appendices 8 and 9, Pp 107 - 118.

6.6 Recommendations

Basing on the findings of the study, the following recommendations could be made:

- MIE should revise the success criteria in both junior and senior secondary school syllabi so that they promote learning through practice. This would assist in achieving the SDGs because learners would easily be changed positively on how they interact with the environment.
- MoEST should train secondary school Geography teachers on how they would promote the achievement of SDGs through teaching.
- Secondary school Geography teachers should use transformative learning approaches that would encourage learning through practice, for example carrying out tree planting projects and giving learners Geography activities that promote critical thinking.
- Geography teachers in secondary schools should conduct experiments in some Geography topics. For example, in the topic “hydrosphere”, learners would carry out an experiment about transpiration in tree leaves. This would assist learners to appreciate the role of trees in the hydrosphere and climate of the region. This would stimulate them to start taking care of trees, which would promote the achievement of the SDGs, for example, SDG 13: Climate action.
- Geography teachers should use Values Education Approach when delivering lessons. This would empower learners to take responsible actions by keeping in mind environmental integrity and a just society, both for present and future generations. It would also stimulate meaningful learning and application of knowledge to address problems, issues and questions relating to people and their environment.

6.7 Suggestions for Future Research

The following are the areas that could require future research:

- Assessing the quality of Geography textbooks in promoting SDGs related to Geography topics.
- Investigating challenges facing Geography teachers in achieving the SDGs through Geography teaching.
- Exploring the role of Geography learners in addressing SDGs related to Geography topics.

6.8 Conclusion

The study has clearly shown that the teaching of Geography in secondary schools in Malawi has a lot of failures in achieving the SDGs. This situation exists although UNESCO encourages different countries to promote the achievement of SDGs through the teaching of various subjects including Geography. In reality, the teaching of Geography would be the best vehicle for promoting the achievement of SDGs because of its geographical concepts of place and space, which are key dimensions for the analysis and pursuit of sustainability. Considering the fact that SDGs are current issues that appear in international policies, it is important that MoEST and MIE should work hand in hand to find ways that would assist in promoting the achievement of the SDGs through Geography teaching. The issues of training Geography teachers about SDGs and revising the success criteria to promote learning through practice need to be considered. It is necessary for Geography teachers to strive by using the approaches that would transform the minds of the learners on how they interact with the environment. If all these efforts would be made, the teaching of Geography is likely to assist in achieving the SDGs.

6.9 Closing remarks

A well known philosopher, Herbert Spencer, once said: “*The great aim of education is not knowledge but action.*” This implies that it is not enough to simply have knowledge gained through rote memorisation or experience, but rather it is what you do with that knowledge that really defines education. In line with this study, the teaching of Geography should lead to actions for achieving the SDGs. The MIE should revise the success criteria so that they promote learning through practice, and assist in the teaching that can lead to achieving the SDGs. MoEST should train secondary school Geography teachers on how they can teach in order to achieve the SDGs. Teachers should emphasise on teaching that encourage learning by doing in order to address issues of SDGs through their teaching. The teaching methods should be transformative and not transmissive. These would transform learners to act with passion and compassion and make the world safer and more sustainable for the future generations. Geography teachers should always remember that teaching is a vehicle for achieving some of the SDGs, therefore, they must work hard in order to achieve them.

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APPENDICES

Appendix 1: Permission letter from the Faculty of Education



MZUZU UNIVERSITY

OFFICE OF THE DEAN
FACULTY OF EDUCATION

Private Bag 201
Luwingu
Mzuzu 2
MALAWI
Tel: (265) 01 320 722/575
Fax: (265) 01 320 505

Ref.: MU/1/D3.0

11th April 2019

TO WHOM IT MAY CONCERN

Dear Sir/Madam

PERMISSION TO COLLECT RESEARCH DATA

Duncan Wadson is a registered Master of Education (Teaching Education) Program student at Mzuzu university. He is supposed to collect data for a study titled *Teaching as a Vehicle for Achieving some of the SDGs: Examining Geography Teaching in Secondary Schools in Malawi*. The Faculty of Education at Mzuzu university has approved and cleared this research proposal.

Kindly assist him accordingly.

Yours faithfully,

Associate Professor Victor Mgombezulu
Dean, Faculty of Education.

