

**AN INVESTIGATION OF HOW SELECTED NAMIBIAN GRADE 9 GEOGRAPY
TEXTBOOKS ARE REORIENTING SCHOOL GEOGRAPHY TO EDUCATION FOR
SUSTAINABLE DEVELOPMENT**

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ABSTRACT

The World Social Science Report (UNESCO, 2013) describes environmental issues and challenges, many of which are driven by human activities. These include: changing consumption patterns, climate change, deforestation, desertification, water, population growth, poverty, food security, waste products and cultural diversity and globalization. Education for sustainable development [ESD], a vital tool for achieving the Sustainable Development Goals, requires a rethinking and reorienting of education to address sustainability (UNESCO, 2016). The International Geographical Union Commission on Geographical Education (2007, 2016) acknowledges the importance of reorienting of school geography to ESD.

In Namibia, ESD has been embedded in the national curriculum. However, teachers play a critical role in reorienting school geography to ESD at the level of the classroom. They need appropriate resources to do so, the most widely used of which is the textbook. This study addresses the need for empirical research on how Namibian textbooks are reorienting geography to ESD. Using a qualitative interpretive research design, the study had the goals of understanding how selected Grade 9 textbooks are reorienting geography to ESD in what is taught (content) and how it is taught and learned (pedagogy), and how textbook authors perceive the reorienting of geography to ESD. Data were gathered through an online questionnaire of authors' perceptions of their educational goals, important ESD content, the teaching strategies they use and the challenges they face. Document analysis was done on two causes of environmental deterioration — deforestation and population explosion in the theme Ecology — in three approved Grade 9 textbooks.

The study provides evidence of how the selected textbooks are helping to reorientate school geography to the ESD content prescribed by the Namibian geography syllabus in a way that emphasizes knowing about, as opposed to critically engaging with the environmental challenges and issues at hand. With the exception of one textbook, the textbooks generally do not help to reorientate pedagogy to the transformative, change-oriented, futures-focused pedagogy advocated by the literature. Furthermore, the authors' responses do not contain evidence that suggests their thinking is informed by contemporary perspectives on ESD or geography education. The findings provide insights for understanding how textbooks are helping to reorient Namibian school

geography that may be of value to textbook authors and curriculum developers. Furthermore, it illuminates the need for theoretically informed curriculum and textbook writing workshops.

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DEDICATION

This thesis is dedicated to my beloved mother Foibe Paulus Kasita. She brought me up in the absence of my father who passed on when I was one year old. She always supported me and ensured my progress at school and all my academic spaces. She paid for my school fees, and always advised and encouraged me to concentrate and keep up with schoolwork. Without her encouragement and support, it would not have been possible to achieve what I have.

DECLARATION OF ORIGINALITY

I, **Naftal Amutenya Uusiku**, student number 13u7264, declare that this thesis entitled: *An investigation of how selected Namibian Grade 9 geography textbooks are reorienting school geography to ESD* is my own work. Where I have drawn on the words or ideas of others, these have been acknowledged according to Rhodes University Education Department referencing guidelines.

A handwritten signature in black ink, appearing to read 'Naftal Amutenya Uusiku', is written over a light yellow rectangular background.

Naftal Amutenya Uusiku

Date: 1 December 2019

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ACRONYMS

CAPE	Cape Action for People and Environment
CAPS	Curriculum and Assessment Policy Statement
CEE	Council of Environment Education
CGE	Commission on Geography Education
CK	Content Knowledge
DBE	Department of Basic Education
EE	Environmental Education
EHRD	Education for Human Rights and Democracy
ESD	Education for sustainable development
IGU	International Geographical Union
LCE	Learner-Centred Education
LSM	Learning support material
MBESC	Ministry Basic Education Sport and Culture
NCBE	National Curriculum for Basic Education
NGO	Non-governmental Organisations
NIED	National Institute for Education Development
PCK	Pedagogical Content Knowledge
PESTLE	Political, Economic, Social, Technological, Legal, and Environmental
SA	South Africa
SADC	Southern African Development Community
SD	Sustainable Development
SDG	Sustainable Development Goals
SEO	Senior Education Officer
SME	Small and medium Enterprise
TEA	Towards Education for All
UNDESD	United Nations Decade of Education for Sustainable Development
UNESCO	United Nations Education Scientific Cultural Organization
US	United States
ZPD	Zone of Proximal Development

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CHAPTER 1

OVERVIEW OF THE STUDY

1.1 Background to the study

The Global Education Monitoring Report [GEMR] (UNESCO, 2016) recognizes education as a vital tool to achieve the Sustainable Development Goals [SDGs] that address sustainable consumption and production, climate change, ocean and marine resources, terrestrial ecosystems, poverty reduction, hunger eradication, health improvement (including HIV/AIDS), human rights, gender equality and empowerment, peace, non-violence and human security, sustainable agriculture, resilient cities and global citizenship. Moreover, the World Social Science Report (UNESCO, 2013a) describes environmental issues and challenges, many of which are driven by human activities. These include: changing consumption patterns, climate change, deforestation, desertification, water, population growth, poverty, food security, waste products and cultural diversity and globalization. The International Geographical Union [IGU] Commission on Geography Education [CGE] calls for ESD to be integrated into geography education at all levels and in all regions of the world (IGU, 2007). It acknowledges the need to reorient geography education towards ESD and affirms the role geography education can play in deepening our understanding of the contemporary challenges we face (ibid).

The Geography Education Charter (IGU/CGE, 2007; 2016) highlights action themes described in the United Nations Decade of Education for Sustainable Development [UNDESD] 2005-2014, that have a geographical dimension. These include water, rural development, overexploitation of natural resources and sustainable consumption, energy choice, food security, migration, urbanization, poverty, sustainable tourism, intellectual understanding, cultural diversity, climate change, disaster reduction, biodiversity and the market economy. The Charter calls for school geography to reorient to ESD in terms of what is taught and how it is taught. Young people should acquire geographical knowledge of the complex and contested socio-ecological issues and challenges we are facing globally and nationally. School geography should be future-oriented and change-focused. It should develop dispositions such as critical and creative thinking, and action competencies that will enable young people to participate actively in transforming society and anticipating unforeseen futures (IGU/CGE, 2016).

The need to address environmental challenges in Africa including social inequality, poverty, cultural change, social justice, health risks, natural resource depletion, biodiversity loss and climate change is recognized (Lotz-Sisitka & Lupele, 2017). In South Africa, an ESD orientation is focused on specific challenges such as HIV/AIDS, unemployment, poverty, poor living conditions and environmental degradation (Roux & Teise, 2016). Namibian policies and development plans identify environmental issues and challenges that need addressing. These align with those identified at global and continental levels (see for example Towards Education for All [TEA]); (Namibia, Ministry of Education and Culture [MEC], 1993); Namibia Vision 2013 (Namibia, Office of the President, [OP], 2004); National Curriculum for Basic Education (Namibia, Ministry of Education [MoE], 2009); Harambee Prosperity Plan [HPP] (Namibia, OP, 2016).

In spite of the call by the IGU/CGE to reorient school geography to ESD, there is little research on this at the level of the classroom in Southern Africa. Wilmot and Dube (2015) and Wilmot (2017) identified the integration of ESD into school geography as a challenge for teachers. Raselimo (2016) identified a number of factors militating against the integration of ESD into school geography in Lesotho, including a shortage of qualified teachers and lack of understanding of the nature and point of school geography in the society. Dube (2017) comments on South African teachers' lack of Content Knowledge [CK] and Pedagogical Content Knowledge [PCK], and the difficulties they experience contextualizing issues within the structural constraint of schools. They also experience difficulties with the meaning of Sustainable Development [SD] and ESD (Dube, 2012 as cited in Dube, 2017). Very little research has been done on how ESD is integrated into Namibian school geography at the level of the classroom and the role played by learning support material, particularly textbooks. Loubser and Simarumba's (2016) research on the implementation of Environmental Education [EE] in geography in the Zambezi region found that most teachers were confident about their knowledge on EE topics but some were unsure about environmental challenges in Namibia. Tshiningayamwe (2017) found that Namibian biology teachers were not fully prepared to be able to implement ESD.

According to the Global Education Monitoring Report (UNESCO, 2016) textbooks are valuable sources of information about sustainable development. Learning Support Materials [LSMs] play an important role in supporting the integration of ESD into schooling, including school geography. Lee and Catling's (2016) research found that textbooks remain the most widely used LSM in geography classrooms. Graves and Murphy (2000) as cited in Martinha, 2011, p. 28, argue that in spite of the recent growth of access to multimedia and the internet, the textbook remains the principal teaching resource used in the geography classroom.

From my experience as a Senior Education Officer [SEO], I am aware that textbooks are the most important learning support material (LSM) used in school geography. According to the Namibian textbook policy, many teachers may not be able to teach effectively if they do not have textbooks (Namibia, MoE, 2008). All textbooks in education require the evaluation and approval of National Institute for Education Development (NIED) (ibid.). Evaluation panels evaluate textbooks based on criteria such as: content (relevance, accuracy, sufficiency, appropriateness, organization, promotion of cross-curricular issues, representation of Namibia's diversity and evidence of inclusive education), activities, skill development, critical thinking and understanding (Namibia, MoEAC, 2015). An analysis of the criteria used by NIED suggests a shallow approach focused mainly on technical elements with little attention paid to the orientation of education, knowledge and learning, and pedagogical approach promoted by the book (Namibia, MoEAC, 2015).

I am not aware of any other studies on how geography textbooks are reorienting school geography to ESD in Namibia. Raselimo (2010) looked at the interface between environmental education and geography in Lesotho. Vujovic (2013) looked at climate change education in geography textbooks in Gauteng Province, South Africa. My study addresses this gap in the literature by investigating, with a view to understanding, how textbooks are reorienting Namibian school geography to ESD. It also explores textbook authors' perceptions on reorienting school geography to ESD. As a Senior Education Officer [SEO] and a textbook author, the study may help me to gain insights for understanding how Namibian geography textbooks reorient geography to ESD both in terms of what must be taught (content) and how it should be taught (pedagogy).

1.2 Research goals

The overarching goal of this research is to understand how Namibian geography textbooks at one level of the school system (Grade 9) are reorienting geography towards ESD. This goal was addressed through the following two research questions:

1. How do Namibian textbook authors perceive the reorienting of school geography towards ESD?
2. How are selected Grade 9 Namibian textbooks reorienting school geography towards ESD?

1.3 Research methodology

An interpretive orientation was adopted for this study because its goal is to understand how textbooks are reorienting Namibian school geography to ESD. According to Bertram and Christiansen (2014), in an interpretive paradigm “researchers describe and understand how people make sense of their worlds and how they make meaning of their particular action” (p. 26). The situation is engaged from the view of participants (*ibid.*) (in this case textbook authors). The individuals give their understanding and interpretation of the world and a researcher builds theory on their interpretations (Cohen, Manion & Morrison, 2011). The world is social, therefore “reality is a social construction and it is dependent on the meanings that people ascribe to their own experiences and interaction with others. The social world is what people perceive it to be” (Plooy-Cillier, 2014a, p. 29) because, as Nieuwenhuis explains, “people construct the social worlds by sharing meanings” (2016a, p. 61). Qualitative data generating methods, namely document analysis and a questionnaire, were selected to address the research questions and explore a specific phenomenon (Leedy & Ormrod, 2010). A desktop document analysis of selected Namibian Grade 9 geography textbooks was done and an online questionnaire was administered to gain insights of author’s perspectives and experiences of reorienting geography to ESD.

1.4 Contribution to the field

The findings of this study may contribute to the literature on geography textbooks from a Namibian perspective. The study sheds light on how selected ESD content specified in the curriculum is interpreted by textbook authors; the view of knowledge and learning that informs the reorienting of geography towards ESD and the pedagogical approach adopted for this at one level of secondary

school geography (Grade 9). It provides insights for understanding textbook authors' perceptions on the reorienting of geography towards ESD. The findings of the study may be useful for the future development of Namibian geography textbooks. This may be of value to textbook authors and curriculum developers in reorienting school geography towards ESD.

1.5 Structure of the thesis

The thesis is structured as follows:

Chapter 2 is a review of the literature and a discussion of the interpretation of ESD from a global, regional and Namibian perspective.

Chapter 3 is a review of the literature on ESD in school geography from a global, regional and Namibian perspective, and a discussion on the ESD pedagogy.

Chapter 4 is a review of literature on the role of textbooks in supporting ESD learning.

Chapter 5 sets out the research methodology explaining the approach and methods that were used. It discusses the data collection and analysis, ethical issues and trustworthiness.

Chapters 6 and 7 present the data analysis and findings according to the research goals and research questions. Chapter 6 discusses the findings of the questionnaire on the authors' educational goals, their perceptions and experiences of integrating ESD content into textbooks, and the challenges they face when writing textbooks.

Chapter 7 presents the findings of the analysis of how three Grade 9 textbooks integrate and deal with two causes of the deterioration of the environment, namely deforestation and population explosion in the theme Ecology.

Chapter 8 discusses what emerged from the textbook analysis in relation to the literature reviewed in Chapters 2, 3 and 4.

Chapter 9 synthesizes and concludes the study. The lessons that may be learned from the study are presented and some recommendations are put forward. The chapter concludes with a critical reflection on the research process.

CHAPTER 2

THEORETICAL PERSPECTIVES ON EDUCATION FOR SUSTAINABLE DEVELOPMENT (ESD)

2.1 Introduction

The goal of this study is to understand how Grade 9 geography textbooks reorient geography towards ESD. This chapter presents a review of literature on ESD relevant to the study. The chapter consists of four sections. The first section provides an overview of education in a period of global socio-ecological crisis, the second reviews literature on global perspectives on ESD that are relevant to the study. The focus then shifts to Namibian perspectives, which includes a discussion on Namibian high level statements on ESD and how these link to the goals of Basic Education contained in Namibian educational policy and documents. The final section synthesizes and concludes the discussion.

2.2 Education in a period of global socio-ecological crisis

It is widely accepted that “societies across the globe are facing challenges arising from the pace of technological progress and globalization” (Leicht, Heiss & Byun, 2018, p. 40). The World Social Science Report (UNESCO and the Organisation for Economic Cooperation and Development [OECD], 2013a) describes the environmental issues and challenges facing the planet, many of which are driven by human activities. These include: changing consumption patterns, climate change, deforestation, desertification, water, population growth, poverty, food security, waste products and cultural diversity and globalization. In Namibia, where this research was done, policies and development plans identify environmental issues and challenges that need addressing. These align to those identified at a global level (see for example Towards Education for All (TEA), Namibia, Ministry of Education and Culture [MEC], 1993; Namibia Vision 2013, Namibia, Office of the President, [OP], 2004; National Curriculum for Basic Education, Namibia, Ministry of Education [MoE], 2009; Harambee Prosperity Plan [HPP], Namibia, OP, 2016). These are discussed in more detail in Section 2.6.

Drawing on the Brundtland Commission, De Sousa and Raath (2018) note that “sustainable development is the development that meets the needs of the present without compromising the ability of future generation to meet their own needs” (p. 338). Kofi Annan, the Secretary General of the United Nations in 2001, asserted that “our biggest challenge in this century is to take an idea that sounds abstract — sustainable development — and turn it into reality for all the world’s people” (Kofi Annan, 2001 as cited in Stimpson, 2006, p. 65). According to Stimpson “... making the abstract real, and developing the capacities of individuals and societies to work for a sustainable future is, essentially, an educational enterprise” (2006, p. 65). Given the many unresolved social, political, economic and environmental challenges facing humankind globally, education is seen as having an important role to play in building a peaceful and sustainable society (UNESCO, 2015). Furthermore, the knowledge, skills, values and attitudes to lead productive lives, make informed decisions and assume active roles locally and globally in facing and resolving global challenges can be acquired through ESD and Global Citizenship Education (GCED) (UNESCO, 2015, p. 19).

2.3 Education for Sustainable Development (ESD)

ESD first emerged at the United Nations Conference on Environment and Development (UNCED), (also known as the Earth Summit) held in Rio de Janeiro in 1992 where Agenda 21 was published, to reduce human impact on the environment (UNESCO, 2009). ESD is seen as bridging the gap between environmental, social and economic concerns (UNESCO, 2016). Education has a critical role to play in preparing people for a sustainable future, however Stimpson (2006) cautions that ESD is a contested concept for which there is a lack of consensus about the meaning of ESD, its orientation and practice.

ESD is an evolving approach with the key characteristics of holism and interdisciplinary, critical thinking, participatory decision making, applicability, local relevance, pluralism of pedagogy and fostering values underpinning sustainable development. Its main aims are social empowerment and to build personal capacities for future-oriented thinking and action. It builds on the triple bottom line of society, environment and economy for its scope and content, with culture as the dimension where the three link (Firth & Smith, 2013 as cited in Dube 2014, p. 144). Learning should provide an opportunity to everyone to acquire the knowledge, skills, values and attitudes that empower them to contribute to Sustainable Development (SD). Education is at the heart of the

2030 Agenda for Sustainable Development, with goal 4 aiming to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all (UNESCO, 2015).

UNESCO (2015) contends that:

Education must be relevant and respond to rapidly changing labour markets, technological advance, urbanization, migration, political instability, environmental degradation, natural hazards and disasters, competition for natural resources, demographic changes, increasing global unemployment, persistent poverty, widen inequality and expanding threats to peace and safety (p. 5).

The Global Education Monitoring Report [GEMR] (UNESCO, 2016) recognizes education as a vital tool to achieve the Sustainable Development Goals [SDGs] that seek to address: sustainable consumption and production, climate change, ocean and marine resources, terrestrial ecosystems, poverty reduction, hunger eradication, health improvement (including HIV/AIDS), human rights, gender equality and empowerment, peace, non-violence and human security, sustainable agriculture, resilient cities and global citizenship. Given the challenges we face, there is an urgent need to educate for a sustainable future and it requires a rethinking and reorienting of education to address sustainability (UNESCO, 2016).

More recently, the literature asserts that “... sustainable development has become a paradigm for thinking about development in which environmental, social and economic considerations are balanced in the pursuit of improved quality of life and universal values such as human rights” (UNESCO, 2017, p. 16). The growing importance of good governance and the political dimension is also recognized (UNESCO, 2017). Politics enables self-determined participation in the “transformation of unsustainable paradigms, policies and practice” (UNESCO, 2017, p. 16).

In addition, ESD is more than knowing about environment, economic or equity and social justice issues; it involves a willingness and ability to engage intellectually and personally with the tension that is created by the interconnectedness of this system (Nolet, 2009 as cited in UNESCO, 2017). ESD encompasses broad concepts like: equity among generations, gender equity and equality, human rights, inclusivity, tolerance, poverty reduction, environmental preservation and restoration, natural resources conservation and social justice (UNESCO, 2016). It recognizes the importance of enhancing understanding of local issues in the global context (ibid.). This is a way

of understanding human rights and promotion of quality of life through education (Leicht, Heiss & Byun, 2018).

According to UNESCO (2012), ESD is education for social transformation with the goal of creating a more sustainable society. The goal of ESD is seen as promoting sustainable development in society by enabling people to participate in decisions that improve everyone's life by transforming society without damaging the planet (UNESCO, 2017). Another goal is to enhance personal lives through developing new interests and opening students' minds to a wide range of ideas and possibilities (Roberts, 2013) and above all to "balance different, and often competing, needs against an awareness of environmental, social and economic limitations we face as a society" (De Sousa & Raath, 2018, p. 339). It is through ESD that competencies that enable individuals to participate in socio-political processes are developed to move their society towards sustainable development (Leicht, Heiss, & Byun, 2018). Education should "empower learners to engage and assume active roles both locally and globally to face and resolve global challenges and ultimately to become proactive contributors to a more just, peaceful, tolerant, inclusive, secure and sustainable world" (UNESCO, 2013b, p. 3). Roberts (2013) contends that "students also need to develop skills and capabilities for their present and future lives as individuals, citizens and in the world of work" (p. 21). In a similar vein, De Sousa and Raath (2018) contend that ESD should transform learners' thinking and behaviour to cope with present and future challenges and to promote a more just and equitable society. Moreover, "ESD is the acute realization of cross-cutting and interconnected nature of sustainable development challenges" (UNESCO, 2017, p. 17).

UNESCO calls for educational policy to advance ESD by providing a space for developing innovative learning environments for real-world, participatory, action-oriented and holistic forms of education (Leicht, Heiss, & Byun, 2018). Education including formal schooling is seen as needing to be transformative, futures oriented and enabling individuals to be agents of change (Leicht, Heiss, & Byun, 2018). This study seeks to understand whether, and if so how, Namibian geography textbooks promote this view of education.

ESD is needed to maintain and improve the quality of life of future generations (Reid as cited by Dube, 2012). Therefore, "ESD and related educational approaches are fostering competencies that

enable students to find sustainable solutions to demanding issues and prevent conflicts.” (UNESCO, 2017, p. 16). UNESCO (2015) asserts that it is through ESD whereby “the knowledge, skills, values and attitudes required by citizens to lead productive lives, make informed decisions and assume active roles locally and globally in facing and resolving global challenges can be acquired” (p. 19). UNESCO (2018) reports that “to date ESD has been promoting knowledge, skills, values and attitudes that empower learners to take informed decisions and responsible action for environment integrity, economic viability and a socially just society” (p. 38) “for present and future generations while respecting cultural diversity” (UNESCO, 2014 as cited in UNESCO, 2015). This is an essential for education in a globalized world with unsolved social, political, economic and environmental challenges to help in building a peaceful and sustainable society (UNESCO, 2015).

ESD emphasizes improving access and retention in quality Basic Education, and reorienting existing educational programmes to address sustainability (UNESCO, 2012). UNESCO (2017) notes that: “Embedding ESD should take into account the challenge of changing the essentially anthropocentric understanding of the world, while reclaiming the intrinsic values of education as an experience that enhances each individual’s capabilities and freedom” (p. 28).

2.4 ESD as transformative social learning

Global frameworks acknowledge the need to re-think education and call for education that is transformative and oriented to the common good (UNESCO, 2015; 2016; 2017). The critical task of education in an interconnected and interdependent world is seen as not only enabling people and communities to adapt to change at local and global levels. It is also seen as that which fosters capabilities to transform the world. This will enable people to realize their humanity and protect the biophysical environment on which they depend (UNESCO, 2017, p.15).

Jickling and Wals (2008) advocate active and transformative learning for developing responsible citizens who can engage with social and environmental issues and participate in decision making processes in their community. A similar view of transformative education is promoted by UNESCO (2013b). It describes transformation pedagogy as that which 1) encourages learners to analyse real life issues critically and to identify possible solutions relatively and innovatively; 2)

supports learners to critically revisit assumptions, world views and power relations in mainstream discourses and consider people/groups systematically underrepresented/marginalized; 3) respect differences and diversity; 4) focus on engagement in action to bring about desired changes; and 5) involve multiple stakeholders in, including those outside the learning environment in the community and in large circle of the society (p. 5). ESD also “creates opportunities for students and the wider community to learn together through partnerships, participation and action to work towards a more sustainable future” (Tilbury & Wortman, 2006, p. 197). It encourages learners to identify and explore questions, issues and problems for sustainability actively relevant to the context with their community (ibid.).

Lotz-Sisitka, Wals, Kronlid and McGarry (2015) argue that ESD needs transformative social learning in order to transform people and society. This will enable the creation of new forms of human activity and new social systems that are more sustainable and socially just (ibid.), which lead to the “promotion of quality of life, equity and justice” (De Sousa & Raath, p. 347). ESD should be implemented through transformative, cooperative and critical learning (UNESCO, 2016).

UNESCO argues that this approach to education will “facilitate reflective or critical learning, knowledge and skills acquisition, and greater agency to address complex sustainability issues” (UNESCO, 2016, p. 11). This will enhance quality of education which allows students to have “access to content and pedagogy designed to foster learning to live together on a planet under pressure and share respect for human dignity” (UNESCO, 2017, p. 17). Hence, ESD enables individuals to reflect on their own actions by taking into account their current and future social and environmental effects from a global perspective which enable them to intervene productively in shaping them in a more sustainable manner (UNESCO, 2018, p. 41).

“ESD principles will have to be translated into pedagogical practices that engage students in developing meaningful understandings and enduring dispositions” (UNESCO, 2017, p. 26). The learning outcomes in ESD are “learning to know the dynamics and content of sustainability; learning to critique; learning to bring about change and learning to care (Wals & Lenglet, 2016, as cited by UNESCO, 2016, p. 11).

Rieckman (2018, p. 44) describes transformative education as one which helps to develop the following competencies:

- systems thinking competency
- anticipatory competency
- normative competency (an ability to understand and reflect on the norms and values that underlie one's actions and to negotiate sustainability values in the context of conflicts of interests, uncertain knowledge and contradictions)
- strategic competency (to collectively develop and implement innovative actions for sustainability at the local level and further afield)
- collaborative competency
- critical thinking competency
- self- awareness competency and
- problem-solving competency

How Grade 9 textbooks help teachers and learners to develop these competencies is discussed in Chapter 7.

The global literature (for example, Tilbury, 2011; UNESCO, 2012; UNESCO, 2017) describes the different values ESD promotes. These include, inter alia, care and stewardship, respect for others and human rights, responsibility, adaptation, intention to solve problems, equity, freedom, justice and solidarity, human dignity, valuing diversity, responsible use and management use of resources, cooperative and conciliatory attitude, agency and resilience. The extent to which the Grade 9 textbooks reviewed for this study help learners to develop these values, is discussed in Chapter 7.

ESD implies social learning centred transformation in relation to sustainability in order to create a new human activity and new social systems that are more sustainable and socially just (Lotz-Sisitka, Wals, Kronlid & McGarry, 2015). The paradigm shifts from optimization towards transformation to focus on problem-solving (ibid.). Whether, and if so, how the Grade 9 textbooks help to facilitate new human activity and social systems, is discussed in Chapter 7.

2.5 Southern African perspectives on ESD

In a seminal text on ESD titled '*Schooling for sustainable development in Africa*', Lotz-Sisitka and Lupele (2017) describe how Education for Sustainable Development focuses on matters of concern arising at the social-ecological-political-economic interface. It involves “engagement with risk, uncertainty and ‘wicked’ or difficult-to-resolve problems, envisioning new futures and engagement in actions and practices that model and enable the emergence of a more sustainable and socially just society” (Lotz-Sisitka & Lupele, 2017, p. 6). They argue that the discourse about ESD is contested, with development challenges being at the heart of ESD. Environmental challenges including for example, social inequality, poverty, cultural change, social justice, health risks, natural resource depletion, biodiversity loss and climate change must be addressed in a context where at the same time many sub-Saharan African societies are still dealing with “the continuing effects of a long history of colonialism and segregation, establishing new societies and governance structures and a complex array of risks associated with the more recent spread of hyper-capitalism, globalization and earth degradation”(Lotz-Sisitka & Lupele, 2017, p.3). According to these authors ESD learning processes can be “described as adaptation to constraints and affordances” (p. 8). They further insist that ESD learning should be understood as a process of discovery that enables learners in schools to participate in and generate new understanding about themselves and the world around them (ibid.). A similar view is expressed by Dube (2017) who says that in Southern Africa ESD is “... a process that provides humanity with opportunities to engage in lifelong learning to address existing and emerging social, economic and environmental issues” (p. 96).

2.6 Namibian perspectives on ESD

ESD is an integral part of official Namibian high level documents. Namibia’s Towards Education for All (TEA) policy strives for ESD to enhance ecological balance through sustainable management (Namibia, MEC, 1993). It is against this background, Namibia Vision 2030 (Namibia, OP, 2004) argues that “the country will operate a totally integrated, unified, flexible and high quality education and training system that prepares Namibian learners to take advantage of rapidly changing global environment” (p. 10). Namibian education is discussed in detail in Section 2.6.2 and 2.6.3. More recently the strategic plan for the Ministry of Education, Arts and Culture

(2017/18 – 2021/22) insists: “educate and train for sustainable national development” (Namibia, Ministry of Education, Arts and Culture, 2017). For this reason, PESTLE (Political, Economic, Social, Technological, Legal, and Environmental) was analysed by the Ministry of Education, Arts and Culture (ibid). The analysis included all the ESD dimensions.

Table 2.1: Summary of environmental issues and challenges in official Namibian documents

Towards Education for all [TEA] (Namibia, Ministry of Education and Culture [MEC], 1993)	Namibia Vision 2030 (Namibia, Office of the President [OP], 2004)	National Curriculum for Basic Education [NCBE] (Namibia, Ministry of Education [MoE], 2009)	Harambee Prosperity Plan [HPP](Namibia, OP, 2016)
Drought HIV/AIDS	1. Water scarcity 2. Drought 3. Deforestation 4. Land degradation 5. Food security 6. Biodiversity loss 7. Exploitation of fish 8. Urbanization 9. HIV/AIDS	1. HIV and AIDS 2. Environmental degradation 3. Pollution, poor sanitation and waste 4. Inequality 5. Manage our natural resources	1. Drought 2. Climate change 3. Water management and security 4. Poverty

Table 2.1 summarizes the environmental issues and challenges identified in official Namibian documents. It illustrates continuity and change in the ESD focus in national policy — from a narrow focus on drought and HIV/AIDS in 1993 — to an expanded list of environmental issues identified by the President’s Office in 2004 and, more recently, to a focus that includes climate change in the 2016 Harambee Prosperity Plan. In addition, the recent Namibian National Development Plan 5 (NDP5) has a pillar for environmental sustainability to ensure a sustainable environment. NDP5 calls for equitable inclusive quality education and a developing strategy for peace and stability, conflict prevention and resolutions. (Namibia, National Planning Commission [NPC], 2017).

2.6.1 ESD in Namibian Education

After independence in 1993, the immediate task of Namibian education was to reduce the inequality of the past. Namibian education aims to provide opportunities for students to pursue the development of their highest intellectual potential and undertake basic and applied research that will contribute to the social, economic, cultural and political development of the country (Namibia, MEC, 1993). The Namibian policy is aligned to the holistic view described in international

literature (Leicht, Heiss & Byun, 2018). Namibia's Toward Education for All policy rests on four major goals: access, equity, quality and democracy (Namibia, MEC, 1993). Guided by these general goals, the TEA describes specific goals for Basic Education, namely: to promote unity, liberty, justice and democracy; promote human rights and respect for others; foster the highest moral, ethical and spiritual values; prepare learners for responsibilities and challenges of adult life citizenship; understanding of natural and social environment; and provide knowledge, understanding and values, and develop creativity and practical skills (Namibia, MEC, 1993, p. 55). TEA argues that Namibian learners must study how democratic societies operate and the obligations and rights of their citizens (Namibia, MEC, 1993). The goals of Namibian Basic Education promotes knowledge, skills, values and attitudes to lead to productive lives, make informed decisions and assume active roles locally and globally in facing and resolving global challenges which are similar to those of UNESCO, 2015.

Namibian Vision 2030 insists that Namibian action to reduce threats should focus on educating all Namibians with respect to environmental and development issues as well as the total economic values of Namibian natural resources (Namibia, OP, 2004). One way of educating Namibians is by undertaking basic and applied research that will contribute to social, economic, cultural and political development of the country as reflected in TEA. Namibia has a vision to improve knowledge regarding complex ecological process and improving existing knowledge, and filling in knowledge gaps through improving access to knowledge, research and development. The aim is to develop Namibia's social, economic and ecological well-being and to educate all Namibians according to constitutional and human rights (ibid.), to enhance democracy as one of goals of Namibian education in TEA. Again, Vision 2030 does not specify skills in TEA that are needed to develop a social, economic and ecological well-being. Namibian vision 2030 indicates what should be taught (environment and development issues) and why they should be taught, but not how they should be taught as TEA does.

The NCBE "has been developed to give direction to Basic Education towards the realization of Namibian Vision 2030. It also ensures continuity of the foundation principles of the Namibian education system described in Towards Education for All (Namibia, MoE, 2009, p. 1). The goal

for Namibian education is to empower learners to develop Namibia into a knowledge-based society (ibid.) as reflected in the Namibian Vision 2030.

2.6.2 Aims of Namibian Basic Education

TEA has specific aims for Basic Education which are: **Functional literacy and language development** for effective communication: intellectual development of questioning, appreciation and creativity to enable learners to discuss issues, solve problems and apply themselves to tasks, showing that learners know how to critique, bring about change and care (UNESCO, 2017); **personal development** for learners to obtain knowledge, skills and attitudes to transform Namibian society and develop self-confidence and self-reliance — Namibian TEA policy mirrors the orientation and goals of global education trends and thinking in UNESCO documents; **spiritual and ethical development** to enhance respect for, understanding and tolerance of other peoples' ways of living — Namibian Basic Education enhances respect of differences and diversity (UNESCO, 2013b); **social and cultural development** to promote democratic principles, social responsibilities and equality of opportunity for males and females; **national unity** for promoting awareness of the place and role Namibia has within the region and its relationship to neighbouring countries; **vocational orientation and economic development** to foster learners' awareness of local, regional and national needs of Namibia and positive attitudes toward the challenges of cooperation (UNESCO, 2015); and finally a **development of environmental awareness** to cultivate a holistic understanding of all living things and their environment, and a sense of responsibility towards restoring and maintaining ecological balance through sustainable management of natural resources (Namibia, MEC, 1993).

