Repositioning Geography in Education for Sustainability: the South African Higher Education context

by

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submitted in accordance with the requirements
for the degree of

DOCTOR OF PHILOSOPHY

in the subject

GEOGRAPHY

at the

UNIVERSITY OF SOUTH AFRICA

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FEBRUARY 2017

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Abstract

The 21st century environmental crisis that humankind faces has resulted in a need to re-orientate ourselves towards environmental sustainability. Singular paradigmatic ways of knowing no longer deal with multiple interconnected realities and associated uncertainty, diversity and risk faced by humankind. Geography focusses on interactions between the 'human' and 'natural' world, and should play a leading role in Education for Sustainability (EfS). The multidimensional worldview of geographers together with their integrative skills, awareness of scale, place and space and holistic viewpoint positions the discispline in the forefront of sustainability related challenges. The extent of the contribution depends on the view of Geography and how it is transferred to graduates, during their undergraduate studies.

In reality non-geographers view the discipline as suitable for EfS, with the Geography fraternity less enthusiastic. This thesis suggests that South African Geography (as is the case internationally) has limited success in making its instrumental value known through EfS. Using the integral perspective of epistemological pluralism, it is suggested that an obstacle is the fragmentation of undergraduate Geography between sub-fields and theoretical and practical/ analytical courses, with limited intra-discipline discourse. The identity of Geography appears to be locked into dualisms of society versus nature and theory versus technique. These dualisms create an obstacle for the reconfiguration in terms of mutual conceptualisation of society-nature interaction in a strong theoretical setting and with techniques in a supporting role.

The multi-paradigmatic methodology used in this thesis includes an assessment of undergraduate curricula of 17 Departments of Geography at South African universities, a questionnaire on Geography and EfS sent to departments, focus groups at selected departments and interviews with a selection of South African geographers. Findings indicate that although sustainability features on the

undergraduate level in all departments, it is not a cross-cutting theme. It is concluded that closer integration between the sub-fields and identities of Geography, regarding the diversity of Geography as an asset and the acceptance of multiple paradigms, is the only way through which Geography in South Africa will be able to strengthen its position in EfS, while ensuring a vibrant future for the discipline.

Dedication

This thesis is dedicated to the discipline of Geography, with its history of contested identities, although is difficult to see the need for such contestation, but rather the need for a theory encompassing linkages and interaction between and integration and coupling of human and natural systems on various spatial and temporal scales. Whether Geography takes up this challenge or not, is irrelevant to the trend of continuous transformation in how science is conducted (Skole 2004). This thesis aims to provide a case for Geography in Education for Sustainability and to strengthen the position of the discipline in this regard.

“Geographical imaginations are vital to make sense of challenges to sustainability which are produced and distributed across scale.” (Grindsted 2015a:320)

Acknowledgements

I would like to acknowledge and extend my gratitude to the following people for their respective contributions, which made completion of this thesis possible:

Prof. U.J Fairhurst, the supervisor, for her guidance right through, attention to detail and patience to deal with the slow progress of this research from beginning to end.

Prof. M.D. Nicolau, co-supervisor during the later stages of the research, but who provided direction at that stage as well as input and encouragement.

Ms. M. Nöthling, co-supervisor during the initial stages of the research, for continued interest and support.

The *36 geographers from 10 Departments of Geography in South Africa* that participated in this research, either through completing a questionnaire and/or taking part in a focus group or an individual interview.

Ms. A. Lombard, who took on my lecturing and some tasks in the Department of Geography at the University of South Africa during my research and development leave in order to make progress with this research.

Mr. J. Pretorius, who assisted with the design of the Excel templates to analyse the data generated through the assessment of the undergraduate curricula of Departments of Geography in South Africa, as well as ICT support.

Ms. I. Pretorius, who assisted with data capturing and to transcribe the voice recordings of the interview and focus group conversations, as well as *Ms. T. Moolman* who assisted at short notice to finish the transcribing of the last few recordings.

Last but not least I would like to acknowledge the role of my late parents, who without hesitation and unconditionally always encouraged and supported me along my journey of life-long learning.

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List of Abbreviations for General Terms

Abbreviation	General Term
AASHE	Association for the Advancement of Sustainability in Higher Education
AQ	All Quadrants
AQAL	Short for ‘all quadrants’, ‘all levels’, ‘all lines’, ‘all states’ and ‘all types’
EcoE	Ecological Education
EE	Environmental Education
EfS	Education for Sustainability
ESD	Education for Sustainable Development
EMP	Environmental Management Programme
FCCC	Framework Convention on Climate Change
GIS	Geographical Information Systems
HE	Higher Education
ICT	Information and Communication Technology
IGU	International Geographical Union
IMP	Integral Methodological Pluralism
ICSU	International Council of Scientific Unions
IPCC	Intergovernmental Panel on Climate Change
ISCC	International Social Science Council
LL	Lower Left (Quadrant)
LR	Lower Right (Quadrant)
MIT	Multi-inter-transdisciplinary/disciplinarity
NQF	National Qualification Framework
ODL	Open and Distance Learning
RS	Remote Sensing
STARS	Sustainability Tracking, Assessment and Rating System
UNDESD	United Nations Decade of Education for Sustainable Development
UNESCO	United Nations Organization for Education, Science and Culture
UK	United Kingdom
UL	Upper Left (Quadrant)
UR	Upper Right (Quadrant)
USA	United States of America
WCED	World Commission on Environment and Development

List of abbreviations for Higher Education Institutions in South Africa

Abbreviation	**Higher Education Institution in South Africa**
UP	University of Pretoria
UV (Bmf)	University of the Free State – Bloemfontein Campus
UV (QQ)	University of the Free State – Qua Qua Campus
UJ	University of Johannesburg
UZ	University of Zululand
UL	University of Limpopo
Wits	University of the Witwatersrand
Univen	University of Venda
Unisa	University of South Africa
NWU (Potch)	North-West University – Potchefstroom Campus
NWU (Mfk)	North-West University – Mafikeng Campus
UKZN	University of KwaZulu-Natal
WSU	Walter Sisulu University
UFH	University of Fort Hare
Rhodes	Rhodes University
UWC	University of the Western Cape
US	Stellenbosch University
UCT	University of Cape Town

List of Abbreviations for Divisions and Approaches in Geography used in this thesis

Abbreviation	Division and Approach in Geography
H	Human Geography
P	Physical Geography
I	Integrated/Thematic Geography
E	Environmental Science/Management
S	Spatial/quantitative/qualitative
G	Cartography/GIS/RS
O	Other
M	Meteorology
T	Tourism
SF	Sustainability-focussed
SR	Sustainability-related
NS	Not sustainability-focussed or -related

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Chapter 1: Setting the scene

"Although the door is now open for social scientists to shape a new science on global change, it is up to human geographers to go through that door - otherwise it is unlikely that critical or reflexive social science will be pulled into a new science on global change." (O'Brien 2010:547)

1.1 Introduction

This research links with the challenges, limitations and inadequacies observed in the way humankind is dealing with the current environmental and sustainability issues experienced in the world. Although human activities are undoubtedly affecting the environment in different ways, both positive and negative, it is becoming clear that much more than a simplistic look at the impacts of human activities on the environment is at stake (O'Brien 2010:542). Despite its potential to contribute to addressing the 21st century environmental dilemma faced by humankind, there are indications that teaching and learning at higher education level is falling short in this regard (Lozano et al 2013:10-11). Even more worrying is that this appears to be holding true for a discipline as Geography, perceived to have environmental issues as one of its focus areas (Liu 2011:249). The shortfall thus highlighted clearly needs attention, with Education for Sustainability (EfS) implied to have an important role to fulfil. This includes the connection and integration between EfS and disciplines with which it clearly has an affinity, such as Geography. It is exactly this relationship that is addressed by this research, therefore positioning it within the discourse concerning EfS and its linkages with Geography.

Dealt with first in this chapter is the positioning of the research within the contemporary scholarly debate on how sustainability needs to be addressed in traditional disciplines, which leads to and is followed by a discussion on the rationale for the research. From this the research problem is deduced and pinpointed, with supporting contextual background completing the picture. The overall aim and associated objectives of the research are stated, as is the vision of the nature and value of the intended contribution. This is namely to re-focus the attention of geographers (specifically in South Africa) on how environmental issues are dealt with in their discipline and how this can benefit from re-envisioning within the context of the demands of EfS in the 21st century. The chapter concludes with a brief review of the approach adopted for the research and the chapter outline that the thesis will follow.

1.2 Positioning of this research

Skole (2004:739) envisions Geography as the "Preeminent Interdisciplinary Environmental Discipline", with the potential to be at the forefront of knowledge creation in the environmental sciences. The extent to which Geography rises to the occasion depends largely on the way in which it deals with the challenges posed in terms of being a truly integrative discipline (O'Brien 2010:247). Given the vast environmental dilemma faced by humankind and taking note of developments in EfS and infusing these with Geography, can aid in strengthening the position of Geography as leader in empowering individuals and societies in their endeavours to become more sustainable. The lack of evidence that Geography has yet acted determinedly to incorporate EfS, is cause for concern (Liu 2011:245). A stronger focus on EfS in Geography can contribute to producing graduates who become influential citizens, who value their environment and appreciate their role in sustaining it, for current and future generations. The extent to which a stronger focus on EfS in Geography can succeed in this regard is currently debated, as reflected in numerous recent articles in academic journals (referred to right through this thesis).

The researcher's role as a higher education practitioner in the discipline of Geography at the University of South Africa (Unisa) over three decades has included several initiatives to incorporate sustainability related themes and approaches in line with EfS in the Geography curriculum and in individual Geography modules. The researchers' experience is in Open and Distance Learning (ODL) and the researcher acknowledges that such themes and approaches can be and are addressed in Geography in different ways in different academic departments and in different academic institutions in the country. This provides a more specific focus for this research, namely to explore the link between EfS, Geography and teaching and learning in various academic contexts, with a view to providing recommendations on how this critical link can be developed and strengthened. As highlighted by Holmes (2002:2), Geography is well-positioned to support EfS due to its affinity with multi-inter-transdisciplinary linkages. If taking this route, however, the question remains to what extent Geography can still maintain its disciplinary identity.

1.3 Background to this research

Mpofu (2015:257) indicates that the problems faced by practitioners in the field of sustainability can be described as ill-structured and 'messy' and they also have no single, clear-cut solutions. These problems are not usually solved effectively within disciplinary boundaries, and require innovative approaches such as critical systems thinking (Smith 2011:5-13), inter- and transdisciplinary connections (Marinova and McGrath 2004) and scenario and strategy development (Komiyama and Takeuchi 2006:3-5). Implementation of these approaches is demanding and time consuming. They also require more than cosmetic rearrangements portraying education as "a magical wand which could be waved anytime and anyhow to arrive at sustainable development" (Manteaw 2012:379). In addition, the importance of a direct focus on mind-sets and practices responsible for the unsustainable present, which EfS should aim to unlearn, could be highlighted (Ibid).

Although it is acknowledged that various definitions of 'sustainability' exist, this research subscribes to the interdisciplinary nature of sustainability, focussing on interaction between people (their well-being, culture, the economy etc.) and their physical environment (including resources), while seeking to balance environmental, economic and social concerns without compromising any of these aspects (Liu 2011:246). New approaches to education and capacity building are the foundation for responding to the sustainability challenges of the 21st century, and are closely related to environmental change (O'Brien et al 2013:51). EfS is associated with this and aims to align the principles, values and practices of sustainability with teaching and learning in order to encourage changes in behaviour that will either create or lead to greater sustainability (Bonney 2012:7-9).

The concept of EfS is used in this research, as the researcher regards it as less contentious and more inclusive than the still widely used concept of Education for Sustainable Development (ESD). In reality, despite some differences in point of departure, the concepts of EfS, ESD and sustainability education seem to be used interchangeably – at least, this appears to be so in the literature that was consulted. The literature on EfS generally points to the inadequacy of traditional educational offerings to deliver professionals able to deal with the multitude of sustainability issues with which modern societies are grappling (Mochizuki and Fadeeva 2010:391). Contributing to this inadequacy are the following: a focus on knowledge transfer and reproduction (Sipos et al 2008:70-72); increased specialisation in narrowly defined academic disciplines (Bacon et al 2011:194); a focus on what should be taught, and not on what should be learnt and how (Sleurs 2008:40); and limited appropriate real-world learning opportunities (Brundiers et al 2010:309;311-312). In the ODL context in which the researcher has experience, students are separated from each other and from their lecturers in time and space, which implies that these issues are more pronounced and need to be addressed more innovatively than in contact teaching situations.

In higher education there is evidence of a growing body of thinking to more radical innovations in teaching and learning to serve the sustainability agenda more effectively (Mochizuki and Fadeeva 2010:399). Increased interest is evident in competence-based approaches as a means to achieving transformation towards sustainability. This requires shifting the focus from the content that subjects have on offer, to emphasising the various competencies involved (Mogensen and Schnack 2010:65). According to Blomhøj and Jensen (2003:126), an approach that focuses on competencies implies some form of action, a sphere of application and consideration of a subjective element as well. These competencies need to be acquired through personal awareness and insight and understanding of local situations, in order to deconstruct local problems and to develop alternatives (Manteaw 2012:382).

1.4 Rationale for this research

The challenges associated with this millennium, which amongst others include the uncontrolled growth in population numbers, rampant and widespread poverty and producing enough food for everybody, combined with the increasing pressure on Earth's resources, require new and innovative approaches to human capacity development. For individuals and societies to not only survive but to actually thrive within this new context, will require them to be equipped with skills such as flexibility, adaptability, collaboration and the ability to solve problems (Levinger 1996:13). The question remains how to impart these skills over an individual's life span, given the constraints faced in many contexts and as is experienced on a large scale in the Global South.

Geography is well placed to contribute to the acquisition of skills required for the new era but the discipline and geographers seems to be markedly absent in the context of EfS and associated discourses (Chalkley 2006:235-236; Grindsted 2013:18; Liu 2011:249). In addition, many geographers seem not to be as proficient as they should be with crucial geographical skills such as integrating diverse materials and approaches, while addressing interactions between the human and biophysical domains in terms of scale and locational considerations (Aplin and Batten 2004:359-360). It is precisely these skills which are increasingly required to address sustainability issues. Globally this problem extends into the existing teaching practices in Geography at tertiary level, which are still entrenched in the 'conventional' and 'measurement' paradigms. This concurs with the conclusions following from the assessment and reflection of Geography within the South African context by Beets (2007:578-579).

In order to understand the role and value of Geography in the 21st century, Simanden (2002:264) argues for more clarity on the understanding of the discipline, not only in terms of a "tradition of thought" but also in terms of a "tradition of practice". For Simanden (2002) it is important to reflect on "the becoming of geographers", which relates to the positioning of Geography with regard to academic hybrids as "Environmental Science" and "Environmental Management" and how to deal with the incorporation of emerging approaches as EfS in the discipline. Within the context of "what it takes to be a good geographer", as coined by Simanden (2002), this research concerns how EfS is dealt with in undergraduate Geography at universities in South Africa. The intention is to show how Geography fares in fulfilling expectations in terms of the incorporation of EfS, what the implications of this are for the integrity of the discipline and which adjustments, if any, may be required.

1.5 Problem statement

The point of reference for this research is the nature of the 21st century environmental crisis faced by humankind and the re-orientation of teaching and learning during university studies that is required for graduates to be able to foster and support the notion of environmental sustainability upon completion of their study period and graduation. As an integrative, holistic discipline that studies both the 'human' and 'natural' aspects of the world we as humans are living in, Geography ought to be and is often perceived to be in an excellent position to function as a major role player in the field of EfS. Ideally speaking, well-trained geographers should have a valuable contribution to offer in terms of their integrative skills, awareness of scale and location as well as their ability to step back from the detail and to look at the broader picture (Aplin and Batten 2004:356).

The United Nations Decade of Education for Sustainable Development (UNDESD) (2005-2014), aiming to infuse the sustainability agenda into all aspects of teaching and learning (UNESCO 2005), created the opportunity for not only the creation of green curricula, but for many subjects, including Geography, to step forward to claim their turf and to show how they can contribute. The reality, however, is that although internationally scholars outside or on the periphery of Geography seem to perceive Geography to be able take the position of an active partner in sustainability studies, the geographical fraternity itself generally does not share this vision and has so far not been overtly keen to join in (Chalkley 2006:235-236; Liu 2011:245). The assumption can be made that the situation in South Africa follows this worldwide trend, although it might not necessarily be the case. There is therefore a need for clarity on this stance, which is what will be addressed in this research.

According to the literature, a range of reasons can be offered for the apparent lack of geographers' interest in EfS (Grinsted 2015a:320; Bonney 2012:1). A study of Danish universities found that although sustainability does not feature very visibly in Geography curricula, it often features implicitly, which contradicts the notion that many geographers find sustainability themes important (Grindsted 2015a:327). Aplin and Batten (2004:359) refer to the failure of Geography to make its instrumental value known in a variety of environmental fields, with many geographers preferring to describe themselves as atmospheric scientists, environmental scientists, social scientists and other professions. They go further and maintain that many geographers have lost, or perhaps never had, the ability of integrating material and approaches, addressing complex interactions in the human-environment system and being familiar with issues of scale and location (Ibid:359-360). However, these are exactly the abilities that geographers should have and would be of value in EfS.

1.6 Aim and objectives

This research aims to propose a suitable approach (or approaches) that can be followed in a drive to strengthen the position of EfS in the Geography undergraduate curriculum in South Africa. Such an approach (or approaches) should make provision for the graduateness of students who can in a truly integrated fashion, face the challenges posed by the changing worlds of work and everyday living. The latter would include enabling graduates to acquire skills that will equip them to earn a living and prosper in the 21st century. In order to achieve this, students need to be provided with rich and active learning environments during their studies where they are able to practise the integrative, location- and scale-related skills of Geography and at the same time master the ability to think critically while engaging with real-life problems in authentic contexts.

The specific objectives of this research are as follows:

- to conduct an exploratory enquiry on the composition of undergraduate Geography curricula in South Africa

- to gauge and critically reflect on the different manifestations of the theme of sustainability and EfS in undergraduate Geography in South Africa

- to critically examine the different approaches to EfS in undergraduate Geography in South Africa, with reference to the main identities of as well as recent trends in the discipline

- to suggest and motivate a suitable academic position through which undergraduate Geography in South Africa could strengthen its role in EfS

- to map the implications of this suggested position in terms of teaching and learning in undergraduate Geography in South Africa.

1.7 Anticipated value of this research

The first potential contribution of this research lies in its exploration of the intergration of knowledge and skills that border EfS and the discipline of Geography, by considering the value of paradigmatic pluralism for dealing with complex geographical and environmental phenomena. Undergraduate Geography could gain significantly from infusion of not only the engaging and participative approaches to teaching and learning associated with EfS, but also trends and developments in this field. This could enrich the learning experience of Geography students markedly in various ways, thus not only improving the way in which they are prepared for the worlds of work and everyday living, but also delivering a new breed of budding, motivated Geography academics and researchers, from whom the discipline at large can benefit. Similarly the teaching and learning sciences, including ODL, could benefit from the examples and practical experience provided by the reflection on the value of paradigmatic pluralism as well as different perspectives to approach EfS in Geography, as presented by this research.

The second potential contribution of this research flows from its consideration of the trade-off between participation of disciplines in multi-inter-transdisciplinary (MIT) programmes associated with EfS, and the risk of weakening the identifies of these disciplines to the extent that their continuing existence as autonomous academic departments at higher education institutions is questioned. A case in point is the experience with the instability of tertiary Geography in Australia, with the accompanying large scale loss of identifiable departmental status, as outlined by

Holmes (2002). An example offering a different perspective is provided by the undergraduate Environmental Management Programme (EMP) of Unisa, with Geography which re-invented itself in an innovative way to be included as a major subject in the EMP, and in addition to serve not only the instrumental value but also the re-productive capacity of the discipline.

1.8 Approach to this research

This research is not conducted on the empirical-technical level, but rather deals with the research problem according to the model described by Denzin (2008:153) as a thoughtful, rigorous and disciplined journey based on reflective enquiry. Preissle (2006:692) defines this journey more specifically in terms of “post-interpretivism that seeks meaning but less innocently, that seeks liberation but less naively, and that … reaches toward understanding, transformation and justice”. The nature of the research problem is such that a conventional meta-analytic, statistically based approach will not be able to uncover the various nuances and subtleties at stake (McNaught 2005:207-208). To this end a multi-dimensional qualitative research strategy is much better suited, supported by narrative enquiry, which has been shown to be a valuable approach in education-related research endeavours (Hart 2002).

In line with the transformative nature of EfS (Sipos et al 2008:69), a transformative research design has been chosen for this research. Transformative research is essentially multi-paradigmatic, drawing on alternative paradigms such as interpretivism, criticalism and postmodernism (Taylor et al 2012), in order to conduct enquiries equally transformative of the researcher as of other participants in the research, including the social system within which the research is embedded. This multi-paradigmatic research space includes research methods associated with various paradigms, woven together to address the research problem under scrutiny from various angles. This allows for acceptance of differences across a variety of research traditions, without necessarily reconciling or integrating these differences, which is contrary to the blending of differences into a whole associated with singular paradigmatic research.

In line with the call by Laszlo (2008) for the need of a multidimensional worldview that acknowledges the interrelatedness of realities confronting humankind in the 21st century, Integral Theory, with its recognition of the value of different paradigms, is regarded as an appropriate theoretical framework for this research. Similar to critical realism, Integral Theory is situated as an alternative to postmodernism, with an ontology associated with integration of the epistemological advances of both positivism and social constructivism (Hedlund-de Witt 2013:1). Reflecting on Geography curricula within a framework of integral pluralism, with attention the relationship between 'the Who' (epistemological distance), 'the How' (methodological variety) and 'the What' (ontological complexity) (Esbjörn-Hargens 2010:143), is bound to provide an unique view and to reveal new insights on the integration of EfS within Geography.

1.9 Chapter outline

Associated with the transformative, multi-paradigmatic research paradigm adopted for this research, the thesis does not fit a traditional layout consisting of chapters dealing sequentially with topics such as a review of the literature, data gathering, presentation, interpretation and analysis, and finally a discussion of results and conclusions. The chapters are rather arranged in terms of a storyline, made up of the carefully selected and arranged elements of the reflective journey constituting this research. In addition, the literature is not only covered in the introductory chapters, but engaged with throughout the thesis, thus supporting the theoretical development and presentation of the central argument.

Chapters 1 to 3 are of an introductory nature and set the scene, provide background and contextualise and position the research. Chapter 1 provides a backdrop for the research and specifically presents the problem statement, rationale, aim and objectives. Chapter 2 reviews a selection of pertinent discourses related to and of importance to the argument concerning Geography and EfS to be developed as part of the research. Chapter 3 relates to the philosophical and methodological underpinnings of the research. Covered firstly are pertinent issues concerning research on EfS and Geography in higher education. Linked to this, the paradigmatic framework appropriate for the research is considered, with the details of the research blue print and associated research process that are set out as well.

Chapters 4 to 7 reflect on and analyse the different manifestations of sustainability and EfS in undergraduate Geography in South Africa. Chapter 4 provides a broad outline of the status of Geography in higher education in South Africa (2014-2015), including the results of an exploratory review of the composition of undergraduate Geography curricula and the inclusion of sustainability. Chapters 5, 6 and 7 critically analyse the different approaches to EfS in undergraduate Geography in South Africa in terms of the human-environment identity, spatial-chorological identity and trend towards cross-disciplinary linkages. This analysis is conducted within the framework of integral theory and utilises the results of an assessment of South African undergraduate Geography curricula (2014-2015), data from a questionnaire completed by some Departments of Geography, data obtained during focus groups conducted at selected Departments of Geography as well as in-depth individual interviews with a selection of geographers.

Chapters 8 and 9 round off the presentation of the research results by providing an integrated view of the evidence considered in Chapters 4 to 7 on various approaches through which EfS is dealt with in undergraduate Geography in South Africa. In Chapter 8 the insights thus obtained serve as input to suggest a preferred academic position to enable an enhanced role for Geography in the context of EfS. A reflective assessment is provided of the usefulness of this position in terms of trends and discourses relevant to Geography and EfS. The implications of this position in terms of teaching and learning are highlighted as well. Chapter 9 summarises the findings and recommendations and indicates the contribution to new insights and knowledge to be placed on the table.

Chapter 2: Contextual framework

"The revolution that is needed to meet the challenges of global environmental change through education and capacity building must be unconventional and daring" (O'Brien et al 2013:57)

2.1 Introduction

This chapter outlines the contextual setting, together with a critical review of the current academic and scientific discourses of the different themes that will be connected and dealt with in this thesis. The focus is not only on these themes in isolation from each other, but on the overlapping areas between them and also how these themes interact with and influence each other. These themes cover the environmental dilemma of the 21st century, sustainable development as a strategy to address this dilemma, education for sustainability (EfS) as a mechanism to support and steer actions towards greater sustainability, how all of this fits into the shifting landscape of knowledge creation and last but not least, how and where the discipline of Geography slots (or can slot) into this picture. A reflection on the connections between the different discourses dealt with and the consequent implications for EfS and Geography within the context of EfS, concludes this chapter.

The discourses presented in this chapter, resonate strongly with the increasing calls from various segments of the scientific community for a new approach to translate knowledge about global environmental change into action to deal with it (Cornell et al 2013:62-63; Mauser et al 2013:422-423; O'Brien 2012:587). However, addressing the problem of global environmental change has proven to be remarkably challenging, which in itself presents a problem with which to cope. In this context, the assumption that knowledge that is more solutions orientated would result in the desired change, might not necessarily represent the best way forward. Other possibilities need to be explored. The discourse analysis offered in this chapter provides some pointers aligned to this way of thinking. The focus is therefore on the role of education and capacity building, and not in terms of superficial adjustments, although considering the need for critical assessment of the way in which problems and solutions in the environmental field are framed (O'Brien et al 2013:48).

2.2 The ultimate 21st century challenge

2.2.1 Global environmental change

The environmental challenges characteristic of the 21st century are exemplified as environmental change, urban growth, water availability, human and environmental vulnerability, human health and infectious diseases (Skole 2004:740), illustrate the multitude of dimensions as well as the complex nature of the issues and problems with which humankind has to deal with. There is general agreement that the spatial reach of human activities, extends far beyond the area where the change is actually occurring (NRC 1999 cited Skole 2004:739). Risks posed to regions and livelihoods can no longer be traced to single variables, but rather multiple stresses with various and diverging origins (Turner et al 2003:8077). A new context has been created demanding new perspectives to deal with the increasingly complex relationship between people and the environment. While discipline based research on these issues and problems remains important, synthesis will only be possible, and predictive capability achieved, with the development of connections across disciplines (Collins 2002:82-83).

The evidence that humankind has to respond urgently to address the environmental issues and problems the world is currently subjected to is overwhelming (IPCC 2007; UNEP 2012). Yet society seems to rather be following the route of adapting to the increasing occurrence and intensity of environmental crises (Biggs et al 2011), than to address the many ambiguous and problematic assumptions underlying much of the current main stream solutions-driven knowledge of and perspectives on environmental issues and problems (O'Brien 2012: 587). Associated with this, the literature points to an increasing number of findings on environmental change considered to be either competing or incompatible, thus not only leading to an increase but also the problematisation of the gap between knowledge and action (O'Brien 2012:590). To move the debate on environmental change beyond apocalyptic jargon therefore requires new ways of thinking about the concept of change, including questioning of classic disciplinary assumptions as well as those underlying contemporary science (O'Brien 2012:594).

2.2.2 The need for a new discourse

Failure of the dominant scientific discourses (including Earth System framing of environmental problems) to effectively deal with challenges presented by global environmental change, necessitates changes in how global change research is done, with more attention being paid to the role of the human dimension, including aspects such as behaviour and agency (Pahl-Wostl et al 2013:238). In addition, the importance of different perspectives and ontologies should be acknowledged, including "how individual and collective beliefs and world-views influence both perceptions of and responses to environmental change" (O'Brien 2010:544). The complexity and uncertainty of environmental change demand a revised comprehension of human-environment relationships not necessarily in line with generally accepted managerial discourses, beliefs and world views (Jasanoff 2010:248-249). The subjective dimensions of environmental change therefore need to be accepted, thus including the reality of dealing with different interpretations and responses (O'Brien 2010:545).

Within the context of the human dimension of global change presenting such a huge challenge in terms of the research agenda (Skole 2004: 740), scaling down from the global to the local in order to be able to fully comprehend the social drivers of environmental change and the resulting processes, has become a priority. This line of enquiry implies a new type of place-based research agenda, with the ability to resolve the local in the context of the global, with reliance on advances in earth-observing systems and geospatial information technologies, indicating a definite, although redefined role for geographers. For this to happen, however, challenging the paradigmatic assumptions about global change will be required. Essentially it involves moving away from the discourse on ‘the environment’ as the prime object of concern “towards an integrated understanding of change based on critical research on space, place, politics, power, culture, identities, emotions, connections, and so on, including the Geography of care” (Lawson 2007 and Skole 2004 cited in O’Brien 2012:593-594).