Appendix 2: Permission letter from the Education Division Manager in SHED

Telephone: +265 01 466 400

Fax: +265 01 466 379

Cell: 0999345348/0881388349

Email: edmshe@gmail.com
Communication should be addressed to:
The Education Division Manager



In reply quote
Ministry of Education Science & Technology
Shire Highlands Education Division
P/Bag 7
ULANJE
MALAWI

REF : NO. SHD/A/DO/1/1

7TH MAY, 2019

TO WHOM IT MAY CONCERN

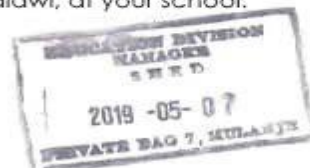
PERMISSION TO COLLECT RESEARCH DATA

I write to request you to allow **MR DUNCAN WADSON** who is currently studying at Mzuzu University a Master's Degree in teaching education to collect research data titled Teaching as a Vehicle for Achieving some of the SDGs: Examining Geography Teaching in Secondary Schools in Malawi, at your school.

Your support will be greatly appreciated.

BRIGHTON LINDE

FOR EDUCATION DIVISION MANAGER -SHED



Appendix 3: Letter seeking permission from the EDM

Duncan Wadson
Khongoloni CDSS
P. O. Box 50
Migowi

10th April, 2019

The Education Division Manager
Shire Highlands Education Division
Private Bag 7
Mulanje

Dear Sir

REQUEST TO CONDUCT A STUDY IN SECONDARY SCHOOLS IN SHED

I am Duncan Wadson, a teacher in Shire Highlands Education Division. Currently, I am studying towards a Master's degree in Teacher Education at Mzuzu University. As a requirement for the award of the master's degree, I am conducting a research titled "Teaching as a Vehicle for Achieving some of the SDGs: Examining Geography Content and Teaching in Secondary Schools in Malawi". I would like to request for permission to conduct the study in 38 secondary schools from 22nd April to 10th May, 2019.

The study will assist to examine the preparedness of Geography teachers in achieving some of the SDGs through Geography teaching. It will assess how Geography teachers address some of the SDGs through the teaching of Geography. The research will assist to explore how the achievement of some of the SDGs through Geography teaching can be enhanced.

I intend to conduct interviews with the two Geography teachers at each school. In the end, they will be asked to fill in the questionnaire. The choice of teachers will be based on those who are qualified and with teaching experience of not less than three years.

The privacy of participants and the schools will be upheld throughout the study. All information will be treated with confidentiality. I hope their participation in the study will be of significance to them in improving the teaching of Geography.

I am looking forward to your favourable consideration on my request. You may contact me on 0995688982 or e-mail: duncanwadson@gmail.com in case of further questions.

Yours faithfully

Duncan Wadson

Appendix 4: Consent letter for Head teachers

Duncan Wadson
Mzuzu University
Private Bag 206
Luwinga, Mzuzu 2

10th April, 2019

To : The Concerned Head Teacher

Dear Sir / Madam

REQUEST TO CONDUCT THE STUDY AT YOUR INSTITUTION

I am Duncan Wadson, a teacher in Shire Highlands Education Division. Currently, I am studying towards a Master's degree in Teacher Education at Mzuzu University. As a requirement for the award of the master's degree, I am conducting research titled "Teaching as a Vehicle for Achieving some of the SDGs: Examining Geography Teaching in Secondary Schools in Malawi". I would like to request for your consent to conduct the study at the school from 22nd April to 10th May, 2019.

The study will assist to examine the preparedness of Geography teachers in achieving some of the SDGs through Geography teaching. It will assess how Geography teachers address some of the SDGs through the teaching of Geography. The research will assist to explore how the achievement of some of the SDGs through Geography teaching can be enhanced.

I intend to conduct interviews with the two teachers, one for junior and another for senior section. In the end, they will be asked to fill in the questionnaire. The choice of teachers will be based on those who are qualified and with teaching experience of not less than three years.

The privacy of participants and the school will be upheld throughout the study. All information will be treated with confidentiality. I hope their participation in the study will be of significance to them in improving the teaching of Geography.

I am looking forward to your favourable consideration on my request. You may contact me on 0995688982 or e-mail: duncanwadson@gmail.com in case of further questions.