Responding to the educational aims outlined in TEA, the Namibian NCBE calls for a caring, healthy, democratic, productive, environmentally sustainable, developing society (Namibia, MoE, 2009). The NCBE outlines the aims of Basic Education for the society and of the future. These are as follows:

- A caring society to “ ...foster the highest moral and ethical values of reliability, cooperation, democracy, tolerance, mutual understanding, and service to others, to develop the learner's social responsibility towards individuals, family life, the

community and the nation as a wholeto develop and enhance respect for, and understanding and tolerance of other people’s ways of living”.

- A democratic society to “... promote moral development, awareness of one’s own values, beliefs and opinions and respect for others; to promote democratic principles at school level by promoting human rights, unity, liberty, justice and democracy.
- A productive society to “... develop knowledge, understanding and values, creativity and practical skills; and to enable learners to solve problems and reflect on and apply knowledge, skills, values and attitudes.
- An environmentally sustainable society to “...provide knowledge and skills, and attitudes and values needed to ensure that the environment is respected and sustained and to make wise choices in terms of development as well as economic activities (Namibia, MoE, 2009, p. 7).

These aims of NCBE meet the demands of goals and aims of TEA and vision 2030 as stated earlier in this section.

The curriculum goals and aims are set for the learners to achieve different core skills. These skills get more specific than in TEA. They include:

- learning to learn: for the learners to be able to organize, regulate and evaluate their own learning, carry out problem-solving tasks and reflect on processes.
- personal skills: learners being able to regulate their own behaviours, make decisions and take responsibility for their actions and decisions, to adapt to change, and show initiative.
- social skills to be able to cooperate, effectively work in groups and in a team-based environment, share knowledge, manage and solve conflicts. They should be able to learn individually and in groups, build from their own learning experiences.
- cognitive skills to think critically, research, explore, generate, develop ideas, analyse, compare, evaluate, plan solutions and solve problems, take decisions, think creatively, flexibly and reflectively, understand situations, interrelationships and systems and think innovatively (Namibia, MoE, 2009, p. 12).

The aforesaid aims of education and intended skills in NCBE (2009) are similar to those in the recent NCBE (2016).

The NCBE asserts the social science key learning areas: “Understanding the development of society, the mechanisms of globalization, the importance of human rights and democracy, and environmental issues” (Namibia, MoE, 2009, p. 13). This mirrors democracy as one of the goals in TEA. Namibian Basic Education calls for all our learners to understand Namibian environmental issues and challenges, how they impact on Namibian society and the quality of its people now and in future, and how they can be addressed on a personal, local, national and global level (Namibia, MoE, 2009). This mirrors problem-solving in TEA; however the NCBE moves from the national to the global level. Learners should understand how they can play a role in addressing issues and challenges locally in their own school and local community. The curriculum, through social sciences, enables learners to understand the relationship of resources, production, society, and the environment and human action, governance and change; conduct critical analyses of social and environmental issues, and evaluate interpretations; and apply skills to contemporary events and situations at local, national and global level (ibid.). This statement indicates that Namibian education is committed to addressing social, political, economic and environmental challenges by carrying out basic research as indicated by TEA. The above- mentioned Namibian documents inform us on what school textbooks should take into consideration.

2.6.3 Pedagogy: Namibian education perspectives

Towards Education for All recommends Learner-Centred Education (LCE) to achieve its educational aims and goals (Namibia, MEC, 1993). LCE is a pedagogy that requires interactive teaching and learning; hence it demands a high degree of learners’ participation, contribution and production (Namibia, MEC, 1993). It is linked to curriculum goals and objectives (ibid.). This statement shows that LCE enhances participation, innovative and action orientation (Leicht, Heiss & Byun, 2018). Through LCE, teachers have a holistic view of the learner, valuing learners experience as a starting point of their studies (Namibia, MEC, 1993).

TEA further urges that learning is more than memorizing and repeating, hence learners need to learn to think independently and critically (Namibia, MEC, 1993). They must master strategies on how to identify, analyse and solve problems (ibid.). Learners “must develop self-confidence, their

own sense that they have the ability to contribute productively to their society, to help it grow and to participate in governing it (ibid.). Our teaching must be learner-centred, which aims towards:

- An enlightened understanding of humankind, its culture, its tradition and history
- A methodology that promotes learning through understanding and practice, directed towards the autonomous mastery of living conditions
- A general re-orientation of the organization of school work with views to foster the acquisition of basic knowledge and skills by all people
- Promoting and protecting the fundamental equality of all learners, and equity in their access to their work in, and their benefits from the learning environment
- Introducing and encouraging classroom practices that reflect a reinforcement of both values and the practice of democracy (Namibia, MEC, 1993, pp. 83-84)

NCBE calls for LCE as it contends in TEA. The point of departure in LCE “is always what the learners already know and do, then acquiring new knowledge through ways of working which are relevant and meaningful for them, and learning how to apply their knowledge creatively and innovatively” (Namibia, MoE, 2009, p. 4). This approach is entrusted to develop core skills including learning, personal skills, social skills, cognitive skills and communication skills (Namibia, MoE, 2009). Learning is interpreted in the constructivism epistemology where learners construct knowledge through many social settings (Van Harmelen, Wilmot & Hendricks, 2001).

LCE approach to teaching and learning is required to prepare a knowledge-based society (Namibia, MoE, 2009), as stated in Namibian Vision 2030. Teaching and learning starts from what the learners already know and can do, before acquiring new knowledge and learning how to apply their knowledge creatively and innovatively. The creation of knowledge should be emphasized rather than relying predominantly on the transmission of knowledge by the teacher. This mirrors the democratic pedagogy described in TEA.

Learners learn best when they are involved in the learning process through a high degree of participation, contribution and production (Namibia, MoE, 2009) as reflected in TEA. However, the teacher has to have wider repertoire of classroom roles — as a manager and organizer of the learning, a counsellor and a coach as well as an instructor. Cooperative learning should be

encouraged through pair and group work. Here learners are guided to search information relevant to certain topics and share ideas in pairs or groups. Unlike TEA, the NCBE specifies the teacher's role in order to implement LCE.

The NCBE recognizes the prior knowledge of the learners as they explore their social and material environment through communicating and playing with others. Learners would regard learning in school as meaningful if they were taught in a way which builds on what they already know, because learners come to school with many experiences. It is against this background that teaching and learning should involve and extend the learners' prior knowledge and experiences and should be challenged by the knowledge that is provided by the school beyond the immediate sphere of the learners. This reflects the constructivism epistemology which is discussed later in the next chapter. Therefore, geography textbooks should also consider learners' pre-knowledge as this study is on textbooks.

The course of the teaching and learning process must always develop high-order thinking skills (Namibia, MoE 2009, p. 30), which is not directly stated in TEA. The policies like TEA have an influence on textbook writing. Learners should analyse, synthesise and evaluate processes and teachers should help them to develop thinking skills by engaging them in problem-solving activities. This leads to the promotion of knowledge, skills and values that lead to the productive lives as stated in TEA and global literature.

2.7 Synthesis and conclusion

This chapter has provided an overview of ESD theoretical perspectives that are relevant to this study, the goal of which is to understand how selected geography textbooks are integrating ESD into school geography at one level of the schooling system (Grade 9). The literature both globally and nationally recognizes the important role education plays in addressing sustainability and development issues. It also describes the need to re-think education so that it is transformative and develops informed, critical and responsible citizens. The literature in a developing world context such as Africa also acknowledges the significance of colonialism and the need for equity and social justice. The next chapter reviews literature on geography education and the textbooks that inform this study.

CHAPTER 3

ESD IN SCHOOL GEOGRAPHY

3.1 Introduction

This chapter begins with a review of literature on how school geography globally has been reorienting towards ESD in terms of what is taught (the content/concepts) and how it is taught (pedagogy) and assessed. This is followed by a discussion on how ESD has been integrated into school geography in Southern Africa and Namibia at the level of curriculum and the challenges encountered when implementing it at the level of the classroom.

3.2 ESD in school geography: Global perspectives

3.2.1 ESD content in school geography

The International Geographical Union [IGU] Commission on Geography Education [CGE] calls for ESD to be integrated into geography education at all levels and in all regions of the world (IGU/CGE, 2007). It acknowledges the need to reorient geography education towards ESD and affirms the role geography education can play in deepening our understanding of the contemporary challenges we face (ibid.). While geography education has the potential to contribute to ESD it will depend on what type of geography and which pedagogy is implemented, for it to be effective. (UNESCO, 2017).

The IGU/CGE sees geography education as contributing to the achievement of the United Nations Decade for Education for Sustainable Development (UNDESD) 2005-2014 goals. It is seen as providing relevant knowledge, skills, values and attitudes for the peaceful coexistence of individuals with nature on Earth (IGU/CGE, 2007).

The Geography Education Charter (IGU/CGE, 2007; 2016) calls for school geography to reorient to ESD in terms of what is taught and how it is taught. Young people should acquire geographical knowledge of the complex and contested socio-ecological issues and challenges we are facing globally and nationally. School geography should be future-oriented and change-focused. It should develop dispositions such as critical and creative thinking, and action competencies that will

enable young people to participate actively in transforming society and anticipating unforeseen futures (IGU/CGE, 2016). “Geographers analyse how the geosphere provides resources and living space for human systems and how society has an impact on earth systems” (IGU/CGE, 2007, p. 224). Hence, “Geography is a subject that naturally lends itself to ESD and provides rich insights into embedding that could be useful for other subject areas as well” (UNESCO, 2017. P. 13).

Geography as a bridging subject between natural science and social science examines the interrelationship between nature and society in different sizes and types of space (Gamerith, Hemmer & Czapek, 2014). Figure 3.1 illustrates the two interconnected geographical subsystems (the human and physical) which form the larger human-environment system. Each subsystem consists of three components (structure, function and process) and occur at different scales (local to global). This focus on human and physical interaction is what makes geography an ideal vehicle for ESD.

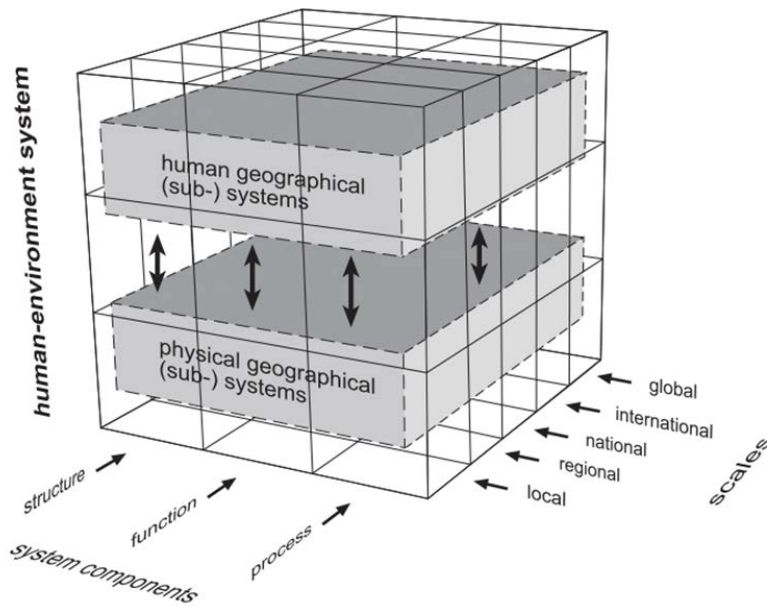


Figure 3.1: Geography’s interconnected human-social system [Source: Pietsch, 2007 as cited in Gamerith, Hammer & Czapek, 2014: p. 11]

Bagoly-Simo (2014) argues for school geography to play a key role in the implementation of ESD in formal education because it shares both the theoretical constructs and methodology of ESD. However, the extent to which it does so depends upon the content and pedagogy implemented (UNESCO, 2017). ESD is concerned with human-environmental interaction with issues that have a strong geographic dimension like natural hazards such as climate change, energy supplies, land use, migration, urbanization, poverty and identity (IGU, 2007; 2016; UNESCO, 2017). Roberts (2013) asserts that the big issues of globalization, climate change, and sustainability have geographical dimensions and school geography can contribute to understanding them.

Roberts (2013) argues that geographical facts are meaningless unless they are put into relation with other facts. It is more than learning many facts and concepts (IGU/CGE, 2016) “Geography can help us understand local issues as well as highlight their links to global phenomena” (UNESCO, 2017, p. 105). According to her, “...young people in the United Kingdom and Australia are interested in issues that will affect their future, want to study local and international issues in school and want to discuss them and voice opinions” (Roberts, 2013, p. 118). Citing Hicks (2007), Roberts contends that young people are interested in issues to do with injustice, in equality and the environment (2013).

The Geography Education Charter (IGU/CGE, 2007; 2016) highlights action themes described in the UNDESD that have a geographical dimension. These include water, rural development, overexploitation of natural resources and sustainable consumption, energy choice, food security, migration, urbanization, poverty, sustainable tourism, intellectual understanding, cultural diversity, climate change, disaster reduction, biodiversity and the market economy.

De Sousa and Raath (2018) call for three major dimensions of environmental sustainability (economic, social and biophysical) to be considered when themes are studied and it should be emphasized that these dimensions are dynamically interdependent (p. 343). This is where learners learn controversial issues that can increase their “awareness of underpinning values and can enable them to examine viewpoints critically” (Roberts, 2013, p. 118). Gamerith et al. (2014) insist that:

Geographically and geo-scientifically relevant phenomena and processes such as globalization, climate change, earthquakes, flooding and storms as well as population change, migration, disparities and conflicts over resources, shape many aspects of our lives and our societies on planet earth (p. 5).

In sum one could say that the additional mission of geographical education is now “to consolidate the notion of sustainable development that population, resources, the environment and regional development work in harmony with each other” (Min & Dongying, 2017, p. 185).

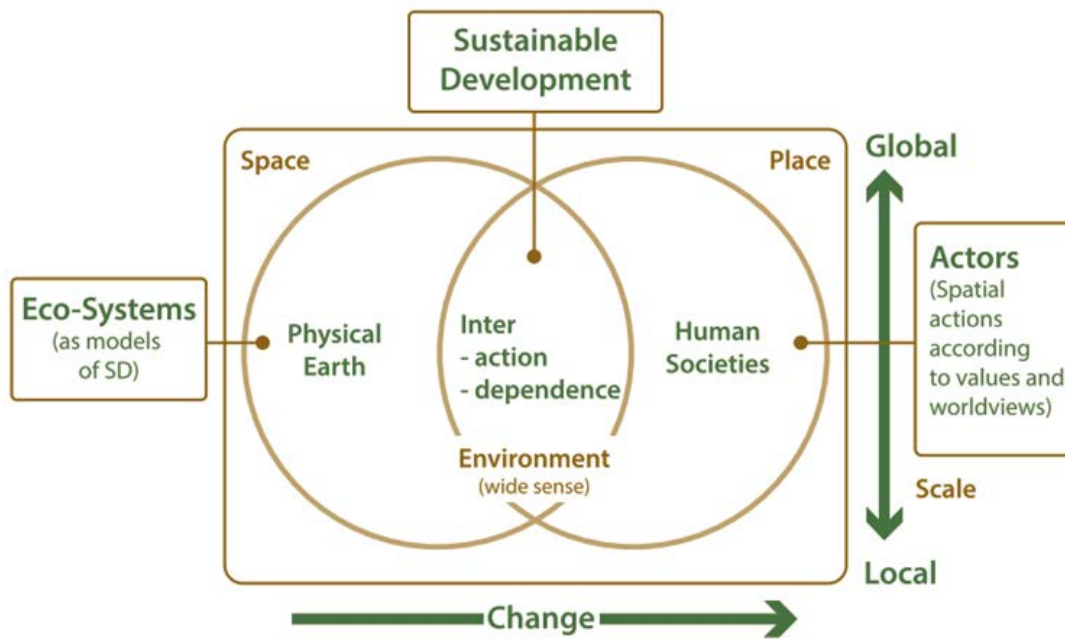


Figure 3.2: Features of geography’s contribution to sustainable development (Source: UNESCO, 2017, p. 109).

Figure 3.2 illustrates how geography as a school subject can be conceptualized within an ESD framework. It shows how Sustainable Development is focused on understanding the interaction and interdependence of the human and physical environment (and the actors and ecosystems associated with each respectively), the changes taking place over time and at different scales (from local to global). UNESCO (2017) contends that the selection of geographic content should focus on a contemporary issue and a question to be addressed. It should be localized and develop an

understanding of why it is found there, focus on geographical patterns and processes and spatial scales (from local to global), actors (perspectives and power issues) and enable an understanding of human-natural environment interrelations in space.

A global trend observed in different national contexts is the re-orientation of school geography towards ESD (UNESCO, 2017). Countries like Germany, Mexico, Australia, Romania, Brazil and England have included environmental content (ESD topics and issues) into the curriculum as well as skills and attitudes and values for ESD. In Germany, the role of school geography in a democracy is seen as developing national and regional identity and an understanding of internalization (Haubrich, 2013). Bagoly-Simo (2014) describes how school geography in Germany responded to the IGU/CGE's call to change from EE to ESD. The German curriculum shows a progression of sustainable development concepts from the fifth grade to the eighth grade. Students should develop a sense of responsibility, environmental values and a willingness to protect the environment (Bagoly-Simo, 2014).

Bagoly-Simo (2014) describes how Mexican school geography includes five explicit dimensions (natural, social, cultural, economic and political) of sustainable development. The Mexican school geography curriculum includes themes like environmental protection and sustainability and disaster control. Its main goal is to develop learners as informed, reflective and critical citizens who can participate in protecting and preserving the environment and controlling disasters.

In Australia ESD topics are integrated into year four to ten of the geography curriculum (Maude, 2014). Environmental issues, including for example, water scarcity, the live-ability of Australian suburbs and the management of Australian places, natural hazards, urbanization, food security, sustainability, the management of landscapes, the interrelationships between land cover change and climate change, global inequalities and migration are included in the geography curriculum (Maude, 2015). Lastoria and Papadimitriou (2012) describe how school geography in Brazil has also undergone profound changes over the past decade as sustainability has become the leading paradigm.

3.2.2 ESD pedagogy and school geography

According to UNESCO (2017), a key principle advocated by leaders in the field of ESD is that school geography should adopt ESD pedagogies. These are described as **learner-centred, action-oriented, constructivist, issues-based enquiry** and **transformative**. They should empower and motivate learners to become active and critical sustainability citizens able to participate in shaping a sustainable future (Leicht, Heiss & Byun, 2018).

According to UNESCO “Education 2030 will ensure that all individuals acquire a solid foundation of knowledge, develop creative and critical thinking and collaborative skills, and build curiosity, courage and resilience” (2015, p. 5). It argues for “**deep understanding**” that helps learners to look at an issue critically and helps them to imagine creative alternatives for the future (ibid.). Six ESD pedagogical principles underpinning education are: critical thinking, dealing with systems, reflecting values, collaboration and communication, facing the future with creativity and stewardship (UNESCO, 2017). These are seen as going hand in hand with key ESD competencies, namely systems thinking, anticipatory, normative, strategic, collaborative, critical thinking, self-awareness and integrated problem-solving competency (Rieckman (2018) as cited in Leicht, Heiss & Byun, 2018).

Lidstone and Williams (2006) call for the adoption of **Learner-Centred Education** (LCE) — an action-oriented, systems approach for ESD in school geography. Huckle (1996) argues for schooling to promote social justice and critical democracy. Huckle says that “... humans are able to learn and communicate with one another and their changing interpretation processes, events and experience lead to changing decisions and changing behaviours” (p. 3).

Through LCE, learners could solve problems beyond their existing level of understanding if they are given slight assistance through the Zone of Proximal Development (ZPD) (Roberts, 2003) because each learner has his or her own ZPD (Roberts, 2013). In addition, learners are “ripe to learn” (Vygotsky, 1962 as cited in Roberts, 2013) but they need teacher support to achieve high levels of thinking (Vygotsky, 1962 as cited in Roberts, 2003).

An **action-oriented approach** is described as that which "... engages learners in action and reflect on their experiences in relation to their intended learning process and personal development" (UNESCO, 2018, p. 49). This approach is seen as enabling self- directed learning, participation, collaboration, and a problem re-orientation (ibid.). UNESCO advocates **project-based learning**, a pedagogy that goes "...beyond the application of knowledge and skills to assigned tasks, expanding room for decision making and responsibility on the part of students and build their sense of self efficacy as active participants in a given project" (2017, p. 29). Challenging questions about impact, change and decision should be included to go beyond the what, where and why (Roberts, 2013).

Since the early 1990s, critical geography educators have acknowledged the important role education plays in **transforming** and empowering people to participate in environmental improvement and protection (Fien, 1993). Fien (1993) insists on education for the environment that is informed by critical pedagogy which provides a socially critical or transformative orientation in ESD. **Transformation** is about teaching learners how to think rather than what to think, for the learners to be actively engaged citizens (Jickling & Walls, 2008). This is because learners make sense of the world through participating in the world and through sharing, discussing and debating how they understand things (Roberts, 2013). The pedagogy should develop and link systemic and critical thinking and environmental and social action (Sterling, 1996).

Tilbury (2011) also describes pedagogical approaches that should be used to implement ESD. These are collaboration and dialogue, engaging the whole system, and the stimulation of innovation and active participatory learning. Tilbury further asserts that learners learn through role-plays, group discussions, debates, critical incidents, case studies, reflexive accounts, critical reading and writing, problem-based learning, fieldwork and outdoor learning, and modelling good practice. ESD learning asks one to: ask critical questions; clarify one's values; envision more positive and sustainable futures; think systematically; respond through applied learning, and explore the dialectic between tradition and innovation (ibid.). Roberts maintains that critical pedagogy enhances critical thinking through debate, dialogue and critical literacy (2013). In addition, De Sousa and Raath (2018) insist on active and critical learning where learners must be

challenged through innovative learning experiences to make their own interpretations regarding environmentally sustainable issues.

“In order to encourage critical thinking, students need to be made aware of a range of probing questions that are possible to ask in geography” (Roberts, 2013, p. 47). Teachers need to identify good key questions that require comprehensive knowledge of what is being investigated (Roberts, 2013). The following questions are seen as enabling critical thinking about an issue:

- Why is this an issue?
- What are the causes of this issue?
- Who are the interested parties?
- What is the reason for their interest?
- Who might gain from this issue?
- Who might lose?
- Who have the power to decide?
- What would be a just solution?
- What are the implications of this issue for the future?
- What would be the consequence of different decisions?

(Roberts, 2013, pp. 47-48)

Furthermore, Roberts outlines the following command words that require an ability to reason: “account for, analyse, assess, classify, compare, contrast, define, discuss, distinguish, evaluate, examine, explain, justify, predict to what extent and why” (2013, p. 79). Roberts advocates learning by doing through projects and practical actions, action research and community problem-solving (ibid.). Roberts provides a compass rose to help teachers ask questions beyond the ‘5Ws’ i.e. “When? What? Where? How? Why? Who? What might? What ought? (2013, p. 45). It helps to distinguish the environmental, social, economic and political aspects of geography.

In addition, Roberts (2013) calls for learners to **learn through inquiry** in order to extend their geographical knowledge and understanding at the same time as they learn skills specific to geography, used by other subjects. They learn more than geographical subject knowledge (ibid.).

She further notes that it is “essential that students are enable to connect their prior knowledge and experience with what they investigating” (p. 8). Through inquiry and investigation, learners easily relate what they are studying with what they experience, then they can develop deep understanding (ibid). Roberts (2003) argues for enquiry learning underpinned by constructivist epistemology. This approach was used to model how school geography could be re-oriented to ESD in a post graduate geography teacher professional development course which I attended in Namibia (Wilmot, 2017).

A similar inquiry approach is promoted by UNESCO:

ESD should occur through learner-centred and inquiry-based activities to contextualize critical thinking, problem-solving and active student participation that emphasize reflectivity, students have opportunity to develop deep environmental, economic and political understandings and the capacity to enact positive individual and collective environmental social change (2017, p. 27)

UNESCO (2017) emphasizes the need for **critical inquiry and systemic thinking** whereby learners are allowed to think critically, to engage with content and perceive knowledge as an ongoing process, examining existing assumptions and deconstructing, reconstructing and constructing knowledge. This enables students to identify a problem, propose solutions, find evidence for and against a proposed solution and evaluate the solutions based on the evidence (ibid.). Through critical inquiry, learners will be assisted “to examine and challenge the status quo and deepen their critical understanding of the issue in the world around them” (UNESCO, 2017, p. 27). Learners need challenging tasks that help them to make sense of data by discussing issues, analysing different viewpoints and writing reports (Roberts, 2013).

De Sousa and Raath stress the need for teachers to develop **systems thinking** of environmental issues so that learners understand the complex interconnections between the causes and effects of human actions and interaction. This, they argue, promotes sustainable thinking and acting (2018, p. 351). The **systems approach** helps learners to look at content in a holistic way, taking into account the interconnected environmental, economic, social and political dimensions of sustainable development (UNESCO, 2017). This type of thinking is useful in problem-solving that is more effective than considering problems in isolation (ibid.).

Because of the strong links between the proposed ESD teaching and learning philosophies and **constructivism learning theories** and pedagogies, it is appropriate to give it a special place in any review. Also, it is an approach already widely advocated and adopted in schools and thus teachers are familiar with many of its tenants. This suggests that the adoption of the pedagogy refinements proposed by ESD should, one would hope, not be entirely strange to geography teachers.

“Constructivist epistemology views knowledge as consisting of more than simply facts” (Van Harmelen, Wilmot & Hendricks, 2001, p.10). Knowledge exists when facts are examined and assigned meanings, when we make factual information and how we interpret information. Learners construct knowledge through many social settings that make up their lived experiences and this knowledge is largely a reflection of the relationship that exists between culture and language (ibid.). “Knowledge cannot be transmitted to us ready-made” (Roberts, 2003, p. 27).

Sanchez argues that teaching geography for sustainable development should be viewed as “a new generation of critical geography education, a tradition which is known for its ‘social reconstruction’ (Walford), ‘emancipatory intent’ (Johnston) and ‘socially critical geography’ (Fien)” (2011, p.162). Hence, “we need to consider the critical theories of society and nature” (Huckle, 1996, p. 6). According to Huckle (1996), the production of socially useful and emancipatory knowledge should be achieved through participatory community development and action research.

Roberts (2003) states four central ideas of constructivism, namely: how we see and understand the world depends on our existing ways of thinking; each individual sees and understands the world differently; in constructing new knowledge we are not adding separate ‘bits’ of knowledge to what we already have; and our constructions of the world are not fixed but are being modified continuously (p. 27). More recently, Roberts (2013) insists that “geographical knowledge is a construction rather than something existing there simply to be found” (p. 17). Mishra explains that “knowledge is constructed by the knower (child) through active engagement with world” (2015, p. 118). Learners will be aware that knowledge cannot be neutral when they begin to construct geographical knowledge for themselves through their work (ibid.).

ESD should enable learners to draw on their own experiences and learn to think critically about transforming society (UNESCO, 2012). A similar point is made by Roberts who explains that social experience is the wider life experience learners bring to school from home and their environment which helps them to contribute to discussions of sustainability (2013). Daniels et al. (2012) as cited in Roberts (2013) believe that “human geography is not a direct reflection of a straightforward reality that is out there but a social construction” (p. 60). According to Mishra the teaching/learning process should provide opportunities for learners to share and integrate their experiences with school knowledge. It enables them to take initiative and develop their voices (2015, p. 118).

Roberts (2013) contends that learners have to be **actively engaged in construction** of geographical knowledge and we need to:

- Take account of students’ existing knowledge and ways of understanding
- Allow time for students to explore new information and to relate it to what they already know: making sense is not an instant process
- Provide opportunities for students to reshape and construct their existing knowledge in light of new knowledge

(Roberts, 2013, p. 20)

Learners develop their understanding of the topic through processing information to make meaning and this increases their ability to make sense of information (Van Harmelen, Wilmot & Hendricks, 2001). Furthermore, learners develop inter alia an ability to identify and solve problems, make decisions, think critically and creatively, work effectively, communicate effectively, and collect, analyse, and critically evaluate information. (ibid., p. 37). “Constructivist epistemology learning is seen as a complex process of knowledge construction and meaning making rather than one of rote-learning” (ibid., p. 38).

Education is about social production and social efficiency where knowledge and understanding are constructed within a social context, new learning is shaped by prior knowledge and diverging

cultural perspectives (Jickling and Walls, 2008). The teacher supports students to enable them to move beyond their existing knowledge and understanding (Roberts, 2013). Therefore, Sanchez (2011) calls for the teaching of geography for sustainability to be underpinned by social constructivism and he calls for teaching and learning units “... to follow four phases of exploration of knowledge: introduction of contents, the organization of new learning and the final application of it” (p. 168).

Westbrook, Durrain, Brown, Orr, Pyror, Boddy, and Salvi (2013) argue for **situated learning** built on social constructivism. They assert that a situated learning perspective recognizes that learning occurs when learners participate in activities that are close to the context in which knowledge will be later required. Furthermore, they emphasize that curriculum and pedagogy cannot be isolated from the social, economic and political contexts (ibid.).

What has emerged from the literature is that ESD requires a shift from teaching, to learning settings that are action-oriented, with a transformative pedagogy; characterized by elements like self-directed learning, participation and collaboration; problem oriented, and inter and trans-disciplinarity; as well as the linked to formal learning (Leicht, Weiss, & Nyun, 2018, p. 40). The extent to which the ESD pedagogical approaches discussed in this section are evident in Grade 9 textbooks is discussed in Chapter 7.

3.2.3 Assessment

The international literature describes assessment approaches that support ESD learning (see for example, Leicht, Weiss & Nyun, 2018, UNESCO, 2017 and Tilbury, 2011). More specifically UNESCO (2017) recommends the following assessments strategies and tasks:

- Tasks that ask students to demonstrate the development of ESD competencies that include both written and non-written performance.
- Group activities that offer opportunities to apply ESD competencies to real-world situations or collaboration with external actors and organizations.
- Tasks that ask students explicitly to study and address the relationship between the subject and sustainable development.

- Role-playing activities that encourage affective learning and the development of empathy and respect.
- Peer review and self- assessments that ask students to monitor their learning and reflect critically on their progress as well as that of their peers.
- Assessment through interactive dialogue between the teacher and learner, aided by the use of rubrics or competency grids (UNESCO, 2017, p. 31).

According to UNESCO, self-assessment and peer assessments are needed for learners to monitor their own learning process and identify possible areas of improvement (2018). The approach to assessment evident in the Grade 9 Namibian geography textbooks is discussed in Chapter 7.

3.2.4 Integrating ESD challenges

In spite of calls for school geography to reorient to ESD, the implementation thereof has not been without its challenges. These include: curriculum overload and a reduction of teaching time allocated to geography; the availability of appropriately aligned ESD teaching and learning materials, a lack of information on how ESD is being embedded in school geography, lack of knowledge and training, no explicitly disciplinary home and strategies to introduce ESD, lack of understanding of nature and values of sustainable development, and lack of critical mass personnel.

The time for teaching geography in schools in many countries is less than it used to be (Van der Schee, 2012). This has been the case with the implementation of the new revised curriculum in Grade 8 in 2017 and Grade 9 in 2018 in Namibia. It means there is less time to cover the syllabus and this could impact on the time needed for implementing the active learning advocated by ESD literature.

According to UNESCO, the material available in some countries has not responded to the call for ESD and teachers struggle to make use of it (UNESCO, 2012). McKeown (2015) found that many efforts towards ESD in schools and classrooms are unreported (p. 68). As a result, there is limited relevant information on ESD available to assist teachers with integrating ESD in the classroom. It is exacerbated by “textbooks are not often completely revised” (UNESCO, 2017, p. 23).

The findings of research undertaken in different national contexts describes a number of challenges of reorienting geography to ESD. In the United States (US), Bednarz, Petersen and Bednarz (2007) found that there was no explicit disciplinary home for and strategies to introduce ESD into the US school geography curricula and a lack of understanding of nature and the value of sustainable development. Pauw (2015) contends that the American Geographic Roadmap focuses on the past and present rather than on future sustainability issue.

Altinyelken (2010) describes the problems of implementing a LCE ESD pedagogy in Uganda. These include inadequate teacher training, large class size, a lack of adequate learning and teaching materials, English as a medium of instruction, unrealistic time planning, low teacher morale and cultural appropriateness as LCE encourages children to question adults. Similarly, Biase's research in the Maldives found that the transition from transmission models of teaching to learner-centredness is a challenging process (2015).

The literature reviewed in this chapter shows that internationally it is recognized that geography education has an important role to play in ESD both in terms of what is taught (curriculum) and how it is taught (pedagogy). However, integrating ESD into school geography has faced challenges.

3.3 ESD in School Geography: Southern African Perspectives

The integration of ESD into national curricula has been researched in a number of Southern African contexts. These are discussed below.