2.2.3 Implications for higher education

To develop real understanding of the complex global environmental changes that are occurring due to, amongst other things human activities, not just a transformation but actually a ‘revolution’ in current mainstream approaches to teaching, learning and capacity building is required (O’Brien et al 2013:49). The same applies in terms of the actions that ought to be developed to deal with these issues. The type of revolution referred to implies a move towards a totally new way of thinking about changes that are occurring, including the questioning of assumptions, which serves as point of departure for developing appropriate educative endeavours in relation to global environmental change.

Choosing a specific paradigm for the required revolution, risks replacement of one flawed educational framework with another and may cause resistance to the required change (O’Brien et al 2013:51). Responding to the challenges of environmental sustainability requires an educational paradigm with openness to new approaches and ways of thinking and doing as well as acceptance of conflicting perspectives. Desirable attributes include integration of all sciences, co-production of knowledge by multiple stakeholders, inclusion of the full range of theoretical and methodological approaches, embracing indigenous perspectives and bringing together scholarship and practice.

2.3 Views on sustainability

2.3.1 Reframing sustainability for dealing with the human predicament

As originally coined by the World Commission on Environment and Development (WCED 1987), sustainability implies the necessity to constrain present actions in order to avoid compromising the well-being of the generations to come, with a reduced range of livelihood possibilities available for them to choose from. This framing relies on the predictive capability of science as primary tool to support formulation of policies and implementation of actions to ensure sustainability. However, the implication of this is that responsible and legitimate action is not possible until an opinion associated with sufficient certainty has not come forth from the scientific community. As explained by Benessia et al (2012:77), the effect of this is for people is to give up their agency and to slip into a pattern of continuous procrastination, because of the inherent uncertainty and complexity associated with the future. However, it is such an attitude that has become a major obstacle for the necessary transformation required to indeed achieve sustainability. It is referred to as the notion of ‘waiting for sustainability’.

Reframing sustainability requires new thinking about the main contradictions implicit in the belief system that humans have ultimate techno-scientific control over the future, the power to change things and the data (evidence) that prove that they are right (Benessia et al 2012:75,87). To be able to step out of this contradictory framework, characterised by divides between facts and values, between reason and passion and between knowledge and experience, the emergence of new, hybrid forms of knowledge and practice need to be encouraged. Crucial in this regard is the development of the ability to synthesise beyond individual components through extended participation and closer alignment of bottom-up with top-down approaches, as argued by Gallopin et al (2001:222-223), but which still remains a challenge to achieve (Benessia et al 2012:76). Instead of waiting for an epistemologically and normatively ultimate definition of sustainability to surface, implementing and testing different definitions of hybridised sustainability over time, which have been developed through participatory processes, rather seems to point the way towards the future.

2.3.2 Post-neoliberal discourses on sustainability

The reality is that almost 27 years after the Brundtland Report (WCED 1987), the world remains characterised by issues such as unchecked consumerism, excessive use of materials and fossil fuel addiction (Martínez-Alie et al 2010:1741). It therefore appears as if the discourse on ‘sustainable development’ (SD) has not really been that successful in producing the required changes in policies and behaviour to effectively address the several serious environmental issues and problems with which humankind increasingly has to cope. A growing consciousness has been developing that the existing, essentially neoliberal framing of the environmental crisis, with sustainable development as strategy towards solution, is not only to a large extent inadequate but problematic as well (Brand 2009:108). Even well-known forms of global environmental governance geared towards sustainability, as the Framework Convention on Climate Change (FCCC), are more and more questioned by not only scientists but by the broader public as well (Park et al 2008:1-2). The question to be considered is how the highly politicised discourse on the environmental crises and sustainability can be opened up for more transformative ways of thinking and action (Brand 2009:114).

In view of the problems associated with the neoliberalisation of nature, a new pathway is sought. Its core ideas equate human wellbeing with economic growth, with destructive environmental impacts occurring in association with the capitalistic driven dominance of society over nature. Moreover, sustainable development itself lacks in its ability to produce visible improvements. A number of emerging post-neoliberal strategies for alternative pathways to the appropriation of nature can be distinguished. In this regard so-called ‘emancipatory post-neoliberal strategies’ are important to take note of, due to their real potential to open up ways of thinking beyond the appropriation of nature through patriarchal, imperial and racist social relations (Brand 2009:111). These strategies reject the framing of the environmental crisis in terms of simply carrying capacity being exceeded or resources not managed properly, but acknowledge that nature is materially mediated, and that it is these forms of cultural, political and economic mediation that require transformation. Furthermore emancipatory strategies reject choices between the ‘false alternatives’ of the domination of nature versus societal subordination to laws of nature, since both of these strengthen dichotomist views of nature separated from society.

2.3.3 Implications for higher education

Although a vibrant trend towards incorporation of the goals of sustainability, as integrated with the goals of development, can be distinguished in teaching and learning as well as research agendas in the higher education sector in many countries, certain obstacles continue to persist and serve to stifle innovation (Bacon et al 2011:194). Examples of these obstacles include continued over-specialisation in academic disciplines that define themselves very narrowly, thus separating science focused disciplines from those focusing on people-environment interactions, departmental and/or institutional barriers to collaboration and externalisation of the outside world due the ivory tower mentality associated with academia.

In terms of the emerging post-neoliberal discourse on the environmental crisis, sustainability and development, top-down instructional approaches, treating knowledge as information, engaging students as passive recipients and focusing on individual learning, will not be able to provide a pathway towards more transformative thinking and doing. An integrated approach to the examination of environmental and social needs and impacts is rather required. However, this is difficult to achieve due to challenges to incorporate inter- and trans-disciplinarity in an academic landscape consisting of segregated disciplines (Godeman 2008:625-

641). To this end deliberate efforts towards creation of more integrative, holistic and collaborative problem focused approaches are required.

2.4 Educational approaches dealing with sustainability

2.4.1 Conceptual dynamics

The potential educational approaches to deal with environmental change and sustainability cover a range of possibilities. The choice of the most suitable approach is debatable and depends on who is involved in making the choice, and what their position is in terms of worldview as well as educational paradigm. The first potential candidate is Environmental Education (EE), also known as fact-based EE, which developed during the 1960s. It is based on an ontology viewing nature as something that can be managed by people, and contends that environmental problems are attributable to societal resource exploitation and production processes. As explained by O'Brien et al (2013:50), EE has a strong basis in the natural sciences, with less emphasis on social, economic and political contributions to environmental problems. Related to EE, but including consideration of the social sciences and humanities, is Ecological Education (EcoE), which developed during the 1980s. In contrast to EE, adoption of the EcoE framework implies that humans are regarded as part of nature. But the normative discourse of EcoE neither acknowledges other perspectives nor allows students to develop their own understanding, while the teacher is regarded as the one who knows best (Sandell et al 2005:176).

The 1990s experienced the birth of Education for Sustainable Development (ESD), regarded as the educational discourse representative of modern environmentalism (Hesselink 2000:87-88). ESD assumes that humans and nature are subjected to event and tradition cycles with the causes of environmental problems being related to conflicts between achievement goals in society and between societies (O'Brien et al 2012:50). ESD has been promoted significantly through the United Nation Decade of Education for Sustainable Development (UNDESD) initiative, from 2005 to 2014. The UNDESD supported countries with reforms to incorporate ESD in education and to contribute to sustainable development and educational quality (UNESCO 2012:10). During the second half of the UNDESD, it became apparent that a range of different interpretations, variations and expressions of ESD are emerging (UNESCO 2012:12). Many of these are future-driven, which links to the concept of Education for a Sustainable Future (ESF) – being regarded as the most recent development in terms of discourse in this field (O'Brien et al 2012:51). An important aspect in which ESF differs from ESD is that it is more inward-directed, instrumentality is less prominent and there is even more emphasis on educational change as prerequisite for sustainable development.

2.4.2 Various perspectives: Conflicting or supporting?

The existence of various perspectives when dealing with sustainability in the educational context is inevitable, and is theoretically desirable in terms of the need for openness, stimulation of debate and generation of new ways of thinking and doing (Corcoran and Wals 2004:3-6). However, selective elevation of a specific perspective as the preferred route for the required transformation, can lead to mistrust and polarisation, thus favouring maintenance of the status quo rather than experimenting with innovative approaches/methods. This is because the values and anticipatory beliefs and assumptions associated with the various perspectives may differ more fundamentally than is apparent on first sight, thus hampering rather than promoting the required transformative change. Addressing these beliefs and assumptions may therefore be a suitable point of departure to overcome barriers to operationalising transformative change in education and capacity building in response to global environmental changes (Wickson et al 2006:1048-1049). However, this is unlikely to occur if the practice continues to frame tasks at hand as technical problems that are to be solved with the aid of known knowledge.

Despite the apparent ambiguities in the different mainstream perspectives concerning educational endeavours related to sustainability, the overarching message conveyed by the second report on the UNDESD in 2012 is that ESD is no longer seeking its niche. It currently plays a synergising role and serve as an umbrella for a variety of educational approaches that have as focus the well-being of the Earth and its people (UNESCO 2012:65). The view expressed in the second report on the UNDESD does not refer to ambiguity between different perspectives, but rather recognises and accepts that ESD is interpreted differently in different contexts around the world, therefore a uniform view of ESD cannot be prescribed (UNESCO 2012:20). Despite these differences, some core elements of ESD that are not bound by specific contexts and/or regions can be distinguished. The following statement illustrates this point: “ESD seeks to enable citizens around the globe to deal with the complexities, controversies and inequities rising out of issues relevant to environment, natural heritage, culture, society and economy” (UNESCO 2012:12).

2.4.3 Implications for higher education

The importance of higher education in sustainable development as well as the prominence of the role of higher education in debates on global environmental change is no longer disputed, and is associated with various international educational actions, of which the UNDESD is a well-known example (Manteaw 2012:377). However, as much as the UNDESD has provided ESD with the visibility and backing to signal its importance globally in terms of the need for more sustainable living, ESD at the same time seems to be largely neglected or not receiving the attention it should be in many parts of the world. Inevitably, different reasons can account for this, as pointed out by Manteaw and Gruenewald (2007:172-73). The issue seems to be that although ESD is widely regarded to be a suitable vehicle to address the social and ecological problems faced by the Earth, the kind of education that is required for this purpose is not receiving the critical questioning that it should (Manteaw 2012:377).

In terms of the sustainable development discourse, the educational focus needs to be on the unsustainable present, and how to ensure that a balance is maintained between economic growth and resource conservation. But this perspective too is contentious because it implies consistency between resource conservation on the one hand, and sustained economic growth, based on resource exploitation, on the other hand. Depending on the position taken on this, the role of ESD might be compromised, to the extent that it could be discredited as pedagogical greenwash. Rethinking the meaning of sustainable development in different contexts and translation of this into an appropriate role for education has therefore been identified as a priority (Dresner 2010:2). To this end approaches such as community-focused learning and place-based education have been suggested to transform learning to make sustainable development more meaningful to people (Manteaw 2012:382).

2.5 The geographical perspective

2.5.1 The nature of Geography

From the founding of modern academia in the nineteenth century, the identity of Geography as a discipline has been contested (Peet 1998 cited Turner 2002:52). Two identities have dominated this struggle: the spatial-chorological and the human-environment theoretical positions and their variants (Turner 2002:53). Unification of these positions seems to be an illusionary ideal, although achievement of unification has been falsely claimed in the past – but that was during stages when the one position was actually prevailing over the other. This situation has obviously not served Geography well in the past, and raises several questions about the configuration of the discipline and its future. Furthermore, although the geographical way of knowing, spanning the natural sciences and the humanities, is one of the greatest assets of Geography – it also presents a huge challenge. This challenge relates to the entrenched, continuing divide between the humanities and natural sciences, that manifests as Physical and Human Geography, despite prolonged efforts of many geographers to blur this division.

Many geographers would agree with the viewpoint that a major strength of Geography lies in its openness to a variety of explanatory constructs, such as the positivist, humanist, realist and Marxist, to mention a few (Turner 2002:53). This inclusivity undoubtedly serves to assist in bridging of the divide between the natural sciences and the humanities that continues to threaten the rationale that has kept the discipline together over the past century. Apart from the divide between the natural sciences and humanities, geographers are inclined to partition knowledge in terms of substance or objects of study, leading to the diversification of Geography into well-known sub-fields such as Climatology, Geomorphology, Urban Geography, Economic Geography, and so on. The question, however, is how well this disciplinary self-definition and its rationale serves capacity building in the 21st century and to what extent it fits the identified need for giving more attention to the need for EfS in Geography. Ultimately this partitioning may not withstand the restructuring of knowledge characteristic of the sciences, and that would be likely to spread.

2.5.2 Approaches to Geography

The discipline's spatial-chorological identity was strongly evident in practice during the 1960's to 1970's as spatial Geography. It continues to dominate formal justifications regarding the discipline up to the present. This identity expresses the vision of influential voices as Ferdinand Ritter, Karl von Richthofen and others through the manifestation in terms of regional Geography, the science of regional differentiation, spatial distribution studies and the history and other details of places, its chorography. Depending on the approach taken, distribution studies could link directly with to the so-called 'spatial vision concept' and its focus on spatial relations. Thus defined, Geography is exceptional in that it is not so much the objects being studied that matters, as the approach taken in studying the objects, whatever they are. Although the spatial manifestation of the interaction between people and the environment forms part of the spatial-chorological identity, this identity is not concerned with only that, but also with the areal association of any phenomena on Earth.

The origins of the human-environment identity can be traced as far back as Von Humboldt, who envisioned Geography as situated in the systematic sciences, with his work focusing on uncovering how landscapes relate to different phenomena that are affecting them. Later on scholars as Ratzel, Schouw and Kropotkin expanded on this with their vision of a systematic geographic science with a human-environment identity. Disagreement on how to deal with this dualism arose, favouring either the means of understanding (based in the spatial-chorological identity) or the substance to be understood (based in the human-environment identity) and this continues to plague the discipline. Corresponding to increased awareness of environmental issues, together with the diversification of Geography into various sub-fields, the human-environment identity has since established its presence in the Geography landscape, where themes such as environmental perception, cultural ecology and behavioural geography, to mention a few, have since been included.

2.5.3 The value of and contribution by Geography

Although the contribution of geographers to the discourse on teaching, learning and research on global environmental change cannot be denied, many specialisations in Geography are not contributing according to expectations (O'Brien 2010:543). A possible reason can be traced to the diversification that accompanies the two identities of Geography, combined with the effect of specialisation within the sub-fields of the discipline. As a result geographers are inclined to perceive themselves as, for example, atmospheric scientists, social scientists or geo-information specialists (Aplin and Batten 2004:359). Associated with the urgency of the global environmental change dilemma, the scholarly literature indicates a growing need for a fully integrated approach towards human-environment interactions. This presents a golden opportunity for Geography to fulfil its role as an integrative discipline, and not divided into sub-specialisations (Skole 2004:739). A concern being voiced, however, is that many geographers seem to have become less proficient in key geographical skills and the ability to relate to flexibility, inclusivity and integration (Aplin and Batten 2004:359), which are, in fact, the very abilities required to address environmental change issues and problems.

Various cases were made during the past fifty years or so that favour attempts to strike a balance between the spatial-chorological and human-environment identities of Geography. It stands to reason that such a balance, if indeed possible to achieve, will support the integrative nature of the discipline. This, together with manifestation of a less rigid diversification in terms of Human and Physical Geography and their associated sub-fields, will go far to increase the explanatory relevance as well as the usefulness of Geography for real-world problem-solving. The challenge is to maintain the two identities in the discipline in such a way that sensible abstractions (rules, laws, lessons, etc.) follow on their coupling, or else such a unity will remain superficial and false, with no real meaning attached to it. A win-win situation would be if the spatial-chorological and human-environment identities merged in such a way that the major traditions of the discipline are still accommodated, while consistency with the rationale of the systematic sciences is maintained. This type of merger would enable retention of the breadth as well as the bridging characteristics of Geography, and in this way allow the development of the discipline to its fullest possible potential.

2.5.4 Implications for higher education

Being a discipline at the confluence of an extensive range of discourses, Geography lends itself to emersion in cross-disciplinary linkages of various forms (Harvey 2001:218-219). This may lead to Geography being included in multidisciplinary departments (e.g. dealing broadly with the Environmental Sciences) and/or offering analytic tools and disciplinary insights as a service to other departments/disciplines, in other words to non-geographers. This, however, foregrounds the conflict of interest between the demands of Geography as a discipline and Geography as a way of understanding, organising and using certain types of information. Holmes (2002:2) indicates that although this trend emphasises the utility of Geography, a negative cost is experienced in terms of the reproductive capacity of the discipline as well as for undergraduate programmes focused on its intellectual core.

In line with the trend in academia to move away from the partitioning of knowledge towards integrating the sciences (i.e. assembling the puzzle rather than to consider the individual pieces), the time for Geography to reconsider the diversification of the discipline according to the traditional sub-disciplinary approach is overdue. Over-focusing on too narrowly defined specialisations in the discipline implies that Geography will be valued for its technical now-how rather than for its claims to be the ultimate provider of a holistic view (Holmes 2002:18). Ultimately the success and survival of Geography rather depends on its ability to link spatial technologies, measurements and observations (i.e. the spatial-chorological identity) to the human-environment identity, while enabling those inside the discipline to pursue such work, to attract scholars outside the discipline to join hands (Skole 2004:742).

2.6 The shifting landscape of knowledge creation

2.6.1 Transformation in response to global environmental change

In order to deal with the challenges associated with global environmental change in the 21st century, the landscape within which knowledge is created in higher education is continuously evolving. The drivers contributing towards this phenomenon include the increasing emphasis on the development of the knowledge society in the economic sphere, the requirement of sustainability from an environmental perspective and the call for interaction with an increasingly engaged civil society (Wickson et al 2006:1047). Taking these drivers together, they point towards the need for knowledge creation flowing from contextualised, real world problem solving through consultative and participatory research approaches (Mauser et al 2013:421-422). However, the latter approach is difficult and regarded by some scholars as incompatible with classical disciplinary focussed approaches to research (Horlick-Jones and Sime 2004:445), which dominated knowledge creation over a long period of time and became entrenched in institutional structures and processes.

Although many scientists are convinced that they have solutions to the problems posed by global environmental change, the lack of consensus still prevailing after many years of research about issues such as global climate change and resource availability, illustrates the need for new ideas and approaches for knowledge creation (Lawrence and Després 2004:398). Despite continued appeals for the development of alternative approaches in this regard, Pahl-Wostl et al (2013:36) report almost ten years later that progress has been slow and point out that two particularly relevant challenges in this regard seem to be “the integration of natural and social sciences and the production of societally relevant knowledge”. O’Brien et al (2013:49) take it a step further with their suggestion that in order to address the urgent challenges faced by society, a revolution in the system of education, capacity building and research is required. This would entail questioning and transformation of underlying assumptions and beliefs in order to not only change the system as such, but also the way of looking at the system.

2.6.2 Moving towards transdisciplinary cooperation

The focus on discipline specific research over the past few centuries has been associated with giant leaps in not only the quantity but also the quality of research been produced. The resulting development of supporting research structures and systems encourages the practice to frame research questions in terms of the ability of scientists to conduct the required research accordingly. As a result discipline-bounded research is often not well suited for and also do not have the capability to address complex societal issues characteristic of the 21st century, such as climate change, food and water insecurity and public health (Mauser et al 2013:422). The multi-layered nature of these issues presents a dead-end for discipline-bounded research. The need is clearly for an approach to research and knowledge creation that transcends disciplinary boundaries. Although transdisciplinary cooperation may be a desirable goal, Godeman (2008:626) explains that this involves huge obstacles, since it brings both academic cultures and discipline-based outlooks into question.

The role of transdisciplinary research and knowledge creation is to overcome the limitations associated with discipline-bound research (Godeman 2008), so that the complexity associated with 21st century global environmental change issues can be dealt with effectively. Key characteristics that distinguish trans-disciplinarity from related research approaches can be summarised in terms of its focus on problems, evolving methodology and a collaborative dimension (Wickson et al 2006:1047-1052). In terms of the quality of transdisciplinary research, it is accepted that the degree of knowledge integration that is achieved, is of great importance. This follows from recognition that the Earth and its processes function as an integrated system, pointing towards the need to integrate approaches from various disciplines when engaging in research on complex Earth system processes. In terms of sustainability, the value of trans-disciplinarity in bridging the mismatch between knowledge created in academia and knowledge required to solve complex societal problems, needs no further elaboration.

2.6.3 Implications for EfS and Geography

Associated with the UNDESD, higher education institutions worldwide have been challenged to reorient towards a more specific focus on EfS (UNESCO 2007). These institutions therefore embarked on implementation of undergraduate degrees in sustainability, with many of these inter-, multi- or transdisciplinary rather than embedded in specific disciplines (Remington-Doucette et al 2013:405). The pre-fixes of “inter-”, “multi-” and “trans-” are viewed as indicative of the progression in the level of integration being achieved. Trans-disciplinarity is at the highest level and involves what is between, across and beyond disciplines (Marinova and McGrath 2004:3), but has a controversial element in that it is perceived to pose a threat for the existence of traditional disciplines. Important to realise, however, is that despite the apparent benefits of transdisciplinary study programs for sustainability learning, the success achieved in this regard still remains largely unsubstantiated (Remington-Doucette et al 2013:408).

The prominence of the sustainability agenda, with its focus on the need for integration of knowledge about the human and natural worlds, a holistic perspective and collaboration (between disciplines and institutions), created opportunity for various disciplines to participate in new ways of not only what students should learn, but also how they should learn it (Fromhold-Eisebith et al 2009:410-411). This is particularly true for Geography and its potential contribution to sustainability learning due to its integrative nature combined with its spatial focus. The reality, however, is that Geography lags in its contribution to sustainability study programmes, whereas Pretorius and Fairhurst (2015) provides a working example of how Geography can fulfil a useful role in serving as an anchoring discipline for such programmes. But this role poses certain risks, as the focus on provision of useful tools and selections of insights may be at the expense of the requirements of the discipline, especially regarding its reproductive capacity.

2.7 Connecting the discourses

2.7.1 Making the connections

In the light of the scientific and social advances during the past 25 years or so, the obsolescence of the managerial approach to education (dominating since the nineteenth century) is becoming evident (O'Brien et al 2013:50). As argued by Sterling (2001:40), the managerial approach subscribes to acceptance of predictability and, associated with that, development of disciplinary expertise, academic autonomy, transmission of knowledge and the virtues of control. Ultimately this approach results in the education of people to adapt to change, whereas what is required is to build the capacity of people to be change agents (i.e. not only to be able to shape, but also to create change). The discourse on the nature of the global scale environmental dilemma and how to deal with it, points towards a revised approach to education, one which synthesises and applies the latest findings from a range of fields in order to create the required transformation (Esbjörn-Hargens et al 2010 cited O'Brien et al 2013:50).

The research agenda for the environmental dilemma requires a transition very similar to that for education: From research dominated by the natural sciences to involvement of social sciences and humanities and from a disciplinary focus to a balance between disciplinary and MIT research, with addition of the human dimension (Pahl-Wostl et al 2013:38) is the key call. The need for this is generally recognised, and has been emphasised by role players as the International Social Science Council (ISSC) (Hackmann and St. Clair 2012:16) and the International Council of Scientific Unions (ICSU) (ICSU 2010).

Based on the issues raised, crucial aspects to consider when charting the road to the future include the following:

- characteristics of global environmental change that make a response to it difficult
- challenges involved in the management of the transition to sustainable resource management and governance
- the need to consider the role of human agency in the development of a spectrum of responses to the change being experienced.

2.7.2 Implications for EfS and Geography

It cannot be denied that EfS (collectively, in all its forms) is continuing to contribute significantly to the transformation of education and capacity building in association with the various facets of global environmental change (UNESCO 2012). Despite this contribution, concerns that still not enough is being done are frequently expressed. An example is O'Brien et al (2013:49), who pointed out that many, if not most, universities and research institutes are not geared towards working within a MIT context, which limits the scope and depth of education and research on environmental issues and problems. Furthermore, graduates are not delivered and research results not generated as quickly as suggested to be necessary by research findings. In this regard 'business as usual' approaches or extrapolating from the past to the future will not lead to desired results. In fact, it has become crucial to more proactively adopt transformative approaches to learning and research.

Geography, if practised as an integrative science, has the potential to contribute significantly to EfS, and specifically in terms of the overdue shift in the discourse on global environmental change (O'Brien 2010:247). Instead of accepting apocalyptic future scenarios as inevitable, Geography may open the door for consideration of alternative futures, involving human agency to stimulate a move towards desirable change. The success that will be achieved in this regard, however, depends on geographers recognising the necessity for a deeper understanding of environmental change in an integrated way in terms of the interaction between its human and natural/physical dimensions. Hence the challenge for geographers is to reconcile the ontological differences between those regarding themselves as either human or physical geographers. It is up to geographers to determine the extent to which this challenge will be taken up but it is one which will, without a doubt, have implications for the future of the discipline.

2.8 Concluding remarks

This chapter provided a critical review of the key discourses concerning global environmental change, strategies on how to deal with it, the educational response and the positioning of Geography in this scenario. It has been indicated that questions and issues regarding the relationship between people and the environment have obtained an elevated status in academia, research as well as in the public domain. This relationship, however, is multidimensional and therefore fraught with complexity and inter-linkages. A deep understanding of the workings of this relationship will therefore only be possible if approaching it in a way that integrates perspectives from the natural and the social sciences. Although this need seems to be generally accepted, the research agenda associated with global environmental change continues to be dominated by the natural sciences, while the incorporation of societal concerns necessitating consideration of more fundamental changes in the nature of scientific enquiry, as implied by the problem statement for this research.

Despite shortcomings, EfS has been shown to be a valuable approach to assist learners at all levels in their education to unlearn the entrenched unsustainable ways of humankind to make a living on the fragile planet Earth and to substitute these for more sustainable pathways. Now that the UNDESD (2005-2015) has drawn to a close, it is clear that EfS is making progress on a worldwide scale and is emerging as a unifying theme for many types of education that focus on various specific aspects of sustainability. At the same time reports indicate that EfS has remained a non-issue in many parts of the world, for example Africa in particular. This explains the need for the Global Action Programme on Education for Sustainable Development (UNESCO 2014), which came into being to address such shortfalls. Provision has to be made for different interpretations of EfS as pertaining to unique local contexts, cultures and circumstances. Although different approaches to, and perspectives of EfS may be regarded as a sign of a healthy and vibrant field of study, this unfortunately also makes it difficult to achieve transformative change, which is the ultimate goal.

The potential role of Geography in EfS, especiall/y in terms of the human-environment identity of the discipline, has been identified in this chapter. The spatial-chorological identity of Geography, need not be discarded as it plays a role in effecting EfS as well. The diversification in terms of Human and Physical Geography, with further specialisation in fields as Climatology, Geomorphology, Urban Geography and Economic Geography, to mention a few, continues to challenge unity in terms of a shared identity for the discipline. Depending on the approach taken, Geography may only be suitable for incorporation in EfS to a varying degree. The fact is that these differences exist, with all of the different approaches associated with it offering advantages and disadvantages. The following chapter deals with philosophical and methodological approaches for research on Geography and EfS in higher education. This leads to identification of the meta-theory pertaining to this research and the associated methodological framework in order to effectively probe the positioning of Gegraphy in EfS. A blueprint of the research process to be followed is also provided.

Chapter 3: Philosophical and methodological positioning

"In terms of geography's curricula, sustainability is, perhaps, the greatest force for change, for it suggests that the challenges of the 21st century cannot be met by disciplinary thinking alone. Rather, there needs to be a more integrative approach to knowledge creation, and while Geography is characterised by diversity, we need to ensure that our curricula reflect and explore this." (Whalley et al 2011:385)

3.1 Introduction

While reflecting on how a strengthened position for Geography in EfS can contribute to addressing the issues relating to humankinds' survival on Earth, this research is in agreement with the position that in order to avoid worldwide collapse of social systems, a macro shift is required in the way societal realities are conceptualised and dealt with (Taylor et al 2012:374). To this end acknowledgement of the interconnected nature of all things is a requirement, and associated with that, recognition that in order to be relevant, a narrow scientific view of reality cannot be taken. In terms of the transformational aspect of EfS, the limitations of traditional single paradigm research, characterised by positivism and its offshoot of post-positivism, is increasingly acknowledged (Fien 2002:149-150). This research therefore draws on Integral Theory and its associated meta-theory of compatibility of multiple paradigms, as it allows engagement with the full diversity of the world within the context of a multidimensional worldview (Laszlo 2008:186).

Linked to the synergy in many respects between Geography and EfS, especially in terms of their shared interest in human-environment interactions (Liu 2011:249), this chapter commences with consideration of the nature of research on respectively EfS and Geography, both in the context of higher education. The research implications of the Geography-EfS linkages are specifically addressed, which extends to a critical discussion of associated meta-theoretical perspectives. Based on this, Integral Theory (Wilber 2003) is presented as ontological and epistemological vantage point for this research. The relevant methodological framework is then set out, which, in terms of Integral Theory, allows for the systematic integration of the multiple methodologies available for scientific enquiry. The chapters closes with the blueprint of the resulting research process designed to investigate how undergraduate Geography in South Africa is featuring in terms of EfS, highlighting elements such as the research context, assumptions, participants and the procedures to be followed.