Yours faithfully

Duncan Wadson

Appendix 5: Information sheet for the Head teachers



I am Duncan Wadson, a student pursuing Master of Education in Teacher Education at Mzuzu University. I am carrying out a study titled “Teaching as a Vehicle for Achieving some of the SDGs: Examining Geography Teaching in Secondary Schools in Malawi”. I will conduct this research among Geography teachers in secondary schools in the Shire Highlands Education Division. I would like to examine the preparedness of Geography teachers in achieving some of the SDGs through Geography teaching. I will also need the information about the methods that Geography teachers use in the teaching of Geography so as to achieve the SDGs.

I intend to conduct interviews with the two teachers, one for junior and another for senior section. In the end, they will be asked to fill in the questionnaire. The choice of teachers will be based on those who are qualified and with teaching experience of not less than three years.

If you allow your school to take part in my study, I would like to make it clear that your participation is entirely voluntary, no negative consequences will result from your participation, and all information will be treated with confidentiality. The privacy of participants and the school will be upheld throughout the study. I will provide you with a summary of my research results if you would like me to do that.

Thank you.

Name of researcher: Duncan Wadson

Cell Number: 0995688982

Email: duncanwadson@gmail.com

Signature: _____

Appendix 6: Teacher's consent form



Researcher: Duncan Wadson

The purpose of this study is to assess how some of the Sustainable Development Goals are achieved through Geography teaching in secondary schools in Malawi. The study will be a wakeup call to the Ministry of Education and curriculum developers to start enhancing the internationally agreed policy of incorporating SDGs in education systems, for example, through the teaching of Geography. This research will require teachers to participate with consideration that sustainability starts with teachers.

Your participation in this study will be completely anonymous and the information that you will provide will not interfere with your work.

Participant's Permission

I have read the consent form and conditions of this study. I hereby voluntarily agree to participate in this study.

Participant's name: _____ Signature: _____ Date: _____

Researcher's name: _____ Signature: _____ Date: _____

Appendix 7: Information sheet for teachers



I am Duncan Wadson, a student pursuing Master of Education in Teacher Education at Mzuzu University. I am carrying out a study titled “Teaching as a Vehicle for Achieving some of the SDGs: Examining Geography Teaching in Secondary Schools in Malawi”. I will conduct this research among Geography teachers in secondary schools in the Shire Highlands Education Division. I would like to examine the preparedness of Geography teachers in achieving SDGs through Geography lessons. The study will assess how Geography teachers address some of the SDGs through Geography teaching.

I intend to conduct interviews with the two teachers, one for junior and another for senior section. In the end, I will ask them to fill in the questionnaire. The choice of teachers will be based on those who are qualified and with teaching experience of not less than three years.

If you accept take part in my study, I would like to make it clear that no negative consequences will result from your participation and all information will be treated with confidentiality. The privacy of participants and the school will be upheld throughout the study. I will provide you with a summary of my research results if you would like me to.

Thank you.

Name of researcher: Duncan Wadson

Cell Number: 0995688982

Email: duncanwadson@gmail.com

Signature: _____

Mzuzu University

Appendix 8: Document analysis of Junior Secondary School Geography Syllabus

TOPIC	SUCCESS CRITERIA	DOES IT ADDRESS SDGs?		IF YES, WHICH SDG / HOW IS IT BEING ADDRESSED? IF NO, WHY?
		YES	NO	
HYDROSPHERE (SDG2; SDG3; SDG13; SDG14)	Learners must be able to:			
	Explain the term <i>hydrosphere</i> .		√	The action verb “explain” cannot assist the learners to be transformed in their thinking and start practices that assist in maintaining the hydrosphere, for example, afforestation. Therefore, it cannot promote the achievement of SDGs.
	Explain the main features and processes of the hydrological cycle.		√	If the learners simply explain the main features and processes of hydrological cycle, it cannot contribute to the achievement of SDGs. There is a need for action verbs that can assist the learners to practice different activities in order to maintain hydrological cycle.
	Explain the importance of hydrological cycle.		√	The use of action verb “explain” cannot assist the learners to think critically and discover things on their own. Let the learners do practical activities, for example, conduct experiments and relate what they find out to what happens in our daily lives. The learners would realise that the hydrological cycle is important and they are likely to