3.3.1. South Africa (SA)

South African education strives to achieve Sustainable Development by empowering people to participate actively in all processes of a democratic society, economic activity, cultural expression and community life, and help citizens build a nation free of race, gender and every other form of discrimination (Teise & Roux, 2016). Environmental Education's (EE) agenda of transformation suggests the re-orientation of SA education towards SD through EE, to change from education about the environment to education for the environment.

The South African Geography Curriculum and Assessment Policy Statement (CAPS) stresses the importance of ESD e.g. its general aim is to ensure that children acquire and apply knowledge, skills and values to participate in society as citizens (South Africa [RSA]. Department of Basic Education [DBE], 2011). It aims to produce learners that are able to:

- Identify and solve problems and make decisions using critical and creative thinking
- Work effectively as individuals and with others as members of a team
- Organize and manage themselves and their activities responsibly and effectively
- Collect, analyse, organize and critically evaluate information
- Demonstrate an understanding of the world as a set of related systems by recognizing that problem-solving contexts do not exist in isolation

(RSA, DBE, 2011, p. 5)

The CAPS includes ESD learning content, some of which mirror ESD topics in the UNESCO (2012) and IGU/CGE (2007; 2016) — population distribution and density; population structure, growth and movements; HIV and AIDS; water management in SA; floods; drought and desertification; development issues and challenges; using resources; conventional energy sources and their impacts on the environment, soil and soil erosion, energy management in SA; rural-urban settlement issues and urban structures and growth (RSA, DBE, 2011, p. 5)

The National Curriculum Statement is based on principles of social transformation, active and critical learning, high knowledge and skills, progression, human rights, environmental and social justice. (RSA, DBE, 2011)

Even though my study focuses on ESD in Grade 9 Namibian geography, I looked at the South African geography Curriculum and Assessment Policy Statement (CAPS) for Grade 10 to 12 because that is where geography is an independent subject in the South African curriculum. Recognizing ESD in the South African National Curriculum Statement, the Grade 10 to 12 South African geography CAPS aims for learners to develop knowledge, skills and attitudes in order to: explain and interpret both physical and human geographical processes; describe and explain the dynamic and relationship between the physical and human world; develop knowledge about where

places are, develop a commitment towards sustainable development; create awareness and sensitivity to inequality in the world, fostering empathy, tolerance and fairness; and make and justify informed decisions and judgments about social and environmental issues (RSA, DBE, 2011, p. 8).

CAPS intends to develop and promote geography skills including practising field observation, interviewing people and interpreting sources; applying thinking; practical and social skills, identifying questions and issues; collecting and structuring information; processing, interpreting and evaluating data; making decisions and judgments; deciding on points of view; suggesting solutions to problems; and working co-operatively and independently (RSA, DBE, 2011)

Furthermore, the curriculum aims to foster values and attitudes for the sustainable and fair use of resources for the benefit of all; recognizing the significance of informed decision making; the application of geographical knowledge and skills in learners' personal lives; respect for the rights of people; and a sense of fairness, sustainability and equality (RSA, DBE, 2011).

Geography requires learners to understand climate change and changing weather patterns; sustainable development principles and practices; urbanization, land use management and sustainability; management of natural resources including water and low carbon energy production (Fundisa for Change, 2013, p. 7). Dube (2017) observes principles that already underpin ESD in the South African geography curriculum such as social justice, a healthy environment, human rights and inclusivity, as they create room to accommodate a shift from EE to ESD by dealing with human-environment interactions.

Rosenberg, O'Donoghue and Olvitt, (2013, pp. 9-35), in their *Fundisa for Change: Methods and processes to support change-oriented environmental sustainability practices in South Africa* resource book, describe ESD pedagogies that are similar to those described by Tilbury (2011). These include: information transfer; experiential approaches; investigation; learning by doing and deliberative methods. They explain that an information transfer method requires learning through awareness campaigns, presentations, demonstrations and experiments, guided questioning, field trips and games and quizzes. Experiential approaches include interpretive trails (walking through

an area to learn about the environment), solitaire (sitting and experiencing nature), music, poetry and visual art, role play, and values clarification. Investigation is seen as taking place through participatory, field work and collaborative research, exploring indigenous ways of knowing and case studies. They argue for these types of pedagogies, encouraging learners to think critically, analyse topics at different scales and in different contexts and be creative and imaginative, all of which help learners to seek solutions to environmental concerns (Fundisa for Change, 2013). Furthermore, *deliberative learning* may be enhanced through backward mapping, that is, thinking and anticipating unknown futures, imagining and designing future scenarios (Rosenberg et al, 2013).

In spite of the IGU/CGE's call to reorient school geography to ESD at the level of policy, it has not been without its challenges of implementation by teachers at the level of the classroom in Southern African contexts. Wilmot (2017) and Dube (2014) describe the difficulties teachers experience with integrating ESD into school geography. According to Wilmot (2017), the reorienting of school geography at a classroom level is an ongoing and as yet unresolved issue. Dube's (2014) research found that South African secondary school geography teachers have a shallow understanding of ESD. Most of the teachers in her study see ESD as the interaction between the different components of biophysical environment and focus more on the biophysical dimension rather than the interrelated social, political, and economic dimensions of the environment (ibid.). Dube's study also found that teachers lack training on ESD and there is limited information in the curriculum text to guide and assist teachers (Dube, 2014). She argues that teachers lack Content Knowledge [CK] and Pedagogical Content Knowledge [PCK] and experience difficulty with contextualizing issues within the structural constraints of schools (Dube, 2017). Teachers also struggle to understand the meaning of Sustainable Development [SD] and ESD (Dube, 2012 as cited in Dube 2017).

Attempts have been made in South Africa to address the need for embedding ESD into the formal curriculum, including the geography curriculum. The Fundisa for Change intervention is an innovative project aimed at strengthening teacher content knowledge of ESD (particularly water and climate change) and supporting teachers to adopt ESD pedagogical approaches of active and

transformative learning that is aligned to contemporary international perspectives (UNESCO, 2018).

3.3.2 Lesotho

Like South Africa, Lesotho integrates ESD into its school curriculum. Raselimo, Irwin and Wilmot (2013) note that Lesotho school geography has developed in depth and breadth to address contemporary sustainability issues. There are congruencies between geography and environmental education as conceptualized by the Lesotho Environmental Education Support Project (LEESP) — a three year programme [2001-2004] for Lesotho curriculum reform process to assist implementation of Agenda 21— and its curriculum content creates many opportunities to for integration of environmental education into secondary school geography (ibid.).

The aim of Lesotho geography education is to “develop an understanding of contemporary social, economic, and environmental issues in Lesotho and the world” (ECOL, 2015 as quoted in Raselimo 2016, p. 7). Geography in the Lesotho junior secondary school includes themes that reflect ESD in IGU/CGE (2007; 2016) such as “soil erosion, natural disasters, pollution and energy which are keys environmental issues of Lesotho’s Vision 2020” (ibid.). Raselimo (2016) insists that “school geography is regarded as an appropriate vehicle for ESD by the international community” (p. 6). They learn issues in geography more than in other subject, and it is in geography that they are expected to study issues related to the economy and jobs, the environment, poverty and hunger (ibid.). The syllabus encourages learners to think of practical solutions to issues that can be implemented at a community level (Raselimo, 2016)

Raselimo et al. (2013) insist on four dimensions to stress action-oriented knowledge.

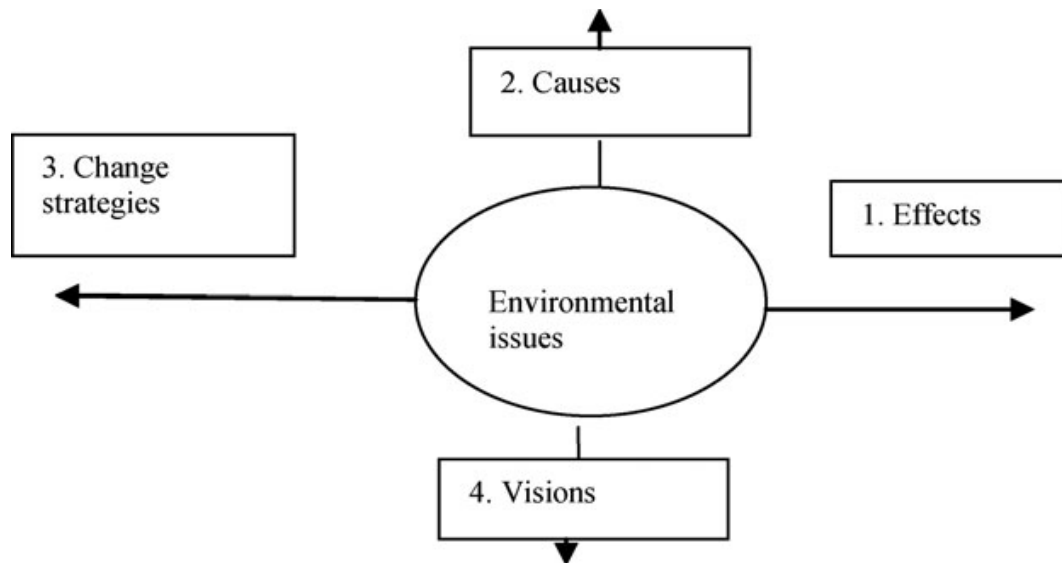


Figure 3.3. Four dimensions of action-oriented knowledge (Source: Jensen cited in Raselimo, Irwin and Wilmot, 2013, p. 307)

The model shows the knowledge about the effect of an environmental issue: knowledge about its root causes; knowledge about change strategies and alternatives to overcome the problem; and visions on what might happen in future. One should have a clear picture of all four said dimensions in order to take a well-informed decision, which leads to well-planned action.

The latest (2018) iteration of the national curriculum states that the general aim of secondary education is to: equip learners with knowledge, attitudes and skills which enable them to respond to socio-economic and technological challenges; provide suitable opportunities for environmental exploration to promote socio-economic development; provide for learners' development of socially and culturally accepted characters and a spirit of cooperation with others; and provide opportunities for learners to actively promote democracy and human rights in society (Lesotho, MoET, 2018).

Drawing from the general aim of secondary education, the Lesotho geography syllabus is aiming for learners to acquire knowledge and understanding of their local and national geographical area relating to Africa south of the Sahara and the Southern African Development Community (SADC) and develop an understanding of contemporary social, economic and environmental issues in Lesotho and the world (Lesotho, MoET, 2018). Thus, Lesotho geography is dealing with issues of

sustainable development dimensions from a local, national and global level as advocated by UNESCO (2017) and the IGU (2016). Furthermore, it aims for learners to develop skills that enable them to address socio-economic and environmental challenges threatening sustainable development in the country; and develop positive attitudes and values that will enable them to become responsible citizens (ibid.). Thus, the syllabus content reflects three pillars (dimensions) of sustainable development (environment, economy and society) (Lesotho, MoET, 2018). The 2018 Lesotho secondary education syllabus covers environmental issues including population and migration, rural settlement, urban settlement, population dynamics and HIV/ and AIDS (Lesotho, Ministry of Education and Training [MoET], 2018).

LEESP envisage a democratic learner-centred pedagogy underpinned by the notion of action competencies which shift from behavioural modifications to a more critical, reflective and participatory approach, of which learners are equipped to cope with future environmental issues (Raselimo et al., 2013). Learners would be encouraged to act on their own values in resolving environmental problems in their communities (ibid.). Learner-centred pedagogy consolidates democracy and transforms society towards sustainable development (ibid.), which is the aim of UNESCO. In addition, the Lesotho geography syllabus suggests a case study and carrying out field study (Lesotho, MoET, 2018; Rosenberg et al., 2013).

Geography assessment objectives in Lesotho are almost similar to those of SA: knowledge with understanding, skills and analysis, and judgment and decision making (Lesotho, MoET, 2018). The geography curriculum suggests command words which enhance ESD e.g. contrast, compare, describe differences, describe and comment on, explain, how, locate, use information provided, match, suggest and predict (ibid.).

In the Lesotho context, Raselimo's study found that ESD is not clearly explained in the geography curriculum and concludes that:

Given that sustainable development is not explicitly mentioned in the geography curriculum, reorienting geography towards sustainable development would depend on the ability of individual teachers and textbook writers to recognize the sustainability issues covered in the curriculum and seize the opportunity to promote sustainable development values (2010, p. 197).

However, there is no clear connection between physical geography and human/economic geography in the Lesotho curriculum (Raselimo & Wilmot, 2013), and other challenges include a shortage of qualified teachers and lack of understanding of the purpose of school geography in society (Raselimo, 2016).

3.3.3 Zimbabwe

The focus of the Zimbabwean school geography mirrors the roles and aims of ESD in UNESCO (2017) and IGU/CGE (2007; 2016). It seeks to: encourage an appreciation and sensitive awareness of the environment on a local, national and world scale; foster an understanding of and develop positive attitudes towards different communities and cultures within our own society and elsewhere in the world; enable pupils to acquire and apply appropriate levels of knowledge for the benefit of the individual and the community within a socialist society; develop in pupils the skills associated with the selection, collection, representation, interpretation and use of geographical data in a variety of forms; promote in pupils an awareness of spatial and environmental patterns and relationships in the real-world and the dynamic nature of these patterns and relationships; encourage pupils to use spatial concepts and apply principles on a range of scales in a variety of environments; and enable pupils to acquire an understanding of the various economic, cultural and political forces which influence decision making (Zimbabwe, Ministry of Primary and Secondary Education (MPSE, n.d.)).

Like SA and Lesotho, the Zimbabwean geography syllabus includes topics which mirror ESD action themes in IGU/CGE (2007; 2016) i.e. human activities in the desert, desertification, people and ecosystems; exploitation of resources, the effects of resources and development, conservation of resources, urbanization, urban function and the sphere of influence, the quality of rural-urban life, the growth and structure of population, migration, and population and disease (Zimbabwe, MPSE, n.d.).

According to Dambudzo (2015), a framework for the Zimbabwean curriculum implies that the education system must support Zimbabwe's development needs. The framework intends to achieve sustainable development for the country and the world. It reflects national to global phenomena in UNESCO documents, where learners mobilize their knowledge, skills and attitudes

independently and creatively to address different challenges and solve problems effectively (ibid.). Therefore, the three ecological structures of SD in the following diagram are important areas of the framework (Dambudzo, 2015).

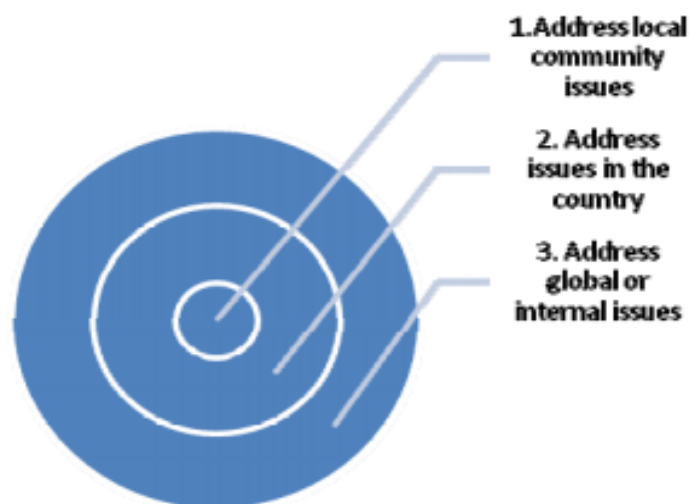


Figure 3.4: Ecological structure of curriculum for Sustainable Development (Source: Dambudzo, 2015).

Figure 3.4 shows the ecological structure used in Zimbabwean curricula. It shows ESD by looking at curriculum contents locally, national and globally levels as did IGU/CGE (2007; 2016).

Zimbabwean curriculum frameworks recognize project work and collaborative learning in Tilbury (2011) and Rosenberg et al. (2013,) as a vital pedagogy for ESD (Dambudzo, 2015). In addition, methods such as the case study, audio visual aids and field studies are recommended to be used in teaching and learning geography in Zimbabwe (Zimbabwe, MPSE, n.d.).

As in SA and Lesotho, Zimbabwean geography assessment is based on knowledge and understanding, skills and their application, and judgment and decision making (Zimbabwe, MPSE, n.d.). The assessment objectives are the same, even though the different countries use different terminologies.

The findings of research in Zimbabwe highlight some challenges. Textbooks are expensive, the consequence of which is that schools operate without an adequate number of prescribed/approved textbooks; teachers do not undertake fieldwork and they do not implement the localized curriculum. The teachers' interpretation of the geography syllabus is poor and there is a lack of teacher professional development. The examinations have a backwash effect on what is taught and how it is taught (Dzimiri & Marimo, 2015).

Van Harmelen, Wilmot and Hendricks (2001) further claim that teachers are acting as facilitators as they create opportunities for the learners to articulate their prior knowledge; teachers engage learners in order to both increase the collective understanding and to correct misconceptions; the teacher is a scaffolder through demonstration, modelling, transmission, or any other strategy; and they ensure that learners have internalized the new knowledge and that it becomes part of their lived experience.

3.4 ESD in Namibian School geography

The Namibia curriculum explicitly seeks to reorient school geography towards ESD. The purpose of Namibian school geography is “to develop desirable attitudes and behavioural patterns in interacting with the environment in the manner that is proactive and nurturing” (Namibia, Ministry of Education, Arts and Culture [MoEAC], 2015a, p. 6). In addition, learning is seen as an interactive, shared and productive process where ESD leads to understanding of the interaction of living and non-living things (Namibia, Ministry Basic Education Sport and Culture [MBESC], 2003). This is supported by the Geography Grade 8 and 9 syllabus which calls for active learning and a high participation in knowledge production (Namibia, MoEAC, 2015a). Geography teachers should decide when it is better for learners to discover and explore information themselves, when they need teacher-directed learning, and when learning should be done in cooperative and collaborative groups, pairs, individually or as a whole class (ibid.).

The importance of young Namibians learning about environmental challenges and risks is acknowledged in the Namibian NCBE which regards social sciences (including geography) as a key area for understanding of the development of society and environmental issues (Namibia, MoE, 2009). This thinking is evident in the Grade 8 and 9 syllabus document which states that all

learners need to understand the nature of environmental risks and challenges in Namibia, know how they will impact on society, understand how these risks and challenges can be addressed on a national and global level and understand how each learner can play a part in addressing them in their school and local environment (Namibia, MoEAC, 2015a, p. 3). The syllabus lists the main risks and challenges, two of which are focused on in this study: “the challenges and risks we face if we do not care for and manage our natural resources” and “the challenges and risks to health caused by pollution, poor sanitation and waste” (ibid. p. 3).

This thinking mirrors UNESCO’s (2012) view that reorienting education includes selecting issues that are relevant to the local community. Even though Namibian geography provides understanding on challenges and risks, there is no evidence of challenging the status quo in the Grade 9 geography syllabus. It is also similar to the learning ESD outcomes advocated by Wals and Lenglet (2016) in UNESCO’s Global Monitoring Report (2016, p. 11), namely:

- Learning to know
- Learning to critique
- Learning to bring about change
- Learning to care

Table 3.1 summarizes ESD topics that are integrated into the Grade 8 to 12 geography syllabi.

Table 3.1: Summary of ESD content in Namibian secondary school geography

Summary of ESD content in Namibian secondary school geography

Geography syllabus (Namibia, MoEAC, 2015a)	Geography syllabus (Namibia, MoEAC, 2015a)	Geography syllabus (Namibia, MoE, 2010)	Geography syllabus (Namibia, MOE,2009)
<p>Grade 8 Population Geography: Dependency ratio, population growth and movement (rural-urban migration, emigration, immigration, commuting and refugees)</p> <p>HIV and AIDS</p>	<p>Grade 9 Deterioration of Namibian environment: Deforestation, desertification, bush encroachment, population explosion, pollution, and overgrazing [Theme 3: Ecology]</p> <p>Population growth and movements: migration, emigration, immigration, rural-urban migration, dependency ratio, pressure on natural resources, infrastructures provision of services</p> <p>HIV & AIDS [Theme 7: Population Geography]</p>	<p>Grade 10 Deforestation, desertification, bush encroachment, population growth and explosion, pollution, population education, environmental education and sustainable production, rural-urban migration, social standard, pressure on natural resources and dependency ratio.</p> <p>HIV and AIDS</p>	<p>Grade 11&12 Shortage of food, soil exhaustion and erosion, drought, flood, pests & diseases, overgrazing, desertification, salination, deforestation, pollution, sustainable agriculture, exploitation of fish, overfishing sustainable use, increase congestion, shortage of water, socio culture problem, depletion of woodland, household health safety, global warming, acid rain, population explosion, migration, overpopulation, environmental problems, economic development and environmental sustainability.</p> <p>HIV and AIDS</p>

Table 3.1 shows how cross-curricular issues are integrated into the syllabus. In Grade 9 this is done primarily in two themes (Ecology [Theme 3] and Population Geography [Theme 7] of the syllabus. Table 3.1 provides evidence that the content focus is aligned to the themes, risks and challenges identified by the international education community (the IGU/CGE; WSSR and UNESCO) and Namibian curriculum policy. Even though water scarcity, inequality, food security and climate change are among the environmental challenges mentioned in Namibian high level statements; these are not covered in the Grade 8 and 9 geography syllabus where school geography is compulsory to all learners in Namibia.

In addition to specifying the learning content, the Grade 8 and 9 syllabus document calls for an approach to teaching and learning underpinned by learner-centred education. As discussed in

Chapter 2, Namibia's Towards Education for All policy [TEA] (Namibia, MoE, 1993) advocates **learner-centred education** [LCE], underpinned by constructivist epistemology. The policy recognizes that learners bring knowledge and social experiences to school and that LCE enables learners to participate in knowledge construction, which promotes learning through understanding (ibid.).

A[n] LCE approach in geography recognizes that learners bring a wealth of knowledge and social experience to school and learners should have opportunities to discover and explore information and create knowledge in groups, in pairs, individuals and as a whole class (Namibia, MoEAC, 2015a). The Grade 8 and 9 geography syllabus states that teaching must build on, extend and challenge this prior knowledge and experience, and learners must be active participants in constructing knowledge and meaning (ibid.). Furthermore, it calls for the use of a variety of teaching strategies and it places the responsibility on the teacher to decide:

“... when it is best to convey content directly; when it is best to let learners discover or explore information for themselves; when they need directed learning; when they need reinforcement or enrichment learning; when there is a particular progression of skills or information that needs to be followed; or when the learners can be allowed to find their own way through a topic or area of content” (Namibian, MoEAS, 2015a, p. 5).

No further guidance is given on what active learning is or how to implement it in the classroom. Textbooks thus play an important role in modelling how the pedagogical approach advocated by the syllabus can be achieved in practice.

Namibian LCE's pedagogical orientation is similar to the ESD pedagogies described in the literature (see example Tilbury (2011); Rosenberg, O'Donoghue and Olvitt (2013), and UNESCO, (2016)), as well as the social constructivist, participatory pedagogy advocated by geography educators (Van Harmelen & Wilmot, 2001; Roberts, 2013; Sanchez, 2011; IGC/CGE, 2007, 2016; Wilmot, 2017). Tshiningayamwe, citing the United Nations Environmental Programme (2006), notes that “the pedagogy of ESD encompasses progressive constructivist education approaches: critical thinking, participation, contextualize learning, use local materials, problem-solving, community engagement, action-oriented, socially critical and student-led” (2017, p. 112).

Implementing LCE in Namibia has not been without challenges. Nyambe and Wilmot maintain that teachers were not sufficiently prepared to take on the new learner centred pedagogy (LCE). LCE is criticized for watering down academic standards, teaching little subject content, creating chaotic and unruly classrooms due to its democratic underpinnings, learner indiscipline, and little learning going on due to the use of group work (2014, p. 31). Facing all those challenges, learners will not be able to develop a holistic view of environmental issues and are likely to promote a narrow environmental determinism (ibid.). Moreover, teachers in Namibia lack self-confidence to implement LCE, thus most of them claimed not to have been properly trained and have insufficient knowledge to implement the new pedagogy (Nyambe & Wilmot, 2014). In addition, there are no suitable materials for LCE that can be used to actively engage in learning activities (ibid.). The extent to which this approach is modelled in Grade 9 geography textbooks is discussed in Chapter 7.

The Namibian Grade 8 and 9 geography syllabus has four **assessment** objectives: 1. Knowledge with understanding, 2. Analysis and interpretation, 3. Judgment and decision making and 4. Application of geographical skills (Namibia, MoEAC, 2015a). These objectives are similar to the revised Bloom's taxonomy in Bunt (2018) and Roberts (2013). The extent to which these objectives are achieved in the assessment tasks on environmental topics in Grade 9 textbooks is discussed in Chapter 7.

Not much research has been done on ESD in Namibian school geography. Loubser and Simalumba, (2016) found that most geography teachers in the Caprivi (Zambezi) region felt they knew how to teach environmental education topics such as population, biodiversity, environmental degradation and risks, and that they are comfortable with LCE. However, they found that most teachers were unsure about environmental challenges in Namibia and learners were seldom required to do outdoor activities (ibid.).

A study conducted in the Kavango region found that teachers understood the socio-ecological and economic dimensions of the environment (Zokka, 2016) but used limited teaching methods to support learners' understanding of environmental problems. Simasiku's (2012) study showed learners action competencies were developed through fieldwork investigations focused on

understanding how people living in Tsumeb's informal settlements are affected by economic and social issues including poor waste management and limited water supply. It resulted in learners participating in a cleaning campaign, tree planting and environmental auditing (ibid.).

Anyolo, Karkkainen and Keinonen's study (2018) found that teachers reported using participatory teaching methods similar to the ESD pedagogy described in the literature (Tilbury, 2011; Rosenberg, O'Donoghue and Olvitt, 2013; UNESCO, 2016). However, there was no evidence of this being implemented in their classrooms. They also found that while all the teachers in their study indicated that ESD is integrated into the subjects they teach, there are contestations on how it should be integrated. Some felt that ESD should be taught across the curriculum while others felt ESD should be a discrete subject that gives sufficient attention to ESD topics (ibid).

Anyolo et al.'s (2018) research found that most senior secondary teachers have not attended training on ESD and their knowledge of ESD is shallow. ESD is perceived as knowledge acquisition about the environment in order to use its resources sustainably for the benefit of future generations. The teachers in their study did not demonstrate a holistic understanding of sustainable development as that which has social, political and economic dimensions. Tshiningayamwe (2017) also found that Namibian biology teachers were not fully prepared to be able to implement ESD.

I am not aware of any studies that focus on the role played by learning support material, particularly textbooks.

3.5 Conclusion

This chapter has reviewed literature which describes how school geography is reorienting to ESD globally, in Southern Africa and Namibia. The latter is evident in the curriculum goals and the selection of ESD topics. Contemporary thinking in school geography education advocates transformative and action-oriented learning which enables learners to make informed decisions, take action and solve problems. Namibian education policy adopts learner-centred education underpinned by a constructivism epistemology, using different teaching and learning methods including group work, field work, case studies, experiential approaches and investigation. Assessing learning needs to align with the curriculum goals. Reorienting school geography to ESD

has not been without its challenges particularly at the level of the classroom. The next chapter reviews literature on the role of textbooks in supporting and enabling ESD learning for teachers in classroom.

CHAPTER 4

THE ROLE OF TEXTBOOKS IN REORIENTING SCHOOL GEOGRAPHY TO ESD

4.1 Introduction

This chapter presents a review of literature on geography textbooks that is relevant to this study. Teachers need quality LSMs to reorient school geography towards ESD (UNESCO, 2012). Quality textbooks are seen as being the backbone of good classroom practice (UNESCO, 2013). This chapter discusses research on geography textbooks that is relevant to the study. It also discusses the Namibian textbook approval system and criteria used to evaluate textbooks.

4.2 Geography textbooks

Textbooks help some teachers to better understand the subject matter they are teaching (Bednarz, 2004). Textbooks are regarded as important because they are a prime source for subject knowledge and understanding (Lee & Catling, 2016a). In spite of the recent growth in access to multimedia and the internet (Martinha, 2011), textbooks are still the most widely used resource in school geography (Lee & Catling, 2016a). Textbooks are a map that provides an overview of the content. Pingel (2010) contends that textbooks are educational materials that teachers primarily use for preparing and structuring their lessons. According to Williams (1983), for textbooks to be an effective tool, teachers not only need to know how to use them but also need to appreciate how useful they can be. Lee and Catling (2016a) caution that textbooks are used not only as sources by teachers, but often become the curriculum in schools on which the teacher rely.

Pingel (2010) notes that the role of the textbook in the classroom is changing, due to the rapid growth of electronic education media. Furthermore, he maintains that textbooks play an important role in anchoring the political and social norms of a society (ibid.). Textbooks are seen as useful resources for teaching and learning because of their tendency to carry a sense of authority for teachers and learners and because they are "... typically regarded as a repository of legitimated knowledge linked with the authority of teachers who use them" (Hopkins, 2001, p. 49). Textbooks should address what is intended to be taught and provoke learners' critical thinking, and also offer a systematic scheme for acquiring and mastering concepts, skills and relevant attitudes (Hopkins, 2001). There is a view that well written textbooks are essential to the education process as they

allow learners from diverse backgrounds to engage meaningfully with subject matter (Oakes & Saunders, 2002; Mohammad & Kumari, 2007 as cited in Vujovic, 2013). However, “textbooks generally present information as unquestioned, cut-and-dried facts” (Fundisa for Change, 2013, p. 8).

“Geography textbooks set the parameters for knowledge and serve as the source of fact, concepts and generalizations to be learned by students at each grade level” (Bednarz as cited in Jo & Bednarz, 2009, p. 4). The factual information needed to develop an understanding of geographical content should be clearly stated in geography textbooks (Jo & Bednarz, 2009). Geographical concepts should be well explained (ibid.). According to Pingel “textbook authors have to be concrete, they have to give examples that relate to the students’ own experience” (Pingel, 2010, p. 14). Furthermore, Mishra (2015) maintains that because geography is an integral part of social sciences, its textbook should provide perspectives that help teachers and learners to understand different issues. Geography textbooks are unique because they are in part politically motivated and tend to be socially negotiated interpretations (Kowasch, 2017). They have an important role as an intermediary between the curriculum (syllabus) and its implementation in the classroom (Zecha, Popp & Yasar, 2016). Furthermore, geography textbooks include specific case studies involving place, environments, regions and countries (Lee & Catling, 2016b)

“Textbook questions and exercises are quintessential part of every textbook” (Mishra, 2015, p. 118). According to Roberts (2013), geographical questions should focus on factual information, understanding of concepts, use geographical source as evidence, reason about process, have different viewpoints, probe assumptions, ask for judgment and conclusions, and ask opinions on ethical matters (p. 103). Roberts (2013) works with a revised version of Bloom’s taxonomy by Anderson and Krathwohl’s (2001) revised Bloom’s taxonomy when devising questions to gauge the level of thinking. The range of cognitive thinking skills – from lower-order to higher-order thinking – is illustrated in Figure 4.1 below.

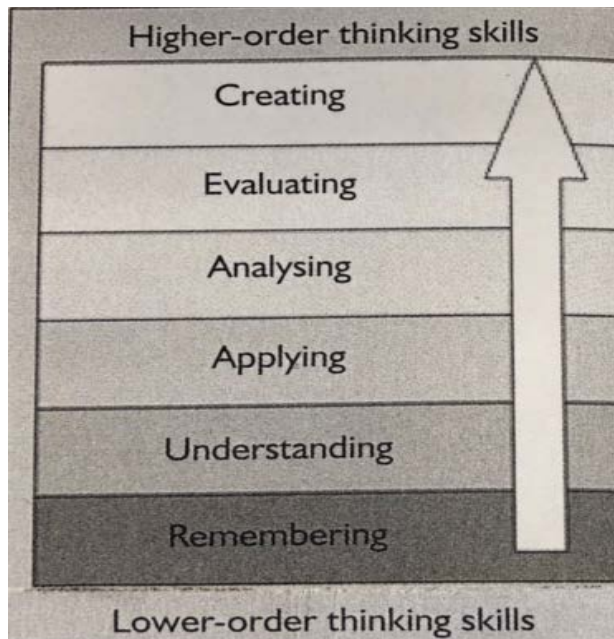


Figure 4.1: Revised Bloom's taxonomy (Anderson & Krathwohl, 2001, in Roberts, 2013: p. 101).

According to Roberts (2013), teaching should promote all levels of thinking. Textbooks play an important role, modelling questions which span the entire range shown in Figure 4.1.

4.3 Textbooks and ESD learning

According to the Global Education Monitoring Report (UNESCO, 2016) textbooks are valuable sources of information about sustainable development. They, like other learning support materials [LSMs], play an important role in supporting the integration of ESD into schooling, including school geography. Textbooks are seen as being at the heart of formal education (UNESCO, 2017). "Embedding ESD brings textbooks up-to-date by integrating the latest insight into the complex and interconnected local and global challenges in subject content" (UNESCO, 2017, p. 23). UNESCO (2017) goes on to say that textbook authors should approach the content and write in a way that facilitates open-ended instruction rather than steering learners towards one right answer. It emphasizes the importance of learner-centred teaching and learning, the interconnectedness of biological, physical, social, economic, political and cultural phenomena, and a holistic perspective on Sustainable Development issues.