3.2 Research on EfS in higher education

3.2.1 Advancement of EfS through research

Within the context of growing concern about the negative impacts of 21st century environmental change, the role of higher education in the transformation of society towards greater sustainability has experienced a significant growth in scholarly attention since 2000 (Stephens and Graham 2010:611). However, much of this literature consists of atheoretical, basic empirical or descriptive studies of specific initiatives at specific higher education institutions (Fien 2002:144-145). Nine years after this observation by Fien (2002), not much had changed, with Reunamo and Pipere (2011:111) pointing out that the literature on research in the field of sustainability education reveals prominence of contextuality, lack of coherency in the use of key concepts and dominance of qualitative approaches. This is possibly related to the fact that research on EfS has until now being a relatively new field, characterised by an experimental research culture, while scholars are still probing different options and finding their way how to go about it.

While some higher education institutions have been slow to craft a response to the sustainability challenges of the 21st century, others have been quick to react and have since advanced significantly with integration of sustainability in various aspects of their organisations. Associated with this, assessment of the variety of factors affecting the transition to sustainability in either a negative or positive way, constitutes a valuable area of research concerning the advancement of EfS (Stephens and Graham 2010:613). While researching and planning such sustainability initiatives, it is important to take into account the irony associated with institutions of higher learning, namely that although they are focussed on learning, they are actually very slow to learn themselves, and even slower to change (Albrecht et al 2007:404). Furthermore, for research results to be widely applicable, more balance is required between contextual studies versus dynamic analyses involving different levels and scales in higher education.

3.2.2 Research orientations in EfS

Although scrutiny of the literature indeed reveals a steadily growing number of scholarly contributions relating to the field of EfS (Pipere et al 2010:6), research on EfS is generally still regarded to be in its start-up phase, with an urgent need for growing the required research capacity. It is important to realise that research on EfS can be regarded as a subset of the broader field of educational research, with some overlapping that may occur in terms of for example trends, struggles, advances and debates. Due to the diverse nature of the issues and challenges facing proponents of sustainability in the higher education sector, it can be argued that a more eclectic approach might be required to select appropriate paradigms and/or methodologies to conduct research on EfS, than in the case of traditional educational research (Fien 2002:151-152). The value of an eclectic approach is that it acknowledges the contribution of all research paradigms in terms of their particular value, as for instance argued by Taylor et al (2012) with reference to interpretivism, criticalism and post-modernism.

Based on the study of Reunamo and Pipere (2011), insightful deductions are possible about the research orientations of scholars engaged EfS research. Although identifying a persistent division between quantitative and qualitative approaches, about a third of the participants in this study relate to methodological pluralism through their expressed preference of mixed methods approaches

(Ibid:119). Application of agentive perception modelling revealed the desire of EfS researchers to contribute to societal development and change (Ibid:110). Of importance is the agentive nature of EfS researchers in terms of decisions on the direction into which changes suggested by the research, need to develop (Ibid:112). While scholars seem critical about compiling research agendas for EfS (probably because it is unhelpful in dismantling fragmentation), they are more comfortable to engage in reflection on paradigmatic and methodological aspects relating to EfS research (Pipere et al 2010:11-13; Wright 2007:106).

3.3 Research on Geography in higher education

3.3.1 Geography curricula, the age of super-complexity and research

Despite the now famous call of more than 40 years ago by Gould (1973), relating to the importance of the reviewing of and the reflection on Geography curricula, Whalley et al (2011:397) point out that since the 1970's, only a trickle of such reviews can be observed in the scholarly literature. In the light of the demands of the 21st century, referred to as the age of 'super-complexity' (Barnett 2000), reflection on and revisiting the approach, nature and relevance of Geography curricula, especially at undergraduate level, seems to be an overdue matter. In addition the idea of 'knowledge' is becoming more and more relative and uncertain, with the privileged role of universities as the 'guardians of knowledge' under contestation. Together with the changed context in which higher education institutions now have to function, the challenges for Geography curricula are profound. Recognising that context and circumstances are important factors in shaping the response to these challenges, the need for Geography to remain relevant while maintaining its diversity, is supported by Whalley et al (2011:380).

Transformation of higher education over the past 40 years, associated with massification, courses being vocationalised and emphasis on assessment performance, lead to curricula being dictated by not only employers, but also socio-economic realities imposed by 21st century super-complexity. Under these circumstances, the importance to maintain a discipline as Geography with its traditions as well as academic autonomy, versus the role of newer political, economic and other developments, becomes an important matter to research in order to determine how student experiences are shaped. As Cotton et al (2013:193-195) explain, exploration of these tensions may indicate in what form and to what extent hidden curricula continue to play a role in selecting topics/themes for Geography curricula. An example is the discipline's role in sustainability, leading to emphasis on factors as scale, place, connection and uneven development, serving as illustration of the effect of the hidden curriculum as implied theme. Of importance is that qualitative approaches seem to be more appropriate to gauge why and how hidden curricula take shape, diffuse and are perceived.

3.3.2 Geography-EfS linkages: Research implications

According to Grindsted (2013:6), research dealing with the linkages between Geography and the field of EfS, specifically in the context of higher education, only recently started to gain more visibility in the scholarly literature. This trend is expected to intensify as a result of the impacts of initiatives such as the UNDESD (UNESCO 2005, 2011) and the response by the academic sector in terms of approximately 1400 higher education institutions worldwide that have signed declarations on sustainability by 2011 (Grindsted 2011:29). Universities are therefore increasingly adopting approaches and/or policies whereby sustainability is modelled into their core functions in an integrated way. This extends to the curriculum, with the adoption of 'whole-of-university' approaches. These encourage environmental awareness and responsibility, thereby linking the principles of sustainability being taught in the classroom with implementation on the campus (McMillin and Dyball 2009:62-63).

The Geography fraternity subscribed to the EfS agenda in 2007 with the development and acceptance of the 'Lucerne Declaration on Geographical Education for Sustainable Development' through the initiative of the International Geographical Union (IGU) (Haubrich et al 2007:243-250). However, the understanding by geographers of their role and function in the sustainability discourse, and exactly how this manifests in geography curricula, depends on a number of variables and may lead to disciplinary traditions being challenged, as alluded to by Grindsted (2013:7-9). Within the context of the institutionalisation of sustainability in terms of university policy and initiatives, the demand for related courses and curricula is clear. If Geography does not step in to satisfy this need, other disciplines are bound to move in to capitalise on the opportunity and capture the market for sustainability offerings. This has already been happening, associated with the reluctance of Geography to take a leading role (Liu 2011:254).

Although the evidence points towards a notable involvement of Geography in sustainability research, the same cannot be reported about research relating to the various facets of the involvement by Geography in EfS and/or the relationship between Geography and EfS (Bonney 2012:20). As argued by Tight (2014:93-94), higher education as phenomenon is generally perceived to be a rather odd field of study, with the associated research being of a highly introspective nature. No wonder scholars pursuing this type of research are spread rather thinly across departments and disciplines, with quite a large variation in the tools, techniques and theories utilised to conduct this research. The majority of researchers in almost any academic department would therefore typically not have the educative aspects (i.e. scholarship of teaching and learning) of their respective disciplines as research focus. This can be assumed to hold true in the case of Geography as well. Fortunately the synergy, overlap and grey areas between Geography and studies concerning the many facets of sustainability (Bennett 2013:100), implies that research on educative matters in many aspects of Geography will be applicable to EfS, and vice versa.

3.4 Meta-theoretical perspectives informing this research

3.4.1 Integral Theory and a multidimensional worldview

The 21st century confronts humankind with a world getting more and more complex, while having to deal with issues of the day such as environmental degradation, resource exploitation, hunger and poverty, inadequate educational systems and unstable financial markets, to mention a few. None of these issues can be addressed properly within the confinement of a single discipline, with the aid of only one specific methodology and/or in a singular way through the lens of only one worldview. Together with this, the number of perspectives on these issues and how to deal with them in the best possible way are becoming more and more. In the absence of a framework to connect all of these perspectives in a sensible way, the ability of humankind to effectively address the issues being grappled with is clearly hampered. Linked to this, Esbjörn-Hargens (2009) points out that humankind is now part of a global community and therefore requires “a framework – global in vision yet also anchored in the minutiae of our daily lives – that can hold the variety of valid perspectives that have something to offer our individual efforts and collective solution building” (Ibid:1).

Scholars are increasingly recognising the naivety of the idea that it is easy to identify and contain issues as those mentioned in the preceding paragraph, and to suggest possible actions (Carolan 2004:513). A related matter concerns the ontological status (‘the What’) of these issues. This refers to the different realities in terms of which the issues are viewed and enacted (i.e., brought into being). Climate change serves as example, with Inglis (2008:498) who highlights that instead of a single reality, a multitude of interlinked sub-issues at various scales are involved, associated with different values, needs and behaviours. Ontologically climate change can therefore be thought of as a multiple and not a singular object, which recognises its first, second as well as third person dimensionality. This ontological pluralism implies that climate change, and similarly many other 21st century global issues, cannot be viewed objectively in terms of third-person realities only. Not only ontological, but also epistemological and methodological pluralism is at stake, fitting in with the position taken by Integral Theory on enactment, namely that phenomena are brought into being through methodological practices.

Positioned as a response to the inadequacies of postmodernism as philosophical response to the global challenges of the 21st century (Hedlund-de Witt 2013:1), Integral Theory (Wilber 2000a, 2000b) offers a theoretical framework within which major insights from the humanities, arts, natural and social sciences are woven together to provide a way of integrating the many dimensions and ways of knowing in science (Esbjörn-Hargens and Wilber 2006:524). Integral Theory follows a post-disciplinary model (Ibid), which is in contrast to the disciplinary exclusivity and turf-wars characterising much of academia. As a result of the large range of applications within, across and between disciplinary boundaries, which include examples from Geography (Eddy 2005) and sustainability (Brown 2005b), Integral Theory has since its inception proven itself as an emerging approach in the field of meta-theory. In this regard, Integral Theory attempts to achieve exactly what is implied, namely to incorporate as many relevant perspectives, methodologies and styles as possible into a coherent framework, thus informing a meta-paradigmatic approach (Visser 2003:xii-xiii).

3.4.2 Grounding the meta-paradigmatic research space

Integral Theory provides the opportunity to conduct research and analysis that is compatible with a large variety of contexts and spectrum of scales (Esbjörn-Hargens 2009:2). This is because it provides the means through which to organise a range of approaches to research and the analysis of results in a coherent and accessible way, while not only allowing but also guiding the researcher to make a selection of the most important, yet relevant, methodologies together with the tools, techniques, and insights associated with them. The so-called ‘AQAL-model’ – with AQAL the shorthand for ‘all quadrants’, ‘all levels’, ‘all lines’, ‘all states’ and ‘all types’ –

captures the essence of the integral research space. These five elements signify some of the most basic recurring aspects of reality in the following way (Esbjörn-Hargens and Wilber 2006:525-526):

- Quadrants – representing the perspectives of subjectivity, inter-subjectivity, objectivity and inter-objectivity that need to be considered in the process of understanding any aspect of reality
- Levels – development level in the four quadrants, viewed in terms of either depth or complexity and associated with awareness/consciousness
- Lines – various distinct capacities associated with different levels of consciousness/development
- States – temporary occurrences of aspects of reality (seconds to days to months to years) within the four quadrants
- Types – variety of consistent styles assumed by aspects of reality in different domains, irrespective of level of awareness/consciousness.

The implications of excluding any of these five recurring elements comprising an integral approach, would mean that the researcher will be settling for a less comprehensive understanding of and engagement with reality (Esbjörn-Hargens 2006a:92). Viewed differently, by considering all these elements, the researcher will have certainty that she/he is taking account of all main aspects and is not missing out on anything crucial. The hallmark of the integral approach is AQ (All Quadrants) mapping (illustrated in Figure 3.1), providing the basis for a meta-paradigmatic approach while allowing consideration of interrelationships between worldviews and viewpoints (Haigh 2013:174-175). Essentially the four quadrants comprising the AQ map represent different dimensions of the actual life-worlds of people that are always to some extent present. For an interior view, the upper left quadrant (UL/”I”) represents individual intentional subjectivity and the lower left quadrant (LL/”We”) collective inter-cultural subjectivity. In the case of an exterior view, the upper right quadrant (UR/“It”) represents individual objectivity through observable behaviours and the lower right quadrant (LR/“Its”) collective objectivity through observable ecological/social systems.

Upper Left (UL)	**Upper Right (UR)**
Interior view *Individual; ‘What I think or experience’* *Intentional* *Subjective, inward view of the ‘self’* *First-person perspective* ***I***	*Exterior view* *Individual; ‘What she/he or it does’* *Behavioural* *Individual objectively viewed* *Third-person perspective* ***It***
We *Second-person perspective* *Inter-subjective dynamics* *Culture and world view of group* *Collective; ‘What we think or should do’* *Interior view*	***Its*** *Third-person perspective* *Inter-objective dynamics* *Social and environmental systems* *Collective; ‘What they do’* *Exterior view*
Lower Left (LL)	**Lower Right (LR)**

Figure 3.1: *AQAL basics – mapping of the four quadrants* (adapted from Esbjörn-Hargens 2009:3-4, Figure 1 and 2; Haigh 2013:176, Table 1; Combs 2009:9)

3.4.3 Transformative linkages with Geography and EfS

Most approaches available for making sense of and researching modern day environmental issues and the various dilemmas facing humankind, are inherently fragmented. This is a result of certain dimensions of environmental philosophies and actions that are being emphasised and foregrounded, while other dimensions are being ignored or underplayed, resulting in undeniable bias (Esbjörn-Hargens 2005:5-6). In this process, very little attention is given to the cultivation of mutual understanding between perspectives, which is increasingly realised to be a crucial part of being able to address environmental issues (Ibid). Embracing such an approach, however, requires transformation to higher levels of insight concerning ‘the self’ as well as others, and of the complex interrelationships between virtually everything (Taylor et al 2012:373-374).

As holistic discipline, including scholars in human and physical sciences as well as humanities, Geography is well positioned to encourage collaboration and dialogue between the fields and sub-fields involved with sustainability studies. Ideally this could lead to fostering a transformational approach to research, with a multitude of insights and perspectives being utilised coherently and at a level appropriate to fully comprehend the complexity of environmental phenomena. However, divisions between Physical and Human Geography, and between positivist and critical Geography, to mention two examples, work against the ability of Geography to make a useful contribution in this regard (Bennett 2013:108). Researching this incongruity within the framework provided by Integral Theory, with its view that a lack of capacity to hold multiple perspectives is crippling feasible solutions to environmental issues, is bound to provide insightful perspectives on strengthening the position of Geography in terms of its transformative potential to support and enhance EfS.

3.5 Methodological framework for this research

3.5.1 AQAL mapping and integral methodological pluralism

In terms of Integral Theory, the spectrum of possibilities associated with the AQAL model is referred to integral methodological pluralism (IMP), based on the belief that everything contains an element of truth. Guided by the principles of non-exclusion, unfoldment and enactment (Wilber 2003:109-122), IMP implies that all modes of human inquiry contribute towards completion of the total puzzle, although some to a lesser and some to a greater extent. Since the perspectives related to the four quadrants of the AQAL model can be viewed from the inside or the outside, the

AQAL model leads to eight zones of enquiry (Esbjörn-Hargens 2009:16). Each of the eight zones is associated with a specific methodological family and methods of inquiry, and the application of each of these exposes reality in a way that is not possible for any of the other. In addition, these methodologies are not mutually accountable to each other with regards findings that are obtained. This post-metaphysical approach strives to present realities wherever and in whichever way they exist through a participatory modus operandi, thus avoiding the depiction of realities in ways that are removed from the observer (Wilber 2003 cited in Esbjörn-Hargens 2006a:94-96).

Table 3.1: *Methodological families for each of the eight zones of enquiry associated with the AQAL model* (Wilber 2003:276-278; Esbjörn-Hargens (2006a:96-98)

Zone	Qua-drant	Perspective	Viewed from	Methodological families
1	UL	Individual interior	Inside	Phenomenology – studying direct realities
2			Outside	Structuralism – studying patterns of direct realities
3	LL	Collective interior	Inside	Hermeneutics – studying inter-subjective understanding
4			Outside	Ethno-methodology – studying social orders through patterns of mutual understanding
5	UR	Individual exterior	Inside	Autopoiesis theory – studying self-regulated and perpetuated behaviour
6			Outside	Empiricism – studying observable behaviour
7	LR	Collective exterior	Inside	Social autopoiesis theory – studying self-regulated and perpetuated system dynamics
8			Outside	Systems theory – studying the big picture in terms of the functioning and fit of its parts

Table 3.1 depicts the linkages in the AQAL model between interior and/or exterior perspectives, an inside/outside view and the eight methodological families. In the educational context (e.g. pedagogic/curriculum research), investigations can be approached as an in- or outsider to academia, mapping to respectively the interior

and exterior halves of the AQAL model (Haigh 2013:178). For the interior half, a subjective, personal perspective is at stake. Individual intentions (UL) might therefore be explored by interviews (1st person; outside view), while focus groups (2nd person; inside view) might be used for the collective (LL). For the exterior half, an objective, 3rd person perspective is at stake, with typically an outside view. Individual behavioural aspects (UR) might therefore be explored by empirical observation, while systems analysis might be used for the collective (LR). This example meets the requirement of integral research that 1st, 2nd and 3rd person methodologies (one from each of the major groups) need to be used. The resulting data and results are then triangulated and cross-correlated with the aid of the integral model to form a coherent picture.

3.5.2 Expanding to the full dimensionality of the AQAL model

Although mapping of the four quadrants forms the basis of AQAL analysis, it is only the first of five steps. Perspectives relating to ‘all levels’, ‘all lines’, ‘all states’ and ‘all types’ need to be considered in addition and should form part of the analysis from the start. The first element, *‘all levels’*, involves levels of consciousness/development that can be distinguished across all four quadrants of the AQAL model. In the UL and LL, these are levels of depth of consciousness, while levels of complexity of development can be distinguished in the UR and LR (Esbjörn-Hargens 2009:7). The importance of this lies in the nature of research questions that vary according to levels of depth/complexity, with acceptance of many potential developmental possibilities. Higher levels include levels lower down, referred to as ‘holarchy’ (a type of hierarchy). This can be explained as an identity widening from ego-centric, through ethno-centric, socio-centric, world-centric and planet-centric, to culminate in cosmos-centric (Ibid:9). Wilber (2006) cautions against naming the levels, since they do not exist on their own but in terms of their content (moral, cognitive, artistic, etc.), which is what can be observed and measured.

A variety of developmental lines, named *'all lines'*, can be identified in each of the quadrants of the AQAL model. These lines co-exist and unfold in sync with the levels of consciousness/development. A simplistic scenario consists of three main lines, namely aesthetic-artistic ('I'), moral-ethical ('we') and cognitive-scientific ('it/its') (Baldwin cited Wilber 2003:329). As shown by Esbjörn-Hargens (2009:9), lines in the UL may refer to aspects as cognition, values, needs and morals, while lines in the LL may provide expression of religious/philosophical views or the link between culture and worldviews. Moving to the right-hand exterior, lines in the LR may refer to ecosystem development, geopolitical structures and forces of production (Ibid). Finally, in the UR lines may cover the spectrum of goal-seeking, problem-solving, occupational, interpersonal and other observable behaviours/practices (Edwards 2003).

Because the realities confronting humans in virtually all contexts are continuously changing, attention to *'all states'* by the AQAL model is particularly relevant (Esbjörn-Hargens 2009:13-14). These states do not overlap with each other (e.g. a drought and a flood cannot occur simultaneously), have bearing on circumstances regarded as unusual and usually occur within time limitations. With reference to the quadrants of the AQAL model, examples of states include the following: UL – individual states (i.e. depressed emotions), LL – group states (i.e. crowd excitement), LR – systemic states (i.e. the economic situation), UR – behavioural states (i.e. smiling/crying).

The last element of the AQAL model, namely *'all types'*, refers to stable and resilient categories, either unique or overlapping. In terms of education (Ibid), examples include types of learners and types of teaching and learning styles. Considering types can be valuable in contexts as diverse as operations planning, project design and product development, with practitioners adjusting their style according to circumstances. Types vary according to the quadrants of the AQAL model, as illustrated by the following examples (Esbjörn-Hargens 2009:15): UL – personality type, LL – type of religious system, LR – type of government regime, UR – body type.

3.5.3 The AQAL model in educational contexts

In the current academic milieu, characterised by issues as turf wars between disciplines and clashing perspectives such as positivist, modern and postmodern, recognition of the multi-dimensional nature of reality by Integral Theory offers a refreshing perspective. In the context of engaging students with the issues that the world is currently grappling with, the relevance of the integral perspective lies in its exploration of the multiple ways of getting to know the multi-dimensional nature of reality through various paths of inquiry, without pre-postulating ontological structures (Esbjörn-Hargens 2006b:22). From this perspective the AQAL model is of particular value, since consideration and inclusion of the elements of this model is bound to result in more multi-faceted teaching and learning spaces than can be achieved by most current approaches.

Starting off with the four quadrants of the AQAL model, any teaching and learning related experience can be conceived as consisting of a behavioural dimension (reading, lecturing, etc.), a personal, individualised dimension (imagination, thoughts, etc.), a culturally related dimension (appropriateness, shared meanings, etc.) and a systemic dimension (curriculum, policies, etc.). This can be mapped directly to respectively the UR, UL, LL and LR quadrants of the AQAL model. Within each of these quadrants, Integral Theory acknowledges the existence of at least three levels of complexity, associated with body, mind and spirit. This results in the so-called 12 commitments or forms of engagement of Integral Teaching and Learning (four dimensions x three levels), that are outlined by Esbjörn-Hargens and Foucaultii (2007:10).

In educational contexts, the levels included in AQAL modelling are typically associated with the traditional, modern, postmodern and integral worldviews. In addition, each of these worldviews can be linked to specific behaviours, experiences, cultural practices and systems. Recognition of different ways of knowing, depending on the level (worldview) at stake, has implications for lecturers/students as part of transforming to integral awareness. To this end it is crucial to understand the relationship between taking multiple perspectives (cognitive line) while interacting meaningfully with others (interpersonal line) and acting ethically (moral line). Consideration of states such as embodiment, awareness and consciousness, and recognition of multiple typologies, can potentially enhance the transformative potential of teaching and learning dramatically.

3.5.4 Implications for probing the standing of Geography in EfS

As a discipline claiming to take a holistic, integrative perspective, Geography ought to be concerned with different ways of 'seeing' the world, and how this relates to belief systems, socio-economic circumstances and culturally related traditions, to mention a few important aspects. As argued by some scholars, amongst others Whalley (2011:384), the continued practice to perceive Geography in terms of sub-disciplines, works against the integrative thinking that is required to deal with real-world issues. Despite this being the case, indications are that the understanding of differences and diversity is emerging as key emphasis for Geography in the 21st century (Ibid). This requires recognition of multiple ways of 'knowing' and for Geography curricula to respond accordingly to allow students to develop a localised awareness of the complexities they are confronted with.

In the context of the challenges associated with global environmental change, sustainability is regarded as another emerging concern to be addressed by Geography. Since it is not possible to meet the 21st century challenges with knowledge and insights being fragmented between sub-disciplines, the need for an integrated approach to sustainability may pave the way for some long over-due changes to Geography curricula (Ibid:385). By addressing some of the major criticisms about sustainability, Integral Theory contributes towards better understanding of this concept. This relates to the four quadrant AQAL view of sustainability, equating a truly holistic perspective. In this way it is possible to interpret sustainability in terms of psychological, cultural, behavioural and systemic primary dimensions, with many more secondary dimensions at stake as well (Riedy 2005:70-71).

Comparison of the integral view of sustainability with the traditional ‘three pillars’ view, reveals several discrepancies (Ibid). A potential limitation seems to be that sustainability issues are mostly considered by focussing on developmental lines in the systemic quadrant, while largely ignoring the subjective quadrants (Ibid:71). Although some practitioners consider sustainability issues within the other three quadrants as well, an AQAL approach is rarely followed in practice. Integral Theory argues for epistemological balance between objective and subjective ways of knowing as only viable means to deal with the challenges humankind face. Since the presence of the same trend in Geography may affect the discipline’s ability to strengthen its position in EfS negatively, this constitutes a major line of investigation in this research, which needs to be scrutinised from various angles.

3.6 The research blueprint

3.6.1 Context – undergraduate Geography in South Africa

The context for this research is the landscape of undergraduate Geography in South Africa, displayed by the curricula of 17 Departments of Geography at South African universities (2014-2015) and as perceived by the members of staff associated with these departments. Since two of these departments are split between different campuses, with slight differences in the curriculum between the campuses, it was decided to analyse these separately. Curricula can be obtained from faculty yearbooks, which can be supplemented with information from departmental websites, all which are open domain. The undergraduate focus of this research connects with the influence that this level of study has on student's perceptions of any discipline, including Geography. Following Moore and Gilmartin (2010:329), a positive undergraduate experience may awaken interest in Geography and contribute to the belief that it is an interesting/engaging discipline. Since the majority of students leave university after the undergraduate phase, perceptions of Geography thus obtained will be transferred further. This also refers to positioning of Geography in EfS and the extent to which students are exposed to opportunities to contextualise learning in terms of sustainability. Adoption of this angle of inquiry will provide an intriguing perspective on undergraduate Geography in South Africa. While previous studies addressed the composition of the curriculum in terms of the systematic directions in Geography (e.g. Fairhurst et al 2003a; 2003b), this research explores the value of the curriculum in pursuit of EfS, and how this synergy, in which ever form it is manifesting, may be deployed to benefit both Geography and EfS.

3.6.2 Participants – lecturers at Departments of Geography

The systematic assessment of curricula is generally regarded as a useful approach to review the nature of curricula, the associated academic content and the implied theoretical positions (Grindsted 2013:11). However, it is difficult if not impossible, to obtain a complete picture without the views of those involved in the compilation, implementation and day-to-day application of these curricula, referring to lecturers at the respective departments. In total 36 geographers from 10 of the 17 Departments of Geography in South Africa participated in this research, either through completing a questionnaire or taking part in a focus group and/or individual interview. For more information on the participants in terms of representativeness criteria, please refer to Annexure 7. Note that in terms of ethical clearance and consent, neither the names of participants nor the institutions to which they are affiliated, are disclosed.

This research thus concerns an insider perspective on Geography, since the researcher is a geographer, the object being researched relates to Geography and the participants are associated with Departments of Geography as well. Despite the positionality introduced to the research through this approach, the insider perspective is appropriate since the integrity and future of the discipline of Geography is at stake. From this point of view those engaging with the discipline of Geography and with Geography students on a day to day basis, ought to be in the best position to provide input on the role of Geography in EfS and the direction to be taken in this regard. Furthermore the multidimensionality associated with the application of the AQAL model in the design of the data collection and analysis strategy will assist in countering the subjectivity associated with the insider perspective to a large extent.

3.6.3 Methodologies selected for data collection

3.6.3.1 Integral Theory as point of departure

A basic premise of the application of Integral Theory is that the associated 1st, 2nd and 3rd person methodologies (refer to Figure 3.1) need to be applied concurrently in any research-based investigation. A coherent picture of the research problem being investigated can then be formed by means of triangulation and cross-correlation of data obtained through application of the various methodologies, while making inside/outside observations of the collective interior/exterior and/or individual interior/exterior. Numerous approaches can be followed to make sure that 1st, 2nd and 3rd person methodologies are included in a research project, with the advantage of integral research that it is scalable. As explained by Esbjörn-Hargens (2006a:98-99), the basic premise of Integral Theory can be achieved by using as few as only three different methodologies (one per major category – listed in Table 3.1). The selection of methodologies for this research and how it complies with this premise is set out in the following sections (3.6.3.2 – 3.6.6.6).

3.6.3.2 Assessment of undergraduate Geography curricula

A systematic assessment of the undergraduate curricula offered by 17 Departments of Geography at South African universities, forms the basis of this research (refer to Annexure 1). This assessment focuses on the curricula as offered during 2014-2015, as published in the faculty yearbooks of the respective universities. The purpose of this assessment is to determine to what extent the composition of the modules comprising the curricula reflects the influence of the following divisions of and/or approaches relevant to Geography: Human Geography, Physical Geography, Integrated/Thematic Geography, Environmental Science/Management, spatial and/or quantitative/qualitative analysis, Cartography/Remote Sensing/GIS, a category for 'other' (Tourism and Meteorology) and lastly sustainability (as sustainability focussed or related or neither of these). Since curricula conform to the idea of a specialised system, this implies a systems analysis. The template that has been designed to capture the data resulting from this analysis of the curricula is shown in Figure 3.2. According to Integral Theory the methodology of systems analysis belongs to the right-hand side of the AQAL model and specifically the LR quadrant, known for objective 3rd person methodologies, in this case to explore the collective exterior from the outside.