				develop values thinking. In the end, they would develop practices that may assist to achieve the SDGs.
	Suggest ways of maintaining hydrological cycle.	√		Through suggesting the ways of maintaining the hydrological cycle, the learners would develop creative thinking. This would assist them to practice what they have suggested. This would assist to promote the SDGs, for example, SDG2; SDG3; SDG13 and SDG14.
POPULATION OF MALAWI (SDG1; SDG2; SDG3; SDG4; SDG11; SDG13)	Describe the population composition of Malawi.		√	The action verb “describe” is not appropriate in this success criterion. If the learners simply describe the population composition of Malawi, it cannot bring transformation in their thinking. It was necessary to use the action verb that would assist the learners to think and start carrying out the activities that would assist to bring changes in their society in terms of population control. This would assist in promoting the achievement of SDGs, for example, SDG1; SDG2; SDG3; SDG4, SDG11 and SDG13.
	Explain factors that influence population distribution in Malawi.		√	If the learners explain the factors that influence population distribution in Malawi, it cannot bring any change in the learners and their society. There was a need for action verb that would assist the learners to conduct activities that

				would assist in population control. For example, the learners would perform drama that can transform their communities on issues of population control. This would in the end assist in promoting the SDGs, for example, SDG 1; SDG 2 and SDG 3.
	Describe factors that influence population density in Malawi.		√	The action verb “describe” is not practical, hence the success criterion cannot assist in promoting the achievement of the SDGs.
	Explain the effects of rapid population growth in Malawi.		√	If the learners explain the effects of rapid population growth, they would not easily be transformed in their thinking and cannot bring change in the environment that they live. To achieve SDGs, the action verb in the success criterion should be the one that would assist the learners to have an activity for practice.
	Suggest strategies for controlling rapid population growth in Malawi.	√		The action verb “suggest” would assist the learners to develop creative thinking that would assist in bringing transformation in their minds. It is necessary that the success criteria should be in the way that would assist the learners to think on their own. Later on, they would be able to practice what they have thought, hence promoting the SDGs.

ENVIRONMENT (SDG6; SDG11; SDG12; SDG13; SDG14; SDG15)	Explain the term environment		√	If the learners explain the term “environment”, their thinking would not easily change towards achieving the SDGs. The action verb “explain” does not even allow the learners to practice activities that would assist in conserving the environment. Therefore, the success criterion does not address SDGs.
	Explain how the components of the environment and earth are related.		√	The action verb “explain” is not relevant in transforming the learners’ mind and the environment. It is necessary that the learners should learn through actions. This calls for a need to use action verbs that would assist the learners to practice various activities. If this is done, then the SDGs, for example, SDG 6; SDG 11; SDG 12; SDG 14 and SDG 15 would be achieved.
	Explain the importance of various components of the environment.		√	If the learners explain the importance of various components of the environment, it cannot assist them to take action in conserving various components of the environment. Therefore, the success criterion does not address the SDGs.
	Debate how life would be without the components of the environment.	√		The action verb “debate” is relevant because learners would be able think critically and argue for or against a given topic. This can bring positive change in the minds of learners after realising that the components of the environment support life. They are

				likely to develop values that can assist them to start preserving the environment. This would assist in promoting SDGs, for example, SDG 6; SDG 11; SDG 12; SDG 13; SDG 14 and SDG 15.
FISHING IN MALAWI (SDG1; SDG3; SDG12; SDG14)	Explain the importance of fish.		√	The action verb “explain” cannot assist learners to think critically and be transformed on the way they see fish. Therefore, this success criterion would not assist in promoting the achievement of SDGs, for example, SDG 1; SDG 3; SDG 12 and SDG 14.
	Identify human activities that endanger fish resources.		√	The use of action verb “identify” in the success criterion is not appropriate. If the learners identify the human activities that endanger fish resources, it cannot assist in achieving the SDGs because there would be no practical activity that would assist learners to develop knowledge and skills on how to conserve fish.
	Locate the major fishing grounds in Malawi.		√	If the learners locate the major fishing grounds in Malawi, it would not bring change in their thinking. It is necessary that the success criterion should be in such a way that it should assist the learners to practice or do any activity. If they learn through practice, they are likely to promote the achievement of SDGs, for example, SDG 1; SDG 3;