According to UNESCO, the following general ESD pedagogical principles should be embedded in geography textbooks:

- The textbook is learner-centred, supports teacher in taking into account learners' preconception and worldviews. The textbook support ways of making links between learners' personal geographies and stabilized geographical knowledge.
- The textbook helps enhance the student's ability to become an independent learner. Textbook encourage learners to gather some information themselves.
- Textbook transmits differentiated worldviews that challenges stereotypical visions and negative categorization.
- Textbook covers geographical idea to deal with system by acting as a bridge between the natural and social sciences while focusing on the spatial dimension.

(UNESCO 2017, pp. 122-123)

The international literature describes a number of studies on ESD in geography textbooks undertaken in different national contexts. In the US, geography textbooks are seen as important tools for reforming geography education (Bednarz, 2004). However, the findings of research done by Bednarz, Petersen and Bednarz (2007) showed that none of the four texts they evaluated directly supported sustainable development. Another study in the US found that all five geography textbooks reviewed were inadequate in their geography content (Bednarz, 2010). Bednarz explains that "they focused on traditional regional geography and featured few explanatory theories, concepts, relationships or details" (p. 65).

Boehn and Hamann's (2011) research found that geography textbooks in Germany integrated ESD in ways that are relevant to students' everyday life and textbooks offered solutions to issues, for example, renewable energy. More recently, Kowasch (2017) found that German geography textbooks contribute to awareness-raising in ESD, for example analysed textbooks address the issue of resource exploitation and consumption. "A wide range of mineral and energy sources are mentioned and discussed in both continuous and discontinuous text elements" (Kowash, 2017, p. 67). Another study done on German geography textbooks found that ESD is a key concept in geography instruction, and textbooks incorporate three parameters of ESD, namely ecology, economy and society (Boehn & Hamann, 2011).

A study undertaken in Germany, Romania and Mexico found that in all three national contexts, geography textbooks discuss demographic dynamics using a common set of concepts (e.g. total population, growth, demographic policies) (Bagoly-Simo, 2013). However, “none of the three examples delivers an explicit contribution to ESD through the topic of demographic dynamics” (p. 71). Smith (n.d.) found that English geography textbooks give simplistic accounts of ESD and do not acknowledge the complex philosophical, ethical and political debates surrounding the concept of ESD.

In Portugal, a study found that ecological and environmental education topics occupy 70% of Grade 9 geography textbooks (Tracana, Carvalho, Ferreira & Ferreira, 2008). A study done in China found that sustainable development is the major focus of geography textbooks (Min & Dongying, 2007). In some textbooks, sustainable development is a main topic. According to Jimenez, Lerch and Bromley (2017) recent research on social sciences textbooks worldwide shows a growth in the discussion of environmental damage and protection, human rights, and indicators concerning gender equality.

In Luxembourg, the integration of ESD in textbooks has not been realized in primary science textbooks (Andersen, 2017). There are very few tasks related to environmental topics and sustainability impacts are not directly addressed in these tasks (ibid.). Topics such as climate change and disaster preparedness do not occur in textbooks and none of the textbooks foster teaching approaches for action-based research (ibid.), which is recommended by UNESCO and IGU/CGE.

Sahin (2016) analysed middle school science textbooks in Turkey where significant emphasis on integrating sustainability issues was placed within the science education programme and its textbooks. The Turkish learning outcomes and the content of the textbooks was analysed. They were found to be based on Council of Environment Education (CEE) framework.

In addition to research focused on the integration of ESD into geography textbooks, there is a body of literature describing research on a range of topics associated with geography textbooks. It includes, for example, issues related to the writing and using of textbooks in the classroom

(Waugh, 2000; Lambert, 2000), geography authors' perceptions on writing English textbooks (Lee & Catling, 2016a), and different methods of analysing textbooks. These include: a competence pedagogy analysis in Portugal (Martinha, 2011); a content analysis of visuals in the Czech Republic (Janko & Knecht, 2013); a comparison of questions and tasks in Chinese textbooks (Yang, Wang & Xu, 2015) and an analysis of how textbooks represent Islam and Muslim life in Bavaria (Zecha, Popp & Yasar, 2016). Mahmood (2011) argues for the identification of indicators for judging textbook quality based on social needs, overall aims and objectives of the curriculum, and up-to-date pedagogical and psychological theories of learning.

A recent, large scale geography textbook content analysis study, done on 450 textbooks in 28 European countries, found that a regional and thematic textbook approach was significantly more complex than might be expected, based on the previous study (Senegacnik, 2018). The findings also reported that while appropriate terminologies were prepared and defined, textbook authors' adherence to these was less than expected. Another study (Mishra, 2015), which analysed textbooks using Jo and Bednarz spatial thinking taxonomy, found that Indian school geography textbook questions mostly covered non-spatial concepts at the level of cognitive processes. Most of the questions required learners to match their knowledge with pre-established context-independent knowledge (*ibid.*).

Research on textbooks in South Africa that is relevant to my study includes that done by Naidoo (2008) who evaluated the knowledge dimension of science textbooks using Bloom's revised taxonomy (Anderson & Krathwohl, 2001). This involved analysing the extent to which the textbooks promoted factual knowledge, conceptual knowledge, procedural knowledge and metacognitive knowledge. The findings showed that the textbooks focused more on factual and procedural knowledge. Another study that also focused on knowledge, undertaken by Ngubeni (2009), found that South African geography textbooks emphasize geographical knowledge without any integration of everyday knowledge (Ngubeni, 2009). The knowledge focus of Namibian textbooks is discussed in Chapter 8.

Raselimo's (2010) analysis of geography textbooks in Lesotho found that one textbook dealt with the causes and effects of ozone depletion and pollution by focusing strongly on the social and

economic dimension. This textbook neglected the political and environmental dimensions as advocated by UNESCO. Only one of the textbooks in the study considered the physical, social and economic dimensions of the environment. Overall, the findings showed that the Lesotho geography textbooks do not take account of the political dimension. Raselimo also looked at the approach to pedagogy informing the textbooks. One book used a deductive approach with each chapter starting with a list of objectives “followed by text rather than text being introduced with activity exploring learners’ prior knowledge” (2010, p. 226). On the other hand, the study found that in another textbook “...most chapters begin with an activity eliciting learners’ prior knowledge on the topic” (Raselimo, 2010, p. 227). Other findings were that the textbooks contained group work activities, experiments and project work that promoted action-oriented learning; they required learners to think of the solutions to problems, for example soil erosion. They also promoted inquiry learning and provided opportunities for outdoor learning (Raselimo, 2010). The extent to which these findings are similar or different to those of this study is discussed in Chapter 8.

In Southern Africa much of the material on embedding ESD content and pedagogy into geography in the region is prepared by Non-governmental Organisations (NGOs) and universities. In South Africa, for example, NGOs like the Conservation Education Programme of Cape Action for People and Environment (CAPE) Learning for Sustainability Project and Bird Life in Environmental Education have produced ESD materials and resources. The most recent teaching and learning support materials, the Fundisa for Change resources for environmental learning have been developed by a consortium of university-based, NGO and state partners, with limited input from academic geographers and geography educators (Fundisa for Change, 2013). Similarly, in Namibia, ESD materials covering issues like environmental legislation in Namibia, development and the environment, gender issues in Namibia, women and the environment, conflict and the environment, war in Namibia and changing policies have been produced by organisations like Enviroteach as far back as 1995 (Du Toit & Sguazzin, 1995).

Murray and Wilmot (2000) evaluated the LSMs developed and used in the Namibian Life Sciences project. They found that the materials promoted environmental awareness, sex education, community involvement, and democratic practices. That said, the Grade 8 and 9 focus was more

on the biophysical dimension which they contend was at the expense of the social, and little attention was given to the political dimension. Furthermore, they found that when dealing with topics linked to democratic practices and responsible citizenship, opportunities were not provided for learners to make decisions and consider consequences.

4.4 Namibian school geography textbooks

The Ministry of Education in Namibia acknowledges that many teachers may not be able to teach effectively if they do not have textbooks (Namibia, MoE, 2008). All textbooks used in Namibian schools have to be evaluated and approved by the NIED which falls under the Ministry of Education. Registered publishers are invited to submit their textbooks to NIED for evaluation and approval purposes (Namibia, MoEAC, 2015b). The Ministry is responsible for identifying and recommending four suitably qualified evaluators for a subject-specific panel to evaluate each school subject. This panel is tasked with approving a maximum of three textbooks per subject per grade. The panel members are recommended by NIED and approved by the Permanent Secretary and they have to undergo training on the techniques of evaluating textbooks before undertaking their work as evaluators.

The evaluation panels undertake a criteria-referenced textbook evaluation that includes a focus on: content (relevance, accuracy, sufficiency, appropriateness), organization, the promotion of cross-curricular issues, representation of Namibia's diversity, inclusive education, activities, skills development, critical thinking and understanding (Namibia, MoEAC, 2015b). To be eligible for approval a submission (textbook) must score 80% of the marks allocated for conformity to the curriculum and must score a minimum of 70% of the total available marks in all evaluation categories on the evaluation sheet. Approved textbooks are listed in the textbook catalogue for at least five years for the schools to select the title they wish to use (ibid.).

Apart from focusing on specific geography syllabus topics and competencies, the Namibian school textbook evaluation criteria support a reorienting to ESD. This is evident from the emphasis placed on cross-curricular themes which include gender, environmental learning, HIV and AIDS, Population Education, Education for Human Rights and Democracy (EHRD) and representation of diversity (Namibia, MoEAC, 2015b). These are similar to the environmental issues described

by UNESCO (2016). Emphasis is also placed on self-assessment activities, skills development, critical thinking and subject-specific knowledge with understanding (Namibia, MoEAC, 2015b).

Publishers should produce affordable but durable textbooks without compromising quality (Namibia, MoEAC, 2015b). The Ministry provides guidelines for the design of textbooks, including for example, the type of cover and paper to be used and the format and maximum pages per textbook. The textbook is also expected to be aligned to the methodological approach and objectives in the new curriculum.

4.5 Conclusion

This chapter has reviewed literature on textbooks pertinent to the study. Drawing on international literature, the role of textbooks as primary sources of subject knowledge and useful resources for teaching and learning in school geography, was described. This was followed by a discussion on the research on geography textbooks in Southern Africa and Namibia. These perspectives will be drawn on to make sense of and interpret the findings of this study, which are presented in Chapters 7 and 8. The next chapter describes and justifies the research methodology of this study.

CHAPTER 5

METHODOLOGY

5.1 Introduction

Chapter 5 describes and justifies the interpretive research orientation and methods used in the study. It starts with a description of the research goal and questions and how these informed the choice of a qualitative research orientation. This is followed by a discussion on how data were gathered, analysed and interpreted and how sampling and piloting were done. Issues of validity and trustworthiness are addressed and ethical considerations explained.

5.2 Research goal and questions

The overarching goal of this research is to understand how Namibian geography textbooks at one level of the school system (Grade 9) are reorienting geography towards ESD. This goal was addressed through the following two research questions:

- 1. How are selected Grade 9 Namibian textbooks reorienting school geography towards ESD in terms of what it taught (content) and how it is taught (pedagogy)?**
- 2. How do Namibian textbook authors perceive the reorienting of school geography towards ESD?**

5.3 Research orientation

An interpretive orientation was adopted for this study because its goal was *to understand* how textbooks are reorienting Namibian school geography towards ESD. According to Bertram and Christiansen (2014), in an interpretive paradigm "... researchers describe and understand how people make sense of their worlds and how they make meaning of their particular action" (p. 26). The situation is engaged from the view of participants (*ibid.*) (in this case text book authors). A similar view is expressed by Cohen, Manion and Morrison (2011) who state that the way in which individuals make sense of and interpret their experiences of the world is foregrounded in interpretive research and it is used to build theory. Interpretive research acknowledges that the world is social and that "... reality is a social construction and that it is dependent on the meanings

that people ascribe to their own experiences and interaction with others (Plooy-Cillier, 2014, p. 29). “The social world is what people perceive it to be” (ibid.). “People construct the social worlds by sharing meanings” (Nieuwenhuis, 2016, p. 61). In addition “reality is socially constructed” (Merriam, 2009, p. 8). The researcher interprets how people make sense of their worlds and how they make meanings of their actions and then discover results through the interpretation of data (Nieuwenhuis, 2016). This is relevant to my research because I am interested in understanding what authors think and say, and what they do when they write textbooks. It also informed my choice of data gathering techniques.

5.4 Research process

The research was conducted in two phases. The first phase focused on investigating, through an online questionnaire, how geography textbook authors perceive the reorienting of school geography towards ESD. The second phase consisted of a desk top analysis of selected Grade 9 Namibian school geography textbooks. These methods enabled me to respond to the research questions stated in 5.2.

5.5 Sampling

“Sampling involves making decisions about which people, settings, events or behaviours to include in the study” (Bertram & Christiansen, 2014, p. 3). According to Pascoe (2014), “we purposefully choose the elements that we wish to include in our sample, based on a set of characteristics” (p. 142). Merriam (2009) asserts that “the investigator wants to discover, understand and gain insight and therefore must select a sample from which the most can be learned” (p. 77).

Given the length and scope expectations of a Master’s degree research project, it was not appropriate to focus on the geography textbooks in all grades of schooling. Instead a purposeful sample consisting of three Grade 9 textbooks was selected (Maree & Pietersen, 2016). Grade 9 textbooks were selected for two reasons: firstly, it is the end of the junior secondary phase of schooling in which geography is a compulsory subject taken by all Namibian learners. Secondly, 2018 was the first year the new revised national curriculum was implemented in Namibia in Grade 9. I assumed that the Grade 9 textbooks would be the most theoretically up-to-date, reflecting and

aligned with contemporary trends and developments in school geography. The three Grade 9 textbooks in my sample were approved by the NIED for use in Namibian public schools. The Namibian public school textbook approval process is explained in 4.4. Furthermore, I sampled one theme in the Grade 9 curriculum, namely Ecology, because an analysis of the curriculum (Namibia, MoEAC, 2015a), revealed that it is in this theme that ESD content, in the form of environmental issues and challenges as described in the literature, is included (UNESCO, 2016; IGU/CGE, 2007, 2016).

I experienced challenges when trying to contact geography textbook authors. Publishing houses were reluctant to provide me with authors' contact details. My sample of authors was one of convenience which included authors whose contact details I managed to obtain. The sample did however include, inter alia, one of the authors of each of the three Grade 9 textbooks analysed in this study. Guided by the literature, I assumed that they would have in depth knowledge about a particular issue and of their professional role, expertise or experience in writing textbooks (Cohen et al., 2011). I am a co-author of one textbook series but have played a very small part in the conceptualization and writing of the series. Given that this study seeks to understand how textbooks are integrating ESD into school geography, and the extent to which they are aligned to contemporary thinking in ESD and geography education, I contend that my role as a co-author is not a risk because there is no material benefit from the research and such cannot compromise the integrity of the research. The findings of the study will deepen my understanding of how textbooks are helping to reorient school geography to ESD; these insights will enhance my professional practice and they may be useful for other textbooks authors, publishers and NIED officials.

5.6 Data gathering

Table 5.1 summarizes the data gathering methods used in the study.

Table 5.1 Data gathering instruments

Methods of data gathering	Purpose	Instrument used
Phase 1: Survey	To understand authors' perceptions of reorienting school geography towards ESD	Online questionnaire
Phase 2: Document Analysis	To understand how environment and sustainability issues and challenges are being dealt with in three Grade 9 textbooks both in terms of what is taught (content and knowledge) and how it is taught and learned (pedagogy /approaches to teaching and learning)	Textbook analysis using an analytical tool developed from the literature on ESD and school geography

5.6.1. Survey

I gathered information on authors' perceptions and experiences through a survey. This was done through an online questionnaire. Questionnaires are widely used and are seen as "... a useful instrument for collecting survey information, providing structured often numerical data, being able to be administered without the presence of the researcher, and often being comparatively straightforward to analyse" (Wilson & McLean as cited in Cohen et al., 2011, p. 377).

A questionnaire has a number of advantages. These include:

- it can be administered to a large number of people (Bertram & Christiansen, 2014);
- it is quicker to code and analyse data (Bailey as cited in Cohen et al. (2011);
- online questionnaires are quick to reach respondents who are geographically spread-out (Bertram & Christiansen, 2014);
- the use of closed questions are quick to respond to and straightforward (Wilson and McLean as cited in Cohen et al., 2011);
- closed questions make it easier for the data to be entered into a spreadsheet for subsequent processing and analysis (Newby, 2010);
- open-ended questions are useful if the possible answers are unknown or the questionnaire is exploratory (Newby, 2010);

- open-ended questions are also valuable in giving a sense of the respondent's voice (Newby, 2010);
- open-ended questions enable participants to respond in their own words, explain and qualify their responses and avoid the limitations of pre-set categories of responses (Bertram & Christiansen, 2014; Cohen et al., 2011).

The literature describes the different ways in which a questionnaire can be administered. Bertram and Christiansen indicate that “a questionnaire can be administered directly by the researcher, and the respondents complete them then and there” (2014, p. 77). Alternatively, the researcher can hand a questionnaire to individuals or groups and then collect them once completed. If respondents are far from the researcher, the questionnaire can be posted or emailed to respondents who then return a completed questionnaire. Cohen et al. (2011) say that questionnaires can be administered by “self-administration, post, face to face interviews, telephone and the internet” (p. 404).

I decided to use an online questionnaire because some of the geography textbooks authors are not Namibians and do not live in Namibia. It was thus a convenient and efficient way of gathering information from them. The questionnaire was prepared, loaded onto an online survey application and sent to seven authors. They were asked to complete the questionnaire and submit it online, using a ‘submit’ feature. I found that the use of questionnaires was quick and efficient. The technology for administering the online questionnaire and submitting the responses online was piloted before it was sent to the seven authors. From my own experience I am aware of the challenge of obtaining a good response rate when administering a questionnaire. Six of the seven authors to whom I sent a questionnaire, completed the questionnaire and returned it to me.

The design of the questionnaire (See Appendix A) was guided by the literature. I phrased the questions carefully using language the authors would understand, in an effort to avoid ambiguity and misinterpretation (Cohen et al., 2011). I avoided asking questions that would lead the respondents to a particular answer (Bertram & Christiansen, 2014). Questionnaires can contain either closed or open-ended questions. I used closed questions to obtain biographic information about the textbook authors. This included gender, qualifications, experience and the grade/s for which textbooks had been written. I used a Lickert scale item for the authors to indicate the

importance of teaching different environmental issues and the extent to which different pedagogical principles and approaches are taken into consideration when writing textbooks. Open-ended questions were used to elicit the information on the sources of information authors used when writing textbooks and the challenges they experience when writing about environmental risks and challenges.

The literature also describes the limitations and challenges of questionnaires. Firstly, the researcher is not always present to see whether a respondent understands the questions and in cases where the respondent does not understand the questions, inappropriate responses may be given (Bertram & Christiansen, 2014). Secondly, closed questions do not enable respondents to comment, elaborate or explain their response (Cohen et al., 2011). Thirdly, Roberts cautions that “questionnaires are not good at eliciting complex reasoning about issues” (2013, p. 179). Fourthly, open questions can lead to irrelevant and redundant information and they require more time to complete (Cohen et al., 2011). Apart from one respondent, the other six answered all the questions. The quality of the responses was however disappointing. Almost all the responses to the open-ended questions were brief and lacking in depth and explanation.

5.6.2. Document analysis

Document analysis “involves understanding the information relayed and the underlying values and assumption of the authors, as well as any arguments developed” (Cohen et al., 2011, p. 253). It requires data to “be examined and interpreted in order to elicit meaning, gain understanding and develop empirical knowledge” (Corbin & Straus, 2008 cited in Bowen, 2009, p. 27). The three approved Grade 9 geography textbooks were analysed for the purpose of understanding how the textbooks integrate ESD into Namibian school geography at the level of the classroom and to explore the congruence between Namibian school geography, and trends and developments in school geography internationally.

Textbooks are not neutral sources of information; they make presuppositions concerning knowledge, learning, values and pedagogy (Freebody, 2004). With this in mind and guided by the international literature on school geography and ESD as discussed in Chapters 2 and 3 and summarized in Table 5.2, I generated questions and developed an analytical tool (see Table 5.3)

which I used to answer my research sub-questions (shown in the left-hand column of Table 5.3). The findings of the analysis and discussion of the findings of the textbook analysis is presented in Chapter 7.

Table 5.2: ESD content, view of knowledge and pedagogy

	International	Namibian
<p>Environment and Sustainability Content</p>	<p>Changing consumption patterns, climate change, deforestation, desertification, water, population growth, poverty, food security, waste products, and cultural and globalization (UNESCO, 2013).</p> <p>Sustainable consumption and production, climate change, ocean and marine resources, terrestrial ecosystems, poverty reduction, hunger eradication, improvement health (including HIV/AIDS), human rights, gender equality and empowerment, peace, non-violence and human security, sustainable agriculture, resilient cities and global citizenship: Equity among generations and gender equity, tolerance, environmental preservation and restoration (UNESCO, 2016).</p> <p>Socially inequality, poverty, cultural change, social justice, health risk, natural resources depletion, biodiversity loss, climate change (Lotz-Sisitka & Lupele, 2017).</p> <p>HIV, unemployment, poverty, poor living conditions and environmental degradation (Teisa & Roux, 2016).</p> <p>Water, rural development, overexploitation of natural resources and sustainable consumption, energy choice, food security, migration, urbanization, poverty, sustainable tourism, intellectual understanding, cultural diversity, climate change, disaster reduction, biodiversity and marketing economy (IGU, 2007; 2016).</p> <p>Globalization, climate change and sustainability (Roberts, 2013).</p> <p>Injustice, inequality and the environment (Hicks, 2007 in Roberts, 2013).</p> <p>Progression. Environmental protection and sustainability, quality of life and society, disaster control and environmental problems and possible risks for living space (Bagoly-Simo, 2014).</p> <p>Progression. Population distribution and density; population structure, growth and movements; HIV and AIDS; water management in SA; floods; droughts and desertification;</p>	<p>Drought and HIV/AIDS (Namibia, MEC, 1993)</p> <p>Water scarcity, drought, deforestation, land degradation, food security, biodiversity loss, exploitation of fish, urbanization and HIV/AIDS (Namibia, OP, 2004).</p> <p>HIV/AIDS, environmental degradation, food security, pollution, poor sanitation and waste, inequality and management of our natural resources (Namibia, MoE, 2009).</p> <p>Drought, climate change, water management and security, and poverty (Namibia, OP, 2016).</p> <p>Dependency ratio, population growth and movements, migration, refugees, HIV/AIDS, deforestation, desertification, bush encroachment, population explosion, pollution, overgrazing, pressure on natural resources and infrastructure provision of services (Namibia, MoEAC, 2015a).</p>

	<p>development issues and challenges; using resources; convectional energy sources and their impacts on environment; soils and soil erosion; energy management in SA; rural-urban settlement issues; and urban structures (South Africa, DBE, 2011).</p> <p>Water scarcity, the live-ability of Australians, natural hazards, urbanization, food security, sustainability, management of landscapes, interrelationships between land cover change and climate change, global inequalities and migration (Maude, 2014).</p> <p>Climate change, changing weather patterns, sustainable development principles, and practices, urbanization and land use management and sustainability, management of natural resources including water and low carbon energy production (Fundisa for Change, 2013).</p> <p>Soil erosion, natural disasters, pollution and energy (Raselimo, 2016)</p> <p>Settlement population and migration, HIV/AIDS in Lesotho (Lesotho, MoET. 2018).</p> <p>Human activities in desert, desertification, people and ecosystem, exploitation of resources and development; conservation of resources, urbanization, urban function and the sphere influence, the quality of urban life, the growth and structure of population, migration and population and disease (Zimbabwe, MPSE, n.d.).</p>	
View of knowledge	<p>More than factual knowledge, contested knowledge, systemic thinking (Socio-ecological), interdisciplinary, critical and creative thinking, communication, collaborative, curiosity, examining a status quo (Stimpson, 2006; UNESCO, 2017; 2018).</p> <p>Knowledge with understanding on interdependent and interrelated human (social, economic and political) and biophysical dimension (UNESCO, 2017)</p> <p>Holistic (interdependence), transforming thinking and behaviours (De Sousa & Raath, 2018).</p> <p>Understanding changing the essentially anthropocentric understanding of the world (knowledge as tentative)</p> <p>Critical thinking and future-oriented (Firth & Smith as cited by Dube, 2014).</p>	<p>Learning to know and understand, systemic and creative thinking, think independently, apply knowledge, effective communication, questioning and critique, aware of regional, plan solutions, national and global, holistic (socio-ecological) understanding, critical analyses, apply skills (Namibia, MEC, 1993; Namibia, MoE, 2009).</p> <p>High-order thinking (analyses, synthesis and evaluate)</p> <p>Understand environmental risks, know their impacts, understand solutions, make judgment, analyses, collect, classify,</p>

	<p>Critical knowledge (Wals & Lenglet, 2016).</p> <p>Knowledge of what we do not yet know (Fundisa for Change, 2013)</p> <p>Local to global (Roberts, 2013; Haubrich, 2013).</p> <p>Holistic (Bagoly-Simo, 2014).</p> <p>Root causes, change strategies and alternatives (Jensen as cited by Raselimo, Irwin & Wilmot, 2013).</p> <p>Local, national and global, holistic, selection, collection, representation, interpretation and use of geographic data, knowledge with understanding, applying skills, make judgment and decisions (Zimbabwe, MPSE, n.d.).</p> <p>Think critically and creatively, analyses topics, develop alternatives and solutions (Fundisa for Change, 2013)</p>	<p>interpret, apply skills and take action (Namibia, MoEAC, 2015a).</p>
Pedagogy	<p>Participatory, self-direct learning, active participation, collaboration and problem-solving innovative, action-oriented, critical inquiry, holistic (UNESCO, 2017; 2018,).</p> <p>Find solutions, make decisions, analyses critical issues, critically revisit assumptions, world views and power relations, reflective, collaborative learning and take actions (UNESCO, 2012; 2015; 2017; 2018).</p> <p>Recognition of prior knowledge (Jickling and Walls, 2008).</p> <p>Partnership, participation and action (Tilbury & Wortman, 2006).</p> <p>Transformative social learning (Lotz-Sisitka, Wals, Kronlid & McGarry, 2015).</p> <p>Reflective or critical learning (UNESCO, 2016).</p> <p>Transformative, cooperative and critical learning (UNESCO, 2016).</p>	<p>LCE, challenging status quo, participation, contribution and production, responsible learners, make decisions, taking actions cooperative learning, solving problems, bring about change, evaluate their own learning, flexibility (Namibia, MEC, 1993; Namibia, MoE, 2009).</p> <p>Constructivism (recognition of pre-knowledge) and creation of knowledge (Namibia, MoE, 2009).</p>

	<p>Bring about change (Wals & Lenglet, 2016).</p> <p>Future-oriented, change-focused, action taking, transformative (IGU/CGE, 2016)</p> <p>Problem-solving (Pauw, 2015)</p> <p>Decision making (Haubrich, 2013).</p> <p>Integrate their experience (Mishra, 2015).</p> <p>Problem-solving (South Africa. DBE, 2011).</p> <p>Dialogue and debate, (Roberts 2013)</p> <p>LCE, action-focused, systems approach (Lidstone & Williams, 2006).</p> <p>Collaboration and dialogue, engage with the whole system, active participation (Tilbury, 2011).</p> <p>Social construction (Fien, 1993).</p> <p>Decision making (South Africa, DBE, 2011).</p> <p>Information transfer, experimental, investigation, learning by doing, and deliberative method (Rosenberg et al, 2013).</p> <p>Reflective and participatory, solving problems (Raselimo et al. 2013).</p> <p>Project and collaborative learning (Dambudzo, 2015).</p> <p>Change-oriented, self-discovery and explore, cooperative and collaboration, LCE (Namibia, MoEAC, 2015a)</p> <p>Participatory, brainstorm and discussions (Anyolo et al. 2018)</p>	
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Pedagogical approach	Independent individual work and working in small groups (Roberts, 2013). Cooperative and independently (South Africa, DBE, 2011).	Individual, pair and group work (Namibia, MoE, 2009; MoEAC, 2015a).
Strategies	Action research (Huckle, 1996; Tilbury, 2011). Role-plays, group discussions, debate, critical incidents, case studies, reflective accounts, critical readings, problem base learning, field and outdoor learning and modeling good practice (Tilbury, 2011). Project-based learning (UNESCO, 2017). Presentations, awareness campaign, demonstration and experiment, guided questions, field trips, games and quizzes, solitaire, music, poetry, visual art, role play, and value classifications, collaborative research, exploring indigenous way of knowing and case studies, backward mapping (Rosenberg et al. 2013) Case study, field study, audio visual, (Lesotho MoET, 2018; Zimbabwe, MPSE, n.d.).	Field work (Simasiku, 2012; Anyolo et al. 2018). Observing, (Namibia, MoEAC, 2015a).
Assessment	Tests, examination, practical tasks, tasks that use variety data information, research tasks, fieldwork tasks, projects, oral presentation, demonstration and performance (South Africa. DBE, 2011).	Practical exercises, projects, topic tests, end of term tests, and end of year examination (Namibia, MoEAC, 2015a).
Values	Tolerance (UNESCO, 2013). Resilience and adaptation (Fundisa for Change, 2013). Cultural heritage, care and stewardship, respect others human rights, responsibility, adaptation, intention to solve problems, equity, freedom, justice and solidarity, human dignity, valuing diversity, responsible use and management use of resources, cooperative and conciliatory, attitudes, agency empathy, respect, and resilient (Tilbury, 2011; UNESCO, 2012; 2017; 2018). Caring (Wals & Lenglet, 2016). Responsibility, and appraise diversity (Bagoly-Simo, 2014). Empathy, tolerance, fairness, cooperation, (South Africa, DBE, 2011).	Appreciation, self-confidence, self-reliance, respect of others and different diversity, democratic, caring, cooperation, tolerance, mutual understanding, service to others, human rights, liberty and justice and social responsibility (Namibia, MEC, 1993).

Table 5.3: Analytical tools

Research sub-questions	
<p>1. How do the textbooks view knowledge?</p>	<ol style="list-style-type: none"> 1. How is the content structured and organised? 2. To what extent do textbooks deal with environmental issues in terms of: <ol style="list-style-type: none"> (a) Causes (driving forces) (b) Impact and consequences (c) Adaptation (d) Possible solutions 3. Do the textbooks promote a holistic understanding of the interrelationship between the social and physical world? Do the textbooks promote an understanding of the environment as a system consisting of interconnected and interdependent social and biophysical dimensions? 4. Do the textbooks promote an understanding of environmental issues at different scales (from local to national to global)? 5. Do the textbooks promote a view of knowledge as tentative and changing as opposed to absolute infallible truths? 6. Do the textbooks promote a view of knowledge as contested? Do they recognize that people’s thinking is shaped by their values and worldviews and these differ from person to person and from community to community? 7. Do the textbooks promote knowing as well as understanding and being able to apply ones knowledge in different contexts? (know, explain, apply) (surface and deep learning) 8. Do the textbooks provide opportunities for learners to critique and challenge the way things are? Do the textbooks help learners to identify alternate ways of being and doing? Do the textbooks adopt a change-oriented approach? Do they provide opportunities for considering how to change behaviour? 9. How do the textbooks deal with diversity in terms rural/urban, culture, language, geographical origin, race, socio-economic class, gender, age etc.?
<p>2. What view of learning underpins the textbooks?</p>	<ol style="list-style-type: none"> 1. Is the view of knowledge one of transfer and absorption OR construction and meaning making? 2. Are there activities which actively engage the learners in the construction of knowledge? 3. Do the textbooks take accounts of learners’ existing knowledge? 4. Do the textbooks engage learners’ existing knowledge? 5. Do the textbooks engage learners in a variety of activities and experiences in which their ideas and practices are acknowledged, built on and challenged, modified and transformed? (Do textbooks provide opportunities for discussions and debate? Do they challenge the knowledge learners bring to schools?)