3.6.3.3 Questionnaires to Departments of Geography

A questionnaire approach has been selected to obtain input from the staff members at Departments of Geography, who are the people involved with not only decision-making about the composition Geography curricula, but also with its implementation and with day-to-day interaction with students. The aim of the questionnaire (refer to Annexure 2) has been to capture reflections of staff members on the relationship between EfS and the teaching and learning of Geography at undergraduate level in their respective departments. Since the curriculum of any department should preferably be the outcome of deliberations between staff members, the questionnaire required a collated response from a small group of staff members per

Name of university				
Name of department				
Mission/vision	Vision: Mission:			
Role of department in MIT				
Disciplinary focus areas in department				
Degrees offered by department	Degree A	Degree B	Degree C	Degree D
First level modules	Module 1A Composition Sustainability	Module 1B Composition Sustainability		
Second level modules	Module 2A Composition Sustainability	Module 2B Composition Sustainability	Module 2C Composition Sustainability	
Third level modules	Module 3A Composition Sustainability	Module 3B Composition Sustainability	Module 3C Composition Sustainability	Module 3D Composition Sustainability
Estimate of curriculum composition in units, every module taken as 1 unit: H: y1 units; P: y2 units; I: y3 units; E: y4 units; S: y5 units; G: y6 units; M: y7 units; T: y8 units As a percentage: Example – H (%) = (y1 units/Y) x 100 [Y = y1 + y2 + y3 + y4 + y5 + y6 + y7+ y8] H (%) = ?; P (%) = ?; I (%) = ?; E (%) = ?; S (%) = ?; G (%) = ?; M (%) = ?; T (%) = ?				
Estimate of curriculum composition, relative to credit loading of modules: H: z1 credits; P: z2 credits; I: z3 credits; E: z4 credits; S: z5 credits; G: z6 credits; M: z7 credits; T: z8 credits As a percentage: Example – H (%) = (z1 credits/Z) x 100 [Z = z1 + z2 + z3 + z4 + z5 + z6 + z7+ z8] H (%) = ?; P (%) = ?; I (%) = ?; E (%) = ?; S (%) = ?; G (%) = ?; M (%) = ?; T (%) = ?				
Sustainability breakdown: Sustainability focused (SF): b1 units (d1 credits); Sustainability related (SR): b2 units (d2 credits); Not sustainability focused/ related (NS): b3 units (d3 credits) In terms of modules: SF (%) = (b1/Y) x 100; SR (%) = (b2/Y) x 100; NS (%) = (b3/Y) x 100 In terms of credits : SF (%) = (d1/Z) x 100; SR (%) = (d2/Z) x 100; NS (%) = (d3/Z) x 100				
Overall rating by researcher: Spatial/Quantitative/Qualitative focus: r1/5; Geo-information science focus: r2/5; Human-environment focus within sub-disciplines: r3/5; Human-environment focus within themes: r4/5; Exploration of linkages with environment-related and other sciences: r5/5; Sustainability coverage: r6/5; Merging of dominant identities associated with Geography: r7/5				
Key: Human Geography: H; Physical Geography: P; Integrated/Thematic Geography: I; Environ-mental Science/Management: E; Spatial/Quantitative/Qualitative: S; GIS/Cartography: G; Meteorology: M; Tourism: T				

Figure 3.2: *Outline of the template used to capture data about 17 Departments of Geography in South Africa, with focus on their undergraduate curricula*

department (with representativeness observed) and therefore not a response per individual. The response rate was not very good, with feedback that was received from six departments only – four departments completed the questionnaire, while two departments responded that they could not manage to do it. The Deparment of Geography at Unisa, to which the researcher is affiliated, was one of these four departments. As for the other departments, the researcher was not present when the staff members conveined to complete the questionnaire. All in all a total of 17 staff members from four Departments of Geography participated in the completion of the questionnaire. In terms of Integral Theory, this methodology belongs to the family of empirical observation techniques, utilised to obtain an objective, 3rd person view from the outside of observable behaviour, with the behavioural, UR quadrant of the AQAL model at stake.

3.6.3.4 Focus groups at selected Departments of Geography

In order to expand on the range and depth of perspectives on the research topic and because the feedback obtained via the questionnaire approach was inadequate in terms of the response rate, focus groups have been added as methodology to obtain additional supporting relevant data (refer to Annexure 3 for the focus group protocol). Focus groups are acknowledged as a valuable research tool for geographers to lead to new insights to both researchers and participants (Cameron 2011 cited in Winlow et al 2013:293). Departments to conduct focus groups with were selected based on their differing approaches towards the structuring and/or organisation of the undergraduate Geography curriculum. In total four focus groups were conducted at four Departments of Geography, all associated with institutions which have sustainability policies in place or with sustainability initiatives at institutional level. The Department of Geography at Unisa was one of the departments that participated. The focus group at Unisa was facilitated by the researcher and the same procedures than for the focus groups at other institutions were followed. Each of these focus groups covered about 90 minutes of semi-structured conversation. A total of 19 geographers participated in these focus groups. Departments that appeared not to be at all interested in the topic have not been considered, since it would not be possible to obtain valuable insights from them in terms of the research aim and objectives. Focus groups belong to the family of hermeneutical interpretative techniques, implying the LL quadrant of the AQAL model with emphasis on exploration of the collective interior from the inside with associated inter-subjective 2nd person methodologies.

3.6.3.5 Individual interviews with a selection of geographers

Compared to focus groups, which are valued for their ability to explore research problems within a participatory context, but subject to group effects (Kaplowitz 2002:238), individual interviews generate data in one-on-one settings. This is free from the influence of peer pressure or other potentially negative group effects (Ibid). The more flexible context of individual interviews is bound to reveal additional insights to those from focus groups. In this research, candidates for individual interviews have been selected to get a comprehensive view of the opinions from proponents of the various divisions and/or approaches in Geography, while considering seniority, age, race, gender, specialisation and NQF level/s of teaching. Follow-up individual interviews have also been conducted after focus groups, but these did not work very well because of time limitations and were therefore not continued right through. A total of 15 interviews were conducted – eight stand-alone, while seven were follow-ups after focus groups. The focus group schedule has been used as guide for individual interviews, although allowing more freedom in terms of the context of the response provided (refer to Annexure 3 for interview protocol). Individual interviews (subjective 1st person methodology) explore the outsides of individual interiors (UL quadrant of AQAL model), pointing towards structuralism as appropriate methodological family.

3.6.3.6 Self-inquiry and reflection by the researcher

With three decades of experience as lecturer in the Department of Geography at Unisa, including an active role as researcher on the scholarship of teaching and learning, and specifically the role of Geography in EfS (for example: Pretorius 2004, Zietsman and Pretorius 2006, Pretorius 2012, Pretorius et al 2015, Pretorius and Fairhurst 2015), the researcher is well-positioned to contribute towards the data pool for this research in terms of critical reflection on own experience. This inclusion of the researcher as a source of data in the research process is in line with the trend towards greater acknowledgement of personal agency and empowerment as a focus area in educational research approaches (Hart 2002:141). Narrative inquiry has been selected as strategy to unpack and present the relevant experience based perspectives of the researcher, with acknowledgement of the value-laden nature and subjectivity associated with such an approach (Ibid:159). This type of inquiry fulfils the criteria of phenomenological research, which is located in the UL quadrant of the AQAL model and entails a 1st person perspective on the insides of the individual interior.

3.6.4 Interpretation of levels, lines, states and types

The focus so far has been on the coverage of the four quadrants of the AQAL model in terms of IMP. Quadrants, however, constitute only the first of five recurring elements of an integral approach. Excluding any of these will result in a less comprehensive understanding of reality. The *developmental lines* for this research correspond to the view that Geography has aligned itself with academia in the 21st century according to four positions: the spatial-chorological vision, the human-environment condition as study object, the move towards cross-disciplinary linkages and the quest to merge disciplinary identities (Turner 2002:63-64). For this research, *levels* are conceived with reference to depth of consciousness and complexity of development been achieved by curricula, as viewed in terms of the four developmental lines. This depth/complexity is contextualised in terms of the worldview been taken during the process of curriculum development and implementation. Taking it a step further, consideration whether curricula are sustainability focussed or sustainability related or neither of these two options, provides a perspective in terms of different *‘states’* (linked to time-dependency), whereas *'types'* refer to the different manifestations of curricula on first, second and third year level.

3.6.5 Data organisation and verification procedures

Integral Theory (specifically the AQAL model) guides the data organisation and verification procedures that have been employed in this research. The 'lines' of the AQAL model (the four positions to which 21st century Geography can be aligned), forms the basic organising structure for the data sourced through the various methodologies. Starting with the LR quadrant, the systems analysis of curricula relies on the organisation of information per module and year level in a template, to be able to identify trends and to get an overall perspective. This information has been verified by means of feedback from departments on the completed templates, combined with comparison of information on departmental websites as well as in the newsletters of the Society of South African Geographes. Moving to the UR (behavioural) quadrant, the questionnaire to departments may seem to be an instrument to obtain empirical data, but has been used differently in this research. Since only four questionnaires were returned, the data obtained have been organised to identify emerging views and facilitate comparisons and not to calculate statistics. The interview and focus group data obtained with regard to the LL and UL quadrants have been transcribed and organised with the aid of an assistant and with guidance by the researcher. The assistant has a professional teaching qualification and several years of teaching experience. An additional assistant with a master's in Geography was used to finish off the transcription of the last few interviews. The researcher verified the transcriptions against the recordings to check for accuracy before commencing with the analysis of the transcribed texts.

3.6.6 Analysis and assessment approach

Within the structure provided by the AQAL model, the analysis and assessment approach that has been followed in this research supports a non-reductionist exploration to uncover the different ways in which 21st century Geography relates to

EfS. The implication of this non-reductionist approach is that the data have not been analysed empirically as would be required by rigid evidence-based assessment. A critical, postmodern framework for analysis and examination of the data has rather been utilised. In this framework the focus is on the interplay between 'the who' (linked to the epistemological stance taken by staff associated with the various Geography departments), 'the what' (linked to the ontological status assigned to the global environmental change issue through the various curricula) and lastly 'the how' (linked to the methodology employed by the 'the who' to engage with 'the what', and the different manifestations of EfS, if present). Within this framework results which initially may appear to be contradictory, can be interpreted in terms of different combinations of 'the who', 'the what' and 'the how', thus explaining the observation and existence of different enacted realities. The results of this analysis, supplemented with data obtained in terms of the various dimensions of the AQAL model, feeds into the final assessment, involving systematic consideration of the evidence at hand to facilitate the formulation of an informed set of conclusions on the current and future role of Geography in EfS.

3.7 Issues of quality

To ensure confidence in the eventual findings of this research, consisting of a qualitative enquiry, proper philosophical grounding is paramount (Hart 2002:143-144). This is because unlike quantitative research, different genres of qualitative research can be distinguished, each with its particular tradition of scholarship, through which the associated epistemology and ontology translate into a selection of specific research methodologies. In terms of Integral Theory, constituting the theoretical framework for this research, methodological rigour has been ensured through the mapping of the research space in terms of quadrants, levels, lines, states and types (refer to Sections 3.6.3 and 3.6.4). Integral Theory claims that these five elements are understood to be part of every moment of reality. Consideration of this spectrum of elements therefore ensures a comprehensive engagement with reality. Applying this to the research implies a thorough attempt not to exclude any of the main aspects concerning the problem at hand.

In the context of this research, with its reliance on critical, narrative inquiry as investigative strategy, trustworthiness and authenticity may be regarded as appropriate quality measures (Hart 2002:150). Trustworthiness can be interpreted as referring to the quality of findings, with authenticity referring to the nature and quality of the research process (Ibid). Assessment of the quality of the findings of this research utilises criteria such as truth value, consistency, applicability and neutrality. It furthermore relies on triangulation as well, and is embedded within the integral framework and the consequential variety of approaches (methodological, sampling and theoretical) being utilised in the investigation. In terms of the integral framework, the authenticity of this research is associated with adherence to the principles guiding IMP, namely non-exclusion, unfoldment and enactment, leading to the selection of appropriate methodologies for each of the AQAL quadrants (refer to Section 3.6.3), each with its own validity claims and modes of investigation.

3.8 Ethical considerations

With non-exclusion as foundational principle, implying that all legitimate perspectives offer some truth, adoption of Integral Theory as theoretical framework for this research presents some challenges. This specifically refers to dealing with diverse and conflicting constructs, ideas and information, with the choices to be made having implications for knowledge building and ethics. The resulting epistemic indeterminacy requires the research process to encourage participants to be open to and facilitate the incorporation of all relevant perspectives (including nonconforming aspects), to establish common understanding of key concepts and assumptions, to ensure that no hidden agendas are involved and to provide opportunity for reflection on the power dynamics involved. In the process of knowledge building and truth discovery about the role of Geography in EfS, this research is therefore entangled with ethical constructs as inclusivity, equality, integrity, sincerity, empathy and mutual regard, to mention a few (Murray 2008:9).

In terms of the ethical considerations outlined in the previous paragraph, this research has been conceptualised, planned and conducted within the framework and guidelines provided by the ‘Policy on research ethics’ of Unisa (2012). As required by the policy, ethical clearance for the research has been obtained through a formal application and presentation to the Ethics Committee of the College of Agriculture and Environmental Science. This application has been approved in November 2013 (refer to Annexure 5) after which the research commenced, with the provision that the guidelines for research involving human participants are adhered to and that the committee needs to be informed of any changes in the approved methodology. The approved application included draft consent forms and focus group and interview schedules. The ethics committee was informed in November 2014 that the methodology was adapted to include a questionnaire and that focus groups would no longer be conducted with students, but with lecturers instead (refer to Annexure 6).

3.9 Concluding remarks

The philosophical and methodological considerations intertwined with this research, has been highlighted in this chapter. To start off with, the nature of research on EfS and Geography in higher education, with reference to research orientations, has been reviewed. Linked to the increased concern about 21st century environmental change, it is evident that research on EfS is gaining momentum. Due to the diverse nature of the issues being faced, the need for flexibility in selecting appropriate paradigms/methodologies for research is recognised. Geography, on the other hand, lags in its contribution to EfS, despite the ‘Lucerne Declaration on Geographical Education for Sustainable Development’ (2007) and despite its notable contribution in terms of various aspects relating to sustainability research.

The notion that it is easy to identify, contain and address issues related 21st century environmental change is now accepted to be naïve. The limitations of postmodernism as a response to 21st century challenges are becoming clearer by the day, with the necessity of mutual understanding between perspectives increasingly being realised to be part of the ability to address environmental issues. Through a post-disciplinary model, Integral Theory provides an inclusive framework within which multiple perspectives on environmental issues can be incorporated to address the problems that the world is grappling with in a holistic way. Integral Theory therefore emerged as logical choice to ground this research philosophically, with acceptance of methodological pluralism as guiding principle.

The methodologies selected for data gathering provide coverage of the four quadrants of the AQAL model of Integral Theory. In this way coverage of all aspects of the realities with which this research is engaging with, is ensured. The ‘lines’, ‘levels’, ‘states’ and ‘types’ of the AQAL model have also been considered, and will be used to structure data collection, organisation, analysis and assessment, as well as the presentation of the results. Due consideration of quality and ethical aspects concludes this chapter, which also rounds off the first part of the thesis, providing the different dimensions of the contextual framework. The following part of the thesis deals with results, analysis and assessment, with the next chapter specifically exploring the landscape of EfS in undergraduate Geography in higher education in South Africa.

Chapter 4: EfS in undergraduate Geography in South Africa

“As we boldly stride towards a new South African democracy, the change and restructuring of the geography discipline is once again inevitable. The need for the restructuring of South African Geography is certainly recognised and a literature review reflects consistent calls for: better integration of the various sub-disciplines; improved interdisciplinary functioning; more proactive contributions for geographers towards a new South African democracy, and finally a more aggressive marketing of Geography as a professional vocation” (Nicolau and Davis 2002:17)

4.1 Introduction

An important objective of this research is to conduct an assessment of the inclusion of sustainability and EfS in the undergraduate Geography curriculums in South Africa. This assessment requires an investigation of the structure and organisation of the undergraduate Geography curriculum, including its philosophical and conceptual underpinnings and other ways through which it has been informed. The most recent comprehensive research on the state of the discipline of Geography in South Africa dates from the turn of the century (Fairhurst et al 2003a and 2003b). The latter research covered all aspects of the discipline and its practice, including the undergraduate curriculum, but did not focus on that exclusively. A review of the inclusion of sustainability in the Geography curriculum of South African universities, specifically at undergraduate level, has not been done before. This is in contrast to international experience, with examples supplied by the reviews of Bonney (2012) and Liu (2011) for the United States of America (USA) and Grindsted (2013) for Denmark. The lack of such reviews for South Africa implies that no secondary data was available for this research and that data on the undergraduate Geography curriculum in South Africa had to be sourced.

Before providing the details of contemporary undergraduate Geography curriculum in South Africa, an explanatory context must be provided. The first part of this chapter therefore positions undergraduate Geography in South Africa within its historical context, and then continues by dealing with the evolving nature of geographic thought in South Africa, and how this has informed the undergraduate curriculum. The second part of this chapter deals with the results of the assessment of the structure and organisation of the undergraduate South African Geography curriculum (2014-2015), with reference to the role of some contemporary developments. This includes the aspect of sustainability and the assessment of its inclusion in the curriculum. The methodology according to which these assessments have been conducted will also be elucidated in this part of the chapter. The results of these assessments form crucial input data for the integral analysis of the curriculum in terms of the four identified integral developmental lines (human-environment, spatial-chorological, cross-disciplinary linkages and merged identities) as presented in the following four chapters.

4.2 The historical context of undergraduate Geography in South Africa

4.2.1 Historical and epistemological grounding

Taking a historical look, Geography had strong ties with the teaching profession in South Africa over a long period. As a result most Geography graduates entered the teaching profession up to as recently as the mid-1990s (Fairhurst et al 2003b:82). Associated with political, social and economic changes that occurred in South Africa at that stage, the discipline transformed itself to serve a wider spectrum of vocations (Nicolau and Davis 2002:14). While still accommodating the needs of the teaching profession to an extent, contemporary Geography in South Africa focuses on a broad based education that involves both human and natural phenomena and their interactions, while engaging with appropriate theoretical frameworks, critical analysis and analytical work (Fairhurst et al 2003b:81).

In line with the international arena, undergraduate Geography in South Africa developed an identifiable structure and organisation (Ibid:82). Initially this was closely aligned with practices in the Anglo-American academic sphere (Nicolau and Davis 2002:13). However, growing distance between South African Geography and its roots gradually set in since the 1980s and continues to guide South African geographical discourse towards more local relevance (Ibid). Despite these changes, Geography (internationally and in South Africa) kept its basic structure of Physical and Human Geography, consistently over many decades. The challenge in this regard has been to retain focus on the coherence of the discipline, so that it is not perceived as having a compartmentalised approach and thus to be of lesser relevance to society (Ibid: 17).

4.2.2 Pre- to post-apartheid

The nature of undergraduate Geography at South African universities was greatly affected after 1948 with implementation of the apartheid policies of the government that came into power at that stage (Crush 1993:61). Separate universities that were organised along racial lines came into being, and as a result new departments of Geography were created as well. In sync with the government policy of that period, interaction between geographers from historically Black and White universities was constrained and of a very limited nature (Fairhurst et al 2003b:83). During the heydays of apartheid, the emphasis on quantification and the quest for so-called objectivity as part of an uncontested positivist framework meant that South African geographers did not really challenge the injustices of apartheid, while some even spent their energy to legitimise it (Magi et al 2002:1).

Initiatives to transform the South African socio-political landscape gained momentum towards the 1994 democratic elections, and continued thereafter. During this period specifically human geographers and to a lesser extent physical geographers, got involved to reverse the legacy of the racialised era in terms of the social, economic and spatial inequalities that came about as a result of apartheid (Ibid). These developments provided geographers with a multitude of opportunities to contribute to transformation in post-apartheid South Africa through relevant teaching and research (Nicolau and Davis 2002:13-14). With the new democracy in place, it has been observed that the emphasis of geographers shifted from a focus on protest to a focus on reconstruction and development, with aim to contribute positively through research and policy reflection to the post-apartheid future (Mather 2007:145-146).

4.2.3 Positioning of sustainability in the curriculum

The historical and epistemological context of undergraduate Geography in South Africa provides a clue of what could be expected in terms of transformation to sustainability. A positive influence is provided through the historical structuring of the discipline in South Africa according to the natural environmental setting as well as societal aspects (e.g. economic system, political framework, social structure) (Fairhurst et al 2003b:87). This structure resonates with the human-environment tradition of Geography, and implies direct linkages with sustainability (Turner 2002:59-61). Interrelationships between the various components of the environment and life-world was supposed to be dealt with in Regional Geography, but which gradually lost its flavour (Fox 2005:1). Instead, the various sub-disciplines of Geography developed increasingly on their own, leading to fragmentation, so that Fairhurst et al (2003:87) remark that “A means of unifying and integrating the discipline to meet it highest goal continues to elude geographers”.

4.3 The evolving nature of geographic thought in South Africa

4.3.1 North-South versus local dynamics

With inception of Geography in South Africa in the early 1800s, the colonial roots of the discipline were established firmly and eventually became largely institutionalised (Wesso and Parnell 1992 cited Ramutsindela 2001:34). As a result, Anglo-American models of geographic thought were taken over and were initially used uncritically by South African scholars in teaching as well as in research, despite the irrelevance of the majority of these models for South Africa (Simon 1994:296-300). From the 1980s, however, the Eurocentric link was increasingly challenged by geographers, leading to calls for decolonisation and development of a local Geography indigenous to South Africa (Ibid). The call for decolonisation resulted in two research traditions in human geography: the first focusing on the impacts of apartheid (Rogerson and Parnell 1989:16-19), with the second working towards Geography not "for" but "of" the black working class (Wellings and McCarthy 1983:337).

In sync with the neo-liberal transformation of South Africa's political economy from the first democratic elections in 1994 and thereafter, undergraduate teaching (also in Geography) responded by placing greater emphasis on global competiveness and the need to subscribe to the knowledge economy (Fataar 2003:34). However, questions were posed concerning the extent to which the scholarly drive to address the legacy of apartheid might be compromised by the imperative of globalisation (Mather 2007:144). The tension that has been created in this way is evident in teaching and research in university Geography in South Africa up to today (Ibid). Associated with this shift in emphasis, it is observed that instead of contributing to theory that is read globally, a situation developed in which South Africa is now rather spatialised as a case study and then used for theory building by the Anglo American geographical world (Oldfield and Patel 2016:3), which is a deficit in need of redress.

4.3.2 Shifting conceptualisations of progress

Assessment of the progress in South African Geography should be observed from different vantage points and utilise various indicators. In South Africa the peak of the political struggle in the 1980s, associated academic boycotts and calls for disciplinary repositioning, lead to heated debates on the direction of Geography in the local context (Ramutsindela 2002:6). The period up to the 1980s was characterised by descriptive approaches (Wellings 1986:121-122), positivism (Mather 2007:147) and limited theoretical engagement (Pirie 1985:480-481). However, socio-political conditions in South Africa required geographers to redefine their take on society and space to engage with the environmental, development and planning challenges forming part of the democratic transition of South Africa (McCarthy and Rogerson 1992:4). Conceptually the 1980s were therefore characterised by theory building and providing the local with legitimacy, thereby contributing to progress and reorientation of Geography in South Africa.

Undergraduate Geography in South Africa did not immediately respond to the scholarship drive referred to in the previous paragraph, but only about ten years onwards (Mather 2007:147). As the Geography curricula of many universities were largely uncritical and entrenched in quantitative, positivist approaches, pressure increased to replace it with approaches relevant to the needs of a changing South Africa (Ibid 146). At the same time higher education in South Africa was restructured by government to achieve rationalisation, which was accompanied by restructuring of Geography departments as well. At that stage Environmental Science and Environmental Management were added to many Geography departments, leading to the following comment by Fairhurst et al (2003a:97): "... incorporation of environmental science and environmental management into departments of geography is probably the most profound structural change to have taken place in contemporary South African geography."

4.3.3 Linkages with EfS

It stands to reason that the progress over the past fifty years or so, from viewing Geography within a positivist spatial perspective towards considering space and society within a more critical framework, served the standing of the discipline in South Africa well (Oelofse and Scott 2002:39). This transformed context improved opportunities for geographers to challenge the status quo and to explore and develop the theme of nature-society relationships, which is regarded as an important thread in binding the different sub-disciplines of Geography (Ibid:38). For Geography to be regarded as role player in environmentally related fields, including Environmental Management and EfS, this referred to integration is crucial (Sandham and Retief 2016:3; Pretorius and Fairhurst 2015:439-440). The several environmental challenges faced by South Africa are a key research focus of many South African geographers, and have become a feature of the undergraduate Geography curriculum. However, perpetuation of issues as the Physical and Human Geography divide and the lack in theoretical debate among local geographers (Ramutsindela 2002:9) constitutes an opposite force that continues to limit the contribution by Geography despite appeals in the past (Ramutsindela 2001:36).

4.4 The contemporary undergraduate Geography curriculum in South Africa

4.4.1 Elements of the curriculum as in 2000

Within the context of this thesis, the purpose is not to explore the historical development and organisation of the undergraduate Geography curriculum in South Africa. The focus is rather on the current (2014-2015) curriculum, with the situation in 2000 serving as benchmark. This is because an in-depth study on the state of Geography as a discipline in South Africa was conducted around the turn of the century, and subsequently published by Fairhurst et al (2003a). The latter study also covered the organisation and structuring of the undergraduate Geography curriculum in South Africa roundabout 2000. The information contained in the report by Fairhurst (2003a) therefore provides a comparative context for this research 15 years later, although the aim now is not to consider the curriculum as such, but how sustainability is featuring in it.

According to Fairhurst et al (2003b:87) the traditional division into Physical and Human Geography, each with their sub-disciplines, was still a prominent feature of the undergraduate curriculum by 2000. At the same time some structural transformations to the curriculum were emerging, mainly in response to various pressures experienced by society on different scales. Examples include 21st century environmental change, technological development, globalisation and educational transformation. Dissatisfaction with strict disciplinary structures and the shift in emphasis away from nomothetic science, contributed to this curriculum transformation. Identifiable additions in the 2000 curriculum therefore include Environmental Science/Management, Geographical Information Systems (GIS), skills training and integrated study programmes (Ibid).

Table 4.1 shows the proportionate contribution of the different major study areas identified by Fairhurst et al (2003b:88) to the undergraduate Geography curriculum in South Africa. The first striking observation is that Regional Geography, which was supposed to fulfil the integrative function at a stage, effectively disappeared from the South African curriculum by 2000. The impact of the societal concern over the environment clearly manifests in the curriculum, with the weight attached to Environmental Studies directly comparable to that of the traditional Physical Geography component. In 2000 the skills component of the curriculum ranked 4th at 16%, to a large extent reflecting the growth in popularity of GIS. This can also be interpreted as a response to add more emphasis on vocational training in the curriculum. The aggregated approach followed by Fairhurst et al (2003a) to consider the curriculum, however, masks the remarkable diversity present at the level of individual course/module titles. In South Africa this number has increased from 29 in

1970 to 173 in 2000, reflecting the outcome of postmodern curriculum structuring (Ibid:79)

Table 4.1: *Primary divisions in the undergraduate Geography curriculum in South Africa in 2000* (Adapted from Fairhurst et al 2003a:80, Table 4.4)

Primary division	%	Rank
Human Geography	37	1
Physical Geography	25	2
Environmental Studies	21	3
Skills	16	4
Regional	1	5

4.4.2 Methodology for assessment of the curriculum as in 2014-2015

Although the methodology used in the research by Fairhurst (2003a) to allocate courses/modules to specific primary divisions in Geography was not specifically stated, it appears to have been based on course titles, backed by information from faculty yearbooks. Furthermore, it appears as if each individual course/module might have been allocated in its entirety to a specific division in the discipline, and was therefore not split in terms of contributing to more than one division. For this research a slightly different methodology had to be designed, including consideration of course/module content. This more precise look at the curriculum is required to uncover different manifestations of EfS in undergraduate Geography in South Africa and to be able to relate it to main identities of and trends in the discipline.

It was therefore decided to make provision for the fact that although many courses/modules are focussed and can be allocated to a specific division and/or approach in Geography, this is not always the case. Many courses/modules are quite complex and to provide an objective assessment, it would be best to split them between relevant divisions and/or approaches. An additional consideration is that all courses/modules in a specific department do not necessarily have the same credit loading. In any assessment of their relative contribution to the total, this needs to be taken into account as well. In the last instance the initial screening indicated that the curriculum has become so diverse, that assessment results should rather be provided per department and not be aggregated for all universities together.