				SDG 12 and SDG 14.
	Brainstorm ways of preserving fish.	√		The action verb “brainstorm” would assist the learners to think critically on their own. This is good because it would promote creative thinking in the learners. It would be easy for the learners to practice what they have thought on their own. This would promote the achievement of SDGs, for example, SDG 1; SDG 3; SDG 12 and SDG 14.
	Assess the economic importance of fish in Malawi.	√		If the learners assess the economic importance of fish in Malawi on their own, they are likely to appreciate that fish have an important role in Malawi. Therefore, they can develop positive thinking and assist in practices that would prevent fish from diminishing. This would assist in achieving the SDGs, for example, SDG 1; SDG 3 and SDG 12.
ENERGY (SDG7; SDG11; SDG13)	Explain types of energy.		√	The action verb “explain” in the success criterion cannot assist the learners to be transformed in their thinking. If they explain the types of energy, it cannot assist in achieving the SDGs because there would be no practical activity.
	Explain the importance of energy.		√	The learners would explain the importance of energy but if they do not have practical activities on different

				types of energy, for example, solar energy, then they cannot be transformed. The practical activities would assist the learners to be transformed and they can prevent using the forms of energy that produce gas that increases carbon dioxide in the environment, for example, charcoal. If this is prevented, the SDGs can be promoted, for example, SDG 1; SDG 3; SDG 12 and SDG 14.
	Explain the ways of conserving energy.		√	The action verb “explain” in the success criterion cannot assist in bringing change in the way learners think and behave in the environment that they live. Therefore, the success criterion does not qualify to promote the achievement of the SDGs.

Appendix 9: Document analysis of Senior Secondary School Geography Syllabus

TOPIC	SUCCESS CRITERIA	DOES IT ADDRESS SDGs?		IF YES, WHICH SDG / HOW IS IT BEING ADDRESSED? IF NO, WHY?
		YES	NO	
CLIMATE CHANGE (SDG2; SDG3; SDG11; SDG12; SDG13; SDG17)	Learners must be able to:			
	Explain the meaning of the term <i>climate change</i> .		√	If the learners explain the meaning of the term “climate change”, it cannot assist in developing creative thinking in them. They cannot develop new values if they simply explain climate change. The success criteria should be in the form that can assist the learners to practice activities that may assist to maintain climate. There should be the success criteria that would assist the learners to conduct experiments so as to be transformed in their minds. Consequently, the SDGs, for example, SDG 2; SDG 3 and SDG 13 would be achieved.
	Examine causes and effects of climate change	√		If the learners examine the causes and effects of climate change on their own, they are likely to think deeply and develop an understanding of the topic. As a result, they can be transformed in their minds and take action in order to control climate change. This can assist in achieving SDGs, for example, SDG

				2; SDG 3; SDG 11; SDG 12; SDG 13 and SDG 17.
	Explain climate change mitigation and adaptation measures.		√	The action verb “explain” in the success criterion is not appropriate in promoting critical thinking in the minds of learners. Therefore, this success criterion cannot assist in achieving the SDGs.
WASTE MANAGEMENT (SDG3; SDG6; SDG11; SDG13; SDG14; SDG15)	Explain the different types of wastes.		√	If the learners explain the different types of wastes, they cannot be transformed to start managing the wastes. What is needed is to have the success criteria that encourage the learners to think on their own and practice different activities in Waste Management. For example, they can start paper recycling. Through their practice in waste management, SDGs, for example, SDG 3; SDG6; SDG 11; SDG 13; SDG 14 and SDG 15 would be achieved.
	Explain the effects of poor waste disposal.		√	The action verb “explain” in the success criterion cannot assist the learners to think critically and develop new values. To achieve the SDGs, the success criteria are supposed to transform the learners’ minds. Therefore, the use of the action verb “explain” cannot assist in transforming the minds of learners hence cannot assist in achieving the SDGs, for example, SDG 3; SDG 6; SDG 11; SDG 13; SDG 14 and SDG 15.