	6. Do textbooks enable learning in an interactive and experiential way? (Do they promote learning through active engagement with world?)
3. What pedagogical approach and strategies are used in the textbook?	<ol style="list-style-type: none"> 1. Do the textbooks adopt a learner-centred approach? Do they build on learners' existing knowledge? Are they participatory? Do they promote problem-solving? Do they involve learners in decision making? Do they involve learners in action taking? 2. Do the textbooks elicit and build on the knowledge and experiences of learners? How the textbooks relate the content to the learners' real-life situations? 3. Do the textbooks promote critical, systemic and creative thinking? Do the textbooks encourage learners to be curious and question the status quo, thinking of the whole system, identify and explore alternative ways of living? 4. Do the textbooks model and encourage the use of participatory active learning strategies, including for example transferring information, exploring, enquiry-based learning, project work, simulation, field work and investigation, group discussions and collaborative learning, reflective, story-telling, deliberative method, learning by doing, issue analysis? 5. Do the textbooks encourage learners to work individually, in pairs, in groups or as a whole class? 6. How is learning assessed? What types of assessment are included? (Practical exercises, tasks to use variety of information, research tasks, fieldwork tasks, projects, oral presentations, demonstration and performance, tests, end of term tests and examination). What types of learning are assessed?
4. What values and action competencies are promoted by the textbooks?	<ol style="list-style-type: none"> 1. Do the textbooks promote decision making and action taking in the local community? 2. Do the textbooks develop democratic practice and responsible citizenship? Are the textbooks encouraging the learners to make meaning of their world? Understand how it works and how they fit into it? Do they encourage learners to make consider alternate ways of being, make decisions and take responsibility for their actions? 3. Do the textbooks promote the following values? <ul style="list-style-type: none"> ➤ Valuing cultural and natural heritage? An appreciation of indigenous knowledge ➤ Care and stewardship (an awareness of the world and concern for knowing about it) ➤ Respect for the other and others' points of view ➤ Democratic values: equity, freedom, social justice ➤ Respect for human rights ➤ Human dignity ➤ Valuing of diversity and different kind of life and ways of living ➤ Responsible use and management of resources ➤ Cooperative and conciliatory attitudes ➤ Agency

	<ul style="list-style-type: none"> ➤ Resilience ➤ Tolerance ➤ Empathy
5. What types of questions are asked, and what thinking skills are promoted by the textbook activities?	<ol style="list-style-type: none"> 1. Do the textbooks ask higher-order thinking questions? What type of knowledge is promoted (factual, conceptual, procedural and metacognitive)? 2. Which cognitive dimensions are promoted (remembering, understanding, applying, analysing, evaluating)? Do the textbooks promote decision making skills, problem-solving skills and creative thinking? 3. Do the questions help learners to understand issues in relation to the future and the consequences of decisions?
6. How do the textbooks view the role of the teacher and the learners?	<ol style="list-style-type: none"> 1. What is the role of the teacher in the textbook? (Is the teacher viewed as a transmitter of knowledge? Is the teacher a mediator and scaffolder guiding and supporting learners as they construct knowledge make meaning?) 2. What is the role of the learner? (Are they passive recipients of information about environmental issues and challenges? Are they active participating in knowledge construction?)

Document analysis is not without its challenges. The information in documents might not be useful or understandable to the investigator and sometimes they do not provide sufficient detail for answering a research question (Merriam, 2009, Bowen, 2009). The researcher may face problems in determining the authenticity and accuracy of documents (Merriam, 2009). Bowen (2009) cautions that that documents are not always retrievable and they may contain bias. The literature also describes the advantages of document analysis. According to Merriam, documents are good sources of data on particular subjects and many documents are easily accessible, free and contain information needed by the researcher (2009). Document analysis is seen as being less time-consuming, less costly and unaffected by research processes (Bowen, 2009). Large amounts of data can be collected and analysed (Plooy-Cillier & Cronje, 2014). My experience was that document analysis required a great deal more time than I anticipated because I was interested in doing an in depth analysis for the purpose of generating rich insights. For this reason I decided to limit the scope of the analysis to two environmental challenges (deforestation and population explosion) in the theme Ecology in Grade 9.

5.7 Data analysis

Cohen at al. (2011) argue that data analysis involves “making sense of data in terms of the participants’ definitions of the situation, noting patterns, themes, categories and regularities” (p. 537).

5.7.1. Questionnaire analysis

When I received the online responses, I read through them very carefully to familiarise myself with what the authors were saying. I then analysed the six authors’ responses in order to identify similarities and differences in their responses to the following questions:

- What are the authors’ educational goals when writing textbooks?
- How important do they perceive the teaching and learning of environmental challenges to be?
- Which environmental challenges do they perceive as critically important?
- What are the authors’ perceptions of different pedagogical approaches?
- What, if any, challenges and difficulties have authors experienced when dealing with environment and sustainability issues and challenges in textbooks?

5.7.2. Document analysis

The two environmental challenges (deforestation and population explosion) were analysed using content analysis. According to Cohen et al. (2011), content analysis is “the process of summarizing and reporting written data – the main contents of data and their messages” (p. 563). “Content analysis involves coding, categorizing, comparing and concluding” (ibid.). The six broad categories used to guide the analysis of how the Grade 9 textbooks are summarized in Table 5.3. The data were sorted and organized in order to give meaning through coding and content analysis (Plooy-Cilliers, 2014b). Guided by Cohen et al., who explain that content analysis is a “process of summarizing and reporting written data” (2011, p. 563), the text was broken down into small text in order to identify similarities and differences between the three textbooks. I used marker pens to highlight pieces of text to categorize them (Blanche, Durrheim & Kelly, 1999). This helped me to identify emergent patterns and themes. These are discussed in relation to the literature reviewed in Chapters 2, 3 and 4.

Figure 5.1 illustrates how data were analysed using a deductive approach (Bertram & Christiansen, 2014).

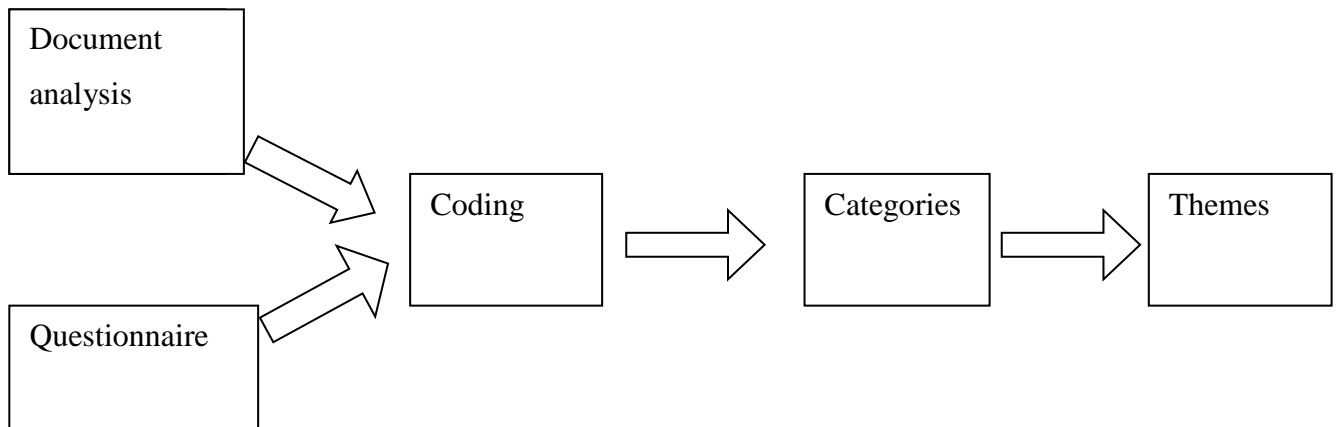


Figure 5.1: Data analysis process (Adapted from Lichtman, 2006 as cited in Dube, 2012, p. 131)

5.8 Validity and trustworthiness

This research report contains evidence that my research was carried out in a rigorous and systematic way, and that the results are valid and can be trusted. “Validity in research is about

determining whether the research measured what was supposed to be measured” (Koonin, 2014, p. 256). It “refers to the degree to which the explanations of phenomena match the realities of the world” (McMillan & Schumacher, 2001). Merriam (2009) points out that research studies need to present insight and conclusions that ring true to readers, practitioners, and other researchers. According to Newby (2010) particular attention should be given to sampling to ensure validity.

Bertram & Christiansen (2015) assert that “it is important to examine the data rigorously” (p. 189). Lincoln and Guba as cited in Cohen et al. (2011), maintain that rigour can be achieved through audit trails of evidence and member checking when coding or categorizing results. In this study rigour was achieved through comparison of what emerged from the analysis of the questionnaires and the document analysis.

According to Niewenhuis (2016b), results from document sources should be triangulated with those of other sources. Triangulation is done when a researcher uses two or more methods of data collection in the study (Louw, 2014; Cohen et al. 2011). It “is a powerful way of demonstrating concurrent validity” (Campbell & Fiske cited in Cohen et al., 2011, p. 195). It validates claims, processes and outcomes (Newby, 2010). The validity of this research was ensured by including texts (extracts) from each textbook, which enables the reader to check my analysis against the source materials. This ensured transparency in this research and enhances the trustworthiness and validity of the results.

The four ESD global categories used in the analysis (content, view of knowledge, pedagogy and values) are drawn from the international literature on ESD and geography, thus providing a high level of confidence in the basic architecture of the analysis. The analytic tool was constructed in careful steps based on a detailed item analysis of the international and Namibian literature including the national curriculum and geography syllabus. This enhanced the trustworthiness and validity of the categories used and the alignment of the measures against a recognized set of ESD content, pedagogy, values and knowledge standards.

Triangulation was adopted for understanding the differences, similarities and purposes of the phenomenon of this study. It was used to compare what authors said (questionnaire) and what they

did (document analysis). In addition, I used critical friends (including a colleague who is also undertaking post graduate geography education research who is familiar with the field) for peer review purposes. This helped me to ensure that my analysis and interpretations are plausible.

5.9 Ethical considerations

Bertram and Christiansen (2014) argue that ethics has to do with behaviour that is considered right or wrong and this is an important consideration in research, particularly with research involving humans and animals. Participants should be respected and they should be fully informed about the purpose of the research. The authors were contacted telephonically and invited to participate in the survey before the consent forms and the questionnaire were sent to them. At no time did I mislead or exploit the participants (Louw, 2014). The information in the consent letter stated clearly that participation is voluntarily and they have the right to withdraw at any time (see Appendix B). I assured the authors that their responses were anonymous and could not be linked in any way to the textbook they had authored. I explained that the research was focused on understanding how textbooks are reorienting school geography to ESD in relation to contemporary thinking in ESD and geography education rather than for comparative purposes. I also declared by position as a co-author of one of the series.

5.10 Conclusion

This chapter has explained the research orientation that I adopted, the research process that was followed, how participants were selected, the two methods use for generating data, how data were analysed and interpreted, and the considerations given to ensure the validity and trustworthiness of the findings. The next chapter presents the findings of the analysis of authors' perceptions and experiences of textbook writing.

CHAPTER 6

AUTHORS' PERCEPTIONS

6.1 Introduction

Chapter Six presents the analysis and discussion of the authors' responses to the online questionnaire. The chapter begins with a discussion on the profile of the six authors who participated in the survey. All six of the authors who completed the questionnaire are authors of the three approved Grade 9 textbooks analysed in this study. The presentation and discussion of the findings is structured according to the questions asked in the questionnaire, namely: the author's educational goals; their perceptions of teaching environmental issues and challenges; the sources of information they use to write textbooks, pedagogical consideration, and the challenges they experience when writing textbooks. The questions consisted of open-ended questions and the Lickert scale. The chapter concludes with a synthesis of the findings.

6.2 Author profiles

Table 6.1 summarizes the six authors' biographical information and experience. It shows that four of the six authors are female. Their academic qualifications range from a Bachelor's to a Master's degree level with five having a post graduate qualification. With the exception of one author who is an academic geographer, the majority of the authors have school teaching experience. Apart from one author, the rest have six or more years of teaching experience. Five have secondary school teaching experience and two have both primary and secondary school teaching experience. Only one author, a teacher educator, has secondary school and university level teaching experience. Two authors indicated that they had experiences other than teaching but did not state what it was. The findings show that the geography textbook authors who participated in the survey are mostly teachers. This raises the question: to what extent are teachers (practitioners) aware of contemporary international trends and developments in school geography and environmental education?

Table 6.1: Profile of the six authors who participated in the survey

Author	Male	Female	Qualification	Experience	Years of textbook writing experience	Grades of Namibian geography textbooks written	Other Namibian textbooks written	Textbook for other countries
1		X	Post Graduate Diploma in Education	Primary and secondary school teaching Writing and editing educational materials	6	Primary school Grade 8 & 9	English Second Language Grade 8 & 9	RSA, Swaziland, Lesotho, Zambia, Rwanda & Malawi
2		X	Master's degree	Secondary school and university teaching In-service trainer Professional writer	More than 20	Primary school Grades 8-10	Social Studies Agriculture Grade 8 & 9	Atlases (other African countries) Mathematics and Science for RSA and international audience
3	X		Honour's degree	Primary and secondary school teaching	6	Primary schools Grades 8-10	N/A	South Africa
4		X	Honour's degree	Academic geographer	18	Primary schools Grades 8-10	N/A	
5		X	Bachelor's degree	Secondary school teaching Professional writer	4	Grades 8 and 9 (mapwork only)	N/A	South Africa
6	X		Honour's degree	Secondary school teaching Professional writer	20	Primary school Grades 8-12	History Development Studies	

With the exception of Author #4 who stated that he is an academic geographer, the authors have school teaching experience which varies from four to twenty years. Two have both primary and secondary school teaching experience; three have only secondary school experience, one of whom (#2) also has university teaching and teacher training experience. The academic geographer has no post graduate qualification which suggest that this author may not have no research experience or deep theoretical insights of current trends and developments in the discipline. It is also interesting to note that only one author (#6) writes above Grade 10 level.

Five authors indicated that they have written text books for other national contexts including South Africa, Swaziland, Lesotho, Zambia, Rwanda and Malawi (one author). This includes atlases for other African countries and mathematics and science textbooks for South Africa. Three authors said they have written textbooks for subjects other than geography in Namibia, including English textbooks for Grade 8 and 9, Social Studies and Agricultural Science for Grade 8 and 9 and History and Development Studies. With the exception of one author whose experience was limited to the mapwork section of Namibian textbook, the rest of the authors have experience in other national contexts and half (three) indicated that they have experience in other school subject areas. There is evidence which suggests that the approach to textbook writing in Namibia is one of generic writing skills which includes the use of ‘professional writers’. This raises the question of what, if any, impact this may have on how theoretically aligned the Grade 9 textbooks are, with contemporary approaches described in the international ESD and school geography literature discussed in Chapters 2, 3 and 4.

6.3 Educational goals

The analysis of the authors’ responses to the open-ended question of what they perceived as their educational goals when writing textbooks, revealed similarities and differences. Two authors focused on the **content**, in particular the need for providing “accurate” and or “up-to-date information about world events”. One of these authors mentioned that this was not always possible because some publishing houses and curricula have “archaic ideas”. One author noted the need for up-to-date content to ensure that “... learners in schools [in] Africa are not left behind in terms of modern methods and practices.” Three authors mentioned the need to make learning “easy” and/or

“accessible”. One author mentioned the need to **improve education** but did not elaborate on what this means.

Three authors focused on learners’ **cognitive skills**. This included learners becoming competent and critical thinkers, users of information and developing learner agency (developing “awareness of change” and “how they have an influence”) and one said that it is “ ... to teach both teachers and learners to think and make informed choices.” One author mentioned developing “... an understanding of how human[s] are part of world events, how they influence these and have a role to play.” These goals mirror some of the goals of the Namibian geography curriculum, namely that learners must be taught to think critically, research, explore, generate and develop ideas, analyse, compare, evaluate, plan solutions and solve problems, take decisions, think creatively and reflectively, understand situations, interrelationships and systems and think innovatively (Namibia, MoE, 2009, p. 12). None of the authors mentioned anything about developing learners’ understanding of the interrelationship of the human and physical world and systems thinking. There was also no mention of the role and value of school geography for enabling ESD. None of the authors referred to contemporary literature in education and school geography to justify or explain their goals. There is little, if any, evidence in the authors’ responses that suggests that they are familiar with contemporary trends and developments in education, especially geography education, described in the international literature. The IGU/CGE (2007; 2016) acknowledges the need to reorient geography education towards ESD and affirms the role geography education can play in deepening our understanding of the contemporary challenges we face (ibid.).

Three authors acknowledged the need for developing **learner agency** but did not elaborate or link it to the current state of the planet and urgent need for transformative education for a sustainable future (UNESCO, 2015; 2016). UNESCO (2018) calls for teaching and learning to be transformed to enable individuals to lead sustainable development as agents of change. The transformative goal of education is not mentioned by any of the authors.

6.4 Environmental issues and challenges

The authors were asked to rank environmental issues and challenges using a Lickert scale of: ‘not important’, ‘important’, ‘very important’, ‘critically important’. The findings are summarized in Table 6.2.

Table 6.2: Summary of the authors’ responses to the importance of environmental issues and challenges

Environmental issues and challenges	Important	Very important	Critically important
Population growth		3	3
Population migration, displacement and refugees			
Urbanization		4	2
HIV/AIDS		3	2
Natural resource exploitation		2	4
Conservation	1	1	4
Exploitation of fish	2	2	2
Water resources and water scarcity		1	5
Water management		1	5
Drought		2	4
Loss of biodiversity	1	2	3
Desertification		3	3
Deforestation	1	2	3
Land degradation	2		4
Land use	2	2	2
Climate change	1		5
Pollution		1	5
Overgrazing	2	1	3
Soil erosion	2	1	3
Food security		3	3
Access to basic services		2	4
Service delivery	2	3	1
Inequality		2	4
Poverty		2	4
Disaster preparedness and management	2	2	2
Severe weather (floods, tornadoes, tropical cyclones)	2	2	2
Environmental conflict		3	3
Gender inequalities	2		3
Unsustainable lifestyles	1	1	4
Sustainable development		3	3
Waste management		1	5

The analysis of the six authors’ responses revealed a high level of similarity, namely:

- None of the challenges and issues listed on the questionnaire were perceived as ‘unimportant’.
- Almost all the challenges were viewed as ‘very important’ and ‘critically important’.
- Five of the six authors viewed the following issues and challenges as ‘critically important’: water resources and water scarcity; water management; pollution; waste management; climate change.
- Four of the six viewed the following issues as ‘critically important’: population migration, displacement and refugees; natural resources exploitation; conservation; drought; land degradation; access to basic services; inequality; poverty; unsustainable lifestyles.

Apart from HIV and AIDS which was only seen as critically important by two authors, the issues identified the most as critically and very important are similar to the key challenges described in the National Curriculum for Basic Education [NCBE] (Namibia, MoE, 2009) and the Harambee Prosperity Plan [HPP] (Namibia, OP, 2016) discussed in Chapter 2 (see 2.6).

Guided by O’Donoghue (2001) who explains how the environment is a system that consists of different but interrelated and interdependent dimensions, namely the human (social, political and economic) and biophysical (life support systems on which life depends, namely soil, air and water), I grouped the environmental challenges listed on the questionnaire into two broad categories: human and biophysical. This was useful for interpreting what emerged in the analysis of the data. The challenges viewed as ‘critically important’ by almost all (five of the six) authors were mostly associated with the biophysical dimension of the environment (natural resource) challenges (water resources and air, water and land pollution) and climate change. Given that climate change is widely viewed as the most pressing challenge humankind faces together with the fact that Namibia is a water scarce country that is likely to become drier in future, the responses to the questionnaire were not unexpected. How water and climate change are dealt with in the Grade 9 textbooks is discussed in Chapter 7.

With the exception of population migration, displacement and refugees, access to basic services, inequality and poverty which four of the six authors viewed as ‘critically important’, there was more difference in the level of importance given to challenges associated with the human activity

(social, political and economic dimensions of the environment) such as population growth, urbanization, HIV and AIDS, gender inequalities and service delivery.

The authors were also asked to rank what they viewed as the five most critically important challenges. Water resources, water scarcity and management and climate change were listed by three authors. This is consistent with the findings of the previous question. One author stated that they are all equally critical and interlinked and that separating them was dangerous. This infers a more holistic systems thinking view. One author with a very different view listed population, inequality, gender issues, urbanization and conservation as the five critically important challenges.

UNESCO (2016) recognizes education as a vital tool to achieve the sustainable development goals that seek to address: sustainable consumption and production, climate change, ocean and marine resources, terrestrial ecosystems, poverty reduction, hunger eradication, improvement of health (including HIV/AIDS), human rights, gender equality and empowerment, peace, non-violence and human security, sustainable agriculture, resilient cities and global citizens. These are parallel with action themes which have geographical dimensions: water, rural development, overexploitation of natural resources and sustainability, consumption, energy choice, food security, migration, urbanization, poverty, sustainable tourism, intellectual understanding, cultural diversity, climate change, disaster reduction, biodiversity and market economy (IGU/CGE, 2007; 2016). This is the one way of integrating ESD into geography education at all levels and in all regions of the world as stated in IGU/CGE (2007).

In the questionnaires the textbook authors identified the environmental issues and challenges they think are critically important i.e. water resources and scarcity, water management, climate change, pollution and waste management, population migration, displacement and refugees, natural resources and exploitation, conservation, drought, land degradation, access to basic services, inequality, poverty and unsustainable life style.

Sustainable consumption and exploitation of natural resources, climate change and poverty are regarded as critically important environmental challenges by the authors as in UNESCO and IGU/CGE. The authors also indicated inequality, which is parallel with gender equality in

UNESCO. They also indicated water resources and scarcity and water management which are some of the major challenges in Namibia as it is a dry country.

Even though the textbook authors, UNESCO and IGU/CGE recognize climate change as an important environmental issue and a challenge to be taught in schools it is not included in the Namibian geography grade 8 and 9 syllabus. Consequently, the authors are likely to not include climate change in their textbooks. (Whether they have in fact included them in the textbooks is examined below)

The syllabus also does not fully respond to the national call, in Namibian high level statements in Vision 2030 and the Harambee Prosperity Plan, for all stakeholders to deal with water scarcity, inequality, food security and climate change.

The syllabus does however include environmental issues and challenges such as deforestation, desertification, bush encroachment, population explosion/growth, pollution, overgrazing and HIV & AIDS.

These vital absences in the syllabus of key ESD issues, such as climate change, water scarcity, inequality and food scarcity is remarkable and puzzling and means that the Grade 8 & 9 Namibian geography syllabus, textbooks and classrooms will not deal with the study of ESD related topics as it called by the UNESCO and IGU/CGE. This will disadvantage Namibian children because Grade 9 is the last grade where geography is a compulsory subject.

Why these important elements of the new geography curriculum were left out of the Namibian syllabus did not form part of this study, but it is important that this be investigated.

6.5 Sources of information

Five of the six authors responded to an open question of where they find information on the environmental challenges and issues listed in Table 5.2, when writing textbooks. What emerged from the analysis of their responses is as follows:

- All five authors who responded to the question indicated that they use more than one source of information.
- The internet is the most widely used source of information.
- The range of sources used by most is limited. One author used academic papers. Two other authors said they used “other books”. One author mentioned using materials produced by NGOs and government. In all cases, no explanation or examples were given to illustrate what these sources are.

There is little, if any, evidence from the authors’ responses that seminal texts in the different subfields of geography (for example, reference texts on geomorphology or climatology) are used as sources of information. None mentioned using publications from in the field of education generally, or geography education (for example, UNESCO texts or the IGU/CGE Charter). Given that most authors are practitioners, it is probable that they are not aware of, or engaging with, contemporary theoretical perspectives in geography education.

6.6 Pedagogical considerations

The authors were asked to indicate, using a four-point Lickert scale, the extent to which they give consideration to thirty pedagogical principles and approaches. These were listed in no particular order. For the analysis, they were grouped into six broad categories:

- Factual information
- Geographical thinking/reasoning/ conceptual understanding
- Critical thinking
- Graphic literacy
- Values and attitudes
- Action Competence/agency

The authors’ responses are summarized in Table 6.3.

Table 6.3: Summary of authors' pedagogical considerations

Pedagogical consideration	Sometimes taken into account	Taken into account	Always taken into account
Providing factual information about environmental and development topics			6
Contextualizing the topic through local case studies or fieldwork in the local community		4	2
Helping learners to find information themselves through fieldwork or from other sources including the internet		4	2
Acquiring up-to-date knowledge by gathering information and making enquiries in the field	1	3	2
Developing geographical reasoning through knowing, explaining and applying knowledge			6
Understanding the interrelation between humans and the natural environment (seeing the environment as a system composed of interrelated dimensions - the social, political, economic, biophysical)	1	4	1
Taking into consideration learners' preconceptions and worldviews. Making links between learners' experiences and the topic being taught		3	3
Developing systems thinking by considering the various spaces as a system in which humans and nature interact		4	2
Relating local experience to global phenomena		3	3
Understanding issues at different spatial scales (local to global and vice versa)		3	3
Understanding spatial patterns and geographical processes	1	3	2
Fostering critical thinking about a topic/issue/problem (through analysis, evaluation, synthesis, making inferences, weighing up evidence, substantiating claims etc).		2	4
Asking questions, identifying issues and questioning the status quo		2	4
Looking at things from different perspectives and points of view		4	2
Solving issues/problems/conflicts		4	2
Taking into consideration the interrelations among human societies/groups/individuals by pointing out different actors and the impact of their worldview and decisions on space. Understanding the underlying power relationships and different values/worldviews of actors	1	4	1
Challenging stereotypical views of gender, religion, wealth, culture, race etc.		4	2
Analysing, interpreting and evaluating (even contradictory) information	1	2	3
Identify stakeholders and decision-makers and consider power issues	1	4	1

Imagining future options, examining side effects and consequences of planned actions		3	3
Encouraging creative thinking about alternative futures. Encouraging learners to think of alternate visions of existing situations and ways of doing and being		4	1
Encouraging creativity and thinking 'outside the box'		2	4
Representing data graphically	1	2	3
Reading and interpreting maps and other graphic representations		3	3
Fostering collaboration and communication	1	4	1
Fostering stewardship – a sense of wonder and awe and empathy and a sense of belonging that may enhance a sense of responsibility and willingness to act	1	2	3
Promoting social justice and equity	1	2	3
Helping learners to understand their own values and those of others. Acknowledging diversity		2	3
Fostering learner autonomy, that is, learning not only to solve problems but being an independent citizen in a fast-evolving world		5	1
Taking action at an individual and community level	1	3	2
Promoting participation by providing opportunities for learners to take a stand, identify opportunities to act, develop and implement action plans.	1	3	2

KEY

Factual information	
Geographical thinking/reasoning/ conceptual understanding	
Critical thinking	
Graphic literacy	
Values and attitudes	
Action Competence/agency	

Table 6.3 shows that all thirty considerations were taken into account albeit at different levels. What emerged from the analysis was as follows:

6.6.1 Factual knowledge

The authors were unanimous that they always take into account 'providing factual information about environmental and development topics.' This is to be expected given that the need for such is emphasized in Towards Education for All (TEA) (Namibia, MEC, 1993) in order for learners to understand the natural and social environment. Jo and Bednarz (2009) stress the importance of geography textbooks containing factual information. But they caution that geographical facts are meaningless unless they are also put into relation with other facts and that learning is more than

the memorizing of facts and repeating them for the learners to think independently and critically. There was less consensus when it came to contextualizing the topic and helping learners to find information themselves through fieldwork or from other sources including the internet, with four authors indicating that while they took these into account, they did not ‘always’ take them into consideration.

6.6.2 Developing geographical thinking and reasoning

The six authors were unanimous that they ‘always take into account’ developing geographical reasoning through knowing, explaining and applying knowledge’. This finding comes as no surprise given that TEA calls for the learners to think critically and independently and master strategies on how to identify, analyse and solve problems (Namibia, MEC, 1993).

The extent to which the authors consider topics (sometimes taken into account/taken into account/always taken into account) varies for the different dimensions grouped in this category. For example, while four authors take into account ‘developing systems thinking by considering the various spaces as a system in which humans and nature interact’, only two ‘always’ take it into account. In spite of the variation, it is significant that all the elements of geographical thinking listed in the questionnaire, are taken into account by all the authors.

6.6.3 Critical thinking

Four authors indicated that the following were ‘always taken into account’

- fostering critical thinking about a topic/issue/problem (through analysis, evaluation, synthesis, making inference, weighing up evidence, substantiating claims etc.), and
- asking questions, identifying issues and questioning the status quo.

Four also indicated that the following were ‘taken into account’

- Encouraging creativity and thinking ‘outside the box’
- Looking at things from different perspectives and points of view
- Solving issues/problems/conflicts
- Taking into consideration the interrelations among human societies/groups/individuals by pointing out different actors and the impact of their worldview and decisions on space

- Understanding the underlying power relationships and different values/worldviews of actors
- Identify stakeholders and decision-makers and consider power issues
- Encouraging creative thinking about alternative futures
- Encouraging learners to think of alternate visions of existing situations and ways of doing and being

Many of the principles and approaches that the authors said they take into account when writing textbooks would contribute in various ways to developing critical thinking. For example, as soon as one asks for evidence to support claims, or does some research to try to analyse causes of a phenomenon then one is contributing in ways to develop critical thinking. The question then remains — to what extent do the textbooks actually measure up to these aspirations?

The textbook authors consider asking questions, identifying issues and questioning the status quo. TEA recommends an LCE pedagogy that requires interactive teaching and learning. Roberts (2013) argues for asking questions as a way of encouraging critical thinking through probing. She further develops a compass rose to help educators to ask questions that include the ‘What?’ ‘Where?’ ‘When?’ ‘How?’ ‘Why?’ ‘Who?’ ‘What might?’ ‘What ought?’ types of questions (p. 45). Geographical questioning should be guided by the “command words” described by Roberts. These require reasoning and include, for example, “... account for, analyse, assess, classify, compare, contrast, define, discuss, distinguish, evaluate, examine, explain, justify, predict, to what an extent and why” (p. 79). Questions using these command words enhance critical thinking and geographical reasoning. The extent to which these questions are used in the Grade 9 textbooks is examined in Chapter 7.

The findings of the analysis of the questionnaire provides evidence of the value the authors attach to developing learners as critical and creative thinkers. This includes questioning the status quo, being aware of the contested nature of issues, vested interests and power relationships, and learning to re-image ways of being and doing. These findings come as no surprise because they mirror those advocated by the Namibian Education Policy (EFA, 1993), the geography curriculum (Namibia. MOEC, 2015) and international literature (IGC/CGE, 2007, 2013). The extent to which these considerations are evident in the textbooks is discussed in Chapter 7. Interestingly, many of these

considerations are linked to educational goals. However, there was little mention of them in the authors' responses to what they saw as their educational goals.

6.6.4 Graphic literacy

Reading and interpreting maps and other graphic representations was 'taken into account'/'always taken into account' by three authors respectively. Only one author indicated that representing data graphically was 'sometimes taken into account' with the rest stating that it was 'taken into account'/'always taken into account'. Again, there is evidence which suggests the authors recognize the importance of developing graphic literacy.

6.6.5 Values and attitudes

While there was variation in the extent to which values (fostering stewardship, collaboration and communication, promoting social justice and equity, helping learners to understand their own values and those of others, and acknowledging diversity) were taken into account, the findings show that they are considered. There is evidence that suggests that the authors are appreciative of and take into consideration, values espoused by ESD.

6.6.6 Action competence/ agency

Fostering learner autonomy, enabling learners to take action at a local level and promoting participation by providing opportunities to develop and implement action plans are all taken into consideration by the authors. Again, this comes as no surprise because it is advocated by the Namibian education policy (EFA, 1993) and the geography curriculum (Namibia, MOEC, 2015) which are underpinned by the principle of democratization.

The findings discussed above, provide evidence that suggests that the authors take into account pedagogical principles that are similar to the transformative education competencies described by Rieckman (2018), namely: systems thinking competency, anticipatory competency, normative competency (an ability to understand and reflect on the norms and values that underlie one's actions and to negotiate sustainability values in the context of conflicts of interests, uncertain knowledge and contradictions), strategic competency (to collectively develop and implement innovative actions for sustainability at the local level and further afield), collaborative competency,

critical thinking competency, self-awareness competency, and problem-solving competency (ibid., p. 44).

6.7 Challenges and difficulties

The authors were asked an open-ended question about what, if any, challenges and difficulties they experienced when writing about environmental risks and challenges. One author did not respond to this question and the authors who only wrote the mapwork sections indicated that the question was not applicable. There was consensus amongst the other four authors who identified the main challenge they experienced as access to up-to-date information and statistics. A similar finding was reported in Dube's (2014) study in South Africa. However, Namibia has a good reputation in terms of the quality of their national statistics so perhaps the specific statistics and information the authors were seeking fell into a niche gap not adequately provided for. One author also mentioned the problem of websites not being kept up-to-date and another mentioned the difficulty of separating propaganda from facts.

The other major challenge they tabled has a more profound effect on the nature and scope of the geography textbooks being written and published in Namibia. The authors state that the geography textbook publishers set a number of limits and constraints on the design and size and space use of the textbook. The impact of this is that where the writer feels that more explanations and illustrations or attention needs to be given to a particular topic for it to be properly understood, that is not possible. The effect can then be superficial and/or incomplete explanations of vital and central ideas.

6.8 Synthesis

This chapter has presented and discussed the findings of the authors' responses to the online questionnaire. The responses were not as detailed as one would have hoped. This is a limitation of a survey. As explained in Chapter 4, had the authors been more accessible, follow-up interviews would have been done. However, in spite of this limitation, the data obtained through the questionnaire provides insights for understanding who the Namibian textbooks authors are, what they see as their goals, what they think are critically important environmental and sustainability issues and challenges, and the pedagogical considerations they take into account when writing.