For this research it was decided to focus the assessment of the curriculum on the role of the following divisions and approaches in Geography: Human Geography (H), Physical Geography (P), Integrated/Thematic Geography (I), Environmental Science/ Management (E), spatial and/or quantitative/qualitative analysis (S), Cartography/ Remote Sensing/GIS (G) and a Category for 'Other' (O) – if other subjects are offered, as Meteorology (M) and Tourism (T). Assessment of the sustainability contribution to the curriculum is dealt with separately in Section 4.6. Figure 4.1 provides an outline of the protocol that was designed to make an assessment of the composition of the course/module offering of each department. The detailed results are supplied in Annexure 1, but presented in summarised form and analysed in Sub-section 4.4.3.

Course/Module information and assessment	Explanation
GEOG302 15 credits Semester 1 and 2	Course/Module code, credits (only supplied if modules carry different credit weights), period offered
Environment and resource planning and management	Course/Module title
Basic assessment: 0.5E + 0.5I	For the basic assessment, the course/module is regarded as 1 unit, irrespective of credit weighting. Interpretation: 50% (or 0.5 of 1) of this course/module is estimated to be aligned with Environmental Science/Management and 50% (or 0.5 of 1) of it is estimated to be aligned with Integrated/Thematic Geography.
Weighted assessment (in terms of credits): 7.5E + 7.5I	This line has been added for departments with varying credit weighting between courses/modules. Since the course/module in the example carries 15 credits, with its composition estimate 0.5E + 0.5I this can be expressed as follows in terms of credits: 7.5E + 7.5I

Figure 4.1: *Protocol followed in estimating the composition of a course/module (without reference to sustainability)*

4.4.3 Assessment results and interpretation

The results of the assessment of the undergraduate Geography curriculum in South Africa (2014-2015) in terms of divisions and approaches in the discipline are provided in Table 4.2 (percentage contributions) and in Figure 4.2 (graphically). A trend observed in 2000 (Fairhurst 2003a:81), which since continued to grow in importance, is the contribution by Environmental Science/Management. This is as high as 47.7% for UZ and 34.4% for UKZN, with both Unisa and WSU almost 30%. In addition, the growing demand for skills focussed training (Ibid) is continuing, so that the contribution by Cartography/Remote Sensing/GIS is quite high for a few departments (e.g. NMMU = 41%; UP = 35.7%; US = 31.2%). In terms of demands for vocational training, some departments offer subjects in addition to Geography, such as Tourism (e.g. UWC and UV - QQ). Amalgamations may also occur, with Geography merged into bigger departments. Synergies as these obviously benefit graduate’s employability. Example: The Department of Geography, Geo-informatics and Meteorology, UP. An observed trend is that departments with relatively high contributions in Categories E or G, are inclined not to rate that high in one or both of the traditional categories of Physical and Human Geography (e.g. H = 8.7% & P = 7.7% for UP; H = 5% & P = 9.4% for WSU; H = 15% & P = 7.2% for UKZN).

Integrated/Thematic Geography is a newcomer, and requires real world issues to be dealt with from a holistic perspective, involving Human and Physical Geography and application of relevant techniques. This approach resonates with the changing relationship between people and the environment due to globalisation and technological change, with compartmentalisation of Physical and Human Geography hindering effective engagement with such issues. Frontrunners in this category are Unisa (39.4%) and Rhodes (35%), with UCT (23.4%) and NWU - Potch (22.3%) noteworthy. For a relative new-comer on the scene, these percentages are significant, indicating the relevance of this approach, which will in all probability continue to grow.

Table 4.2: *Assessment of the undergraduate Geography curriculum in South Africa (2014-2015) in terms of various divisions and/or approaches*

Department	Weighted %-contribution of different divisions and/or approaches in Geography to the curriculum (2014-2015)						
	H	P	I	E	S	G	O
UP	8.7	7.7	6.4	8.2	7.1	35.7	26
UV (Bmf)	29.3	18.2	4.1	22.7	4.9	19.7	-
UV (QQ)	21.5	13.3	3	16.7	3.6	14.4	26.7
UJ	26.2	18.8	9.4	25	5.6	15	-
UZ	18.2	10.9	15	47.7	4.6	3.6	-
UL	16.4	23.2	6.3	14.8	12	27.3	-
Wits	27.5	14.7	12.3	32	2.6	10.9	-
Univen	20	24.3	18.8	5.5	14.9	16.5	-
Unisa	12.2	-	39.4	28.4	6.2	13.8	-
NWU (Potch)	19.3	18	22.3	6.3	7.3	26.8	-
NWU (Mfk)	23.7	23.3	14.3	3.7	11	24	-
UKZN	15	7.2	11.7	34.4	5	23.9	2.8
WSU	5	9.4	8.8	29.3	25.6	18.1	3.8
UFH	32.8	30	6.7	11.6	16.1	2.8	-
Rhodes	27.5	27.5	35	5	-	5	-
UWC	23	12.2	15.9	8.7	5.9	11.3	23
US	18.1	10.6	6.3	4.4	29.4	31.2	-
UCT	26.6	32.1	23.4	12.6	4.2	1.1	-
NMMU	15	12.4	8.5	15.1	8	41	-

(H - Human Geography; P - Physical Geography; I = Integrated/ Thematic Geography; E = Environmental Science/Management; S = Spatial/Quantitative/Qualitative; G = GIS/ Cartography; O = Other)

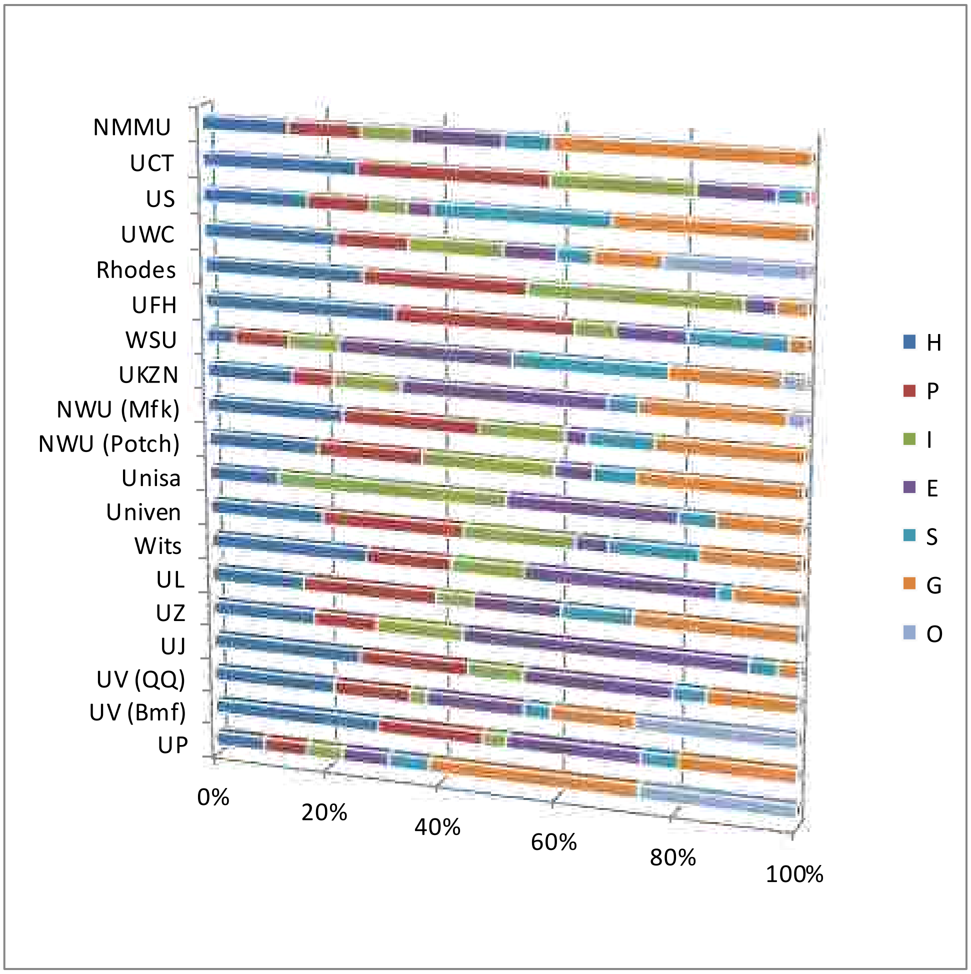

Figure 4.2: *Stacked column presentation of the contributions of various divisions and/or approaches to undergraduate Geography in South Africa, 2014-2015*
(H - Human Geography; P - Physical Geography; I = Integrated/Thematic Geography; E = Environmental Science/Management; S = Spatial/Quantitative/Qualitative; G = GIS/Cartography; O = Other)

For many departments, the traditional division in Human and Physical Geography still manifests very clearly, but with or without combinations with other approaches or divisions. The discussion in this paragraph illustrates the checks and balances at play in this regard. The first permutation presents itself as a relatively high contribution for both H and P, with all other categories less significant. The best example is provided by UFH, with H = 32.8% and P = 30%. The second permutation is where one of H or P is relatively high, but the other lower. Examples include UWC

(H = 23%; P =12.2%) and UL (H = 16.4%; P = 23.2%), although this permutation mostly manifests as H higher than P. In situations where P is quite low, a third permutation exists in terms of a combination with a higher contribution for E, and vice versa. Examples include Wits (P = 14.7%; E = 32%) and Univen (P= 24.3%; E = 5.5%). The fourth permutation that needs to be pointed out manifests as an equally significant contribution for H, P and I, with examples including UCT (H = 26.6%; P = 32.1%; I = 23.4%) and Rhodes (H = 27.5%; P = 27.5%; I = 35%).

A critical observation is that the spatial dimension, which is one of the hallmarks of Geography, does not seem to feature as prominently in its contribution to the curriculum as would be expected. Amongst other things this might be due to the fact that its contribution is partly incorporated in Category G (which includes GIS) and/or features in the form of sub-themes in Categories H, P and I, and could therefore not be identified through this assessment. Despite this possible constraining factor, the spatial dimension features as a significant contributor to the structure and organisation of the curriculum for US (29.4%) and WSU (25.6%), with UFH (16.1%) and Univen (14.9%) also noteworthy.

To conclude this subsection, the view per individual department of Geography which has been supplied here, showcases the astonishing diversity in the composition of the undergraduate Geography curriculum between the various departments and universities. This diversity appears to be an important New Age characteristic of the Geography undergraduate curriculum, as already highlighted by Fairhurst et al (2003a:79). For better or for worse, the days of guaranteed consistency and coherence in the curriculum appears to be gone for good. Together with that the ability of an individual geographer to have a good grasp of the totality of the undergraduate curriculum, also belongs to the past.

4.4.4 Implications for EfS

The organisation and structuring of the current (2014-2015) undergraduate Geography curriculum in South Africa have much to offer for EfS, although the presence of a few less positive aspects may hinder the development of this potential. Appearance of Integrated/Thematic Geography on the higher education scene in South Africa presents an aspect that can be regarded in a positive light. The integration between Physical and Human Geography together with the application of relevant skills advanced through this approach, all fits in well with EfS and its required overarching and holistic methodology to examine social and environmental needs and to look for solutions within the social, political, cultural and ecological domains (Bacon et al 2011:194).

From a certain viewpoint, the significant contribution of Environmental Science/ Management is positive in terms of EfS. This is because sustainability themes usually feature prominently in teaching and learning in these fields of study. Depending on the approach and focus, GIS related courses/modules may also provide opportunity for hands on engagement to address real-world sustainability problems and issues. Negative, however, is that the diversity of the curriculum may easily lead to a compartmentalised approach and over-specialisation, through which the potential value for EfS can easily be eroded and might not fully materialise.

4.5 Developments informing the contemporary undergraduate Geography curriculum in South Africa

4.5.1 Responding to emerging issues locally and globally

The response by South African geographers to the changing realities associated with apartheid and post-apartheid is not unique, with parallels that can be observed in debates in Anglo-American Geography about the relevance of geographical research, specifically about the desirability of applied and policy relevant work (Mather 2007:156). Although the initial response in terms of the curriculum might have been slow, emerging debates that emphasise access and responsiveness eventually lead to redesigned curricula reflecting the new democratic dispensation (Ibid:155). These opportunities, however, have not been fully embraced by local geographers, whose publications are largely based on local case studies with limited generalisation (Ramutsindela 2007:124). Due to the overlapping nature of teaching and research, this might point towards shortfalls in the undergraduate curriculum in need to be addressed.

In association with the democratic transition, global concern about environmental challenges had an increasing impact on the research activities of local geographers and likewise the undergraduate Geography curriculum. Oelofse and Scott (2002:43) specifically highlight this synergy between curriculum and research, with restructuring of programmes and teaching invariably pointing the way towards more applied research. Environmental problems and issues therefore evolved to the point where they form one of the key focus areas in which geographers are currently working, researching and teaching (Ibid:39). The challenges within which geographers are immersing themselves in South Africa, however, call for engagement beyond conventional academic communities, thus connecting with debates on community engagement, justice, morality and teaching in Geography, service learning, etc. (Oldfield 2007:104).

4.5.2 Accommodation of Environmental Science/Management

Mather (2007:149;151-152) highlights the relationship between the increased responsiveness of geographers in the post-apartheid era to factors as policy thrusts, the changing student profile and vocational demands, to mention a few. In several universities this lead to Geography departments being included in amalgamated departments/programmes, often associated with the broad category of Environmental Studies. A common response by Geography departments has been to offer programmes in Environmental Management, GIS, Tourism and Local Economic Development (Nel 1998:7). Although this trend contributed to make the discipline more attractive in terms of career prospects, South African geographers expressed concerns about the possible loss of integrity of local geographical scholarship and teaching (Magi et al 2002:1-3). The extent to which the increased focus on environmental sustainability at institutional level has contributed to the greater emphasis on Environmental Science/Management in Geography curricula is not clear, although bottom-up approaches rather than policy imperatives seem to be the main driver of inclusion of sustainability aspects in the curricla offered by South African universities (Leal Filho et al 2018).

It is now clear that although some of the concerns mentioned in the previous paragraph might be justified, some positive spin-offs are evident as well. An example of the latter is the role of Geography in Environmental Assessment (EA) practice in South Africa. Sandham and Retief (2016) report that "...it appears that Geography has become the principal disciplinary home of EA in terms of both training and research." Fairhurst and Pretorius (2015:446) also report a positive experience, with Geography maintaining its integrity despite its role as anchor discipline in the undergraduate Environmental Management Programme (EMP) of Unisa. On a negative note, the horizon scan of Environmental Science in South Africa (Schackleton et al 2011), presents the other side of the coin by totally ignoring the role of Geography in engaging with environmental issues and systems in South Africa.

4.5.3 Growth of GIS as a major field of study

By the turn of the century, and probably even before, it became clear that the application of GIS in a variety of contexts was not only impacting majorly on Geography as discipline, but also on how society perceives the value and use of geographical information (implying spatial information) in support of decision-making (Zietsman 2002:30). Although the knowledge base for GIS is rooted in the disciplines of Geography as well as Information Systems/Computer Science, it also relies on a number of other disciplines/fields of study. Establishment of GIS as a field of study separate from Geography, as being advocated from time to time, might hold negative consequences for Geography (Ibid:33). This will encourage competition for students and resources, with the links between GIS and industry undoubtedly placing it in a better position.

Although valid, strong academic reasons for the inclusion of GIS in the undergraduate Geography curriculum can therefore be put forward, vocational needs and market pressures seem to be the prime drivers spearheading the development of this field of study. This leads to several concerns among the members of the Geography fraternity about the role of GIS in Geography. These are very similar to the concerns expressed about the accommodation of Environmental Science/Management in Geography (Fairhurst et al 2003a:106). Fairhurst et al (2003b:87) verbalises these concerns as follows: “The major hazard is the undermining of the scientific bases of the discipline and the substitution of applied vocational training. This process has already become strongly apparent in the curricula of several universities”.

4.5.4 Implications for EfS

The response of the undergraduate Geography curriculum in South Africa to the developments outlined in this sub-section, is mostly associated with positive spinoffs for EfS, no matter what perspective is taken. This includes reference to the flexibility and responsiveness of Geography to evolving issues, which characterises the discipline as dynamic and not stuck into past ways of thinking and doing. For EfS, which recognises the importance of context and that one size does not fit all, the drive in the discipline towards relevance in the local context and to develop geographical scholarship that reflects on and engages with the new democratic dispensation in the country, is equally appealing. The accommodation of

Environmental Science/Management and GIS by Geography does not present any issues from the perspective of EfS, and provides an indication that Geography is part of the shift in the 21st century knowledge landscape, recognising that issues and problems can no longer be addressed within singular disciplinary spaces. It is up to the Geography fraternity to decide how to meet these challenges and developments without compromising the integrity of their discipline.

4.6 Introductory review of the inclusion of sustainability in the undergraduate Geography curriculum in South Africa

4.6.1 Debating the need for inclusion of sustainability in the curriculum

Since establishment of the relationship between education and sustainability at the 1972 Stockholm Conference on the Human Environment, numerous policies, strategies and declarations followed promoting inclusion of EfS into as many as possible disciplines (Jahn et al 2011:22). In 2007 the IGU committed to sustainability with the 'Lucerne Declaration on Education for Sustainable Development' (Haubrich et al 2007). This declaration points out that almost all of the UNDESD action themes have a geographical dimension, e.g. environment, biodiversity, climate change, intercultural understanding, etc. For this reason "... it is necessary that the paradigm of sustainable development will be integrated into geography research and teaching at all levels and in all regions of the world in the right manner." (Ibid:28)

Geography therefore seems to be regarded as a suitable platform for sustainability studies by scholars within and outside the discipline. As reported by Bonney (2012:15), this relates to the alignment between sustainability and the human-environment identity of Geography. This does not exclude the spatial-chorological identity of Geography, with the relevance of spatial and place-based perspectives and approaches in addressing sustainability issues being acknowledged (Turner 2002:57). Despite recognition that Geography has a pivotal role in sustainability studies, and despite significant contributions by geographers to sustainability research, the integration of sustainability in the Geography curriculum is lagging behind (Grindsted 2015b:15). But what is the situation at South African universities?

4.6.2 Examples of the inclusion of sustainability in the curriculum

Sustainability is addressed in various ways in the undergraduate Geography curriculum in South Africa. The first permutation is that it commonly features in an *ad hoc* way as sub-theme in courses/modules, wherever it might be applicable and/or relevant. This, however, is not well-planned, lacks visibility and is not the type of engagement foreseen by the Lucerne Declaration. Example: A course/module dealing with the Geography of rural areas (eg. GEO344 offered by UV), which might include sustainability content, but not necessarily. Closer inspection of GEO344 reveals that it covers aspects of sustainable development, but which might have been overlooked in an initial curriculum assessment. Because it is dealt with as a sub-theme, the weight attached to it can be adjusted fairly easily as well.

The second permutation involves courses/modules packaged in such a way that it showcases their sustainability association. Such offerings typically address themes as the impacts of human activities on the environment, the management of the environment or sustainable development. Some examples include: *Environmental Management* 2A/3A/3B (ENM2A10/3A10/3B10) offered by UJ, *Theory and practice in sustainability science and sustainable development* (GEOG3023) offered by Wits and *Soil erosion and land degradation* (ENVS315) offered by UKZN. The third permutation is where sustainability is used as a thread, binding all the courses/modules in the curriculum together, with Unisa as example, although this is not very common in South Africa.

Course/Module information and assessment	Explanation
GEOG302 15 credits Semester 1 and 2	Course/Module code, credits (only supplied if modules carry different credit weights), period offered
Environment and resource planning and management	Course/Module title
Basic assessment: **0.5E + 0.5I; 1SF**	For the basic assessment, the course/module is regarded as 1 unit, irrespective of credit weighting. Interpretation: For explanation of 0.5E + 0.5I (indicated on the left side of the semi colon), refer to Figure 4.1 Following the semicolon, 1SF means the whole module can be regarded as sustainability-focused. If 50% of the module was sustainability-focused and the other 50% not sustainability-focused or -related, it would have been indicated as follows: 0.5SF + 0.5NS
Weighted assessment (in terms of credits): **7.5E + 7.5I; 15SF**	This line has been added for departments with varying credit weighting between courses/modules. In the example provided, the course/module has a weight of 15 credits. The allocation of these credits between E and I (indicated on the left side of the semi colon) has already been explained in Figure 4.1. Following the semi colon, 15SF is the result of the fact that the whole module is sustainability-focused, and carries a weight of 15 credits.

Figure 4.3: *Protocol followed in estimating the sustainability component of a course or module* (SF = Sustainability-focused; SR = Sustainability-related; NS = Not Sustainability-focused/related)

4.6.3 Methodology for assessment of inclusion of sustainability in the curriculum

The assessment of the inclusion of sustainability in the undergraduate Geography curriculum in South Africa utilised the sustainability characteristics of the *Sustainability Tracking, Assessment and Rating System (STARS)* (AASHE 2012). The *STARS* curriculum section (Category 1, Education and Research – ER) distinguishes between sustainability focussed and sustainability related courses/modules. Despite criticism on lack of clarity concerning the ‘sustainability related' category, it was decided to include it in this assessment in order not to omit any important information, since it was suspected that the 'sustainability focussed' category would not rate very high.

Through a thorough grounding in sustainability concepts and principles, sustainability-focused courses/modules engage students with interactions between different dimensions of sustainability. Students are also skilled to make connections between different components of sustainability, in order to deal with complex issues. Sustainability-related courses/modules, assist in building knowledge about a component of sustainability or provide an introduction to sustainability concepts as part of a course. In-depth knowledge of particular aspects of sustainability or a focus area for a student's sustainability studies may also be provided (AASHE 2012:43-46). Figure 4.3 provides an outline of the protocol that was designed to make an assessment of the inclusion of sustainability in the course/module offering of each department. The detailed results are supplied in Annexure 1, but presented in summarised form and analysed in Section 4.6.4.

4.6.4 Assessment results and interpretation

The results of the assessment of the undergraduate Geography curriculum in South Africa (2014-2015) in terms of inclusion of sustainability are provided in Table 4.3 (percentage contributions) and in Figure 4.4 (graphically). It is obvious that the sustainability contribution to the curricula of many, if not the majority of Geography departments in South Africa is not very substantial. If the 'sustainability-related' category has not been included, the weighted %-contribution of different aspects of sustainability to the overall curriculum of departments would be less than 10% and in some cases close to 5% and even lower for seven departments – UP, UV (Bmf), UV (QQ), Univen, UFH, Rhodes, UWC and US. The average sustainability-focused contribution to the curriculum per department is 13.5%, with the average sustainability-related contribution 20.1%. Taken together, the average sustainability-focused and sustainability-related contribution per department is 22.9%. However, significant variations are observed, such as the sustainability-focused contribution varying from as low as 0% (Rhodes and US) to as high as 31.35 (Unisa). The sustainability-related contribution shows equally significant variations, from as low as 5% (LU) to as high as 50% (Unisa).

Table 4.3: *Assessment of the undergraduate Geography curriculum in South Africa (2014-2015) in terms of sustainability*

Department	Weighted %-contribution of different aspects of sustainability in the undergraduate Geography curriculum (2014-2015)		
	SF (Sustainability-focused)	SR (Sustainability-related)	NS (Not sustainability-focused or related)
UP	8.9	8.3	82.8
UV (Bmf)	9.1	23.8	67.1
UV (QQ)	6.6	27.5	65.9
UJ	25	9.4	65.6
UZ	13.6	33.2	53.2
UL	13.6	5	81.4
Wits	23.6	15.2	61.2
Univen	7.1	23.5	69.4
Unisa	31.3	50	18.7
NWU (Potch)	12	16.7	71.3
NWU (Mfk)	13.3	4.7	82
UKZN	14.4	23.9	61.7
WSU	26.3	14.4	59.3
UFH	3.3	31.7	65
Rhodes	0	36.7	63.3
UWC	5.6	19.8	74.6
US	0	13.8	86.2
UCT	21.3	23.7	55
NMMU	19.2	2.4	78.4

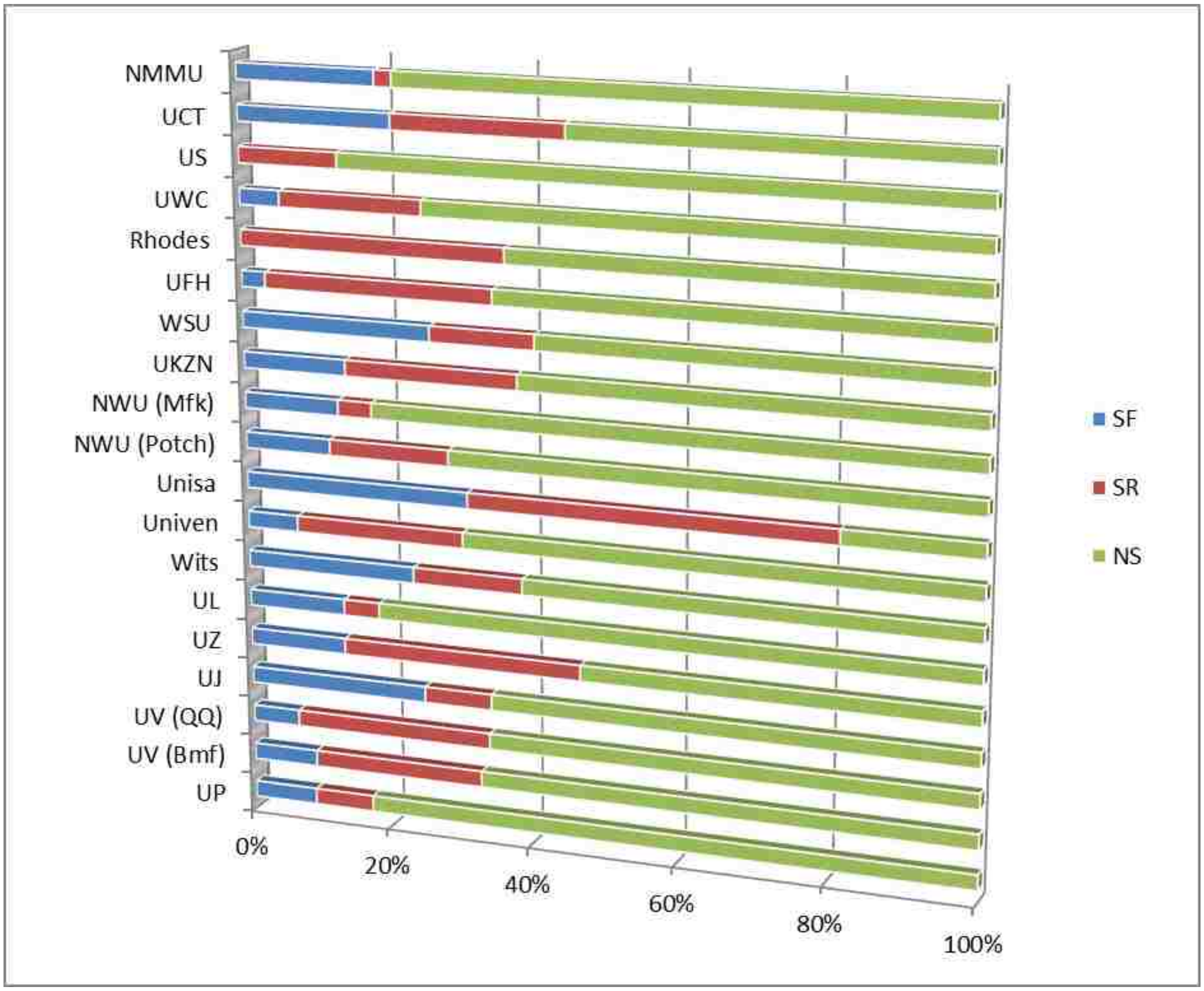

Figure 4.4: *Stacked bar presentation of the sustainability component associated with undergraduate Geography in South Africa, 2014-2015* (SF - Sustainability-focused; SR - Sustainability-related; NS - Not sustainability-focused or -related)

Focusing on the departments with very high or low sustainability contributions, associations can be drawn between these characteristics and the way in which the curriculum for such departments has been compiled. The first important permutation is that departments with a relative high weighting for E and/or I, such as Unisa, Wits, UZ, UKZN, WSU and UCT are inclined to show the highest sustainability contributions. For a department as Unisa, with a relative high weighting in both E and I, this effect is rather pronounced. The second important permutation is that departments with a relative high weighting for G, such as UP, US, NMMU and UL, show relative low sustainability contributions. Obviously these are only general observations, with many exceptions, especially for departments occupying the middle ground and with more diversity in the curriculum.

4.6.5 Taking an integral view

The fragmented imagery emerging from the preceding assessment of the undergraduate Geography curriculum in South Africa in terms of different approaches and divisions forms a sharp contrast with the integral view. The integral view is not focussed on determining right versus wrong, but acknowledges the validity of all opinions, ensures that all available definitions and approaches are equally considered and also accepts all types of justifications (Brown 2005a:6). Such an inclusive approach is helpful to address the very real issue of fragmentation in the undergraduate Geography curriculum, especially in terms of the theory–practice divide. Curriculum development within the broad, all-encompassing framework provided by the integral view works against sub-disciplinary fragmentation and over-specialisation and creates a suitable platform for capacity development to engage meaningfully with sustainability issues and problems.