	Explain ways of managing different types of wastes.		√	If the learners explain the ways of managing different types of wastes, it cannot assist in achieving the SDGs because what is required is for the learners to practice different ways of managing wastes. For example, they can have practical activities in paper recycling. They can construct pits for dumping in the wastes. Through practice, the SDGs are likely to be achieved.
WILDLIFE IN MALAWI (SDG13; SDG15)	Explain the term <i>wildlife</i> .		√	If the learners explain the term “wildlife”, it cannot bring change in their thinking and cannot assist them to change their values on how they interact with wildlife. This cannot lead to achievement of the SDGs.
	Explain the importance of wildlife in Malawi.		√	This success criterion cannot promote the SDGs because the action verb “explain” cannot assist in promoting values thinking in the learners. The success criteria should be in the way that would assist the learners to think on their own. They should study what happens in their environment and discover the importance of wildlife. This may transform their minds and start developing new values on how they can take care of wildlife. This would lead to the promotion of SDGs for example, SDG 13 and SDG 15.

	Describe human activities endangering wildlife.		√	The action verb “describe” in the success criterion cannot assist in achieving the SDGs. This success criterion does not promote critical thinking in the learners and it is not practical hence, cannot assist in promoting the achievement of SDGs.
	Brainstorm conservation measures of wildlife species.	√		The action verb “brainstorm” would assist the learners to think critically. They would be given a task and think on their own and they are likely to be transformed in their minds. This can promote the achievement of SDGs, for example, SDG13 and SDG15.
IRRIGATION FARMING (SDG1; SDG2; SDG3)	Identify areas on world map that depend on irrigation farming.		√	If the learners identify areas on world map that depend on irrigation farming, it cannot assist in promoting the SDGs. There is a need for the success criteria that can assist the learners to practice irrigation. This can promote SDGs, for example, SDG 1; SDG 2 and SDG 3.
	Explain factors which encourage irrigation farming.		√	The action verb “explain” is not appropriate in terms of promoting the achievement of SDGs. This success criterion cannot assist the learners to develop values thinking and be transformed in their minds. Therefore, this cannot assist in promoting the achievement of SDGs, for example, SDG 1; SDG 2 and SDG 3.

	Explain modern methods of irrigation.		√	If the learners explain the modern methods of irrigation, it cannot assist in achieving the SDGs. This is because the action verb “explain” cannot assist the learners to practice the methods of irrigation. Therefore, the success criterion cannot assist in achieving the SDGs, for example, SDG 1; SDG 2 and SDG 3.
WETLANDS IN MALAWI (SDG2; SDG15)	Locate wetlands in Malawi.		√	If the learners locate the wetlands in Malawi, it cannot transform their minds on how they look at the wetlands. There is a need for action verbs in the success criteria that would promote the thinking of the learners. These can assist in promoting the achievement of SDGs, for example, SDG 2 and SDG 15.
	Explain the importance of wetlands.		√	The action verb “explain” in this success criterion cannot assist the learners to think and make discoveries on their own. Let the learners make the study of wetlands in their local areas and think critically about the importance of these wetlands. They need to practice activities, for example, planting and irrigating crops in the wetlands. This would promote SDG 2 and SDG 15.
	Describe activities that threaten wetlands.		√	The action verb “describe” cannot assist the learners in taking action on activities that threaten wetlands. Therefore, it cannot assist in promoting the SDGs.

Appendix 10: Questionnaire for teachers

TEACHER PROFILE (tick where it is appropriate)

YOUR SEX: a. Male [] b. female []

YOUR YEARS OF SERVICE

a. 1 – 10 [] b. 11 -20 [] c. 21 – 30 [] d. Above 30 []

YOUR HIGHEST QUALIFICATION

a. T2 certificate [] b. Diploma [] c. Degree [] d. Master degree []

A. Preparedness of Geography teachers in achieving SDGs

1. How long have you been teaching Geography?

a. 1 – 10 years [] b. 11 – 20 years [] c. 21 – 30 years [] d. above 30years []

2. What do you understand by the term “Sustainable Development Goals”?

3. Have you ever been trained in how to integrate Sustainable Development Goals in Geography lessons?

a. Yes [] b. No []

4. If yes, in what forum did you learn about Sustainable Development Goals?

B. Assessing how Geography teachers address SDGs through selected Geography topics

5. Please tick the number that represents your response to the question.

Learning Geography should skill learners in a range of competencies, to what extent do you promote the following Sustainable Development Goal competencies in your Geography teaching?