By and large, the authors' educational goals (providing accessible, up-to-date content developing cognitive skills) mirrored those in the Namibian curriculum policy. None of the authors mentioned the importance of geography as a vehicle for environment and sustainability education per se. However, all authors indicated that the environmental challenges listed on the questionnaire were important, very important and/or critically important. Water (resources, scarcity and management), pollution, waste management and climate change were viewed as critically important. The authors took all the given pedagogical considerations into account, although the frequency with which they did so varied from sometimes to always. Many of the considerations that were taken into account by most authors are similar to those advocated by contemporary ESD and geography education literature.

6.9 Conclusion

This chapter has profiled six Namibian geography textbook authors. It has presented and discussed their perceptions and experiences of writing textbooks and the challenges they face when doing so. The next chapter examines how selected geography textbooks are reorienting school geography to ESD.

CHAPTER 7

TEXTBOOK ANALYSIS

7.1. Introduction

This chapter presents the findings of the textbook analysis. The purpose of the analysis was to understand how three prescribed Grade 9 textbooks are reorienting school geography to ESD, both in terms of content (what is taught) and how it is taught (pedagogy) and the extent to which this is similar or different to the approaches described in the literature reviewed in Chapters 2, 3 and 4. The three textbooks are referred to as Textbook 1 (**TB1**), Textbook 2 (**TB2**) and Textbook 3 (**TB3**)

The chapter begins by looking at the general structure and organization of the content in the theme **Ecology** Theme 3 of the seven themes in the Grade 9 syllabus). This is followed by a detailed analysis of how each textbook deals with two causes of the ‘**Deterioration of the Namibian environment**’, namely **deforestation** and **population explosion**. The chapter concludes with a synthesis of the findings.

7.2. Structure and organization of the theme Ecology

Ecology is one of the seven themes covered in the Grade 9 geography syllabus. Each theme is structured and organized according to a main topic/s and a number of sub-topics all of which are specified in the syllabus (Namibia, MoEAC, 2015a, p. 23). These are shown in Table 7.1.

Table 7.1 shows that the syllabus foregrounds human causes of the deterioration of the environment, namely deforestation, desertification, bush encroachment, pollution and population explosion. The emphasis is on learning causes, effects and solutions.

Table 7.1: Ecology content

Topics	General objectives Learners will:	Grade 9 specific objectives Learners should be able to:
3.1 Deterioration of Namibian environment	<ul style="list-style-type: none"> • investigate the reasons for the deterioration of the environment and suggest possible solutions 	<ul style="list-style-type: none"> • distinguish between natural causes and human made causes • describe the causes and effects of deforestation and desertification, with reference to farming methods • describe the causes and effects of bush encroachment • explain the effect of population explosion as worldwide as well as a Namibian problem • discuss the causes and effects of land, water and air (atmosphere) pollution • suggest possible solutions to reduce environmental damage with reference to deforestation, desertification, overgrazing and pollution (land, water and air).

Source: Namibia, MoEAC, 2015a, p. 23.

Table 7.2 shows that the structure and organization are similar in each book and there is a high level of compliance with the syllabus content. This may detract from, rather than enhance author creativity and alternate interpretations of the content. The number of pages covering Ecology varies from textbook to textbook. TB1 allocates 19 of 210 pages (9%), whereas **TB2** allocates 25 of 229 pages (11%) and **TB3** 14 of 188 pages (7%). **TB2** shows a high percentage of ecology content while **TB3** shows the lowest. In all the textbooks, the coverage given to the theme Ecology is less than that given to the other six themes in the Grade 9 syllabus except for **Map work** in TB1 (8%). Each textbook uses almost identical subheadings which are closely aligned to the ‘sub topics’ specified in the syllabus content. The number of pages allocated to activities in the textbooks range from seven to ten.

Table 7.2: Structure of Ecology in the three textbooks

	Textbook 1	Textbook 2	Textbook 3
Number of pages dealing with Ecology compared to the total number of pages in the textbooks	19/210	25/229	14/188
Topic/s	Deterioration of the Namibian environment	Deterioration of the Namibian environment	Deterioration of the Namibian environment.
Sub-topics	<ol style="list-style-type: none"> 1. Natural and human causes of the deterioration of the environment 2. Causes and effects of deforestation and desertification. 3. Causes and effects of bush encroachment 4. Effects of population explosion 5. Causes and effects of land, water and air pollution 6. Solutions to reduce the effects of deforestation, desertification, overgrazing and pollution. 	<ol style="list-style-type: none"> 1. Deforestation of Namibia 2. Desertification of Namibia 3. Bush encroachment in Namibia 4. Pollution 5. Population explosion as worldwide and Namibian problem 6. Possible solutions to our deteriorating environmental conditions 	<ol style="list-style-type: none"> 1. Natural causes and man-made causes 2. Effects of deforestation 3. Effects of desertification 4. Bush encroachment 5. Population explosion 6. Land, water and air pollution 7. Solution to reduce environmental damage
Number of activities and assessment tasks	10	9	7

Table 7.3 shows how the three textbooks follow a very similar structure and organization for the theme Ecology. It suggests the use of a generic textbook template which regulates and guides authors.

Table 7.3: Summary of the textbooks' structure and organization

Textbook 1	Textbook 2	Textbook 3
Specific outcomes (objectives) are clearly stated at the start of the theme.	Topic objectives are clearly stated at the start of the theme	The relevant syllabus section showing general and specific objectives is at the start of the theme (refer to Figure 7.1 below)
Textboxes are used to summarize key points and concepts including cross-curricular issues. These are inserted at the start of the theme and alongside the text where appropriate.	The textbook presents the interesting facts at the start or the end of sub-topics.	The text provides factual information about topics or sub-topics with key words embolded.
Individual, pair and group activities and tasks are provided at the end of the sub-topics	Individual, pair and group activities and tasks are provided at the end of the sub-topics.	The textbook does not indicate whether learners should do activities individually, in pairs and in groups.
The text provides factual information about a topic or sub-topics with key words bolded.	The text provides factual information about the topics and sub-topics with key words embolded.	The textbook provides a glossary of new words and their meanings at the start and the middle of the text.
A project activity based on fieldwork is included before a self-assessment and a theme test at the end of the theme.	A project activity based on the fieldwork is included before a set of points to remember (summary) and assessment to conclude the theme.	Activities are provided at the end of sub-topics. The text boxes on the theme summary are provided before self-assessment at the end of the theme
Photographs, a map, graph and diagrams (pictures) are included in the theme.	Photographs, textbox, graph, diagrams (pictures) are included in the theme.	Photographs, diagrams and graphs are included in the theme.

Topic	General objectives	Specific objectives
3.1 Deterioration of the Namibian environment	<ul style="list-style-type: none"> investigate the reasons for the deterioration of the environment and suggest possible solutions 	<ul style="list-style-type: none"> distinguish between natural causes and human-made causes describe the causes and effects of deforestation and desertification, with reference to farming methods describe the causes and effects of bush encroachment explain the effect of population explosion as a worldwide problem as well as a Namibian problem describe the causes and effects of land, water and air (atmospheric) pollution suggest solutions to reduce environmental damage with reference to deforestation, desertification, overgrazing and pollution (land, water and air)

Figure 7.1: Syllabus insert the start of Ecology in Textbook 3.

Figure 7.1 illustrates how the general objectives and specific objectives are made explicit in **TB3**. This helps to clarify the learning expectations for ecology in terms of what the learners should know and be able to explain and do when learning about the causes, effects and possible solutions to the deterioration of the Namibian environment. There is evidence which suggests an emphasis on knowing ('distinguish between' and 'describing') with understanding (being able to 'explain') and problem-solving (suggest 'possible solutions'). No reference is made to linking the content to learners' prior knowledge and lived experiences and no mention is made of contextualizing the issue within the local environment. The global and national contexts are mentioned. The danger with this is that it does not help learners to understand the issue as a local as well as national and global one. Furthermore, the learning outcomes do not mention action taking or developing learner capacity and agency to develop and implement action plans in their local community.

7.3 Analysis: Deforestation and Population Explosion

The analysis was guided by the analytical tool (see Chapter 5.3), the design of which was informed by the literature reviewed in Chapters 2, 3 and 4. The analysis is structured according to the six sub-questions shown in the analytical tool. These questions are:

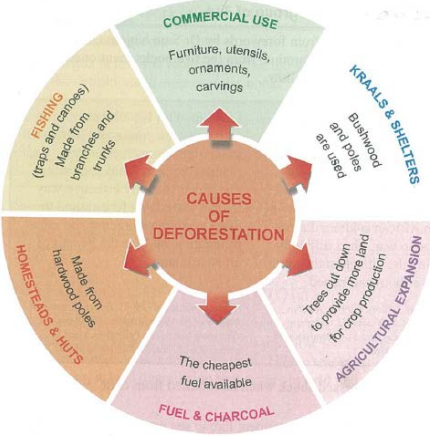
1. How do the textbooks view knowledge?
2. What view of learning underpins the textbooks?
3. What pedagogical approach and strategies are used in the textbooks?

4. What types of questions are asked and what thinking skills are promoted by the textbook activities?
5. How do the textbooks view the roles of the teacher and the learners?
6. What values and action competencies are promoted by the textbooks?

The section dealing with **Deforestation** and **Population Explosion** in each textbook is shown in Table 7.4 and Table 7.5 respectively. These tables are referred to in the discussion of what emerged in the analysis. The table is divided into the following six parts, each of which, for ease of reference, is labelled alphabetically:

- Causes (A)
- Effects (B)
- Solutions (C)
- Activities (D)
- End of theme questions on deforestation and population explosion (E)
- Projects (F)

Table 7.4: Textbooks' coverage of deforestation (see overleaf)

	Textbook 1	Textbook 2	Textbook 3
A. Causes	<p>Causes and effects of deforestation and desertification</p> <p>Deforestation means the removal of trees by humans.</p> <p>Desertification happens when fertile land becomes a desert as a result of a very long drought, deforestation or bad farming methods. Let us look at each of these in more detail.</p> <p>Deforestation</p> <p>Forests only grow where there is enough rain. In Namibia there are forests in the north-east where the rainfall is higher than the average for the country. Tree savannah woodland grows here with tall trees such as teak, tamboti, baobob, syringa, marula and sausage trees.</p> <p>Causes of deforestation</p> <p>During the colonial period, Namibian wood was used for making furniture. After independence this changed. The Namibian government put a stop to unlicensed logging and created a Department of Forestry to control the forest areas of Namibia.</p> <p>In many parts of the world deforestation continues. As the population increases and more land is needed for food production, forest areas are cleared for farming. There is also a demand for wood to make furniture.</p> <p>In Namibia, this is not yet a big problem. In tribal areas, as the population increases, small-scale deforestation takes place for planting fields to supply food to the local people.</p> <p>Page 53-54</p>	<p>Deforestation of Namibia</p> <p>Key words</p> <p>sustainable way: when we use natural resources and energy without harm to the environment</p> <p>soil erosion: when topsoil is gradually lost or destroyed by the force of wind and water, or through over-farming and overgrazing</p> <p>desertification: land degradation in very dry areas</p> <p>outlaw: to make something illegal</p> <p>agroforestry: when trees are cultivated with traditional crops</p> <p>arid: extremely dry</p> <p>fallow: of land that is not used for growing crops so that the quality of the soil can improve</p> <p>herbicides: chemicals that poison plants or weeds, used to control the spread of plants</p> <p>Causes</p> <p>People do not always harvest trees in a sustainable way. For the past few decades, trees have been cut down faster than they can grow back. When this takes place, deforestation occurs. Large-scale, serious deforestation has occurred throughout the world. It is mostly farmers who remove trees to clear large areas of land for agriculture. In the past, when there were fewer people and many forests, this did not matter so much. But now it does as the scale of the clearing is so much bigger, and the speed of the removal of trees is so much faster.</p>  <p>Figure 3.2 Summary of the causes of deforestation</p> <p>Page 76-77</p>	<p>Effects of deforestation</p> <p>Deforestation means cutting down and removing trees. Deforestation also relates to clearing of other forms of vegetation from an area.</p> <p>Causes of deforestation</p> <ul style="list-style-type: none"> • People clear trees to make space for crop farming and to create grazing fields for livestock. • People clear trees to make space for human settlement, transport routes and urban areas. • People clear trees for human activities such as mining and industries. • People cut down trees for human use, for example, construction materials and to provide wood fuel and charcoal for energy needs. • People cut down trees to sell them or export them as timber. <p>Page 49</p>

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">B. Effects</p>	<p>Effects of deforestation</p> <p>Trees drop their leaves and the fallen leaves rot to form natural compost. This keeps the soil fertile. When deforestation takes place, the land loses this natural compost. The soil dries out and becomes infertile. Trees take in carbon dioxide from the air and give out oxygen. Destroying forests means more carbon dioxide in the atmosphere. Carbon dioxide is a greenhouse gas. This means it traps heat. Deforestation contributes to global warming.</p> <p>Page 54</p>	<p>Effects</p> <p>Deforestation contributes to soil erosion and leads to desertification (when the environment becomes more and more like a wasteland). Land cleared of forest loses its fertility within a few years and is prone to capping (when a crust forms on top of the soil) and salting.</p> <p>Page 77</p>	
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">C. Solutions</p>	<p>Deforestation</p> <p>To slow down deforestation we can:</p> <ul style="list-style-type: none"> • Plant more trees. When older trees are cut down we should always replace them with young trees. Do you have a tree planting day at your school? • Use less paper. • Use recycled products. For example, use toilet paper and writing paper made from recycled paper. • Only use wood products from companies that have government approval. We have already noted that the Namibian government put a stop to all unlicensed logging and set up a Department of Forestry to control and protect the forest areas of Namibia. <p>Page 63</p>	<p>Possible solutions</p> <p>There are many things we can do to protect the land from deforestation. Here are some ideas you could try:</p> <ul style="list-style-type: none"> • Protect and care for all indigenous trees, especially the so-called 'wonder tree'. • Limit the use of wood as a building material, use bricks, cement or recycled material instead. Some innovative people are even using plastic bottles and old tyres to build houses! • Outlaw slash-and-burn agriculture, which is when people burn the natural bush and trees, and plough and cultivate the burnt land. • Educate people on how to farm trees (agroforestry). • Varnish or soak your wood (timber) in used oil as this will help prevent damage from the sun, rain, birds and insects. This will help it last longer. • Switch to other sources of energy for cooking, such as solar panels, paraffin or gas. • Recycle paper. 	<p>Solutions to deforestation and desertification</p> <ul style="list-style-type: none"> • Practise reforestation (planting trees in areas where trees have been removed) and afforestation (planting trees in areas where there previously were no trees) • Limit human settlement on natural vegetation. • Teach people about the importance of natural vegetation and the need to conserve natural vegetation. • Use satellites to monitor changes in natural vegetation cover.

Activity 1



Figure 1 These men are doing something involving the vegetation

Working in groups, and reporting back to the class, discuss what is shown in Figure 1.

1. What type of natural vegetation is shown in this photograph?
2. What do you think the men are doing and how are they doing it?
3. Why do you think they are doing it?

Exercise 1

With your partner, describe the causes and effects of deforestation and desertification, with reference to farming methods.

1. What is the difference between deforestation and desertification?
2.
 - a) Suggest two causes of deforestation.
 - b) Name two effects of deforestation.
 - c) In which part of Namibia could deforestation be a problem?
3.
 - a) Name two causes of desertification.
 - b) What is the effect of desertification?
 - c) Where in Namibia is desertification a problem?

Page 55

Activity 3.1 Work with a partner

Distinguish between natural and human-made causes of the deterioration of the environment

Study Figure 3.1 and then answer these questions.

1. Look at the column that lists the problems caused by humans. List the three most serious ones in your opinion and explain why you think these three are the ones we should be most concerned about.
2. How can natural problems such as insects and pests be solved?
3. In your opinion, of the problems caused on land, which is the most serious problem in Namibia? Explain your reasoning.
4. Which one of the proposed solutions could you be involved in and why?

Activity 3.2 Work in a group of 3–4

Read the following extracts from forewords by Dr Sam Nujoma, former President of the Republic of Namibia, from the two books mentioned below and answer the questions that follow.

When I returned to Namibia after spending many years in exile, I was shocked and sad to see the extent of environmental damage in our beautiful country. Because many trees had been destroyed, mainly by the South African soldiers during the liberation war, I had difficulty recognising the village in the north where I was born and raised.

I call upon all Namibians, especially the young and learners, to involve themselves in tree planting because I am convinced that this is the only effective way to deal with the deforestation, to make Namibia a greener and more productive land for the benefit of all Namibians.

(Source: Tarr, P. (Editor). (1997). *Namibia Environment*, Vol. 1. Windhoek: Gamsberg Macmillan Publishers. Used by permission of Namibia Publishing House.)

(Source: Marsh, A. (1994). *Trees: Threatened Lifeline of Northern Namibia*. Windhoek: Gamsberg Macmillan Publishers. Used by permission of Namibia Publishing House.)

1. The president expressed shock when he returned from exile. What was it that he found shocking?
2. Who specifically would the president like to see get involved in solving the problem? Explain.
3. Will his suggested solution help in your opinion? Explain.

Page 78

Activity 3.3 Work in pairs

Define important terms

Read the text below and look up what all the words or phrases in **bold** mean. Write the definitions in your exercise book.

Sub-Saharan Africa suffers from **extensive land degradation**, which makes the land less productive. Deforestation is one of the major factors causing land degradation. One of the solutions is improving **soil fertility**. This can be done by adding **fertilisers** and planting trees that **fix nitrogen in the soil**.

(Source: Adapted from: Nkonya, E., Mirzabaev, A. and von Braun, J. (eds.) (2016). *Economics of Land Degradation and Improvement – A Global Assessment for Sustainable Development*. District of Columbia: Springer International Publishing.)

Page 79

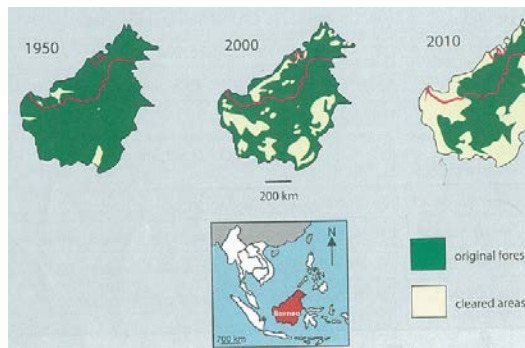
Activity: Self-Assessment:

Describe the difference between deforestation and desertification.

Page 66

Activity: Test

Look at the maps of Borneo in south-east Asia



Environmental deterioration in Borneo

- a) What type of environmental deterioration do these maps show?
- b) Is this problem getting worse or improving? How can you tell from maps?
- c) Give two causes of the problem
- d) What effect does this problem have on habitats in the region?

Page 68

Activity Assessment:

List three causes of deforestation.

Briefly describe four possible solutions to combat deforestation.

Page 97

Activity: Self-Assessment

1. The photograph in Figure 3.15 shows deterioration of the environment. Look at this picture and then answer the questions about it.



Figure 3.15

- a) What form of environmental damage is shown in the photograph? (1)
- b) Explain two possible human causes for what has happened to the environment. (4)
- c) The problem in the photograph could lead to desertification. Define desertification. (2)
- d) Suggest two ways to reduce this problem. (2)

Project

A vegetation transect

Work in groups.

You will need:

- measuring tape
- two sheets of plain A4 paper
- a ruler, a pencil, sticky tape, coloured pens or pencils, a notebook
- plastic bags for plant specimens

Fieldwork

Choose an area of open land or farmland. If it is a farm you must ask

permission from the farmer to go onto his or her land.

- Measure out a line 200 m long. If you have not got a measuring tape you can use a long stride to represent one metre. Put a marker at each end.
- Walk along the transect line 4 strides (4 m) at a time and write down in your notebook each type of vegetation or bare soil or sand or rock that you see along the line.

- Take plant specimens (leaves or grass) and store them in plastic bags. Make sure not to damage the plant when you do this.
- Take note of any landmarks on each side of the transect line.

How to prepare your paper for your transect (see Figure 14)

- Stick the two sheets of A4 paper together along the short side so that you have one double-length sheet.
- Draw a scale line 50 cm long down the centre of the length of the double sheet. This represents your transect line.
- Divide the 50 cm into 1 cm sections. Each 1 cm represents 4 m.

How to record your field notes

1. Use a colour key for different types of vegetation and soil, for example, yellow for bare sand, green for grass, purple for bushes. Fill in the colours along the scale line. Be careful to convert your paced distances to the scale 1 cm: 4 m.

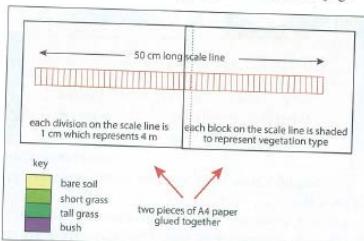


Figure 14 A transect line showing small blocks to be filled in according to the key. This key is not complete. You will need to add vegetation types to it, depending on where you are in Namibia.

Activity 3.8 Work in a group

Project

(20 marks)

Make a transect

A transect is a route along which observations are recorded. It can follow a path or a road or a line. A transect can be used to record information about the features along a route, for example land use, vegetation and buildings.

1. A vegetation transect

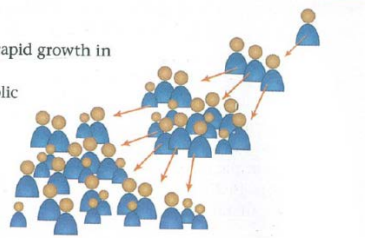
In groups, mark two points on your school ground, A and B, approximately 200 m or more apart from each other. On a piece of paper, draw a line and label the two points A and B. Then walk along the transect line, noting all vegetation, landmarks and features that occur along the line. Collect specimens of types of vegetation. Note changes to soil, places with standing water, slopes, and so on. Discuss the transect in terms of ecological principles in class. (10)

2. A land use transect

In your groups, decide on a site near the school. This may include a village, part of a residential area or a patch of farmed land. Plan your route or transect along a straight line through the area so that it is not less than 1 km in length. Walk the transect. You may walk around buildings and trees, but try to walk in a straight line. Note, as you walk, all the main natural, agricultural and human activity zones along the transect and where they occur. Sketch these on a piece of paper. Pay special attention to the following: soil, crops, housing, livestock, historical features, problems, potential use of land. Discuss the use of features, problems and possible solutions in class. (10)

Total: (20) marks

Table 7.5: Textbook's coverage of population explosion in the theme Ecology (see overleaf)

	Textbook 1	Textbook 2	Textbook 3
A. Causes	<p>Effects of the population explosion in the world and Namibia</p> <p>As you can see, the population of the world and Namibia is growing at a very fast rate. This has been possible because of improvements in food production and distribution, healthcare and education.</p>	<p>Population explosion as a worldwide and Namibian problem</p> <p>What is population growth?</p> <p>In any given population, there will be births and there will be deaths. When the number of births is greater than the number of deaths, then the population will grow (increase in number). The ideal birth rate for humans is 2.1. If the number of births is lower than the number of deaths, then the population is in decline and the population will eventually go extinct.</p> <p>All countries need a certain level of population growth to survive. A country is in serious trouble if the birth rate is very low. In Japan, for example, the fertility rate, which is the number of babies women of fertile age give birth to, is only</p> <p>1.4. So while there were 127 million people in 2014, this is expected to decline to 107 million in 2040 and 97 million in 2050. By 3100, there will no longer be any Japanese people left. The situation is even worse for South Korea. There the fertility rate is 1.25, and it is expected that by 2750 there will be no more South Koreans left. As populations decline, so are homes and farms abandoned, schools left empty and there are too few workers.</p> <p>Although too few births are a problem, so are too many. If many children are being born at any one time, this results in overpopulation. Overpopulation means that the number of people in a given area has increased to such an extent that the resources available in that area can no longer sustain them. As overpopulation is also geographically specific, massive migration to an area can also cause overpopulation. During periods of overpopulation, there are insufficient homes for people, too few hospitals and schools. There are more people looking for work than there are jobs. This is a problem facing Namibia as well as Namibia's neighbour, South Africa. In South Africa in 2015, there were 53 million people, of whom, 15.5 million had jobs, but 2.3 million wanted jobs but could not find any as there were too few jobs.</p>	<p>Population explosion</p> <p>The population explosion refers to the rapid growth in the world's population.</p> <p>Improvements in medical science, public health, nutrition and standards of living mean that people live longer and fewer babies die.</p>  <p>Figure 3.7 A high birth rate causes population growth.</p>

B. Effects

The effects of the population explosion

Population explosion is a term used to describe an increase in the population at a very fast rate. It can also mean an uncontrolled increase in a population. Look at how the world's population is increasing:

- In the year 1810 the population of the world was one billion.
- 120 years later, in 1930, the population of the world was two billion.
- 45 years later, in 1975, the population of the world was four billion.
- 24 years later, in 1999, the population of the world was six billion.
- 12 years later, in 2011, the population of the world was seven billion.
- By 2020 the population of the world is expected to be 7.7 billion.

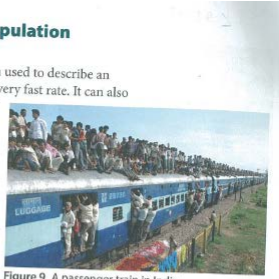


Figure 9 A passenger train in India

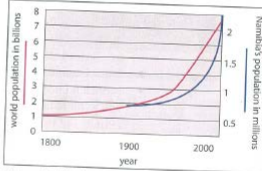


Figure 10 World and Namibian population explosion

Some parts of the world are more densely populated than others. India is one of the most densely populated countries in the world. Look at Figure 9 showing people crowding onto a train. There is just not enough space for everyone.

Population growth in Namibia

Compared to other countries Namibia has a small population. But because Namibia is such a dry country it cannot support a large population. However, population growth in Namibia has also been rapid. Look at these figures:

- In 1960 Namibia's population was 0.6 million.
- In 2014 Namibia's population was 2.4 million.

The problems associated with rapid population growth

A fast growing population puts a heavy strain on the resources such as food, water, shelter, clothing, education and jobs. Pressure is placed on government to find funds to provide the infrastructure (schools, hospitals, roads, municipal services) to support the growing number of people. It is not always easy for government to find this money. One way is to raise taxes, but this makes the government unpopular with the people. Another way is to borrow money. This comes at a cost because interest is charged and this money must be paid back. It is hard for a government to balance its budget in such a situation.

Population issues in Namibia

Namibia in 2015 had a population of 2.3 million people, with 34% of these under the age of 15. So Namibia has a youthful population. The fertility rate in 2015 was 2.25. The population is growing, almost entirely through births as very few people migrate to Namibia. A typical Namibian woman has her first baby at 21 years of age. The **dependency ratio** is high at roughly 63%, which means a typical working person must support many others, especially children.

The Earth has a maximum carrying capacity. The natural resources available to us are limited. As the population increases and as our living standards increase, we use more and more of the Earth's natural resources. As a result of this, our resources are being over-used and used up.

You have studied the factors responsible for the deterioration of the Namibian environment. Over-use of the soil, overgrazing and deforestation are a result of population growth in Namibia. More people need more food and more space.

Look at the graph in Figure 3.9. It shows the growth of the population of Namibia. In 2006, there were nearly 2.05 million people living in the country. The population grew to 2.35 million in 2014.

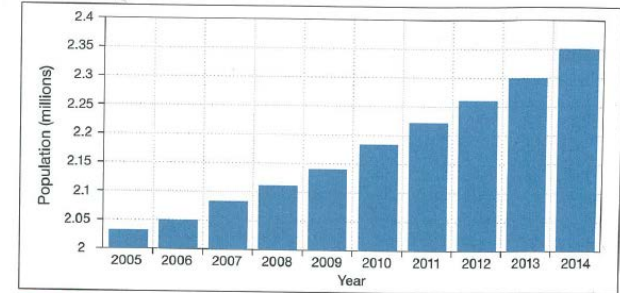


Figure 3.9 Population growth in Namibia

	<ul style="list-style-type: none"> In 54 years our population has increased 200%. Namibia is also experiencing a population explosion! <p>Effects of the population explosion in the world and Namibia</p> <p>As you can see, the population of the world and Namibia is growing at a very fast rate. This has been possible because of improvements in food production and distribution, healthcare and education.</p> <p>Some of the effects of this population explosion are:</p> <ul style="list-style-type: none"> Not enough fresh water for drinking and industry. Not enough food especially in times of drought. Natural resources such as coal and oil are being used up. Overcrowded living conditions. Increased levels of pollution of the air, water and soil. Deforestation. The forests help to regulate the carbon dioxide levels in the atmosphere and the loss of the forests leads to global warming. Loss of arable land because of increased desertification. More land needed by humans results in loss of animal and plant habitats. Some animals and plants are now extinct and many are endangered. Increased levels of diseases spreading across the world because there are more people and many are moving from place to place. Conflict over scarce resources. Unhygienic living conditions for many people based on limited water resources. 		
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">C. Solutions</p>		<p>Managing the birth rate down is an important priority for Namibia. There are many ways to do this:</p> <ul style="list-style-type: none"> One way is to keep children in education for as long as possible. This is not only encouraging children to complete high school, but also encouraging them to study further in colleges. They could learn a trade, become an intern or apprentice, or enrol for a diploma or a degree course at a university. This, in turn, will benefit the children as they are more likely to find employment and more likely to earn a higher wage. Another way is to delay pregnancy until marriage by helping people access family planning services and contraceptives. There are many benefits to delaying having children until marriage. Research has shown that children with married parents are more likely to be educated (including post school education). They are also more likely to be physically healthier, are less likely to be physically or sexually abused, less likely to abuse drugs or alcohol, and far less likely to adopt socially unacceptable behaviours or become a criminal. 	<p>Solutions to overpopulation</p> <ul style="list-style-type: none"> Encourage people to have fewer babies. Educate women. Make contraception easily available.

Activity 4

Working in your group, describe the effects of the world population explosion.

1. Look at the images A, B, C and D in Figure 11 on page 59. In your group discuss what each image

2. Decide which effects of the population explosion each image could relate to.

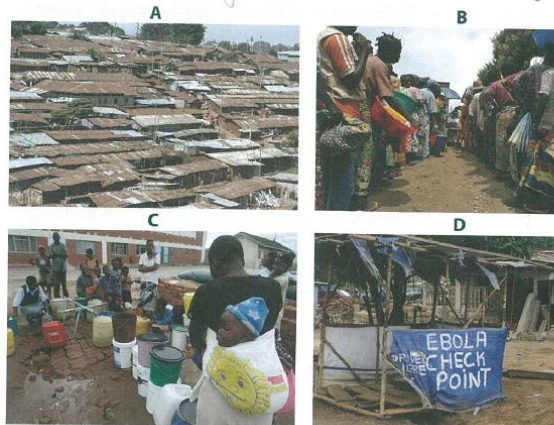


Figure 11 Effects of the population explosion

Activity 3.6 Work in a group of 3-4

Interpret sources

1. Look at Figure 3.10 from Namibia Statistics Agency, showing the projected population growth of Namibia from 2011 to 2041, then answer the questions that follow.
 - a) According to this graph, what is the highest estimation of Namibia's population by the year 2026?
 - b) By how much will Namibia's population have increased between 2011 and 2017?
 - c) In your groups, discuss how the expected growth of the population in Namibia (and the world) will affect your life and the lives of your children one day.

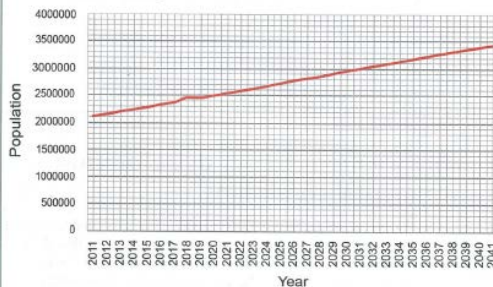


Figure 3.10 Projected population growth of Namibia from 2011 to 2041

2. Read the extract which was published by the *New Agriculturist on-line* on 1 July 2006. Then answer the following questions.

A 'FIRM' approach against desertification

As the driest country in sub-Saharan Africa, the desert country of Namibia receives only low and erratic rainfall. And yet 70% of the population depends on agriculture. The majority of farmers are involved in livestock farming and dryland crop production, although irrigation schemes allow some production of high value crops for export. As in other semi-arid and arid regions, bush encroachment, deforestation, overgrazing, soil erosion, salinisation and deterioration of rangeland contribute to the desertification problems in Namibia. However, a community-based approach, now in its tenth year, has achieved notable success in halting land degradation. The approach, known as the Forum for Integrated Resource Management (FIRM), allows Namibian farmers to participate in gathering the data needed to make informed decisions as well as take the lead in making choices mentioned above.

(Source: Hein, T. (2002). *A Firm Approach Against Desertification*. *New Agriculturist*. Available from: <http://www.new-ag.info/en/focus/focusitem.php?a=1147>. [Accessed 8 March 2016]. Used by permission of WRENmedia.)