The relatively low percentage contribution of sustainability to the undergraduate Geography curriculum, of which the bulk is situated in the category 'sustainability-related', does not resonate very well with the integral view either. This is because 'sustainability-related' refers to building in-depth knowledge about particular aspects of sustainability rather than focussing on overarching connections and interactions – the essence what sustainability is about. From the integral perspective, more focus on the 'sustainability-focused' category will be required in order to be able to address sustainability issues more effectively, because it includes multiple dimensions of reality. The logic is that the more is known about the way consciousness, behaviour, culture and systems affect sustainability, the more effectively interventions can be designed and implemented (Ibid:14).

4.7 Conclusion

This chapter provided a mapping of the landscape of undergraduate Geography in South Africa. This mapping utilised two approaches. Firstly the nuances informing the undergraduate curriculum was considered based on a reflection of relevant literature. Secondly, the results of an assessment of the approaches and divisions in the undergraduate curriculum of 17 South African departments of Geography (2014-2015) were presented and reflected on. The literature based reflection points towards the dynamic, responsive nature of the undergraduate curriculum, especially with regards local forces as the democratic transition in South Africa, larger scale forces as globalisation and trends and developments in academia, but specifically in Geography.

The assessment of the curriculum at the 17 departments of Geography at South African universities reveals a marked diversity of approaches and divisions in the discipline, which is in line with curriculum structuring in the postmodern era. Relative new additions to the curriculum by 2000 such as Environmental Science/ Management and GIS, since then settled in and have by now became dominant features in undergraduate Geography at many South African universities. Examples of departments with a relative high weight for GIS in the curriculum include NMMU, UP and US. For Environmental Science/Management, prominent contributions to the curriculum are evident for UZ, UKZN, WSU and Unisa. Integrated/Thematic Geography is a newcomer, with frontrunners in terms of Unisa and Rhodes, and to a slightly lesser extent UCT and NWU (Potch).

The sustainability contribution to the curricula of many of the Geography departments in South Africa is not very substantial. This is despite the fact that a significant number of South African universities have already or are in the process to adopt sustainability policies at institutional level (Leal Filho et al 2018). Although significant variations can be observed, the average sustainability-focused contribution to the curriculum per Department of Geography is 13.5%, with the average sustainability-related contribution 20.1%. An interesting observation is that departments with relative high weighting for E and/or I, tend to show the highest sustainability contributions. On the other hand, departments with a relative high weighting for G, tend to show relative low sustainability contributions.

The following three chapters critically examine different approaches to EfS in undergraduate Geography in South Africa, representing three of the development lines (with reference to the AQAL model of Integral Theory) that have been identified for this research, namely the human-environment identity (Chapter 5), the spatial-chorological identity (Chapter 6) and the trend towards interdisciplinary linkages (Chapter 7). The quest to merge disciplinary identities (the fourth development line), will be dealt with in Chapter 8 as part of the concluding section of the thesis.

Chapter 5: The human-environment identity of Geography and EfS

"To get to the point: what role might pedagogy – especially at undergraduate, but also at masters level and in doctoral training – play in fostering engaged pluralism? What encouragement does university education provide for those wanting Geography – within and across its two heterogeneous 'halves' – to be more than a nominal entity chock-full of non- or weakly communicating parts?" (Castree 2012:301)

5.1 Introduction

The integral development theme explored in this chapter constitutes the manifestation of EfS in association with the human-environment identity in Geography. For many scholars, an integrated view of phenomena on Earth, that comprises elements from the physical and human/social sciences, is at the heart of Geography – with Harvey (1969:159) often quoted in this regard. Over time the manifestation of the human-environment identity of Geography has taken many turns, and is currently considered by some to be under reconfiguration again (Grindsted 2013:18). This has been, motivated by the environmental dilemma associated with the 21st century and the increasing importance of sustainability and associated discourses. Despite this global trend, not all geographers attach the same importance to the synergy between the human-environment identity and sustainability and thus do not necessarily align their teaching and research accordingly.

This chapter commences with an exploration of the roots, evolution and current position of the human-environment identity of Geography, followed by an analysis how this identity manifests in undergraduate Geography. The next section maps and reflects on the linkages between the human-environment identity and EfS, and in this way sets the scene for an associated assessment of South African undergraduate Geography. The focus will be on those sections of the undergraduate Geography curriculum at South African universities that are aligned with the human-environment identity and to highlight sustainability linkages. The assessment is based on the AQAL model of Integral Theory (discussed in Chapter 3). The information obtained through third, second and first person engagements are shared with the reader by referring to the nature of sustainability inclusion (integral state), study year of inclusion (integral type) and depth achieved (integral level). A synthesising analysis and discussion, with reference to the integral view, rounds this chapter off.

5.2 The human–environment identity of Geography in context

5.2.1 Historical roots

The roots of the human-environment identity of Geography can be traced to the ideas and work of Alexander von Humboldt (1769-1859). Although Von Humboldt did not explicitly advocate for a human-environment identity, a large part of his work focussed on understanding how different phenomena, including human and natural activities give rise to an ordered, functioning landscape. In addition, according to Turner (2002:56), Von Humboldt's work (including his recognition of geognosy that is referred to as Earth Science today) pointed towards Geography positioning within the systematic sciences. Taking Von Humboldt's work further, Frederick Ratzel (1844-1904) was more explicit in his appeal for Geography as a systematic science, with human-environment relationships as specific study phenomenon.

Von Humboldt and Ratzel were not alone in their viewpoints, with Schouw (Denmark; 1789-1852), Reclus (France; 1830-1905) and Kropotkin (Russia; 1842-1921) among the earlier proponents of a focus on human-environment relationships in Geography (Ibid). Support for the value of this identity was also expressed by some German scholars, notably Penck (1858-1945) and Schlüter (1872-1959), although they interpreted it very much along the lines of a landscape focussed identity (Ibid:57). While Ratzel advocated for synergy in the two components of this relationship, there were differences in opinion on the direction of the flow of the in-between interaction, with debates on nature versus culture (i.e determinism versus possibilism) as most dominant factor at the order of the day (Christiansen 1967 cited Grinsted 2013:13).

5.2.2 Evolution over time

When considering the history of Geography's human-environment identity, it is clear that it did not develop in isolation but evolved over a period of time in terms of conceptualisation and methodological approach (Grindsted 2015a:321). In this evolution, linkages with the spatial-chorological identity of Geography (to be considered in the chapter 6) are clear and have been explored at various stages. This varies from the recognition by human-environment proponents as Von Humboldt and Ratzel that all landscapes are bounded areas and need to be analysed as such, to the higher level fusion of the two identities by French geographers as Vidal de la Blache (1845-1918) and Jean Brunhes (1869-1930), who emphasized the necessity of place-based approaches if regarding the human-environment condition as the substance of Geography (Turner 2002:57).

Grindsted (2015a:321) distinguishes several "tides and waves" in the evolution of the human-environment identity of Geography, that at times are associated with "a mosaic of understandings often in opposition to other geographical representations". A well-known example is the debates on environmental determinism in the 18th and 19th centuries. This triggered the switch to positivism, in order to counter what was regarded at that time as the 'speculative science' associated with determinism. The effect of the mechanistic view of reality which thus developed was to ontologically separate society and nature (Ibid: 322). More recently the cultural or linguistic turn triggered critique of the way in which nature and its relationships with society is conceptualised, which cannot necessarily be regarded as neutral or objective (Ibid).

5.2.3 Current position

The current prominence of 21st century environmental change together with recent developments in geoscience and growing awareness of the ever-increasing impact of humans on Earth, aligns well with Geography's human-environment identity and its value for society (Castree 2015:5). Illustrative in this regard are the views of Harden (2012:745) (at that stage president of the American Association of Geographers), that different framings of human-environment interactions constitute a core area of Geography. But it is not business-as-usual and based on a story linking Geography's past with present opportunities, Harden (2012) highlighted the need for geographers to cross the physical-human divide, which will empower them to produce the integrated, relevant knowledge that is required to address issues related to environmental change.

Despite the prominence of the human-environment problematic not only in higher education, but also in the world at large (Castree 2015:5), geographers up to now largely failed to reach over and across sub-disciplinary and methodological chasms to get their message to the world and humankind across (Rapley 2012 cited in DeLyser and Sui 2014:303). Instead, geographers seem to prefer to engage with the human-environment theme in variety of ways, described by Grindsted (2015a:231) in the following way: “Some geographers conceptualise the human-environment theme more or less ad hoc, implicitly or explicitly, whereas others organise it in constructs separating human and nature or build certain interfaces.” At the same time, however, some geographers not only aspired to but also practice engaged pluralism, thus contributing to the reconfiguration of the sub-disciplinary matrix in their own way (Castree 2012:299).

5.3 Manifestations of the human-environment identity in undergraduate Geography

5.3.1 Entrenched dualism

The nature-society nexus features as a focus in the undergraduate curricula of many Geography departments. A division between Physical Geography and Human Geography is however apparent (Reinfried and Hertig 2011; Ziegler et al 2013:252). This ontological dualism has been organising teaching, learning and research in Geography over a long period of time (Castree 2015:4). Its roots can be traced to the reaction against and the replacement of determinism with the mechanistic-universal perspective associated with logical positivism, focussing on generalisation rather than contextualisation and which directly impacted on geography curricula. Physical and Human Geography thus gradually drifted apart, which became a trend institutionalized in terms of research and curricula (Demeritt 2009a:128). This aligns well with the normative ideal that specialisation is required in order to be regarded as an expert and to be rewarded as such (Ziegler et al 2013: 252-253).

Despite its pervasiveness, Simanden (2005:31-32) maintains that for reasons related to amongst other things ethics and epistemology, the death of the physical-human division in Geography is long overdue. He suggests that this division is closely aligned with the ontological dichotomy characteristic of the European tradition, tolerating no hybrids to exist between polar opposites. The resulting layered approach of understanding the world has been largely damaging to Geography’s integrative narrative, which is accepted to be a binding theme for the discipline (Castree 2015:5). An alternative portrayal of knowledge better aligned to the imagery of a complex, chaotic world (Urry 2003) is therefore required. This could imply a move to unconventional boundaries for foci, i.e. rather distinguishing between descriptive, theoretical and ontological Geography, than physical-human oversimplification (Simanden 2005:53).

5.3.2 Emergence of integration and beyond

Recent trends in the structuring of undergraduate Geography curricula resonate with calls for the discipline to improve its alignment with the integrative nature-society narrative, including the need to engage with the many possible forms of enquiry that are available to frame the issues Earth and humankind are grappling with (Castree 2015:1 & 8-13; Demeritt 2009a:127-129). Some refer to this as "Geography's new turn to synthesis and holism" (Sui and DeLyser 2012:112), with so-called 'hybrid geographies' positioned well to give form to the required synthesis by displacing boundaries between divisions, thus working towards creation of something that is ontologically new (Rose 2000:364). In this way increasing numbers of geographers are attracted to cross the physical-human divide, also in curricula, thus providing opportunity for re-invigoration of the human-environment identity (Sui and DeLyser 2012:114-115; Castree 2016:341-342).

Expanding on the arguments that are voiced concerning a divided Geography, Demeritt (2009b:5) noted that the heterogeneity that is part and parcel of Geography implies the existence of not only one, but multiple potential divides in the discipline Therefore the physical-human divide should not be overemphasized and not be regarded as the only or most important issue that could drive the different sub-disciplines of Geography apart. In fact, Goudie (2016:1) reports on the increased visibility of integration in the discipline, with themes as the following providing opportunities for physical and human geographers to cross the divide, and which they are indeed pursuing: Hazards and disasters (including resilience and vulnerability), global change, Earth System Science, human impacts, the Anthropocene, environmental history and environmental influences on history and the study and appreciation of the landscape.

5.3.3 Combined/mixed approaches

The reality in many Geography departments is that while some staff members continue to specialise in Human or Physical Geography (or even sub-specialisations thereof), other staff members are working towards increased integration within the discipline. This unfortunately contributes to undergraduate Geography curricula that appears to consist of a proliferation of a number of weakly interacting and fragmented component parts, with no overall, binding narrative (Castree 2012:300-301; Harrison et al 2004:439). Ideally the undergraduate curriculum being offered should not only be linked to but also support the central narrative projected by the discipline of itself. For Geography to gain a foothold in academia as a truly integrated discipline, pertinent choices regarding curriculum composition is required. The discipline simply cannot continue to perpetuate separateness and sub-disciplinary specialisation, while at the same time presenting itself in terms of a narrative of integration (Harrison et al 2004:439).

Many Geography departments do not offer a comprehensive curriculum that aims to fully develop the human-environment identity of the discipline (Yarnal and Neff 2004:30). This is largely in conflict with and despite the fact that we are witnessing an era during which more physical and human geographers as well as geo-information scientists in particular are participating jointly in research projects about 21st century environmental change and other complex issues directly related to human-environment interaction. What is required, however, is not simply more collaboration between these sub-fields or the mere addition of extra courses or modules, but rather a merger of the different epistemologies and narratives being utilised to create a revamped human-environment tradition that integrates the social, economic and political debates in Human Geography with the expertise of and debates among physical geographers and among geographic information scientists." (Ibid:29)

5.4 Linkages between the human-environment identity and EfS in undergraduate Geography

5.4.1 Different perspectives and approaches

An important observation at this stage is that although research by geographers in the context of the human-environment identity is thriving, and being recognised for its contribution from outside Geography, evidence related to the development and implementation of human-environment pedagogy in the discipline is weak (Yarnal and Neff 2004:28,30). One such approach would be EfS (also referred to as ESD), with the IGU that already committed support to EfS with the “Lucerne Declaration on Geographical Education for Sustainable Development” as long ago as 2007 (Haubrich et al 2007:243-250). Despite this development, the human-environment identity of Geography is still not viewed and/or implemented in the same way and to the same degree in teaching and learning by all geographers. Neither do all geographers who are involved in work related to this identity, necessarily conceive their work in terms of sustainability (Grindsted 2015b:14).

Due to the required integrated, holistic view of the environment and environmental issues that are an integral part of EfS, it will clearly be challenging for Geography departments with their present academic offerings that are closely aligned towards a division between Physical and Human Geography (and their further sub-specialisations), to adopt and implement EfS. However, for Geography departments taking an integrated view of the human-environment identity, there is ample common ground between the discipline and EfS, with nearly all of the themes of the UNDESD that have a geographic dimension (Grindsted 2013:6). Gradual incorporation of sustainability applications and eventual adoption of EfS may therefore support the much needed move towards more integrated approaches in teaching and learning in Geography, with the physical-human divide less prominent.

5.4.2 Ambiguities and inconsistencies

Clearly, some geographers view the human-environment theme as a suitable vehicle to link Geography and EfS (e.g. Jahn et al 2011:21). However, criticisms by some scholars regarding the validity of sustainability (and especially sustainable development) as a concept, presents a dilemma (Grindsted 2015a:323). Other observations include that sustainability features implicitly in Geography, or that other concepts may be better suited to study geographical phenomena (Grindsted 2015b:17). In cases where sustainability is indeed incorporated in undergraduate Geography, matters are complicated due to different approaches to engage with the concept, which involves fact-based, norm-based or policy-based perspectives. In practice these approaches collapse onto each other, thus leading to a variety of politico-educational inspired possibilities for enacting sustainability through teaching and learning (Grindsted 2015a:324-325).

Contradictions between different curriculum approaches to the incorporation of EfS are not unique to Geography (Rieckman 2012:127). It also has bearing to other contexts (discipline-based/ interdisciplinary) relevant for EfS and surpasses debates regarding which approaches are most appropriate to deal with sustainability in curricula (Vare and Scott 2007:191). In Geography results of research on the teaching and learning aspects of the discipline (e.g. Bonney 2012; Gress and Tschapka 2017; Grindsted 2015a) point towards the existence of the paradox that although sustainability themes are accepted to be central to educating geographers, there is significant reluctance among geographers to use sustainability in an explicit way in curricula. Matters are further complicated due to the occurrence of rivalry between different political ecologies of what to regard as the correct skills, knowledge and attitudes in different EfS approaches (Grindsted 2015a:326).

5.4.3 Realisation of the potential

It can be argued that Geography could play an important role in terms of EfS due to the overlapping focus on nature-society interactions (Liu 2011:259). To this end the human-environment identity of Geography seems to be reconfigured towards more direct association with sustainability (Grindsted 2013:18). Evidence of this is supplied by the increased attention to the human-environment theme (including sustainability) in IGU declarations on geographical education since 1992 (Grindsted 2015a:16). In addition, research indicates that sustainability, in the context of the human-environment theme, is of significant importance to a growing number of geographers (e.g. Bonney 2012; Gress and Tschapka 2017; Grindsted 2013). Last but not least the contributions by geographers to do research on human-environment interactions, specifically also related to sustainability, are not only significant but increasing (Goudie 2016).

On a practical level, the incorporation of sustainability in undergraduate Geography curricula faces a few challenges. Firstly, it has to be accepted that the systematic specialisation in Geography that occurred over a long time had the effect to alienate Human from Physical Geography, to the extent that this division will not easily disappear (Demeritt 2009a:128). Secondly, it has to be considered exactly how sustainability can be incorporated, so that it can fulfil expectations of an integrative, meta-narrative and not slip into the position of yet another sub-discipline. Thirdly, the politics associated with the representation of nature-society relations (Grindsted 2015a) need to be carefully considered when introducing sustainability themes into curricula, so as to make sure that teaching and learning can take place within the context of unbiased critical engagement.

5.5 Exploring the connections: The human-environment identity and EfS in undergraduate Geography in South Africa

5.5.1 Context of exploration

The same protocol to establish the composition and sustainability contribution of modules/courses as explained in Chapter 4 (Sections 4.4.2 and 4.6.3), with detailed results contained in Appendix 1, is utilised for this exploration. It is assumed that the analysis of undergraduate modules which include aspects of H (Human Geography), P (Physical Geography) and I (Integrated/Thematic Geography) would provide an indication of the manifestation of the human-environment identity in undergraduate South African Geography. Taking this approach, the information provided in Table 5.1 indicates that this identity is alive and well in South Africa, with the combined presence of H, P, I exceeding the 50% level for more than half of the departments, and even reaching 82.1% (UCT) and 90% (Rhodes). The bulk of this contribution, however, lies with H and P, with their combined presence varying between 12.2% for

Table 5.1: *Manifestation of the H-P-I subgroup in South African undergraduate Geography (2014-2015)*

Department	Weights associated with the H-P-I subgroup in South African undergraduate Geography (2014-2015), as % of full curriculum		
	(H+P+I)-%	(H+P)-%	I-%
UP	21.8	15.4	6.4
UV (Bmf)	51.6	47.5	4.1
UV (QQ)	37.8	34.8	3
UJ	54.4	45	9.4
UZ	44.1	29.1	15
UL	45.9	39.6	6.3
Wits	54.5	42.2	12.3
Univen	63.1	44.3	18.8
Unisa	51.6	12.2	39.4
NWU (Potch)	49.6	27.3	22.3
NWU (Mfk)	61.3	47	14.3
UKZN	33.9	22.2	11.7
WSU	23.2	14.4	8.8
UFH	74.4	62.8	11.6
Rhodes	90	55	35
UWC	51.1	35.2	15.9
US	33.1	28.7	4.4
UCT	82.1	58.7	23.4
NMMU	35.9	27.4	8.5

Unisa to 62.8% for UFH. Varying between 3% (UV, QuaQua) and 39.4% (Unisa), I manifests as a much smaller, although significant component.

5.5.2 Exterior, third person perspectives

The exterior, third person perspectives presented in this sub-section are based on data obtained through assessment of the undergraduate curricula of 17 Departments of Geography in South Africa (Annexure 1), as well as feedback obtained from a questionnaire (Annexure 2) that was completed by small groups of staff members associated with four Departments of Geography. The sustainability contribution considered consists of the aggregate of the identified sustainability-focused and sustainability-related components per module (refer to Sections 4.6.3 and 4.6.4). With reference to the nature of sustainability inclusion (integral state), the data in Table 5.2 indicates that in some cases the relative sustainability contribution for the H-P-I subgroup is significantly higher than for the full curriculum (i.e. UP & US), although this is not a general pattern. For some departments this relative comparison yields almost equal results for the two groups (i.e. Wits & UWC), while for other departments the opposite holds true (i.e. UZ & UJ), indicating that the sustainability contribution is not necessarily concentrated in the H-P-I subgroup but spread in significant proportions over other parts of the curriculum as well.

Taking the analysis of the nature of sustainability inclusion a step further, comparison of the sustainability contribution of modules in which H and/or P feature with modules in which I features, provide deeper insight regarding the integral state at stake. The reason for this comparison is because modules in which H and/or P feature are usually associated with the more traditional, sub-disciplinary approach to Human and Physical Geography, in which the human-environment identity is not presented as an integrated narrative. The opposite holds for modules in which I features, and which blends well with the integrative narrative as well as with EfS. This synergy is confirmed by Figure 5.1. The relative sustainability contribution associated with modules in which I features by far exceeds that for modules in which

H and/or P feature. In terms of EfS, Integrated/Thematic Geography therefore seems to be the preferred approach, with sub-disciplinary oriented Physical and Human Geography less suitable.

Table 5.2: *Manifestation of sustainability contribution (%) – full curriculum compared with modules in H-P-I subgroup, South African undergraduate Geography (2014-2015)*

Department	Relative sustainability contribution (%)	
	Full curriculum	H-P-I subgroup
UP	17	44
UV (Bmf)	32.7	23.1
UV (QQ)	34	23,1
UJ	34.4	15
UZ	46.8	37.8
UL	18.6	24.8
Wits	39	40.9
Univen	30.6	41.7
Unisa	81.3	91.7
NWU (Potch)	28.7	39.1
NWU (Mfk)	18	25.2
UKZN	41.1	43.6
WSU	40.7	62.9
UFH	35	35
Rhodes	36.7	36.7
UWC	25.4	27
US	13.8	31.4
UCT	45	45
NMMU	21.6	24.1

Consideration of the integral type (study year of inclusion of sustainability) in Figure 5.2 reveals an interesting pattern for the H-P-I subgroup. The bulk of the sustainability contribution features during the more advanced stages of the South African undergraduate Geography curriculum, with the contribution during the introductory level of study generally speaking not very significant. Noteworthy is that 60% or more of the sustainability contribution associated with the H-P-I subgroup occurs at NQF level 7 for nine Geography departments, while four departments are in the category 50-59.9%. This compensates for the relative underrepresentation of sustainability in undergraduate South African Geography curriculum through the more advanced level of presentation.

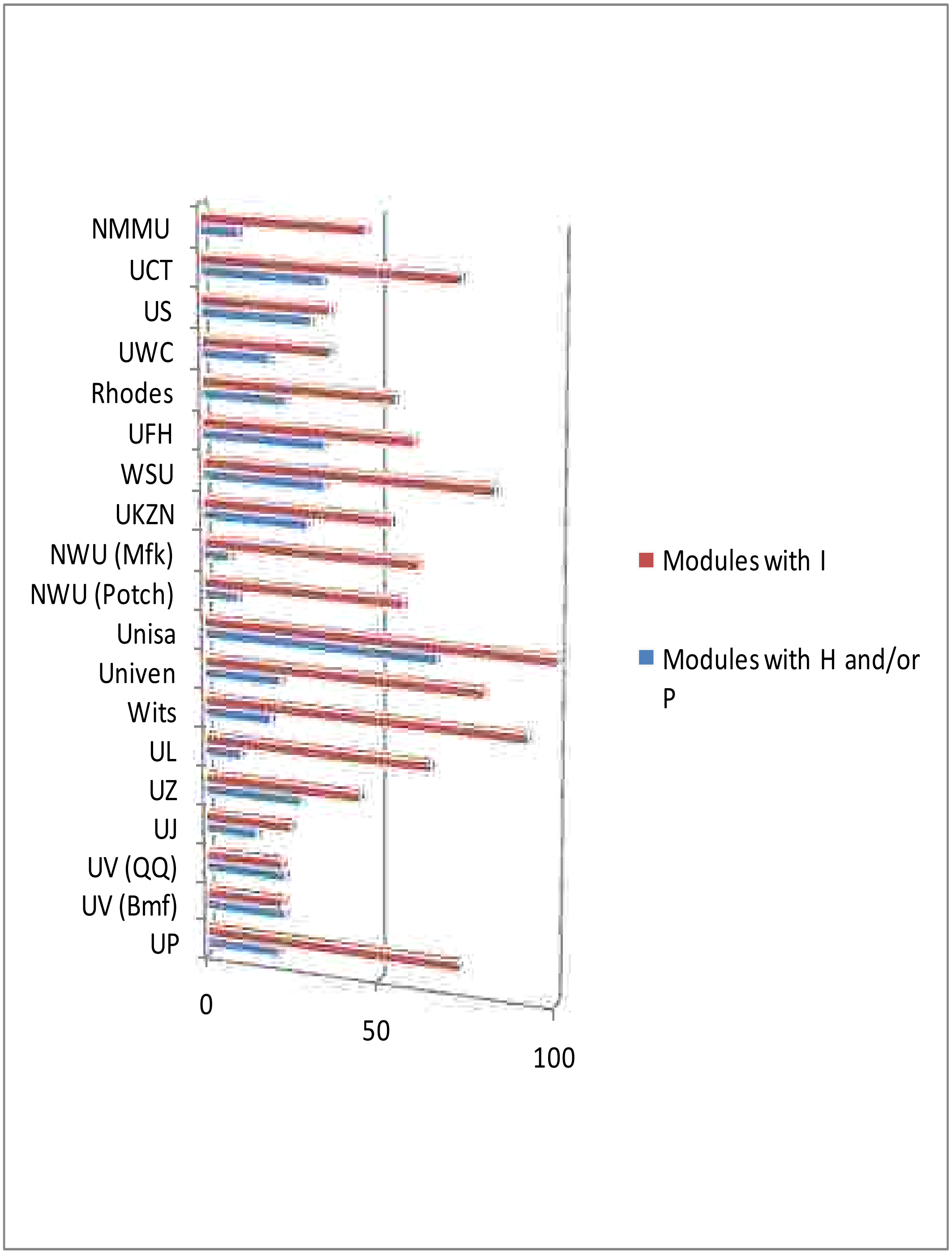

Figure 5.1: *Sustainability contribution (%) for modules in which H and/or P components are present, compared to modules with I components, South African undergraduate Geography (2014-2015)*

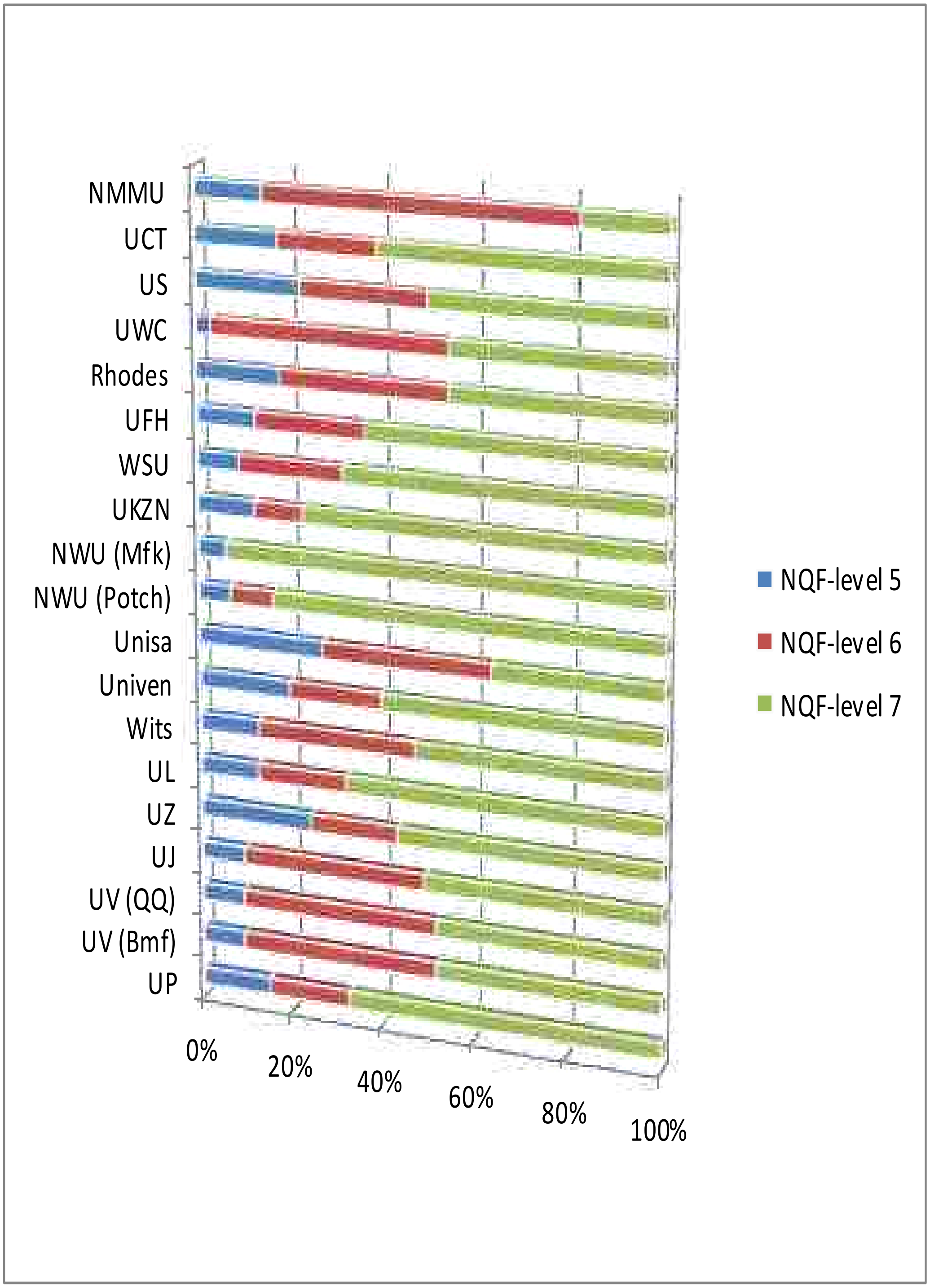

Figure 5.2: *Sustainability contribution (%) per NQF-level for modules in which H and/or P and/or I components are present, South African undergraduate Geography (2014-2015)*

5.5.3 Interior, first person perspectives

Interior, first person perspectives have been obtained during a series of individual interviews in order to obtain an overall outside view of individual, subjective intentions regarding the position of EfS in relation to the human-environment identity of Geography. Examples of some of the major lines of thought that emerged are supplied in Quote Box 5.1. A prominent perspective voiced by virtually all interviewees, relates to the importance they attach to the human-environment identity as a characteristic of Geography and which needs to feature accordingly. Although this positions Geography well in terms of EfS due to the links between the human-environment identity and the physical, or social and human sciences, not many of the interviewees regarded this as a specific advantage. The need for integration between Human and Physical Geography was expressed by a number of interviewees, although some seemed to be happy with the status quo and maintenance of a clear division between these major sub-disciplines. A few strong pleas for closer cooperation and integration between Physical and Human Geography were voiced, of which examples are included in Quote Box 5.1.