Key: 1 = Strongly agree, 2 = Agree, 3 = Not sure, 4 = Disagree, 5 = Strongly disagree

	ITEM	1	2	3	4	5
a.	Practice sustainable land use (SDG 2; SDG 14; SDG 15)					
c.	Practice in water harvesting (SDG 1; SDG 2)					
f.	Exercising tree planting (SDG13)					
g.	Practice in controlling bush fires (SDG 13; SDG 15)					
k.	Practice in waste management (SDG 3; SDG 6; SDG 11)					
M	Practice in using clean energy (SDG 7)					
o.	Practice in controlling soil erosion (SDG 13; SDG 14; SDG 15)					

6. Please, tick the number that represents your response to the question.

To what extent do you use the following methods in the teaching of Geography?

Key: 1 = Strongly agree, 2 = Agree, 3 = Not sure, 4 = Disagree, 5 = Strongly disagree

	ITEM	1	2	3	4	5
a.	Experiments					
b.	Question and answer					
c.	Dictation					
d.	Fieldwork					
e.	Explanation					
f.	Case study					
g.	Lecturing					

h	Inquiry – based learning					
j.	Action learning					

C. How to enhance SDG achievement through Geography teaching

7. What should be done in order to enhance the achievement of the Sustainable Development Goals through the teaching of Geography?

Key: 1 = Strongly agree, 2 = Agree, 3 = Not sure, 4 = Disagree, 5 = Strongly disagree

	ITEM	1	2	3	4	5
a.	MoEST should conduct in-service trainings about SDGs.					
b.	MIE should revise the success criteria in the Geography syllabus to promote learning through practice.					
c.	Teachers should use Transformative Learning approaches.					
d.	Teachers should use Action Learning approaches.					
e.	Teachers should give learners activities that promote critical thinking.					
f.	Teachers should assign learners activities that promote Values Education.					
g.	Teachers should use gender justice principles when conducting practical activities, for example, planting trees.					
h.	Teachers should encourage learners to practice local technologies and innovations.					
i.	MoEST should supply more Geography Sourcebooks on issues that promote SDGs.					

END OF QUESTIONNAIRE
THANKS FOR YOUR PARTICIPATION

Appendix 11: Semi-structured interview guide for a member from the inspectorate section

1. Does the development of Secondary School Geography Syllabus take into account the SDGs?
2. How do the success criteria in both Junior and Senior Secondary School Geography Syllabi promote the achievement of SDGs?
3. In your own opinion, which SDGs do the Junior and Senior Secondary School Geography Syllabi address?
4. How do the success criteria in specific topics of Junior and Senior Secondary School Syllabi address the SDGs that you have mentioned?
5. How does the Ministry of Education, Science and Technology prepare teachers in order to promote the achievement of SDGs through Geography teaching?
6. In what ways do Geography teachers address the SDGs through Geography teaching?
7. Would you explain how the teaching methods that Geography teachers use promote the achievement of SDGs?
8. How can the teaching of Geography be improved in order to promote the achievement of SDGs?

END OF INTERVIEWS

THANKS FOR YOUR PARTICIPATION

Appendix 12: Verbatim report of interviews with the inspectorate section

1. Does the development of Secondary School Geography Syllabus take into account the SDGs?

Response: *Yes, as we review the syllabus, we start looking at the emerging issues at world level. Therefore, SDGs were considered when developing Geography syllabus.*

2. How do the success criteria in both Junior and Senior Secondary School Geography Syllabi promote the achievement of SDGs?

Response: *I should say that the success criteria in most of the topics that appear in both Junior and Senior Secondary School Geography Syllabi address the SDGs, for example, SDG 13: Climate action. However, for the success criteria to assist in achieving the SDGs, teachers should give learners tasks that will assist them to think critically, be creative and change behaviour on how they interact with the environment.*

3. In your own opinion, which SDGs do the Junior and Senior Secondary School Geography Syllabi address?

Response: *The Geography syllabi address almost all the SDGs. For example, the topic “Environment”, in Junior Secondary School Syllabus addresses SDG 13: Climate action and SDG 15: Life on land. The topic “Irrigation Farming”, in Senior Secondary School Geography Syllabus addresses SDG 1: No Poverty and SDG 2: Zero Hunger.*

4. How do the success criteria in specific topics of Junior and Senior Secondary School Syllabi address the SDGs that you have mentioned?