- a) What is the objective of the Forum for Integrated Resource Management (FIRM)?
- b) List the factors mentioned in the article that contribute to the desertification problem in Namibia.
- c) In what type of farming is the majority of farmers involved?
- d) What are deforestation, desertification and bush encroachment?
- e) Name any two causes of the problems mentioned above.
- f) Suggest two possible solutions to the problems mentioned.

Activity 4 Understand world population growth

Study the graph in Figure 3.8 and then answer the questions about it.

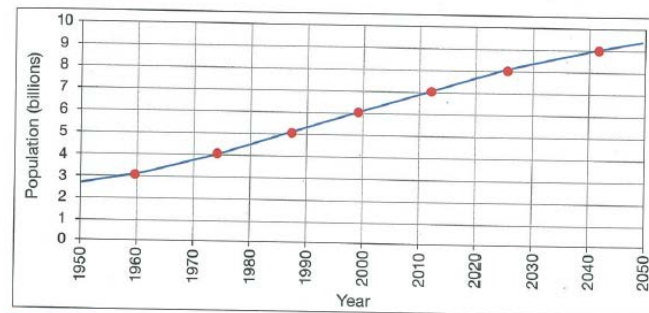


Figure 3.8 Growth in the world's population

1. What was the population of the world in 1950?
2. What was the population of the world in 1960?
3. By how much did the population grow between 1950 and 1960?
4. What was the population of the world in 2000?
5. What was the population of the world in 2010?
6. By how much did the population grow between 2000 and 2010?
7. What is the world population expected to be in 2050?

E. Assessment	Activity: Test Theme 3 Test 1. Match up words 1-8 in Column A with their meanings A-H in Column B	Activity: Assessment h) Briefly describe four possible solutions to combat desertification. i) Rapid population growth can lead to overpopulation. Define overpopulation. j) Briefly describe three possible solutions to control overpopulation.	Activity: Self Assessment 3. Answer the following questions about population explosion. a) Define population explosion. (2) b) Why has population explosion contributed to environmental degradation? (4)																	
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #c6e0b4;"> <th style="text-align: left;">Column A</th> <th style="text-align: left;">Column B</th> </tr> </thead> <tbody> <tr> <td>1. Habitat</td> <td>A: Damage to or destruction of the environment</td> </tr> <tr> <td>2. Overgrazing</td> <td>B: A gas in the atmosphere that traps heat</td> </tr> <tr> <td>3. Environmental deterioration</td> <td>C: Happens when fertile land becomes a desert as a result of continual drought, deforestation or bad farming methods.</td> </tr> <tr> <td>4. Bush encroachment</td> <td>D: Make a new product from an old one</td> </tr> <tr> <td>5. Greenhouse gas</td> <td>E: The area where a plant or animal lives</td> </tr> <tr> <td>6. Desertification</td> <td>F: Allowing too many animals to graze a given area of land</td> </tr> <tr> <td>7. Recycle</td> <td>G: An increase in population at an alarming rate.</td> </tr> <tr> <td>8. Population explosion</td> <td>H: Happens when grazing grasses are replaced with invasive bushes</td> </tr> </tbody> </table>	Column A	Column B	1. Habitat	A: Damage to or destruction of the environment	2. Overgrazing	B: A gas in the atmosphere that traps heat	3. Environmental deterioration	C: Happens when fertile land becomes a desert as a result of continual drought, deforestation or bad farming methods.	4. Bush encroachment	D: Make a new product from an old one	5. Greenhouse gas	E: The area where a plant or animal lives	6. Desertification	F: Allowing too many animals to graze a given area of land	7. Recycle	G: An increase in population at an alarming rate.	8. Population explosion	H: Happens when grazing grasses are replaced with invasive bushes	
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7.3.1. View of knowledge

The analysis of how the textbooks view knowledge was done using the questions (shown in bold in the text below).

- **How do the textbooks deal with deforestation in terms of: causes (driving forces); impact and consequence; adaptation and possible solutions. To what extent do the textbooks promote an understanding of the environment as a system consisting of interconnected and interdependent social and biophysical dimensions?**

TB1 presents factual information on the causes, impacts and solutions of **deforestation** and desertification. Examples are as follows: the causes – “forests are cleared for farming” (Table 7.4, see example A); impacts - the “soil dries out and becomes infertile” (Table 7.4, see example B); solutions – “plant more trees and use less paper” (Table 7.4, see example C). There is no evidence of adaptation of deforestation dealt with in the textbook.

TB1 promotes a holistic view of the environmental system, interconnected and interdependent, with a relationship between the social and physical worlds. It states human activities that are connected to **deforestation** e.g. forests are cleared for farming (Table 7.4, see causes in example A). This also covers the economic dimension of the environment. It reveals that the soil loses its natural compost as a result of deforestation (see effects in example B). **TB1** also refers to the political dimension by acknowledging the Namibian government’s efforts to control and protect the forest areas (Table 7.4, see solutions in example C).

TB2 deals with **deforestation** in terms of its causes, impacts and solutions as follows: one of the causes of deforestation is farmers “remove trees to clear large areas of land for agriculture” (Table 7.4, see example A); impacts and consequences e.g. “deforestation contributes to soil erosion” (Table 7.4, see example B); solutions e.g. “educate people on how to farm trees” (Table 7.4, see example C). There is no evidence of adaptation of deforestation dealt with in the textbook.

TB2 identifies the human activities that cause **deforestation**: commercial use of wood (economic), kraals and shelters, agricultural expansion, fuel and charcoal, homesteads and huts, and fishing (Table 7.4, see causes in example A). One of the solutions to deforestation is “outlaw slash-and-burn agriculture” that indicates a political intervention (Table 7.4, see solutions in example C). There is evidence that suggests the textbook views deforestation in terms of all four Sustainable Development dimensions (environment, society, economic and political). The books do not address the issue of who cuts down trees, why they cut them down and who benefits from this.

Deforestation in **TB3** is also dealt with in terms of its causes, for example, “people clear trees to make space for human settlements, transport routes and urban areas” (Table 7.4, see example A); solutions, e.g. practice reforestation. Even though the textbook has “effects of deforestation as a sub-topic” it does not stipulate any effects of deforestation and instead it defines what deforestation is (Table 7.4, see example A). There is no evidence of adaptation of deforestation dealt with in the textbook.

TB3 promotes a holistic view of the environment as an interrelated and interconnected system consisting of the social and physical world. It states that human activity causes the deterioration of the environment e.g. when humans clear vegetation for agriculture, housing, industry, construction, selling or timber export (Table 7.4, see causes in example A). One of the solutions is calling for a limitation of human settlements on natural vegetation (Table 7.4, see solutions in example C). There is no evidence of the political dimension being considered.

All three textbooks deal with causes and solutions to deforestation. The impact of deforestation is only dealt with in **TB1** and **TB2**. None of the textbooks deal with adaptation.

TB1 tells learners what the term **population explosion** means and it provides graphic information illustrating the upward trend in population growth globally and in Namibia since 1800. Learners are told (rather than asked) what is shown on the graph. Learners are also told that India is one of the most densely populated countries. No graphic data (a population distribution or density map or graph) is provided to substantiate the information provided. Instead, learners are told to look at a photograph of an overcrowded train. **TB1** tells the learners the reasons for rapid population

growth and then it lists the different effects it has on people, natural resources, and the environment (Table 7.5, see example B). The impact of the population explosion on the social, economic and biophysical is not discussed. It is left to the teacher to develop an understanding of how population explosion impacts on the socio-ecological system.

TB2 provides a more detailed explanation of what **population explosion** is and why it is a global and national problem. Links are made to changes in birth and death rates and examples are provided to illustrate the effect this has in different contexts (see Table 7.5, example B). It explains the problems that arise and how these impact on people, government and the economy. Information is provided to help learners understand the effects of and possible solutions to population explosion in Namibia (Table 7.5, see example B). **TB2** takes a more expansive and contextually relevant view of the population explosion by making links to fertility and dependency rates, and Namibia. There is evidence which suggests that the textbook promotes more than merely knowing about population explosion. Relevant and sufficiently detailed information is provided and learners are asked to analyse and interpret information and project how population growth will affect their lives and the lives of their children. This helps to develop learners' understanding of what, how and why population explosion occurs and how it is likely to affect them environmentally, socially and economically (Table 7.5, see example B, C, D).

TB3 provides factual information about what the **population explosion** is, why it has happened, and how it affects people and the environment (Table 7.5, examples A, B, C, D). It requires learners to read a graph showing global population growth but does not ask them to interpret or explain their answers (Table 7.5, see impacts in example B). **TB3** states how the population explosion affects people and natural resources and causes the deterioration of the environment (Table 7.5, example B), which helps to promote an understanding of the different interconnected dimensions of the environment. Learners are told to look at a graph showing Namibia's population growth from 2005 to 2014. It is not clear what purpose the graph serves because no questions are asked and learners are not required to engage with it.

The three textbooks provide factual information about what the **population explosion** is and the effects it has on people, natural resources and the environment. **TB2** takes a more expansive view

of the population explosion, linking it to fertility and dependency rates, the governance and the economy of Namibia. This helps to promote understanding as opposed to knowing.

- **To what extent do the textbooks promote an understanding of the environmental problem at different scales (from local to national to global)?**

TB1 promotes an understanding of **deforestation** at national and global scale e.g. national: the Namibian government created the Department of Forestry to control the forests (Table 7.4, see causes in example A) and global: in many parts of the world deforestation continues. There is no evidence of contextualizing the issue and promoting understanding at local scale.

In **TB2** the understanding of **deforestation** is promoted at local, national and global scales. Examples are as follows: local: protection and care for all indigenous trees (Table 7.4, see solutions in example C); national: outlaw slash and burning agriculture and global: serious deforestation has occurred throughout the world (Table 7.4, see causes in example C).

TB3 presents information on **deforestation** in general without referring to the local, national and global scale. Hence, it does not promote understanding of deforestation at different scales.

TB1 deals with **population explosion** at a global and national scale. Factual information on the rapid growth of Namibian and world population is provided (Table 7.5, see example B). There is no evidence of contextualizing the issue or developing an understanding of the issue at a local level.

TB2 deals with population explosion at a global and Namibian level, providing sufficiently detailed information which may develop learners' understanding of the issue across different scales, and it asks them to think about and discuss the implications of the expected population growth on their lives (and by association their communities and local environment).

TB3 deals with **population explosion** at a national and global scale. This is done in a detached manner without engaging the learners in the issue at hand or linking it to their local context.

- **To what extent do the textbooks promote a view of knowledge as tentative and changing as opposed to absolute infallible truths? Do the textbooks promote a view of knowledge as contested? Do they recognize that people’s thinking is shaped by their values and worldviews and these differ from person to person and from community to community?**

TB1 and **TB3** present factual information about deforestation in ways that do not problematize the issue. There is no evidence which acknowledges the contested nature of knowledge, that is, what people think and believe about the problem is shaped by their values and worldviews and vested interests. There is no recognition of a diversity of views and perspectives. **TB2** also presents factual information, but it goes a step further and provides opportunities for learners to make meaning, support their answers with reasons and discuss them with their peers. This helps learners to become aware of different views that may or may not be similar and the reasons that support the different views (Table 7.4, example D). The questions asked in the activities may assist a knowledgeable teacher to introduce the idea of knowledge being contested and linked to worldviews. Generally, the politics of deforestation and issues of power and who makes decisions about deforestation are not raised in the textbooks.

TB1 provides factual information on the issue in a way that does not provide opportunities for questioning or challenging the way things are and how they came to be like this. The questions asked focus mainly on recalling facts about **population growth and explosion** over time. The focus is on learners knowing the facts, with some opportunity provided for thinking about the effects of population growth how it will impact on them. There is no evidence of providing opportunities for learners to critique the status quo, identify alternative ways of being, doing and changing behaviour on the population explosion.

TB2 takes a more tentative view of knowledge. It frames the issue of population explosion as a worldwide and Namibian problem and helps the learners to consider how the steep upward growth trend for **population growth** in Namibia will affect their lives and those of their children (Table 7.5, see questions in example D). **TB2** encourages the learners to consider the facts on hand and

make inferences and projections for the future. It is action-focused and suggests how the issue may be addressed by keeping children in education and delaying pregnancy until marriage (Table 7.5, see solutions in example C). While not explicitly asking learners to question the status quo, it nevertheless provides opportunities for thinking about alternate ways of doing and being.

TB3 is underpinned by a view of knowledge similar to that of **TB1**, namely, it provides factual information about the issue which learners are expected to know. This is evident from the type of questions asked which require recall of facts presented rather than any application of knowledge. No opportunities are provided for engaging with the information provided, for challenging it or applying it to the learners' world. Learners are not asked to think about how the situation will change with time, what this means for the future and how it will impact on them.

- **To what extent do the textbooks promote knowing as well as understanding and being able to apply knowledge in different contexts?**

TB1 promotes 'knowing' about **deforestation** as it presents factual information. It requires learners to name and give factual information on deforestation as indicated in the activity in example D. There is no evidence of learners being required to explain and apply knowledge.

Factual information to promote knowing is presented in **TB2**. Learners are required to express their views, for example, "... will his suggested solution help in your opinion?" (Table 7.4, see question 3 in example D). Some of the questions asked in the activities require explanation and application (Table 7.4, see Example D [Question 2, 3 and 4 in Activity 3.1]).

TB3 promotes factual information on **deforestation** to promote knowing (see example A, B & C). There is no evidence of promoting explaining and applying of knowledge in different contexts. **TB2** has no questions on deforestation.

All three textbooks promote factual knowledge ('knowing about') of deforestation, but only **TB2** requires explanation and application.

TB1 promotes knowing (what the term ‘**population explosion**’ means) and how it has grown (“look at the graph”) and it gives some of the reasons for why this has happened (“This has been possible because of improvements in food production and distribution, healthcare and education” — see impacts in example A in Table 7.5). Learners are then told what the consequences are (refer to the effects listed in Table 7.5, example B) and asked to work in groups matching the effects listed to images provided (decontextualized images because they are not labelled). While this may appear to be applying knowledge, the level at which this is being done is low (matching an image to a stated effect).

TB2 includes explanations on **population explosion** e.g. a fast-growing population puts a heavy strain on the resources (Table 7.5, see problems/impacts in example B). It brings the issue in Namibia into sharp focus and makes suggestions on what can be done to address the high birth rate. Factual information is explained – this helps to promote knowing with understanding. Furthermore, opportunities are provided for the learners to discuss information presented graphically and apply their understanding to their lives and their children’s lives (Table 7.5, see example D, Question 1(c)).

TB3 provides basic facts about the issue with little explanation. Learners are asked to read a graph but are not given opportunities for explaining or applying knowledge.

With the exception of **TB2** which promotes knowing, being able to explain and apply knowledge, the textbooks emphasize knowing about the issue with little, if any, explanation and application of knowledge required.

- **To what extent do the textbooks provide opportunities for learners to critique and challenge the way things are? Do the textbooks help learners to identify alternate ways of being and doing? Do the textbooks adopt a change-oriented approach? Do they provide opportunities for considering how to change behaviour?**

TB1 asks learners what they think about *why* the men shown in the picture are **deforesting** (Table 7.4, see example D). This helps the learners to think about the reasons for deforestation. However,

it does not problematize deforestation nor does it encourage learners to explore alternative ways of reducing deforestation. Instead, it presents solutions and asks them to recall these. There is some evidence which suggests the textbook is change-oriented, namely, it tells learners to change their behaviour to reduce deforestation by using less paper and it advocates practising the three Rs, that is Reduce, Reuse and Recycle (Table 7.4, see solutions in example C). However, it does not directly involve learners in thinking about how they can change.

TB2 promotes behavioural change among the learners by telling them what needs to be done e.g. it contends that people must be educated about how to farm trees (agroforestry) and to switch to other sources of energy for cooking such as solar panels, paraffin or gas (Table 7.4, see solutions in example C). Some questions require the learners to think about the Namibian context, e.g. “Which problems are the most serious and why? Which of the solutions could you be involved in?” (Table 7.4, see example D). Learners are not required to consider problems in their local contexts, however they are encouraged to think critically or creatively about how they could be involved in solutions and by implication, alternate ways of being and doing. Learners are not explicitly encouraged to challenge or critique the status quo.

As with **TB2**, a change-oriented approach is evident in **TB3** as for example, it calls for **reforestation** (Table 7.4, see solutions in example C). However, like **TB2**, links are not made to the local environment of the learner and no opportunities are provided for critiquing the status quo and identifying appropriate solutions to the issue in the local environment.

There is no evidence of a change-oriented approach to **population explosion** in **TB1** and **TB3** where no alternate behaviours are suggested. **TB 2** suggests how behaviour should change (“keep children in education for as long as possible” and “delay pregnancy until marriage” (Table 7.5, see example C). This is done in a decontextualized way without eliciting learners ideas on what behaviours should change in the context of their lived experience (the local environment). As such, few, if any, opportunities are given for developing critical or creative thinking and challenging the status quo.

- **How do the textbooks deal with diversity in terms rural/urban, culture, language, geographical origin, race, socio-economic class, gender, age etc.?**

Diversity is not dealt with in the section on **deforestation** in the three textbooks.

TB1 foregrounds **population explosion** in a developing world context. This is evident from the images of India, an informal settlement, African people and an African disease (Ebola). This promotes a narrow view of diversity (see Table 7.5, example A).

TB2 foregrounds **Namibia** in general where **population explosion** may not be a priority issue to address as it is elsewhere in Africa and other parts of the world. Diversity of opinion is recognized, for example when learners are asked to give their ideas and reasons to support them. **TB3** does not deal with diversity.

7.3.2 Summary of findings: View of knowledge

What emerged from the analysis on the view of knowledge is as follows:

- Generally all the textbooks deal with (albeit in varying depth and detail), the causes and consequences of, and possible solutions to deforestation and population explosion.
- Generally the textbooks present factual information ('knowing about') of deforestation without giving learners' opportunities to think about, explain or apply their knowledge. One textbook asks questions which requires explanation with reasons and some application of knowledge. Factual information about deforestation is presented in a decontextualized way with few opportunities for learners to make links to or apply their understanding to their own local context.
- All three textbooks promote a view of knowledge as factual information about the problem of deforestation and population explosion in ways that do not problematize the issues. There is little evidence (only in **TB2**) that suggests a recognition of the contested nature of issues, that is, what people think and believe about the problem is shaped by their values and worldviews and vested interests. **TB2** requires the learners to express their views and ideas, which promotes an awareness of the diversity of views and perspectives people have.

The politics of deforestation and issues of power and who makes decisions about deforestation are not raised in the textbooks.

- There is evidence which suggest the three textbooks are change-oriented in that they tell learners what behaviours must change. Generally this is done in a theoretical way, with few, if any, links made to what this means in the learners' local contexts and without eliciting their ideas on what should change and how it should change in their local environments. The learners are not given opportunities to challenge or critique the status quo.
- Generally, all the textbooks promote a holistic view of the environment as an interconnected human and physical system. The political dimension of the environment is neglected and/or not considered. As a result, the issue of power and who makes decisions are not addressed. This militates against critical thinking and questioning the status quo.
- The textbooks deal with the population explosion at a national and global scale with no attention given to the local. Rapid population growth is not contextualized or linked to the learners' worlds.
- Only one textbook deals with deforestation at different levels, namely the local, national and global. Generally, the local context is not foregrounded. This militates against the learners, understanding the relevance of the issue (deforestation) to their local context.

7.3.3 Pedagogical approach and strategies

The analysis of what pedagogical approach and strategies are used in the textbooks was guided by the following questions:

- **How do the textbooks view learning? As transfer and absorption or construction and meaning making? What is the role of the teachers and the learners? Are the learners actively engaged in the construction of knowledge and meaning making? Do the textbooks elicit, build on and challenge learners' prior knowledge? Is learning viewed as individual and social?**

There is evidence which suggest that **TB1** views learning about **deforestation** as a process of information transfer and absorption. No opportunities are provided for eliciting, building on and

challenging learners' prior knowledge. Information is stated as fact without any explanation or substantiation, for example, "During the colonial period, Namibian wood was used for furniture making. After independence this changed" (Table 7.4, example A). This is misleading and factually inaccurate (refer to Chapter 8, Section 8.2.3). There is no evidence of the teacher facilitating or scaffolding learning through demonstrations or activities requiring the construction and co-construction of knowledge (for example by engaging in research or enquiry-based learning). The learners are viewed as passive recipients of information about **deforestation** in the textbook. No opportunities are provided for learners to construct or co-construct knowledge individually, in pairs or in a group. A pair activity requires learners to recall ("describe") factual information. (Table 7.4, example D).

TB2 presents more detailed factual information about **deforestation** and makes some links to the concept of sustainability. However, it does not elicit or build on the learners' prior knowledge. A group activity based on a case study enables social learning and co-construction of knowledge (Table 7.4, see activities in example D). Another activity requires learners to work in pairs to interpret terms. There is evidence which suggests that **TB2** adopts a broader view of the teacher as both a transmitter of knowledge and a facilitator who guides learners in making meaning in a group e.g. the group activity in which they share their views on whether the solution given by Dr Nujoma will help (Table 7.4, see example D).

TB3 contains less than half a page of factual information on **deforestation** with no activities to engage the learners in the construction of knowledge. The textbook presents information for the learners to learn without involving them in any activity. Learners are viewed as passive recipients of information transmitted by the teacher, with little, if any, support provided by the teacher for scaffolding or mediating knowledge.

TB1 does not elicit or build on the learners' prior knowledge nor does it actively involve them in the construction of knowledge. Instead, it presents factual information about the problem of **population explosion** in general and from a Namibian perspective. The textbook tells learners what is in a picture or asks them to match information provided to given images. This suggests a view of learning as transmission and absorption. **TB1** views the teacher as a transmitter of

knowledge and the learners' role is primarily one of absorbing and remembering the information in the textbook which the teacher transmits. There is evidence of learners being active in the learning process, however the nature of the activity is such that it requires learners to match words and their meanings (See Table 7.5, example E) as opposed to constructing knowledge or meaningful interpretation of information.

There is evidence which suggest that **TB2** views the teacher's role as both a transmitter of knowledge and a facilitator and mediator of knowledge construction and meaning making. Learners are given a chance to interpret and make sense of the projected upward **population growth** trend and share their inferences and projections with their peers. Furthermore, **TB2** is text rich; it provides detailed information that is topical (for example the information about birth rates in Namibia) and which offers opportunities for engaging the learners in discussion and debate. There is also a group activity which elicits learners' ideas and requires them to share their projections on how population growth will affect them (see Table 7.5, example D: Activity 3.6).

TB3 does not elicit or build on learners' prior knowledge of **population explosion** nor does it involve the learners in the construction of knowledge. Individual learning takes place through an activity (see Table 7.5, example D) the focus of which is reading and recalling information shown in a graph. The view of learning is that of transmission and absorption of information, with no opportunities provided for teachers to facilitate meaningful activities that engage the learners in meaning making.

- **Do the textbooks model LC pedagogy? Do the textbooks model and encourage the use of participatory active learning strategies, including for example enquiry-based learning, project work, simulation, field work and investigation, group discussions?**

Learner-centred pedagogy underpins the Namibian education policy at all levels and in all disciplines. Given that the three textbooks are all approved by the NIED, it is to be expected that the textbooks adopt and model an active learning approach that engages learners actively in different activities, all of which are focused on knowledge construction and meaning making. This is borne out by Table 7.2 which shows the number of activities included in the Theme Ecology in

each book (ten in **TB1**; nine in **TB2** and seven in **TB3**). These activities include pair and group activities that require learners to read and interpret sources including text (a newspaper article, extracts from reference books) and graphic representation (images, diagrams, graphs), do practical exercises and a project. The type of activity included for deforestation and population explosion is analysed below.

TB1 has a pair activity on **deforestation**. The questions require learners to read and recall information in the text provided, which can be done without the help of a partner (Table 7.4, see example D) so while it looks as though the learners are actively engaged in a social learning activity, they are in fact recalling rather than constructing knowledge. **TB1** has another activity at the beginning of the theme Ecology which shows men with sickles chopping sapling trees. It asks the learners to identify the type of vegetation shown in the photograph, what the men are doing and why they are doing it. This activity is intended to orientate the learners to the issue on hand and stimulate discussion about the deterioration of the environment. The quality of the image is not good and it may encourage guessing rather than reasoned answers.

TB2 requires the learners working in pairs to identify and give reasons for the causes of environmental deterioration that they think are the most serious, suggesting solutions and deciding which is the most serious issue in Namibia and why (Table 7.4, see example D, Activity 3.1). Learners are also asked to work in groups, making sense of and evaluating text from two reference books (Table 7.4, see example D). Question 3 of the activity requires learners to evaluate information (the president's suggested solutions) and substantiate their answers (Table 7.4, see example D). It helps the teacher to facilitate knowledge construction and meaning making on the issue of **deforestation** in Namibia.

TB3 has no activities which engage the learners in knowledge construction or meaning making on deforestation. This reinforces the role of the teacher as a transmitter of information.

With the exception of a project which requires learners to undertake fieldwork, albeit not focused on deforestation or population explosion, **TB1**, **TB2** and **TB3** do not promote the use of different active learning strategies described in the literature. There is no evidence of enquiry-based

learning, debate, simulations, field work and investigations on the topic. The findings suggest that learner-centred pedagogy needs to be strengthened through the inclusion of activities that elicit, build on and challenge learners' prior knowledge and actively engage them in knowledge construction and co-construction and meaning making, individually and in pairs and groups.

- **Do the textbooks promote critical and creative thinking? Do the textbooks encourage learners to question the status quo, identify and explore alternative ways of living?**

Do the textbook ask high-order thinking questions? Do they require learners to analyse, evaluate, explain and apply knowledge to different contexts, speculate, make inferences? An analysis of the types of questions asked about deforestation and population explosion in each of the textbooks revealed the following:

TB1: most (80%) questions are closed-ended and require factual recall-type answers, for example, “What is population explosion?” (Table 7.5, see example D); “what is the difference between deforestation and desertification?” “Suggest [name] two causes of deforestation” (Table 7.4, see example D). There are very few questions that require higher-order thinking skills for example, “Why do you think they [the men in the picture] are doing it [chopping down sapling trees]?” (Table 7.4, see example D).

Most questions (91 %) in **TB2** are closed-ended questions requiring learners to give factual information of what they have learned from the text e.g. “briefly describe three possible solutions to control overpopulation” (Table 7.5, see example E). These types of questions require lower-order thinking as learners recall what they learned. **TB2** gives attention to higher-order thinking as it requires learners to think critically e.g. “In your opinion, of the problems caused on land, which is the most serious problem in Namibia? Explain the reasoning”, “Which one proposed solution could you be involved in and why” (see Table 7.5, example D.). “Will his suggested solution help in your opinion? Explain” (Table 7.5, see example D). These types of questions require learners to evaluate and think critically as is stipulated in ESD literature. This is an indication of transformative education and allows learners to refer the problem into their local context. There is no evidence of questions that require applying, analysing, and creating. This is

an indication that the textbook promotes more lower-order thinking skills compared to higher-order thinking.

In **TB3** most questions on the population explosion are closed-ended questions. Learners are mostly required to recall what is presented in the textbook and find information from the graph (Table 7.5, see example E). The questions predominantly promote lower-order thinking. There is no evidence of learners applying, analysing, evaluating and creating which require higher-order thinking on population explosion. However, there is evidence of promoting understanding e.g. why the population explosion has contributed to environmental degradation (Table 7.5, see example E).

With the exception of **TB2**, textbooks mostly promote lower-order thinking. Textbook authors need to ask questions that challenge learners and allow them to think.

There is no evidence which suggests that **TB1** and **TB3** promote critical thinking. **TB 2** provides interesting facts for the learners to think about. It also contains a case study and information from different sources which the learners are asked to read and make sense of and sometimes evaluate. However, the focus is on developing awareness and some understanding of the issue rather than on encouraging learners to challenge the status quo. The information provided, if used appropriately by a teacher, could help learners to think critically about the issue on hand. It requires a knowledgeable and confident teacher to do this.

- **Do the textbooks promote learner agency through decision making and action taking in the local community?**

TB1 suggests solutions to **deforestation** and makes decisions for the learners e.g. by insisting that more trees are planted when older trees are cut down (Table 7.4, see example C). This promotes awareness of the need for environmental responsibility but it does not develop the learners' decision-making abilities or action taking.

TB2 also makes decisions for the learners by suggesting solutions to **deforestation** instead of asking learners to come up with solutions, make decisions and take action (Table 7.4, see example C). However, in the section that deals with pollution, learners are given opportunities to do field work, investigating and identifying solutions to the issue of pollution and litter in their local environment and then linking this to the problem at a global scale.

TB3 suggests solutions to problems instead of giving opportunities to learners to do so. There is no evidence of learner involvement in decision making or action taking, nor is there any evidence of learners' engaging with issues in their local community.

The findings suggest that learner participation in finding solutions and making decision needs to be developed and strengthened so that they are actively involved in knowledge construction rather than being told what should be done.

There is no evidence of promoting decision making and action taking on **population explosion** in **TB1**. Factual information is presented without suggesting solutions or letting learners come up with solutions and actions. There is no information that refers learners to their local community.

In **TB2** there is no evidence of promoting decision making and action taking in the local community. The textbook dictates what learners should do through solutions, without allowing learners to suggest solutions and make decisions in their local community.

In **TB3** learners are not encouraged to make meaning of their worlds. The textbook makes meaning for the learners. They are not encouraged to consider alternative ways of being, as the textbook provides solutions to the learners. There is no evidence of promoting decision making and action taking in the local community.

None of the textbooks promote decision making and action taking in the local community although learners should be prepared to make decision to solve issues and matters that affect them.

7.3.4 Assessment of learning

- **How is learning assessed? What types of assessments are included? What types of questions are asked and what thinking skills do they require? What type of knowledge (factual [knowing] conceptual understanding [knowing, explaining, applying]) is assessed?**

TB1, TB2 and TB3 have assessment activities at the end of the theme Ecology with questions on deforestation and population explosion (Table 7.4 and Table 7.5, see example E).

TB2 has activities (Table 7.4, see example D) and an assessment task (Table 7.4, see example E), a practical exercise on bush encroachment, a field work group project and an assessment (test) at the end of the theme Ecology (Table 7.4, see example F).

TB3 only has an activity in the general introduction to the theme Ecology which focuses on deforestation and a self-assessment at the end of the theme Ecology.

Only **TB1** and **TB2** have questions on **deforestation**, the majority of which are closed-ended questions that require low-order thinking skills and focus on factual knowledge (Krathwohl, 2002). These questions ask learners to give factual information presented in the textbook or find answers from the map (Table 7.4, see example D and E). **TB1** asks only one question that requires higher-order thinking skills, namely “Why do you think they are doing it?” (Table 7.4, see example D).

TB2’s questions require learners to recall information about **deforestation** (Table 7.4, see example D). Only one question asks learners to evaluate information, namely “Will his suggested solution help in your opinions? Explain your answer.” (Table 7.4, see example D).

There is little, if any evidence, of higher-order thinking being assessed. This reinforces the importance of knowing about an issue rather than analysing, explaining, applying, evaluating, speculating, making inferences, suggesting alternatives, problem-solving and decision making.

7.3.5 Values and attitudes

- **To what extent are the values advocated by the international ESD and geography education literature promoted by the textbooks?**

TB1 promotes awareness of the issue of **deforestation** and responsible use and management of resources e.g. “Only use wood products from companies that have government approval” to avoid further deforestation (Table 7.5, see example C). **TB1** promotes responsible citizenship by making learners aware that people are involved in causing environmental problems such as deforestation. It also encourages them to consider alternative ways of being and take responsibility for their actions e.g. by informing them to “Plant more trees. When older trees are cut down we should always replace them with young trees” (Table 7.4, see example C).

Similarly, **TB2** also promotes awareness of the issue of **deforestation** and the responsible use and management of resources and caring for resources e.g. it calls for protection and caring for all indigenous trees and to limit the use of wood as a building material, use bricks, cement or recycle materials (Table 7.4, see example C). **TB2** encourages learners to think about actions to help address the problem e.g. planting more trees; and it encourages responsible citizenship by suggesting solutions e.g. “Outlaw slash burning and limit use of woods.” No opportunities are provided for learners to come up with their own solutions.

TB3 creates awareness of the issue of **deforestation** but does not deal with values.

TB1 promotes awareness of the world and concern about the **population explosion** by providing factual information. It encourages respect for other peoples’ opinions, respect for human rights and dignity, democratic values and cooperative and conciliatory attitudes, through group work activities (Table 7.5, see example D). There is no evidence of appreciation for indigenous knowledge, caring, adaptation, responsible use and management of resources, agency and resilience, intention to solve problems and valuing diversity, social justice, tolerance, empathy and a different kind of life and way of living.

In **TB2, the population explosion** section promotes awareness of the world and concern about the population explosion, by providing factual information. It encourages respect for other peoples' opinions, respect for human rights and dignity, democratic values and a cooperative and conciliatory attitude through group work activities (Table 7.5, see example D). There is no evidence of appreciation for indigenous knowledge, caring, adaptation, responsible use and management of resources, agency and resilience, intention to solve problems and valuing diversity, social justice, tolerance, empathy and a different kind of life and way of living.