The second important aspect about the human-environment identity that formed part of the interviews concerned the need for possible transitions that are required in this identity to stay relevant in view of the challenges posed by 21st century environmental change. The message emerging from the responses that were obtained points towards acceptance that more integration is required between the sub-disciplines of Human and Physical Geography, but that various pathways exist and are preferred on how and at which stage the required integration should be sought. Some are of the opinion that a certain level of expertise is required before it will be possible to challenge students with tasks requiring integrative thinking. The value of sustainability thinking and EfS to facilitate and support the required integration is not only alluded to, but directly supported, although some geographers remain sceptical about the potential which sustainability really holds for Geography and regard it as one of several themes that can be dealt with in Geography, and that it should therefore not receive any preferred treatment.

Quote Box 5.1 – First person perspectives:
Geography's human-environment identity and EfS

Topic 1: Associations between the human-environment identity and EfS in the undergraduate Geography curriculum

J2: "There's the human side, there's the physical side and even in just those there are so many different sub-disciplines ..."

A4: "Because we deal with space, we deal with environment, we deal with people and sustainability and sustainable issues are often located in that interface between humans and environments …"

D1: "No, I think they go separate into Human Geography and Physical Geography, but at honours there's a possibility of integration."

C: "What I don't like though is the distinction between Physical Geography and Human Geography. I think that that's too wide a distinction and it sets up really a kind of … bias I guess in how you think and where you should be located. I think you should be a geographer and then have a specific specialisation."

A5: "But I think it is very important for the human environment to be linked to the physical environment in some kind of fashion. … I think we deal with them too separately still. I mean there's mention of the relationship between the two, but the relationship I think is more like a Tudor game."

C2: "I think the whole concept of sustainability is a fairly weak one because it's used so broadly and generally and it's become fairly meaningless because it's just ... pulled out for almost everything ..."

Topic 2: Transitions required in the human-environment identity of Geography in order to stay relevant in view of the challenges of 21st century environmental change

J1: "… at the undergraduate level you still have to teach the new student coming from matric to see things in an integrated way, … , not to see in one perspective and you think that's all, it is not all. Whereas sustainability offers a possibility ... of an integrated approach."

D1: "… I think it's very difficult because you need … the skill of lateral thinking, be able to identify relationships between things and ... systems thinking is very tricky, because you really need an in depth knowledge of each component before you can see the synergy as to how they impact each other negatively or positively."

J2: "… Physical and Human Geography can be quite different at times. Taking a thematic approach does allow the two topics to sort of blend into each other, particularly in topics like sustainable development …"

E1: "They intended to maintain the physical … and the human component … but also working towards integration which actually becomes, let's call it a third leg …. But you need like the expertise of the one and … of the other actually to make this thing work. It does'nt exist by itself."

A5: "… if you go and speak to any geographer, they're aware of this link between the human and the physical, ... but I'm not sure whether that is explicitly communicated ... So everybody accepts it's like that, but it's not really explicit. I think it's taken as obvious … I mean that's where our problem comes in.

5.5.4 Interior, second person perspectives

To supplement the outside view obtained by individual interviews, a few focus groups were conducted to obtain an inside view of the collective interior through study of the inter-subjectivities emanating from discussions between focus group participants. To facilitate direct comparison the same themes than for individual interviews were used for focus groups. Although some individual interviews highlighted the uneasiness of some geographers with notions of sustainability, the focus groups spent more time on this issue with stronger opinions about it eventually put forward. Some of these are included in Quote Box 5.2. Despite these strong opinions, the collective view that emerged is that sustainability is covered in undergraduate Geography but mostly implicitly, and sometimes even explicitly, but geographers do not necessarily attach an important role to it.

Concerning possible transitions required for the human-environment identity to stay relevant in view of the challenges posed by 21st century environmental change, several views flowed from the focus groups, but none made the connection that a transition to a greater focus on sustainability might be required. This fits with the general reluctance to adopt sustainability in the first place as expressed in their discussions of the first topic of the theme “Geography’s human-environment identity and EfS”. The value of having bigger themes or questions and to plan and arrange the curriculum accordingly, came though quite strongly in one of the focus groups. Conversely, in another focus group the view was expressed that thematic modules, in which sustainability fits quite well, are inclined to be on a superficial level and therefore not held in high regard.

5.5.5 Quality assessment

In terms of the integral methodological framework utilised for this research, the quality of the results are associated with the mapping of the research space in terms of quadrants, levels, lines, states and types (refer back to Sections 3.6.3 and 3.6.4),

Quote Box 5.2 – Second person perspectives: Geography's human-environment identity and EfS

Topic: Associations between the human-environment identity and EfS in the undergraduate Geography curriculum

B2* & B3*: I am happy with way how we currently present it (… sustainability …) by referring to/introducing the concept at this stage, but not to have it as specific aim …

B3*: … perhaps there are themes …, but it is not the intention … the intention is to really do the traditionally strong components of Geography on first and second year level … the themes are the traditional strong foci of Geography.

F5: "… I do water pollution, environmental degradation, landfill sites, waste water treatment works … and all of these (are) sustainability issues but it is never under the banner of sustainability. It is under the broader banner of environmental issues."

F1*: I think the Millennium Development Goals provide better direction for the content of Human Geography modules than specifically only sustainability. It was not a specific point of departure when you selected content.

J8*: And I think sustainability is easier to incorporate in a program that is integrated between people and environment …

H1: "Philosophically and theoretically the human-environment relationship as one of the streams in Geography are probably best suited to focus on environmental and sustainability studies or issues and that association is as clear as daylight. If someone is not handling that in his or her course, then I do'nt know where they ..."

Topic 2: Transitions required in the human-environment identity of Geography in order to stay relevant in view of the challenges of 21st century environmental change

B1*: I think we are on a journey, but not at the destination yet. This thing of the big themes – the "Big Questions" – is something we need to make stronger. This is the one thing I can think about now and the other thing is to continuously work to sharpen the focus points.

F3*: I know about a module when I was in third year, Environmental Geography, with aim to bring all the physical and human aspects together … but I must say, that it was not a very successful module because it was on very superficial level … "bits and pieces". And in it sustainability was quite central. F1: It is not necessarily superficial, it is more about the space to be able to lecture it, I think.

J8*: It is easy for us since we do not have a sub-disciplinary approach. If I lectured Geomorphology, I would not really have known to how to work sustainability into it. Most of our modules have a focus on human-environment relationships somewhere, and the moment you mention those, it becomes an automatic thing for me …

H1: "… we do have that strong artificial divide between Human and Physical Geography …"

H1: "… but we are pretty much in silos in Human Geography and Physical Geography at first year level and integration is taking place, I would say almost on a staff member basis"

H1: "I want to do it differently, but the structure won't allow it."

* Researcher translated from Afrikaans

combined with the selection of appropriate methodologies for each of the AQAL quadrants (refer to Section 3.6.3). Triangulation and cross-correlation of results obtained through these different methodologies, each representative of a different aspect of reality, consequently addresses matters related to the quality of results. For the exploration of the connections between the human-environment identity and EfS in undergraduate Geography in South Africa, triangulation and cross-correlation between the following findings obtained through various methodologies and from various perspectives, co-support and feed into each other, this pointing towards validity and trustworthiness:

- Mapping of sustainability contributions for the various departments: Indicating the importance of the human-environment identity, but with focus on the divide presentation of Human and Physical Geography, while Integrated/Thematic Geography is emerging but still quite weak, and with a much higher relative weighting for the sustainability component in the latter group

- Individual interviews: Expressing the need for more integration, in which sustainability might play a role, but about which geographers are sceptical

- Focus groups: Confirming why integration is still lacking, and expressing the view that specialisation is superior to thematic/integrated approaches, with sustainability included, but which are regarded as too general to be of value

5.5.6 Analysis and discussion

The exploration of the human-environment identity and its relationship with EfS in the context of undergraduate Geography in South Africa confirmed some trends reported in the international literature, but also yielded a few surprising, though interesting results. The frequently reported ontological dualism between Human and Physical Geography (i.e. Castree 2015:4) manifests clearly in South Africa, which is in alignment with the value attached to specialisation in one of these sub-disciplines (or further sub-specialisations) to get recognition and be rewarded as such (Ziegler et al 2013:252-253). Integrated/Thematic Geography provides a much better opportunity for the human-environment identity to fully develop, but is still in a developmental phase at South African universities and unfortunately seems to be regarded as superficial and too general to be of real value – a viewpoint that was expressed during the focus groups and interviews.

Calls for the need of comprehensive undergraduate curricula in human-environment Geography by scholars as Yarnal and Neff (2004) and Turner (2002), therefore do not seem to have affected undergraduate Geography curricula in South Africa. However, some good examples of individual modules with an integrated human-environment approach, form part of the undergraduate curricula of a number of departments. In addition, as evident from the interviews and focus groups, the situation at South African universities is generally that 'basics' are covered during introductory studies, with integration reserved for more advanced phases of undergraduate studies. Evidence in this regard is supplied by the analysis of the sustainability contribution for NQF Levels 5, 6 and 7, indicating that the bulk of the sustainability contribution features during the more advanced stages of undergraduate Geography curricula in South Africa

5.6 Integral view of the human-environment identity and EfS in undergraduate Geography in South Africa

According to Integral Theory, the validity of and consideration of all definitions and approaches are acknowledged and valued (Brown 2005a:6). From this perspective it is problematic that the human-environment identity in undergraduate Geography in South Africa is dominated by the dualistic inclusion of Human and Physical Geography, while the approach represented by Integrated/Thematic Geography (which is an equally valid approach) is largely under-represented. This unbalanced approach is not suitable to reveal the full dimensionality of the world to students, and may lead to over-simplified conceptualisations of the 21st century issues humankind is grappling with, which is something that simply cannot be afforded much longer.

The promotion of mutual understanding between perspectives is regarded as essential by Integral Theory to be able to effectively address the challenges associated with 21st century environmental change (Esbjörn-Hargens 2005:6). The largely institutionalised dualism in terms of Physical and Human Geography in undergraduate Geography in South Africa together with the lack of an integrative narrative makes it very challenging, if not impossible for students to acquire the required mutual understanding between perspectives. Teaching and learning interventions will also not be able to remedy the situation since the structure of such curricula is too inhibiting. In other words, the implication is that a new way of thinking and doing is required for the discipline of Geography.

Eddy (2005:151,152) explains that Geography can be regarded as an intuitive application of Integral Theory, specifically in terms of understanding of changes in relationships between humans and the environment and how perspectives in this regard are continuously changing. This understanding relates to a Kosmocentric vision of Integral Theory, which stands in direct contrast to the biocentric or anthropocentric visions and can be regarded as an attempt by Integral Theory to extend and complement Geography's quest for a comprehensive theoretical framework to address challenges posed by 21st century global environmental change. Due to numerous similarities with Geography, EfS can assist with facilitation towards this comprehensive framework, although underrepresentation and/or implicit dealing of sustainability in the curriculum, combined with reluctance by geographers to embrace the concept, provides a challenge – worldwide and in South Africa.

5.7 Concluding remarks

This chapter provided a glimpse of the manifestation of EfS as part of the human-environment identity of Geography. To provide context, the historical roots, evolution and current position of this identity were firstly considered. Although human-environment interactions is a core area of Geography, geographers up to now largely failed to address this identity in an integrated fashion, thereby failing to reach over and across sub-disciplinary divides. Physical and Human Geography therefore gradually drifted apart, with dualism that became the accepted norm. This situation is increasingly questioned, with the need for an integrative narrative expressed by several scholars, referred to by some as a turn to synthesis and holism. ‘Hybrid geographies’ are now appearing in curricula to give form to the required synthesis and displace boundaries between sub-disciplines. EfS has the potential to contribute, but features implicitly in curricula, and faces additional challenges due to the scepticism of geographers to fully embrace this concept.

Exploration of undergraduate South African Geography curricula revealed that the human-environment identity features prominently, but mostly in terms of the sub-disciplines of Human and Physical Geography and to a lesser extent as ‘hybrid geographies’, presented by Integrated/Thematic Geography in the South African context. Considering specifically Integrated/Thematic Geography, the relative contribution to sustainability is much higher than for traditional Human or Physical Geography. This sustainability contribution is positioned mostly in the more advanced phases of the undergraduate curriculum, which can be regarded in a positive light, since this implies that students engage with sustainability at relatively high levels of abstraction. Although some South African geographers realise the need for students to engage with Human and Physical Geography more integratively, many are sceptical to utilise EfS as a means to achieve this and do not necessarily see it fit to allocate such a crucial role to EfS at this stage.

Triangulation and cross-correlation between the methodologies and various perspectives used to investigate relationships between the human-environment identity and EfS in South African undergraduate Geography provided results feeding into each other, pointing towards validity and trustworthiness. Further rigour followed from consideration of integral state (sustainability), integral type (study year) and integral level (depth). Regarding the relationship between the human-environment identity and EfS (integral development line), dominance of Human and Physical Geography's dual nature, versus under-representation of Integrated/Thematic Geography, is problematic. This approach is not suitable to engage students with the dimensionality of the world, and may lead to over-simplified conceptualisations of issues. The next chapter continues with the exploration of the development lines that have been identified in the relationship between EfS and undergraduate Geography, with the focus shifting to the spatial-chorological identity.

Chapter 6: The spatial-chorological identity of Geography and EfS

“Dealing with geographical imaginations may not only better prepare students, teachers and practitioners in understanding sustainability challenges in various spatial contexts, but may help us better understand that, what appears to be a solution in one scale may produce sustainability challenges in another.” (Grindsted 2015b:22)

6.1 Introduction

By considering the manifestation of EfS in association with the spatial-chorological identity of Geography, this chapter continues with the exploration of the four integral development lines which have been identified for this research. The spatial-chorological identity connects directly with the traditional idea of Geography being concerned with regional descriptions, but which came under fire during the mid-20th century, mainly due to the lack of scientific rigour. This resulted in a gradual move from an ideographic to a nomothetic approach, with focus on universal regularities as presented by spatial distributions and how phenomena are organised (Rasmussen and Arler 2010:38). In the context of this identity, the spatio-temporal dimensions of the various manifestations of sustainability clearly provide scope for geographers to contribute to a better understanding of 21st century environmental change and the associated complex dynamics and interactions occurring at various scales (Grindsted 2015a:13).

The same structure than for the previous chapter is utilised, but with the focus now on the spatial-chorological identity. The contextual setting for this identity is therefore firstly dealt with, and then the different manifestations of this identity in undergraduate Geography. This is followed by a mapping of and reflection on some of the linkages between EfS and the spatial-chorological identity, thus setting the scene for an associated assessment of South African undergraduate Geography. The focus is on those parts of the undergraduate curriculum that are aligned with the spatial-chorological identity and to highlight sustainability linkages. Similar to the previous chapter, the AQAL model of Integral Theory is used as methodology, with consideration of information obtained through first, second and third person methodologies and perspectives in terms of integral states, types and levels. A synthesising analysis and discussion, with reference to the integral view, rounds this chapter off.

6.2 The spatial-chorological identity of Geography in context

6.2.1 Historical roots

Geography's ancient roots can be traced to the era of the Greek and Roman Empires, during which time scholars produced a spectrum of descriptions of the Earth in various formats – including maps and compendiums with descriptions and/or explanations of the places and people that were encountered during travel and exploration (Turner 2002:53). Characteristics such as these were closely linked to Geography right through the Middle Ages up to the Age of Enlightenment, so that by the 18th century a significant disengagement existed between the lines along which science was developing, while geographers were still largely working within the chorological approach, busying themselves mostly with regional descriptions (Bowen 1981 cited Turner 2002:54). During the reconfiguration of knowledge in the 19th century, this disconnect had significant implications for decisions whether or not and how Geography should be included within the academic division of labour (Harvey 1984:4).

Following the 19th century impasse on the position of Geography in academia, two identities gradually emerged to justify a position for the discipline in the reconfigured knowledge landscape (Leighly 1938). These refer to Geography as a human-environment science (presenting a substance of study) and Geography as a spatial-chorological science (presenting an approach to understand processes/phenomena). Although these identities did not initially aim towards mutual exclusion of the other

(Taaffe 1974:16), this indeed occurred at various stages during the 20th century, with the spatial-chorological identity which dominated modern geographic thought since the middle of the 20th century (Turner 2002:55). In practice this identity gradually moved towards the extreme position of spatial geography/science which peaked in the 1960's and 1970's, and although subsequently challenged continues to be a dominant focus up to today.

6.2.2 Evolution over time

The main evolutionary line that can be distinguished in the spatial-chorological identity involves the shift that occurred from the chorological towards the spatial sub-identity over time, with a few key developments that can be distinguished along the way. Noteworthy in this regard is the 18th century contribution by Immanuel Kant (1724-1803) that provided a definition of the nature of Geography and its relationship with the natural sciences (Tatham 1951:38). Geography gained recognition at this stage primarily as a synthesising science, through its integrative approach – with reference to the spatial and temporal attributes of phenomena. Scholars as Karl Ritter (1779-1869), Ferdinand von Richthofen (1833-1905) and Alfred Hettner (1859-1941) subsequently developed the Kantian vision in terms of the science of regions and regional differentiation, the history/particularities of places (chorography) and distribution studies (Turner 2002:55).

While regional studies with their focus on integration of the phenomena being studied within bounded areal units perfectly aligned with the chorological sub-identity, the same could not be said about distribution studies. Depending on their formulation, such studies signified a move away from the chorological sub-identity, thus forming a link to the spatial sub-identity with focus on spatial relations that developed later (although it also featured in Kant's work earlier). Later attempts to re-invigorate the chorological identity (i.e. Hartshorne 1939) were not successful and eventually gave way to a largely Anglo-driven spatial Geography from the middle of the 20th century onwards, including subsequent re-interpretation of meanings attached to “spatial” (Schaefer 1953:227-228). “Variously expressed, this identity would come to dominate formal justifications of geography for the next forty to fifty years, especially within Western European-North American work” (Turner 2002:56).

6.2.3 Current position

While rooted in locational theories, which allocated a central role to distance as a key variable in determining not only individual but also collective decisions as well as the resulting spatial outcomes, the spatial sub-identity is no longer focussed on only spatial patterns and regularities and with the nomothetic approach and theoretical constructs as central place theory not that prominent anymore (Johnston et al 2014:5-6). The contemporary version of the spatial sub-identity rather acknowledges that space and place matters because it provides a context for the motivation of behaviour and provides theory-led descriptions of spatial patterns and behaviour, based on for instance structuration and critical realism (Ibid). Although the search is still for order, it is no longer only the spatial-geometrical aspects of phenomena/ issues that are at stake (i.e. Haggett 1990), but also the existence of flux, characterised by behaviour based on incomplete information (Bergmann et al 2009:265).

Despite the various exciting contemporary developments in the spatial sub-identity alluded to, the state-of-the art is that some scholars still regard this identity within a quantitative, positivist context (e.g. Cresswell 2013). This highlights the existence of another divide in Geography, apart from the partitioning between Physical and Human Geography (covered extensively in the previous chapter). Kwan (2004:759) refers to this second divide in terms of “the separation of spatial-analytical geographies, which attempt to create a mode of disembodied geographical analysis, from social, cultural, and political geographies.” However, recent work (referred to by Sui and DeLyser 2012:115) based on methodological hybridity between quantitative and qualitative approaches clearly reveals the pseudo nature of the perceived dualism between the spatial-analytical and socio-critical approaches (Barnes 2009 cited Sui and DeLyser 2012:115).

6.3 Manifestations of the spatial-chorological identity in undergraduate Geography

6.3.1 Relationship with the human-environment identity

Undergraduate Geography curricula provide ample scope for the integrated manifestation of the spatial-chorological and human-environment identities. Alluding to this are views by geographers as: “We understand interactions among physical systems and human systems, across time and space, in unique and advantageous ways” (Bednarz 2016:47); “Geography in the 21st century will provide the intellectual and information basis for taking responsible environmental and spatial decisions” (Reinfried and Hertig 2011:31); “Geography is concerned with human-environment interactions in the context of specific places and locations” (Van der Schee et al 2015:13). In terms of implementation in the curriculum, this means that while the theme of study/synthesis relates to the human-environment identity, the approaches which are followed to a large extent relate to the spatial-chorological identity (Rediscovering Geography Committee 1997:26-29).

Geographers generally seem to agree that a focus on ‘integration in terms of place’, ‘spatial representation and analysis’ and ‘interdependencies between places and among scales’, which are all advanced through the spatial-chorological identity lies at the heart of Geography (Ibid; Aplen and Batten 2004:355,359-361; Murphy and Hare 2016: 95-97). However, these spatial approaches frequently ‘disappear’ within the so-called hidden curriculum, partly in response to expectations of students with more interest in the issues (related to the human-environment identity) being dealt with per se than in their geographical properties (Cotton et al 2013:195). The trend towards specialisation, resulting in a fragmented undergraduate offering based on sub-disciplines (Demeritt 2009a:128; Fairhurst et al 2003:87; Whalley et al

2011:384) at this stage still prevents the spatial-chorological identity to achieve its potential as an integrative force in the discipline.

6.3.2 Spatial science, quantification and links with GIS

Johnston et al (2014:4) convincingly support the role of spatial science to obtain an enhanced understanding of the issues that contemporary society is grappling with, and emphasise the importance of quantitative as well as qualitative analysis in this context. Numerous examples of geographers doing excellent work through application of both these types of analysis can be cited (refer to the discussion of the spatial turn by Sui and DeLyser 2012:113). Despite the referred to importance of such data-based approaches, recurring antipathy about spatial science, with quantitative analysis included, continues to haunt Geography (Cresswell 2013; Johnston 2006:290-291,294). Related to this antipathy, Johnston et al (2014:17) observe a decline in the United Kingdom in the attention paid to spatial science/quantitative analysis in undergraduate Geography. This is a pity, since these elements provide valuable knowledge and approaches to gain deeper insight in differences between places, which lies at the core of Geography.

The contemporary trend observed in undergraduate Geography curricula (Ibid:16) is that the inclusion of spatial science and quantitative analysis goes hand in hand with the inclusion of GIS, which has the ability to handle data about various dimensions of time and space and allows deeper understanding of elements such as location, associations and patterns (Ribeiro et al 2016:6455). However, as pointed out by Bearman et al (2016:402), it frequently happens that GIS is taught in dedicated skills-based modules. In this way a disproportionate amount of time could be spent on mastering of skills required to operate GIS software, but which might be at the expense of developing proper insight regarding the science behind spatial patterns and issues (Ibid:395). From a teaching and learning perspective it would be ideal if GIS could rather be imbedded and applied in ‘theory’ modules, which would allow students to directly experience the connection between GIS and its application in the context of problem-solving (Ibid:403).

6.3.3 Beyond spatial patterns: Place-space-scale imageries

Recent thinking on place, space and scale emphasizes the importance of recognizing the existence of multiple perspectives on these concepts (Walsh 2014:308). This contrasts with the singular, unitary representations of traditional spatial science and planning which dominated the scene up to the end of the 20th century. This change in thought is associated with the various transformations in society which can no longer be ignored, resulting in the declined relevance of rigid hierarchies and boundaries, with new spatial imageries that are required. In sync with this development a critical pedagogy of space is gradually developing (Morgan 2000:285-286), allowing Geography students to engage with space as politically produced and socially contested, with the role of scale to be considered similarly. In this way students are provided with opportunities to explore the spatiality of human life in contexts vastly different from, but supplementary to, the insights provided by data driven, quantitative spatial science.

Critical Geography need not be qualitative and can also make use of numbers, although not necessarily an entirely comfortable fit (Schwanen and Kwan 2009:459). In practice it often seems to happen that quantitative and qualitative methods are used in conjunction (Ibid:461). Such mixed approaches require thoughtful implementation, including bridging of methodological, philosophical and epistemological divides (Sui and DeLyser 2012:115). If successful, this opens the possibility for the curriculum to challenge existing boundaries within the discipline, while forging creative connections "… aiming to integrate perspectives on place, space, flow, and connection" (Ibid:113). A key concern is to problematise the idea of space so that students understand that it is a social construction. Only once accepted that space is not simply a container for social events, the curriculum would be able to facilitate a re-examination of space, specifically in terms of the power relations involved in the production of space (Morgan 2000:281).

6.4 Linkages between the spatial-chorological identity and EfS in undergraduate Geography

6.4.1 Spatiality and sustainability transitions

Although there are not that many fully developed proposals available yet that back a reorientation of undergraduate Geography curricula to EfS (Sánchez 2011:162), geographical dimensions as place, space and scale, together with the capacity of Geography for achieving synthesis, are recognised as crucial elements of sustainability teaching and learning (McKeown and Hopkins 2007:20-21). In terms of the 21st century environmental crisis faced by humankind, the shifts considered necessary for society to move towards more sustainable production and consumption provide an exciting context for sustainability research in Geography (Coenen et al 2012:968-969), with the possibility of associated supportive teaching and learning initiatives as spinoff. Of importance is the spatial context of where and how these transitions are taking place as well as the concomitant spatial relationships and dynamics within which these transitions evolve (Ibid).

Referred to as the ‘Geography of sustainability transitions’ (Hansen and Coenen 2015:92), consideration of ‘transition spaces’ towards sustainability provides an excellent opportunity for the amalgamation of the human-environment identity (in terms of the changes in production and/or consumption that are required) with the spatial-chorological identity (in terms of the place specificities and the conditions under which relationships at different scales are regarded to be important). Although it has been manifesting as a research theme in Geography during the last decade (e.g. Lawhon and Murphy 2012; Coenen et al 2012; Nevens et al 2013; Truffer and Coenen 2012), sustainability transitions have not as yet been incorporated in a prominent way as a theme in the teaching and learning of Geography. This is not only in line with but also supports the overall observation by Grindsted (2015a:327) that sustainability themes seem to rather feature in an implicit way than in an explicit way in Geography curricula.

6.4.2 Space-place-time contexts for sustainable systems

The results of various studies, as reflected in the literature that expands beyond Geography (refer to Nyerges et al 2014:1165-1166) point towards the spatio-temporal dynamics of sustainable systems as a uniting idea for sustainability paradigms. It is suggested that 'sustainable systems' can act as synthesising phrase for systems perspectives such as social-ecological systems, human-environment systems and coupled nature-human systems (Engler 2015:291). Understanding how sustainable systems function requires measurement of underlying relationships and elements. Broad- and deep-based information is required for integration across domains and to address the contextual relationships and space-time dynamics of sustainable systems (Nyerges et al 2014:1165-1166). The link with the spatial-chorological identity of Geography is clear, affording the opportunity to address spatio-temporal perspectives while engaging in teaching and learning related to sustainable systems.