Response: *The success criteria in the topic “Environment” that I have mentioned equip learners with knowledge on how they can take care of environment.*

5. How does the Ministry of Education, Science and Technology prepare teachers in order to promote the achievement of SDGs through Geography teaching?

Response: We carry out training workshops and secondary school teachers in all the educational divisions were oriented about the SDGs.

6. In what ways do Geography teachers address the SDGs through Geography teaching?

Response: In Senior Secondary School Syllabus, there is a topic Waste Management which would address SDG 3: Good health and well-being. Teachers discuss with the learners different ways how waste can be managed.

7. Would you explain how the teaching methods that Geography teachers use promote the achievement of SDGs?

Response: It is unfortunate that most Geography teachers frequently use lecture method where they drill the content to learners as they claim that the content in Geography syllabus is large to be covered within limited time.

8. How can the teaching of Geography be improved in order to promote the achievement of SDGs?

Response: MoEST should be in a position to organise more in-service trainings for Geography teachers. We need to train them in different topics of Geography so that they should improve in their teaching and assist in promoting SDGs.

END OF INTERVIEWS

THANKS FOR YOUR PARTICIPATION

Appendix 13: Semi-structured interview guide for an officer responsible for the development of the syllabus

1. Does the development of Secondary School Geography Syllabus take into account the SDGs?
2. How do the success criteria in Junior and Senior Secondary School Geography Syllabi promote the achievement of SDGs?
3. How should the secondary school section be prepared so as to achieve the SDGs through Geography teaching?
4. In your own opinion, which teaching methods can secondary school Geography teachers use in order to achieve the SDGs through Geography teaching?
5. How can the teaching of Geography be improved to promote the SDGs?

END OF INTERVIEWS

THANKS FOR YOUR PARTICIPATION

Appendix 14: Verbatim report of interviews with an officer responsible for the development of the syllabus

1. Does the development of Secondary School Geography Syllabus take into account the SDGs?

Response: *Yes, when developing Geography syllabus, almost all the SDGs are taken as a priority.*

2. How do the success criteria in Junior and Senior Secondary School Geography Syllabi promote the achievement of SDGs?

Response: *The success criteria in both Junior and Senior Secondary School syllabi promote the achievement of SDGs as different topics are related to SDGs. For example, the success criteria in the topic about Climate Change assist in addressing SDG 13: Climate action as we are in the time when we are facing problems due to Climate Change. When developing success criteria for the Secondary School Geography syllabus, we looked at the current issues. This is a current policy at international level that guides us when developing success criteria for Geography syllabus.*

3. How should the secondary school section be prepared so as to achieve the SDGs through Geography teaching?

Response: *There is a need to organise more trainings so that teachers should gain knowledge that would assist in achieving SDGs through their teaching.*

4. In your own opinion, which teaching methods can secondary school Geography teachers use in order to achieve the SDGs through Geography teaching?

Response: *It is necessary that teachers should use learner centred methods when teaching. However, most teachers do not use these methods claiming that their classes*

are large. They prefer using lecture method which also assists them to cover a lot of content within the limited time. Geography teachers need to use methods that are effective in equipping skills and knowledge in learners, for example, Action Learning.

5. How can the teaching of Geography be improved to promote the SDGs?

Response: Teachers should not focus on the examinations as what others do. Learners should be taught in such a way that they should be able to apply the knowledge when they go out after finishing secondary school education. Geography teachers should use Transformative Learning Approach if SDGs are to be achieved. Give learners the tasks that would assist them to think about how they would solve environmental problems. Let them find solutions on their own rather than just telling them what to do. Teachers should not be the masters of content in class. They need to change this, and should focus on activities that promote critical thinking and creativity. Give them content and concepts, but should be creative on their own. If the teacher stands in front of class being the master of everything, then they are killing creativity in learners. If teachers let them create things on their own, I hope they would be moving towards the right direction to achieve the SDGs.

END OF INTERVIEWS

THANKS FOR YOUR PARTICIPATION