TB3 promotes awareness of the **population explosion** through factual information. There is no evidence of respect for other peoples' opinions, respect for human rights and dignity, democratic values and a cooperative and conciliatory attitude, appreciation of indigenous knowledge, caring, adaptation, responsible use and management of resources, agency and resilience, intention to solve problems and valuing diversity, social justice, tolerance, empathy and a different kind of life and way of living.

7.4 Synthesis of the findings: Deforestation

All the textbooks provide factual information on the causes and solutions to deforestation. This is done in ways that help to develop an awareness and understanding of how deforestation is an environmental issue that has both human (social and economic) and biophysical dimensions. None of the textbooks focus on the political dimension, namely who has power and makes decisions, how they are made and who benefits from them. Generally learning about deforestation is decontextualized. It does not elicit or build on the learners' prior knowledge and experiences and does not link the issue to the local environment.

TB1 and **TB2** include learner activities done individually, in pairs or groups, the focus of which is mainly on recall rather than explaining and applying knowledge to solve problems, make decisions or take action. There is little, if any, evidence of critical or creative thinking being promoted. Although the learners are active in the learning process, which suggests an active learning constructivist LC pedagogy, there is little evidence of learners constructing knowledge other than in **TB2**. There are few, if any, opportunities for the learners to challenge or critique the status quo.

Generally, the findings suggest that learner-centred pedagogy needs to be strengthened through the inclusion of different activities that elicit, build on and challenge learners' prior knowledge and actively engage them in knowledge construction and co-construction and meaning making, individually and in pairs and groups.

7.5 Synthesis of the findings: Population explosion

There is a need for greater contextualization of learning about the **population explosion**. This will make learning more relevant and interesting and help learners to understand the issue in the context of their local environment as well as nationally and globally.

All textbooks present factual information on the **population explosion**, which promotes the view of knowledge as absolute infallible truth and also promotes the understanding of the population explosion at national and global scales, with none of them considering it at the local scale. All three textbooks promote awareness and understanding of population explosion.

Based on the findings, contested knowledge should be strengthened rather than viewing knowledge as an absolute infallible truth. Learners should contextualize population explosion in their local contexts.

7.6 Conclusion

This chapter has presented the findings of the analysis of how three approved Grade 9 geography textbooks deal with two environmental challenges in the theme Ecology in terms of how the content is presented (view of knowledge) and the approach and strategies used to teach and learn the content. There can be no doubt that environmental challenges are dealt with in ways that are compliant with the content prescribed in the syllabus. There is evidence that suggests that this is mainly done in ways that promote awareness and knowing about the problem. Active learning is evident from the different activities, however these rarely elicit and build on learners' prior knowledge, develop an understanding of the contested nature of an issue or engage learners meaningfully in finding solutions and taking appropriate action. The next chapter discusses what emerged in the analysis in relation to the literature reviewed in Chapters 2, 3 and 4.

CHAPTER 8

DISCUSSION OF THE FINDINGS

8.1. Introduction

This study addresses the question of how selected Namibian Grade 9 textbooks are reorienting school geography to ESD. This chapter discusses what emerged in the analysis of how the textbooks deal with two issues, deforestation and population explosion, associated with the deterioration of the Namibian environment in the theme Ecology, in relation to contemporary ESD and geography education thinking.

8.2. Transformative change-oriented education

A common theme running through contemporary ESD and geography education literature reviewed in Chapters 2 and 3, is that education – at all levels - needs to reorient to ESD. ESD learning processes involve the acquisition of new knowledge and they foreground the notion of critical thinking, systems thinking, action competence and learner agency, and a commitment to transformative co-engaged, active learning pedagogies (Leicht, Heiss, & Byun, 2018). Education should be transformative and change-oriented.

The International Geographical Union's Commission on Geographical Education [IGU/CGE] calls for school geography to reorient to ESD in terms of what is taught and how it is taught (IGU/CGE, 2007: 2016). Education should be future-oriented and change-focused, helping young people to develop dispositions such as critical and creative thinking, as well as action competencies that will enable them to actively participate in transforming societies and anticipate in unforeseen futures (IGU/CGE, 2016).

8.2.1 Textbook alignment with ESD goals

Geography teachers have a poor understanding of environmental content knowledge and they lack capacity for integrating environment and sustainability issues into their teaching (Raselimo & Wilmot, 2013; Dude, 2017; Wilmot, 2017). Teachers need quality learning support materials to do this (UNESCO, 2012). ESD teaching and learning materials include textbooks as well as maps, cartoons and pictures of activities in community, newspaper articles, brochures, and other

publications on local sustainability issues. Quality textbooks serve as the backbone of good classroom practice (UNESCO, 2013). This is particularly important in a country like Namibia where textbooks are often the only LSMs used in schools.

The findings of this study suggest a close alignment between the content in the textbook and the syllabus. However, the transformative goals (education for democracy and for the environment) of Namibian policy (for example, the Harambas Plan, TEA and the NCBE) are not explained in sufficient detail in the syllabus. This, together with the fact that almost all the textbook writers are experienced teachers (some of whom refer to themselves as professional writers who do not have postgraduate degrees), it is possible that they may not be aware of contemporary trends and developments in ESD and geography education. There is evidence that authors' theoretical understanding needs strengthening so that textbooks model the transformative, change-oriented pedagogy advocated by the literature.

8.2.2 The environment as an interconnected socio-ecological system

The 2007 Declaration on Geography Education for Sustainable Development emphasizes the need for school geography to promote knowledge and understanding of the human-earth ecosystem and systems thinking, namely an ability to think ecologically and holistically in order to understand how nature, society and individuals are interconnected (Haubrich, Reinfried & Schleicher, 2007). Education that deals with a holistic view of environment is essential in a globalized world with unsolved social, political, economic and environmental challenges (UNESCO, 2014 as cited in UNESCO, 2015). Stimpson (2006) contends that curriculum developers and textbook writers should interpret and implement ESD according to social, economic, political and environmental contexts. A similar view is evident in the Namibian school geography curriculum which states that learners should understand the political, social, economic and biophysical dimensions of the world so that they can operate effectively and responsibly in their society and understand the risks and challenges in their world that need to be addressed (MoE, 2009).

While there is evidence that the textbooks promote a holistic view of the environment as consisting of different dimensions, it is not well developed because the connections and relationships are not explained. It is left up to the teacher to make the links and explain the relationships and

connections. This is problematic because the findings of research done in South Africa show that many teachers focus on content and do not understand how to make connections and integrate environmental issues into their teaching in ways that promote conceptual understanding (Lotz-Sisitka, 2011; Dube, 2012). Textbooks play a critical role in providing scaffolding that can help teachers to promote the holistic understanding and systems thinking called for in the literature. Generally, this was lacking in the sections dealing with deforestation and population explosion in the three Grade 9 textbooks. Textbooks authors need to be aware of the importance of developing holistic systems thinking in geography. This should be developed through theoretically informed discipline specific textbook professional development workshops and training.

Namibian basic education has as its goal enabling a democratic society in which learners apply knowledge and skills in different contexts and to contemporary events (Namibia, MoE, 2009). With the exception of one textbook (on the topic of the population explosion), the textbooks do not promote the application of knowledge. The emphasis is on awareness and knowing and to a lesser extent on understanding the environmental issues of deforestation and the population explosion.

8.2.3 The contested nature of environmental issues

According to UNESCO, ESD fosters “competencies that enable students to find suitable solutions to demanding issues and prevent conflicts” (2017, p. 16). Two of the learning outcomes of ESD are learning to critique and bring about changes (Wals & Lenglet, 2016 as cited by UNESCO, 2016). Learners should be assisted to examine and challenge a status quo and deepen their critical understanding (UNESCO, 2017). The NCBE requires learners to plan solutions and solve problems (Namibia, MoE, 2009). The finding indicates that none of the textbooks give an opportunity for the learners to think of alternatives on both deforestation and population explosion. Again, none of them give an opportunity to critique the status quo on the population explosion, but one does this on the topic of deforestation. The three textbooks promote behavioural changes on deforestation, however only one shows evidence of a change orientation to population explosion.

There is little evidence that suggests the three Grade 9 textbooks are helping learners to understand that deforestation and population explosion are controversial issues and that how people view them is influenced by their worldview and vested interests. Knowledge about them is often contested and changing. Issues of power, how decisions are made and who makes them are not dealt with in the textbooks. This compromises the fact that the young people should acquire geographic knowledge of complex and contested socio-ecological issues and challenges (IGU/CGE, 2016).

This needs to be addressed in Namibian textbooks so that they reflect contemporary trends and thinking in geography education. According to the 2007 Lucerne Declaration on Geography, ESD is culturally defined and a contentious issue because it is subject to different interpretations according to the needs of different nations, groups and societies (Haubrich, Reinfried & Schleicher, 2007). Learners need to develop critical thinking skills so that they can challenge injustices and inequalities, identify and evaluate solutions and alternatives and take action.

The textbooks provide factual information about deforestation and population explosion. In one instance, inaccurate information is given and an opportunity to contextualise and engage learners in thinking critically and creatively about a topical Namibian issue is lost. **TB1** states that “During the colonial period, Namibian wood was used for furniture making. After independence this changed” (Table 7.4, example A). It implies a link between deforestation and colonialism and suggests that the issue has been resolved since independence. This is an unsubstantiated claim that is arguably misleading and factually incorrect. It does not deal with the situation in Namibia today where deforestation is associated with the woodcarving industry. Wilmot (2017) notes that the woodcarvers at Okahandja are an important part of the small and medium enterprise [SME] in the Namibian economy today. According to Ogbokor and Ngeendepi (n.d.), SMEs provide employment and a source of income to approximately one third of the Namibian workforce. It is significant that SMEs are not dealt with in the section on Economic Geography (theme 5 of the Grade 9 syllabus). At the same time, the woodcarving industry also encourages deforestation and unsustainable natural resource utilization (Wilmot, 2017). Given this tension, deforestation provides a rich opportunity for learners to acquire knowledge, skills and values necessary for engaging critically with complex environment and development issues (Lee & Williams, 2006; Haubrich, Reinfried & Schleicher, 2007).

The textbooks provide few, if any, opportunities for learners to think critically about deforestation and population explosion. This is evident from the predominance of questions which require low-order thinking skills. Learners are not encouraged to challenge the status quo. It is left to the teacher to ask questions that require critical thinking. There is insufficient modelling in the textbooks of the type of critical and creative thinking emphasized in the ESD and geography education literature described in Chapters 2 and 3. This should be addressed so that the textbooks can better help reorient Namibian school geography to ESD.

8.2.4 Promoting an understanding of environmental issues locally, nationally and globally

The literature emphasizes the need for working across different scales – from the local to the global — in order to develop a deep understanding of the challenges humans face (IGU/CGE, 2013). School geography can help learners to understand local issues as well as their connections to global phenomena (UNESCO, 2017, p. 105). Namibian education aims to foster learners’ awareness of Namibian needs at the local, regional and national level (Namibia, MED, 1993). This means that teaching and learning should be contextually relevant to the lived experiences of learners. In almost all cases, the textbooks present information that helps learners to be aware of deforestation and population explosion in general terms with little, and in some cases, no attention paid to the issue in the context of the learners’ local environments. There is a danger that learners will not understand how global issues, including deforestation and population explosion, affect the quality of life in their own environments and what should be done to address the issue.

UNESCO (2013b) emphasizes education that encourages learners to respect differences and diversity. Based on findings, all three textbooks show no evidence of dealing with diversity on deforestation and only one shows little evidence of diversity on population explosion.

8.3 The view of learning

From a constructivist learning perspective, learners are seen as constructing knowledge through many social settings that make up their lived experience (Van Harmelen, Wilmot & Hendricks, 2001). Roberts asserts that “knowledge cannot be transmitted to us already made” (2003, p. 27). Knowledge exists when facts are examined and meanings assigned to them (ibid.).

The current Namibian Grade 8 and 9 syllabus calls for high participation of learners in knowledge production (Namibia, MoEAC, 2015a). All three textbooks view knowledge on deforestation and population explosion as one of transfer and absorption. This is in spite of the many activities that are included in the textbooks where the emphasis is on working individually, in pairs or groups. In all but a few cases (in Textbook 2), the questions do not require learners to construct knowledge, but rather recall the facts presented in textbooks. The revised Bloom's taxonomy (Krathwohl, 2002) outlines the four main levels in **knowledge dimensions**: Factual knowledge, conceptual knowledge, procedural knowledge and metacognitive knowledge (Krathwohl, 2002 as cited in Green & Naidoo, 2008). Most questions on deforestation and population explosion require factual knowledge. **TB2** provides opportunities for conceptual knowledge development.

Bunt (2018) and Roberts (2013) adapted a revised version of Bloom's taxonomy by Anderson and Krathwohl (2002) for asking questions to foster **cognitive process**. Cognitive development ranges from lower-order thinking to higher-order thinking (Bunt, 2018). The teaching and learning process must always aim to develop high-order thinking (Namibia, MoE, 2009). With the exception of **TB2** (deforestation), the emphasis is on questioning requiring factual recall, with little, if any questions requiring explanation and application of knowledge. This is contrary to the type of thinking advocated by ESD and geography education literature.

According to IGU/CGE (2016), school geography should develop dispositions such as **critical and creative thinking** and action competencies. Generally, the focus in all three textbooks is on developing awareness and some understanding of the issue rather than on encouraging learners to challenge the status quo. That said, one textbook (**TB2**) provides sufficient information that could be used by a resourceful and knowledgeable teacher to stimulate discussion and developing critical thinking. The findings suggest that learner participation in critical thinking, finding solutions and decision making needs to be developed and strengthened so that they are actively involved in knowledge construction rather than being asked to recall knowledge or being told what should be done to resolve an issue. This promotes learning about and memorization of factual information at the expense of constructing knowledge or critiquing it.

8.4 Learner-centred pedagogy

Towards Education for All and the Namibian Curriculum for Basic Education policies are underpinned by **LCE, underpinned by constructivist epistemology**. This orientation calls for interactive teaching and learning with high learner participation, contribution and production (Namibia, MEC, 1993). It also requires an action orientation (UNESCO, 2018). Teaching and learning should recognize, affirm, challenge and extend learners' prior knowledge and experiences (Namibia, MoE, 2009). Nyambe and Wilmot (2012) describe the challenges of implementing LCE in Namibia where many teachers have not experienced this approach themselves. They argue for modelling theory-in-practice to support teachers in changing from a traditional, teacher-centred pedagogy to a participatory learner-centred pedagogy. Textbooks play an important role in providing practical and concrete examples of what LCE pedagogy looks like in practice. Namibia's LCE mirrors the pedagogical perspectives advocated by contemporary international ESD and geography education literature.

The ESD literature describes **pedagogical principles** and **active learning strategies**, including inter alia, critical thinking, dealing with systems, reflective values, facing the future with creativity, and stewardship and collaboration, dialogue and group discussions, simulations and role play, debates, case studies, issues-based enquiry, fieldwork and experiential learning, demonstrations, experiments and learning by doing, awareness campaigns, presentations, independent research and project work (UNESCO, 2017; 2018; Tilbury, 2011; Rosenberg, 2009; Rosenberg, O'Donoghue & Olvitt, 2015). The literature on school geography calls for the adoption of enquiry-based learning (question-led) (Roberts, 2013; Wilmot & James, 2003; Wilmot, 2017) and the LCE action-oriented approach for ESD in school geography (Lidstone & Williams, 2006; IGU/CGE, 2016).

The sections on deforestation and population explosion do not model Learner-Centred Pedagogy (LCP) theory-in-practice adequately. Two textbooks involve learners in group activities: one builds on learners' experiences before factual information is presented while the other one requires learners to give their opinions. The questions on deforestation do not require learners to make decisions, take action and solve problems. The findings suggest that the learner-centred orientation of the Grade 9 textbooks needs to be strengthened through the inclusion of activities that model

constructivist learning processes — namely eliciting, challenging, building on and enhancing learners' prior knowledge and engaging them in knowledge construction and meaning making individually, in pairs and groups. The findings suggest that the Grade 9 textbooks still have a way to go before any claims to reorienting school geography to ESD can be made.

The analysis of the assessment tasks reveals that different activities, texts and self-assessment, and a project are used for assessing learning of deforestation and population explosion. These mirror the assessment strategies described in the geography curriculum. My concern is not with the different types or number of assessment activities but rather with the substance of what is being assessed. Too much emphasis is placed on knowing about deforestation and population explosion with little attention given to explaining and applying knowledge to other contexts or to solving problems and conceptualizing new ways of being and doing. The findings suggest that **assessment of learning** also needs further development and strengthening in order for it to align with current thinking about ESD and geographical learning.

8.5 The role of the teacher and learners

Van Harmelen et al. (2001) contend that teachers act as facilitators when they create opportunities for the learners to articulate their prior knowledge; teachers engage learners in order to both increase the collective understanding and correct misconceptions; the teacher is a scaffolder through demonstration, modelling, transmission, or any other strategy; and ensures that learners have internalized the new knowledge and that it becomes part of their lived experience. The teacher supports students to enable them to move beyond their existing knowledge and understanding. (Roberts, 2013). Learners construct knowledge through many social settings (Van Harmelen et al, 2001). They construct knowledge through LCE which demands a higher degree of participation (Namibia, MEC, 1993).

The two textbooks view the teacher as a transmitter of knowledge on both deforestation and population explosion. Learners are regarded as passive recipients of information. One textbook is unique in this case, as it views teachers as mediators and scaffolders whereby learners construct knowledge and give their opinions.

8.6 Values and action competencies

ESD promotes different values like: appreciation of cultural heritages, awareness of the world and concern for knowing about it, respect for each other and human rights, respect for others' opinions, responsibility, adaptation, intention to solve problems, equity, freedom, justice and solidarity, human dignity, valuing diversity, responsible use and management of resources, a cooperative and conciliatory attitude, agency and resilience, and tolerance and empathy (UNESCO, 2012, 2013a, 2017; Tilbury, 2011).

All three textbooks promote an awareness of both deforestation and population explosion. They provide factual information on both topics. Two textbooks promote respect for other people's opinions, respect for human rights and dignity, democratic values, cooperative and conciliatory attitudes. These same textbooks consider responsible use and management of resources. More attention should be given to the development of learner agency and resilience, tolerance, social justice and empathy. This will help to ensure that Namibian learners are aware of and adopt these values so that they may exercise their democratic right to participate as knowledgeable, caring and responsible citizens.

8.7 Conclusion

This chapter has discussed what emerged in the analysis of the data in relation to the ESD literature. The findings reveal a close alignment with the curriculum content, with the textbooks providing factual knowledge about issues and challenges. The emphasis is mostly on knowing about rather than explaining or being able to apply knowledge to different contexts or situations. In terms of pedagogy, the three textbooks adopt a learner-centred approach evident from the different activities included in each textbook. Closer analysis of the activities showed that there is still a way to go with aligning the approach to the transformative change-focused, futures orientation advocated by contemporary ESD and geography education literature. This dimension of the textbooks should be strengthened so that Namibian school geography is more closely aligned to contemporary theoretical perspectives. A holistic, systems view of the environment consisting of interconnected physical and human elements is not foregrounded sufficiently in the textbooks. Furthermore, the controversial nature of deforestation and population explosion needs to be foregrounded and engaged with. The textbooks should play a stronger role in enabling teachers

and learners to engage critically with the content and challenge the status quo. This should be modelled by the activities and questions asked in the textbooks.

CHAPTER 9

CONCLUSION

9.1. Introduction

In this final chapter, I provide a synthesis of the study and reflect on the research process. I also respond to the question: “What lessons can be learned from the study in terms of how textbooks are reorienting Namibian school geography to ESD?” I conclude with a reflection on the research process.

9.2. Synthesis

This study set out to investigate how Namibian Grade 9 geography textbooks are reorienting school geography to ESD. This was done by a fine-grained analysis of how three approved Namibian Grade 9 textbooks deal with two causes of environmental deterioration – deforestation and population explosion – in the theme Ecology. I also gathered data on authors’ perceptions of their educational goals, important ESD content, the teaching strategies they use and the challenges they face. This was done through an online questionnaire.

The literature reviewed in Chapters 2, 3 and 4 helped me to locate my study within the context of education in a period of global socio-ecological crisis (2.2) and the contemporary issues and challenges education needs to address. It also helped me to understand how ESD is conceptualized globally (2.3) as well as from a regional (Southern African) (2.5) and Namibian perspective (2.6). The literature shed light on the role and goals of ESD (2.4) and it helped me gain a deeper understanding of the aims of Namibian Basic Education (2.6.2) and the learner-centred pedagogy it advocates.

The literature further helped me understand how school geography, a bridging subject between the social and natural sciences, enables learners to acquire a holistic understanding of interconnectedness and interdependence between these two systems and how it contributes to ESD (3.2). The literature deepened my understanding of the transformative education pedagogy that informs contemporary ESD pedagogy in general and more specifically school geography’s goals

and practices (3.2.2). The literature also provided insight on geography textbooks in general (4.2 and 4.3) as well as on the Namibian textbooks (4.4).

In Chapter 5, I described and justified my choice of a qualitative case study method with an interpretive orientation and how I generated data through document analysis and an online questionnaire. I explained how I drew on literature to develop a theoretically informed analytical tool for the textbook analysis.

In Chapter 6, I analysed and discussed what emerged from the analysis of data on authors' perceptions and experiences in relation to the literature on ESD and school geography.

In Chapter 7, I presented the findings of the textbook analysis. Chapter 8 discusses what emerged in relation to the literature.

I am aware that the textbook analysis was narrow in that it only focused on two environmental problems in the theme Ecology. Nevertheless, the fine-grained analysis of these two topics provides insights that may be of value to textbook authors, curriculum developers and policy makers.

9.3. Lessons learned

In spite of the narrow focus on only two topics associated with the deterioration of the Namibian environment in the theme Ecology, there are some lessons that can be learned from the study that may be useful to textbook authors, publishers, curriculum designers and teachers. The study provides evidence of how the three Grade 9 textbooks are helping to reorientate school geography to the ESD content prescribed by the Namibian geography syllabus. However, this is done in a way that emphasizes knowing about, as opposed to explaining or critically engaging with the environmental challenges and issues on hand. With the exception of one textbook, the textbooks generally do not help to reorientate pedagogy to the transformative, change-oriented, futures-focused pedagogy advocated by the literature. Furthermore, there is little evidence in the authors' responses to the questions asked that suggests the authors' thinking is informed by contemporary perspectives on ESD or geography education. The practice of using authors to write textbooks for

different school subjects is a concern because it suggests that authors may not be subject specialists whose practice is theoretically informed.

The following lessons can be learned from the study:

Lesson #1: Theoretically informed subject expert authors

Textbooks have an important role to play in helping to reorient school geography to ESD. ESD learning processes involve the acquisition of new knowledge and they foreground the notion of critical thinking, systems thinking, action competence and learner agency, and a commitment to transformative co-engaged, active learning pedagogies (Leicht, Heiss, & Byun, 2018). Textbook authors should be knowledgeable and up-to-date with developments in their subject and their practice should be theoretically informed. This will enable them to model ESD pedagogy in geography textbooks and strengthen the reorienting of Namibian school geography to ESD at the level of the classroom.

Lesson #2: Review of the Namibian textbook evaluation process

The findings of the study suggests that the evaluation and approval of textbooks by the NIED may need to be reviewed, for the purpose of adding criteria that assess the extent to which textbooks embed ESD content in ways that support transformative environmental learning and critical engagement with controversial issues and challenges.

Lesson #3: Greater support for translating the curriculum goals into practice

The findings of this study suggest a close alignment between the content in the textbook and the syllabus. This is to be expected. However, the transformative goals (education for democracy and for the environment) of Namibian policy (for example, the HPP, TEA and NCBE) are not explained in sufficient detail in the syllabus. There is a need for more explicit and detailed guidelines on how to translate the curriculum goals and methodological approaches into textbooks in ways that model and support transformative ESD pedagogy described in the literature.

Lesson #4: The development of holistic systems thinking

Holistic, systems thinking needs to be strengthened by making more explicit connections and relationships. It should not be left to teachers to do, because studies done in other contexts show that teachers focus on content and often do not understand how to make connections and integrate environmental issues into their teaching in ways that promote conceptual understanding (Lotz-Sisitka, 2011; Dube, 2012)

Lesson #5: The contested nature of environmental issues

ESD learning has as its goals learning to critique and bring about change (Wals & Lenglet, 2016 as cited by UNESCO, 2016). Learners should be assisted to examine and challenge a status quo and deepen their critical understanding (UNESCO, 2017). This needs to be strengthened in Namibian geography textbooks so that they are better aligned with these goals. The textbooks should engage with issues of power including how decisions are made and who makes them, so that they provide more support for the development of critical citizens in a democratic society. The textbooks should play a stronger role in enabling teachers and learners to engage critically with the content and challenge the status quo. This should be modelled by the activities and questions asked in the textbooks. This is necessary for learners to develop critical thinking skills so that they can challenge injustices and inequalities, identify and evaluate solutions and alternatives and take action.

The lessons that may be learned from this study suggest a need for theoretically informed professional development workshops for NIED and Ministry curriculum developers and officials, publishers and authors, the focus of which should be exploring the implications of contemporary thinking in ESD and geography education for reorienting Namibian school geography.

9.4 Reflection on the research process

Undertaking systematic, carefully designed research requires time, extensive reading and critical engagement with relevant international literature, a great deal of commitment, determination and perseverance. On a personal level I underestimated what this involved and how challenging it would be. On a professional level, the research has expanded and broadened my knowledge and understanding of contemporary trends and developments in geography education and ESD, and

the valuable role textbooks should play in supporting ESD learning and modelling transformative active learning pedagogy advocated by contemporary literature. My work as an education development officer and a textbook author with limited experience is more theoretically informed as a result of the insights gained from this research, and my capability as a more effective change agent has been developed.

9.5 Conclusion

Textbooks are the most widely used and often the only resource used in Namibian school geography. As such, they play a critical role in supporting and enabling teachers to implement environmental learning prescribed by the curriculum and advocated by the international geography education and ESD community (IGU/CGE, 2007, 2016; UNESCO, 2016). My study has generated insights for understanding how textbooks are reorienting school geography at one level (Grade 9) and in one theme (the deterioration of the Namibian environment). The findings show that there is still a way to go insofar as modelling and enabling transformative, change-oriented education described in the international literature. The three Grade 9 textbooks are closely aligned to the curriculum content with a heavy emphasis placed on providing factual information about environment and sustainability challenges. However, there is little evidence of the textbooks modelling and supporting teachers in reorienting school geography to the transformative, critically engaged, change-oriented pedagogy advocated by the international literature and espoused by Namibian policies. The insights provided by the study may help to sharpen curriculum developers and authors' perspectives on how textbooks are reorienting school geography to ESD. They may also stimulate discussion on strengthening how textbooks may enable transformative environment and sustainability learning and the development of geographically literate learners who can engage actively and responsibly with global environmental issues in a Namibian context.

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APPENDICES

APPENDIX A

Questionnaire: Reorienting Namibian school geography towards Education for Sustainable Development (ESD)

I am undertaking a research project to investigate the perceptions, experiences and strategies of Namibian textbook authors in their work of integrating education for sustainable development (ESD) into school geography. I invite you to complete the following questionnaire regarding your knowledge, challenges and experience of integrating ESD into Namibian school geography, textbooks.

This questionnaire consists of a number of open-ended questions, a rating-scale item and some background personal information, will take approximately 30 minutes to complete. It focuses on your perceptions of Education for Sustainable Development and textbooks design strategies.

Your responses to the questionnaire will be kept confidential and anonymous. The information in this research project will only be used by me for research purposes only. Should you have any queries or comments about this survey, please do not hesitate to contact me by email:

Mr Naftal Uusiku (Master of Education student, Rhodes University, Grahamstown):
naftaluusiku@gmail.com

OR

Professor Di Wilmot (Supervisor): d.wilmot@ru.ac.za

Part1: Background Information

Please tick the appropriate box

1. Gender

Male	<input type="checkbox"/>	Female	<input type="checkbox"/>
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2. What is your highest academic qualification?

Certificate/diploma		
Bachelors degree		
Honours degree		
Masters degree		
Doctorate		
Other, please specify		

3. How would you describe your work experience? (Please tick all relevant blocks and indicate the work that you are currently doing)

Teaching in a primary school	
Teaching in a secondary school	
Teaching in a university or institute of higher education	
Academic geographer	
Professional writer	

Other, please specify

4. How many years have you been writing textbooks?

Namibian Geography Textbooks	
Textbooks for other countries (for example South Africa)	

5. For which Grades have you written Namibian geography textbooks? Please tick the relevant grade/s.

Primary school	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12	Other (please specify)

6. Do you write textbooks for other Namibia school subjects?

Yes		NO	
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If yes, which subject/s and grades.....

Part 2: Educational goals

Please describe your educational goals which you hope to achieve by writing textbooks.

Part 3: Content

1. How important is the teaching of the following environmental issues and challenges in school geography? Please tick in appropriate box.

Environmental issues and challenges	Not important	Important	Very important	Critically important
Population growth				
Population migration, displacement and refugees				

Urbanization				
HIV/AIDS				
Natural resource exploitation				
Conservation				
Exploitation of fish				
Water resources and water scarcity				
Water management				
Drought				
Loss of biodiversity				
Desertification				
Deforestation				
Land degradation				
Land use				
Climate change				
Pollution				
Overgrazing				
Soil erosion				
Food security				
Access to basic services				
Service delivery				
Inequality				
Poverty				
Disaster preparedness and management				
Severe weather (for example floods, tornadoes, tropical cyclones)				
Environmental conflict				
Gender inequalities				
Unsustainable lifestyles				
Sustainable development				
Waste management				

2. Which FIVE topics do you think are the most critically important?

3. Where do you find information on the topics listed above when writing textbooks?

Part 4: Pedagogical considerations

1. To what extent do you take into account the following pedagogical principles and approaches when writing textbooks? Please tick in appropriate box.

	Not taken into account	Sometimes taken into account	Taken into account	Always taken into account
Providing factual information about environmental and development topics				
Developing geographical reasoning through knowing, explaining and applying knowledge				

Helping learners to find information themselves through fieldwork or from other sources including the internet				
Taking into consideration learners' preconceptions and worldviews. Making links between learners' experiences and the topic being taught				
Fostering critical thinking about a topic/issue/problem (through analysis, evaluation, synthesis, making inference, weighing up evidence, substantiating claims etc).				
Asking questions, identifying issues and questioning the status quo				
Looking at things from different perspectives and points of view				
Solving issues/problems/conflicts				
Contextualising the topic through local case studies or fieldwork in the local community				
Relating local experience to global phenomena				
Imagining future options, examining side effects and consequences of planned actions				
Taking action at an individual and community level				

Developing systems thinking by considering the various spaces as a system in which humans and nature interact				
Identify stakeholders and decision-makers and consider power issues				
Acquiring up-to-date knowledge by gathering information and making enquiries in the field				
Analysing, interpreting and evaluating (even contradictory) information				
Representing data graphically				
Reading and interpreting maps and other graphic representations				
Understanding of why things are located where they are (the spatial dimension)				
Understanding the interrelation between humans and the natural environment (see the environment as a system composed of intertwined dimensions the social, political, economic, biophysical)				
Understanding issues at different spatial scales (local to global and vice versa)				
Understanding spatial patterns and geographical processes				
Taking into consideration the interrelations among human societies/groups/individuals by pointing out different actors and the impact of their worldview and decisions on space. Understanding the underlying				

power relationships and different values/worldviews of actors				
Fostering collaboration and communication				
Fostering stewardship – a sense of wonder and awe and empathy and a sense of belonging that may enhance a sense of responsibility and willingness to act				
Promoting social justice and equity				
Challenging stereotypical views of gender, religion, wealth, culture, race etc.				
Encouraging creativity and thinking ‘outside the box’				
Fostering learner autonomy that is learning not only to solve problems but being an independent citizen in a fast-evolving world				
Encouraging creative thinking about alternative futures. Encouraging learners to think of alternate visions of existing situations and ways of doing and being				
Helping learners to understand their own values and those of others. Acknowledging diversity				
Promoting participation by providing opportunities for learners to take a stand, identify opportunities to act, develop and implement action plans				

The Namibian geography curriculum states that all learners need to understand environmental risks, know their impact on society, understand the solutions and let them be responsible for action. Education must address the main risks and challenges to ensure a change-oriented community (Namibia. Ministry of Education, 2010).

2. What, if any, challenges and difficulties have you experienced when writing Namibian geography textbooks about environmental risks and challenges?

Thank you very much for completing this questionnaire.

APPENDIX B

CONSENT FORM

I..... (NAME), textbook author, do hereby agree to participate in Naftal Amutenya Uusiku’s research by filling in the questionnaire, and I consent to him using the data gathered for educational research purposes.

I understand that my name and textbook title will not be identified or named in this research and I have right to withdraw at any time.

I also understand that Naftal will provide me with feedback on the findings of his research and I have no objection for him sharing the findings with Namibian curriculum developers and geography educators.

SIGNED DATE.....

PLACE..... WITNESS.....