Linked to Geography's spatial-chorological identity, it is increasingly accepted that integrative sustainability thinking requires consideration of place and local contexts (Wilbanks 2015:71). An added insight is that scale matters in the sense that what is happening in terms of sustainability at one scale is inherently linked to sustainability at other scales (Ibid). Cachelin et al (2016) take it a step further by suggesting that place-based approaches to sustainability education may serve to address the issues that undermine the relevance of sustainability in many disciplines – also in Geography. Critical sustainability education, based on a critique of the flawed neoliberal conceptualisations of sustainability, is a possible alternative (Ibid). This pedagogy emphasises place and its enactment in terms of inhabitants and environments and has relevance not only for Geography, but also other disciplines (place indeed involves more than just Geography).

6.4.3 Roles for GIS in sustainability education

Although ample opportunities exist for the application of GIS to advance sustainability, its role in EfS is not widely discussed, and is frequently dealt with through case studies rather than comprehensively (Tan and Rose 2007). The discourse is furthered effectively by Hwang (2013), with the presentation of a framework for teaching and learning sustainability in an explicit way through GIS. The framework outlines five geospatial inquiries (where things are, how they interact, how they relate, how they differ and how they change) that support EfS while incorporating key geographic concepts (Ibid:286). In this way students can make sense of abstract conceptualisations of sustainability while engaging with concrete abstractions thereof (e.g. maps) created through GIS. As a result education *about* but not yet *for* sustainability is furthered, but towards which the implementation of critical GIS approaches may greatly contribute (Goodchild 2015).

Since GIS is recognised for its role not only in Geography but also in interdisciplinary contexts in general (Ribeiro et al 2016:6455), it stands to reason that it in all probability it is suitable for application in the context of EfS as well. However, to be valuable for EfS students need not only be exposed to the technicalities of GIS as a tool, but GIS should rather be utilised to develop critical spatial thinkers, as reasoned by Bearman et al (2016:394-395). In this regard the literature provides examples of scholars arguing in favour of critical GIS science (Jarvis 2011, Favier 2011 and Goodchild 2014 all cited Bearman et al 2016:395). As a discipline that emphasizes both interconnectedness and scalar thinking, Geography is in an ideal position to provide a teaching/learning and research context for the required critical GIS perspective. An added advantage is that of GIS serving as platform to integrate themes that are often still dealt with in Geography in specialised domains and in a piecemeal fashion (Ibid).

6.5 Exploring the connections: The spatial-chorological identity and EfS in undergraduate Geography in South Africa

6.5.1 Context of exploration

The same protocol to establish the composition and sustainability contribution of modules/courses as explained in Chapter 4 has been utilised for the categorisation used in this chapter. The assumption has been made that the analysis of modules that include aspects of S (Spatial/Quantitative/Qualitative Geography) and G (GIS/Cartography) would provide an indication of the manifestation of the spatial-chorological identity in undergraduate South African Geography. Taking this approach, the information provided in Table 6.1 indicates that although this identity has a clear footprint in curricula, it is not as prominent as might have been anticipated, and definitely less prominent than the human-environment identity (refer to Section 5.5.1). The combined presence of S and G exceeds the 50% level for only one department namely US (60.6%), with NMMU at 49% just missing this benchmark. A noteworthy presence is also observed for WSU (43.7%), UP (44%) and UL (39.3%). The bulk of this contribution, however, lies with G, with its presence varying between 1.1% (UCT) to 41% (NMMU). Varying between 0% (Rhodes) and 29.4% (US), an unexpected result is that S manifests as a smaller component, although significant for some departments.

6.5.2 Exterior, third person perspectives

The exterior, third person perspectives presented here are based on data from the assessment of the undergraduate curricula of 17 Departments of Geography in South Africa (Annexure 1) and feedback from a questionnaire (Annexure 2) completed by groups of staff members from four Departments of Geography. The sustainability contribution refered to in this assessment comprises of the summation of the sustainability-focused and -related components identified per module (refer to

Table 6.1: *Manifestation of the S-G subgroup in South African undergraduate Geography (2014-2015)*

Department	Weights associated with the S-G subgroup in South African undergraduate Geography (2014-2015), as % of full curriculum		
	(S+G)-%	S-%	G-%
UP	44	7	37
UV (Bmf)	24.6	4.9	19.7
UV (QQ)	18	3.6	14.4
UJ	21	6	15
UZ	8.2	4.6	3.6
UL	39.3	12	27.3
Wits	12.6	2.6	10.9
Univen	31.4	14.9	16.5
Unisa	20	6.2	13.8
NWU (Potch)	34.1	7.3	26.8
NWU (Mfk)	35	11	24
UKZN	28.9	5	23.9
WSU	43.7	25.6	18.1
UFH	18.9	16.1	2.8
Rhodes	5	0	5
UWC	17.2	5.9	11.3
US	60.6	29.4	31.2
UCT	5.3	4.2	1.1
NMMU	49	8	41

Sections 4.6.3 and 4.6.4). With reference to the nature of sustainability inclusion (integral state), the data in Table 6.2 indicate the relative sustainability contribution for the S-G subgroup to be higher than for the full curriculum for only two departments: UZ – only slightly higher, and NWU (Potch) – significantly higher. The general pattern however, rather indicates a lower relative sustainability contribution for the S-G subgroup compared to the full curriculum. The S-G subgroup therefore performs poorer than the full curriculum in terms of the presence of a sustainability component. If searching for a sustainability component in South African undergraduate Geography curricula, the S-G subgroup is therefore not the best place to start your search. Unisa boasts the highest sustainability contribution in this subgroup (62.5%) with the contributions for UZ, UCT, NWU (Potch) and UFH significant as well. For the rest of the departments, this contribution is 20% or lower – in other words not very significant.

Table 6.2: *Manifestation of sustainability contribution (%) – full curriculum compared with modules in S-G subgroup, South African undergraduate Geography (2014-2015)*

Department	Relative sustainability contribution (%)	
	Full curriculum	S-G subgroup
UP	17	0
UV (Bmf)	32.7	17.4
UV (QQ)	34	17.4
UJ	34.4	0
UZ	46.8	50
UL	18.6	10
Wits	39	4
Univen	30.6	20
Unisa	81.3	62.5
NWU (Potch)	28.7	37.4
NWU (Mfk)	18	3.75
UKZN	41.1	20
WSU	40.7	13.4
UFH	35	33.3
Rhodes	36.7	0
UWC	25.4	5
US	13.8	10
UCT	45	38.5
NMMU	21.6	1.52

Taking the analysis of the nature of sustainability inclusion a step further, comparison of the sustainability contribution of modules in which S features with modules in which G features, provide deeper insight regarding the integral state at stake. The reason for the comparison is because this contribution may vary significantly between modules in which S features and modules in which G features. The comparison will reveal in which curriculum components sustainability is under- or over-represented or perhaps have a balanced occurrence, thus indicating where changes may be considered in future. The pattern revealed by Figure 6.1 is that the sustainability contribution is at large concentrated in modules with S components, while largely under-represented in modules with G components. Notable exceptions are presented by UCT and UFH, with Unisa and UKZN also not fitting into the pattern 100%.

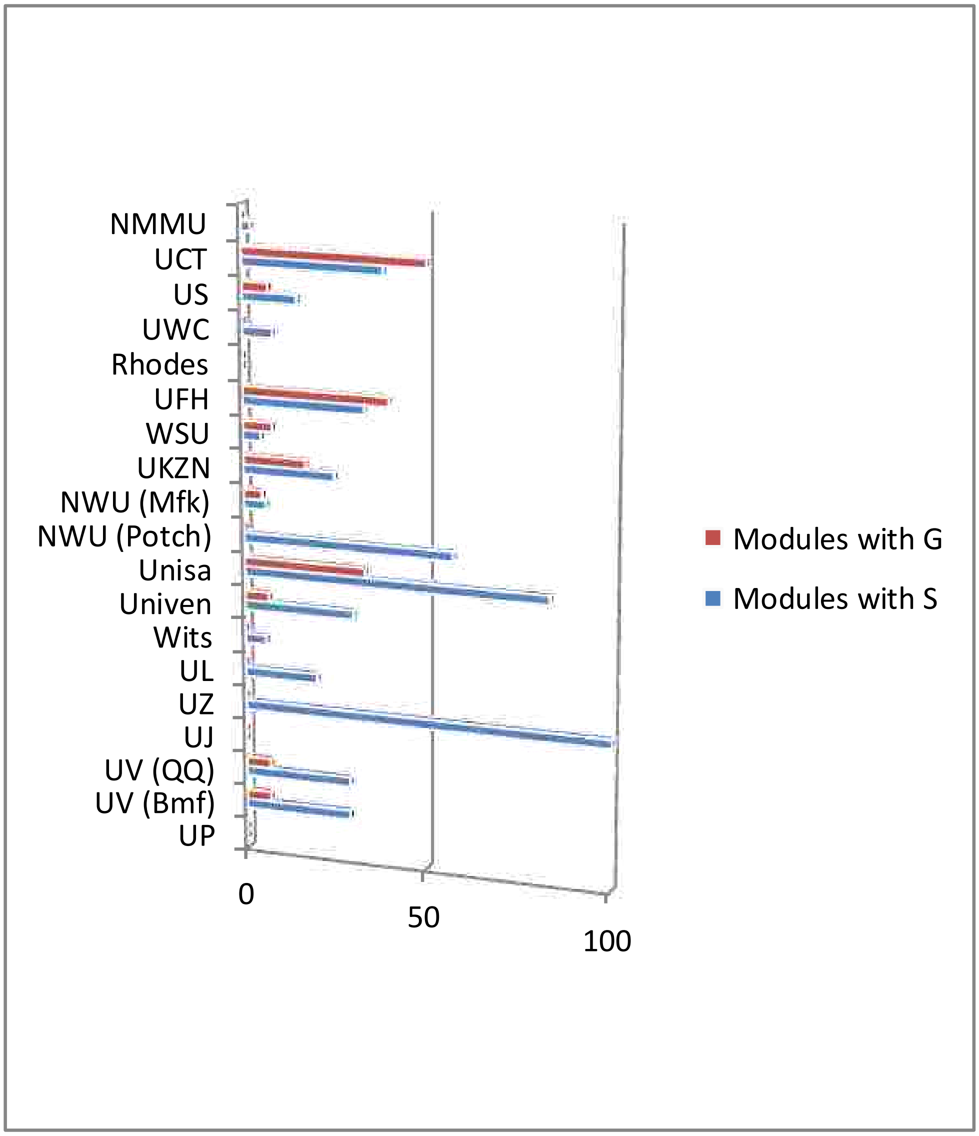

Figure 6.1: *Sustainability contribution (%) for modules in which S components are present, compared to modules with G components, South African undergraduate Geography (2014-2015)*

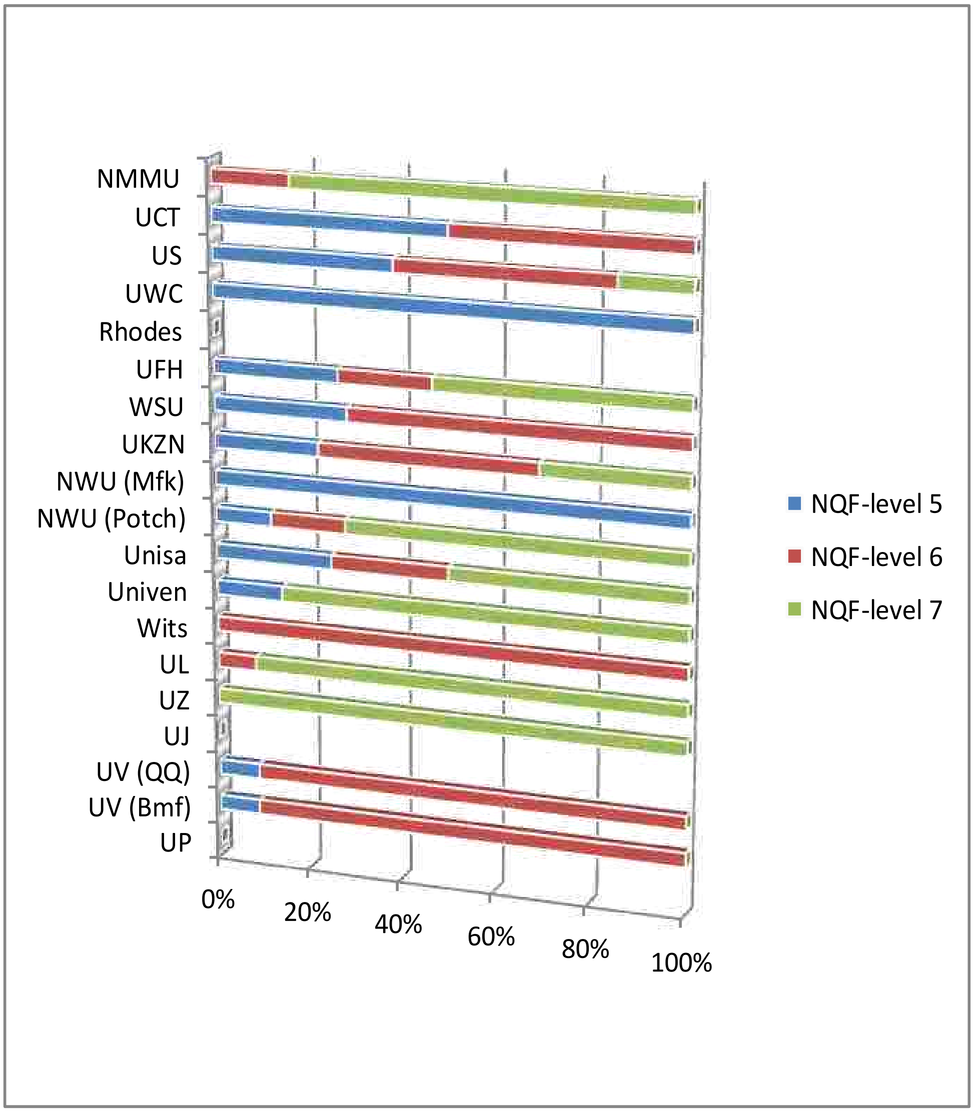

Figure 6.2: *Sustainability contribution (%) per NQF-level for modules in which S and/or G components are present, South African undergraduate Geography (2014-2015)*

Consideration of the integral type (study year of sustainability inclusion) in Figure 6.2, facilitates interesting observations for the S-G subgroup. Similar to the H-P-I subgroup, the pattern for the S-G subgroup for most departments is that the sustainability contribution features during the more advanced stages of the curriculum (NQF-level 7, but also NQF-level 6). During the introductory study level

(NQF-level 5) this contribution seems to be less significant. Noteworthy are US, UFH, UKZN and Unisa, where the sustainability contribution tends to be spread out over the three NQF-levels. This contrasts with a number of departments (e.g. UZ, UL and Univen), where the bulk of the sustainability contribution is concentrated at NQF-level 7. As for the H-P-I subgroup, the fact that the sustainability contribution tends to occur during more advanced NQF-levels is positive, pointing towards greater depth achieved while dealing with the full complexity of sustainability, thus increasing usefulness for EfS.

6.5.3 Interior, first person perspectives

Interior, first person perspectives have been obtained during a series of individual interviews in order to obtain an outside view of individual, subjective intentions on associations between EfS and the spatial-chorological identity of Geography. Examples of some of the major lines of thought that emerged appear in Quote Box 6.1. An important idea expressed is that this identity involves much more than the idea of spatial science, but also relates to aspects such as space, place, scale and boundary making. The contribution of this identity to the make-up of Geography as it is understood and practiced today has been alluded to by a number of interviewees. Regarding the utility of this identity to accommodate sustainability studies, some interviewees admitted to the existence of such possibilities – with suggestions that this might constitute a good fit. The reasoning expressed is that sustainability can and should be analysed spatially, with space, place and scale providing a context for this. One interviewee indicated that such analyses would be important from the viewpoint of human-environment interaction as well, which suggests a link between the spatial-chorological and human-environment identities.

The second important aspect about the spatial-chorological identity that formed part of the interviews relates to the need for transitions that are required in this identity to stay relevant in view of developments in ICTs, the need for theory based analyses and the demands of sustainability challenges. The message emerging from the responses points towards several challenges to address before it will be possible to blend EfS with the spatial-chorological identity. Examples of these challenges are included in Quote Box 6.2, with only a few highlights presented here. The understanding attached to sustainability has been mentioned, with the Global South context demanding a different take than for the Global South. The lacking visibility of sustainability in South African Geography was also referred to, ascribing it to geographers being established in other sub-fields and not willing/interested to make a switch. GIS has also been touched on – in that it is oriented too much towards technicalities. For it to be more useful to Geography, including sustainability applications, a rethink on the approach to teaching and learning of GIS in Geography need to be considered.

Quote Box 6.1 – First person perspectives:
Geography's spatial-chorological identity and EfS

Associations between the spatial-chorological identity and EfS in the undergraduate Geography curriculum

C1: "I don't think Geography's claim to academia … is the spatial disciplines necessarily. Geography is … more than about space per se … but I like to think about things like scale … place making, boundary making. These are for me more useful kind of things that I think, make Geography a discipline. And so I think they are very important to the questions around human-environment interaction."

J1: "I think that's the identity of Geography, the space, that's the key thing and I think that's a nice platform there to infuse the sustainability."

A4: "… because we live in a spatial context … sustainability should be dealt within a spatial context … We often talk about globalisation … but even within that, we're still talking about a spatial context. So yes, personally I think the spatial context is important.

A5: "… I think the spatial aspect is a fascinating complication to the sustainability issue. Making it very stimulating. We can't ignore it. It's not artificial to sustainability within a spatial context. Not at all. It would actually fit in very well with all sorts of spatial aspects of the discipline …"

J2: "I think it's definitely something we need to be aware of and I think it's a very important thing to touch on in any sustainability course is that over space and time things do change. So two spaces might be completely different yet we need to have a sustainable approach in developing both those spaces."

Transitions required in the spatial-chorological identity to stay relevant in view of 21st century challenges and developments

J1: "… what I see is a major handicap that … the way we define sustainability in the Global South would be slightly different than the Global North, because our priorities are different and then you can come up with a different understanding of sustainability."

E1: "… and that might be the reason why sustainability isn't so visible at the moment in terms of spatial studies … it needs that critical mass and you're not getting it from geographers who are established ... They have carved out their own niche ... They're going to remain in their niche …"

C2: "… the way GIS is taught doesn't lead to deeper type of studies. It seems to be very technique driven and sometimes associated with this spatial thing … and it avoids the deeper investigation and meanings behind space and perceptions and feelings and things like that …"

C1: "… at some point we need to be able to introduce these kind of theoretical methodological frameworks which are things like a scalar understanding or an understanding of place and boundary making and how we organise the world in those words, how we organise knowledge through those kind of frameworks …"

A5: "… a problem is once again how people view the discipline … the aspects that are important. I enjoy … the idea behind the spatial variability. I find that is a very important thing in Geography. Other people might focus more on a landform or a society … without regarding … the spatial aspect … as the main focus of interest."

Quote Box 6.2 – Second person perspectives:
Geography's spatial-chorological identity and EfS

Associations between the spatial-chorological identity and EfS in the undergraduate Geography curriculum

B1*: For me the human-environment aspect is interesting in the context of space and time, which is why regard the latter as having a slightly more prominent position as the former. If we think about Geography, time and space and scale are central. So we will rather say that you cannot speak about "sustainability", or for that matter about any other themes/topics in Geography without referring to aspects as time, space and scale.

F1*: I cannot think that it is at all possible to do Geography without the element of interfaces between the environment, people and space. For me that is the basic building blocks of Geography … But the spatio-temporal emphasis in some departments is very weak … and I pick up that some students struggle to with this aspect … it does not come as a natural thing for them …

J8*: *(With reference to GIS)* … the application is not with a focus on sustainability. If there is sustainability in a question, it is there by chance

J6*: I attempted to integrate the map work with the presentation of data within the theme of services provision ... and then the theme of sustainability features very strongly H1: "I mean in my experience, you know, the blending is almost hundred percent possible. You have all the tools at your disposal, I mean, just thinking about Google Earth, functionalities, to bring in scale and obviously space and time issues and I found that to be, you know, working at all levels very, very effectively."
Transitions required in the spatial-chorological identity to stay relevant in view of 21st century challenges and developments B1*: A difficult thing that we still can improve on is the progression from first to third year … For example the concepts space-time or sustainable development – that you take these from the first year and build it as a theme up to the third year. We do not yet really do that … and can improve in this regard. F3*: A move towards more theory based analyses is fine, but certain streams of socio-cultural geographers do not have a clue what spatiality is about. So we can bring it (more theory) in, but keep it for a bit later … It does not help much to have a student that can tell you all about the ins en outs of Foucalt, but cannot compile a table J9*: *(With reference to GIS)* … the moment that you ask an application based question everything collapses J8*: *(With reference to GIS)* I think our students struggle with the practical terms and it deviates from Geography the moment that you have to learn practical computer terms. It actually deviates a lot from Geography and the students that register for Geography do not necessarily have that background or aptitude.

* Researcher translated from Afrikaans

6.6.4 Interior, second person perspectives

To add on to the outside views obtained from individual interviews, focus groups were conducted to obtain inside views of the collective interior by studying inter-subjectivities flowing from discussions. To facilitate comparison the same themes than for individual interviews were used. The importance of spatial and related perspectives for Geography was re-iterated, with added comments about the under-representation of this identity in undergraduate Geography. Although spatiality and related matters are viewed as basic building blocks of Geography, the presentation of these in some departments seems to be very weak or lacking depth. In this regard it could be deduced from the focus group discussions that geographers feel that spatial and related matters are dealt with in GIS, but which has limitations, as already pointed out in Sub-section 6.6.3 (Interviewee C2).

Concerning possible transitions required for the spatial-chorological identity to stay relevant in view of developments in ICTs, the need for theory based analyses and the demands of sustainability challenges, two important observations can be made from the focus group discussions. The first observation concerns the issue of progression and to make sure that space, time and related concepts are included as a theme, building it from NQF-level 5, through 6 to 7. To incorporate sustainability in the undergraduate curriculum, the same type of approach will be required. The second observation concerns the aspect of theory based analyses, which the participants in one of the focus groups regarded as having its place and time, but not at the expense of providing students with some basic analytical abilities as well.

6.5.5 Quality assessment

In terms of the integral methodological framework utilised for this research, the quality of the results are associated with the mapping of the research space in terms of quadrants, levels, lines, states and types (refer to Sections 3.6.3 and 3.6.4), combined with the selection of appropriate methodologies for each of the AQAL quadrants (refer to Section 3.6.3). Triangulation and cross-correlation of results obtained through these different methodologies, each representative of a different aspect of reality, consequently addresses matters related to the quality of results. For the exploration of the connections between the spatial-chorological identity and EfS in undergraduate Geography in South Africa, triangulation and cross-correlation between the following findings obtained through various methodologies and from various perspectives, co-support and feed into each other, this pointing towards validity and trustworthiness:

- Mapping of sustainability contributions for the various departments: Indicating that sustainability is largely lacking in modules in the S-G subgroup, and more so in modules with G components than for modules with S components.

- Individual interviews: Expressing potential for inclusion of sustainability in the S-G subgroup, but pointing to challenges related to the understanding of sustainability, the way GIS is practiced, lack of theoretical frameworks for implementation and lack of specialists willing to drive such initiatives.

- Focus groups: Confirming the status of spatial related aspects as building blocks of Geography, although largely lacking or relatively week in some departments and expressing the need to ensure that adequate progression is built into the development of this as a theme from NQF-level 5, through 6 to 7.

6.5.6 Analysis and discussion

Consideration of the spatial-chorological identity in undergraduate Geography in South Africa revealed a lower than expected presence of the S-G subgroup, which aligns with findings of Johnston et al (2014:17), who report a declining trend in the United Kingdom in spatial science/quantitative analysis in undergraduate Geography. They relate this to a general antipathy about spatial science (including quantitative analysis) that gradually developed and continues to haunt Geography (Ibid:290-291,294). This can probably be regarded as a reaction against the almost exclusive quantitative, positivist stance taken by proponents of the spatial-chorological identity till recently (e.g. Cresswell 2013). Results from interviews and focus groups confirm these trends for undergraduate Geography in South Africa, pointing to the importance of this component for the life and soul of Geography while admitting that its profile is rather weak and that students tend to struggle to grasp it conceptually.

Concerning the presence of sustainability in the S-G subgroup, the analysis provided in this chapter indicates that apart from one or two exceptions, the sustainability contribution largely occurs in modules with S components, while it appears to be under-represented in modules with G components. This is in line with what can be expected according to the literature – Tan and Rose (2007) reports that the role of GIS in EfS is not widely discussed and is often dealt with by case studies rather than comprehensively. In addition GIS seems to rather feature as dedicated skills-based modules, but which limits its abilities for real-world problem-solving and as a result for EfS as well (Bearman et al 2016:402). Despite these limitations, the fact that similar to the H-P-I subgroup, the bulk of the sustainability contribution features during the more advanced stages of the S-G subgroup enhances its utility in general and specifically in terms of EfS.

6.6 Integral view of the spatial-chorological identity and EfS in undergraduate Geography in South Africa

Engaging with Geography in terms of teaching and learning implies not only the existence of adequate theoretical frameworks, but also the ability to utilise them to assist with sense making of observations, descriptions and analyses (Eddy 2005:152). Although spatialities (including considerations in terms of space, place and scale) can be regarded as fundamental to Geography, they are not the only determinants of approaches to be considered to engage students with the intricacies of geographical inquiry. Integral Methodological Pluralism (IMP) (Wilber 2003:109-122) highlights the different approaches that have been advanced within various subfields and that can be used for contextually situating people in terms of spatial considerations (space, place and scale).

In terms of the requirement for adequate theoretical frameworks, the spatial-chorological identity can fulfil the role of an integrative force in Geography, augmented with integral narratives as means for exchanges and understanding between different viewpoints (Eddy 2005:151). This integrative role is hampered by sub-specialisation in Geography, leading to fragmentation of the undergraduate curriculum (Whalley et al 2011:384) which is also characterised by dualisms. The divide between Human and Physical Geography is an example of this. Other divides also exist in Geography, e.g. the separation between spatial-analytical geographies and social, cultural, and political geographies (Kwan 2004:759). However, recent work based on methodological hybridity reveal the pseudo nature of many of these perceived dualisms (Sui and DeLyser 2012:115).

The divide in the S-G subgroup with GIS-related modules that appear to be more technique focused, together with the disproportionate distribution of the sustainability contribution between modules with S components and modules with G components, present a challenge to blend into an integrative narrative. In order for GIS to be of value for EfS, students need not only be exposed to the technicalities of GIS, but GIS should also be utilised to develop critical spatial thinkers (Bearman et al 2016:394-395). Taking the integral perspective as point of departure, GIS has the potential to serve as platform to integrate themes that are often dealt with in Geography in specialised domains and in a piecemeal fashion, and if succeeding this may feed directly into and support EfS as well.

6.7 Concluding remarks

This chapter reviewed the manifestation of EfS as part of the spatial-chorological identity of Geography from various perspectives. The historical roots, evolution and current position of this identity were firstly considered. Although spatial considerations (including space, place and scale) are regarded as essential for Geography, these aspects appear to feature less prominently than expected in undergraduate Geography curricula in South Africa and its presence may be declining as well. This is similar to what has been observed and reported elsewhere, as for instance in the UK and might be regarded as reaction against the almost exclusive quantitative, positivist stance taken by proponents of the spatial-chorological identity till recently. Currently exclusive emphasis on spatial patterns and regularities is not that important for this identity, but rather acknowledgement that space and place matters as context for theory-led descriptions of spatial patterns and behaviour, based on for instance structuration and critical realism.

Exploration of undergraduate South African Geography curricula revealed that the footprint of the spatial-chorological identity (as manifesting in the S-G subgroup) is not as clear as that of the human-environment identity. In addition, the bulk of this contribution lies with G rather than with S. With reference to the sustainability component, the pattern indicates a lower relative sustainability contribution for the S-G subgroup compared to the full curriculum. The S-G subgroup thus performs poorer than the full curriculum regarding the presence of a sustainability component. Further investigation revealed that the sustainability contribution is largely concentrated in modules with S components, while under-represented in modules with G components. Potential therefore exists to expand the sustainability component of modules with G components, which will be of benefit not only to EfS but also to the discipline, since GIS can serve as platform to integrate themes that are often dealt with in a piecemeal way in Geography.

Triangulation and cross-correlation between the methodologies and various perspectives used to investigate relationships between the spatial-chorological identity and EfS in South African undergraduate Geography provided results feeding into each other, pointing towards validity and trustworthiness. Further rigour flowed from consideration of integral state (sustainability), integral type (study year) and integral level (depth). Regarding the relationship between the spatial-chorological identity and EfS (integral development line), the disproportionate distribution of the sustainability contribution between modules with S components and modules with G components, together with the highly technical nature of much of the latter component, present a challenge to blend into an integrative narrative. The following chapter expands the exploration of the development lines now identified in the relationship between EfS and undergraduate Geography, with the focus shifting to Geography’s cross-disciplinary linkages.

Chapter 7: Cross-disciplinary linkages of Geography and EfS

"The present context is inimical to the preservation of Geography's intellectual foundations. The current focus on narrow specialisations ensures that we will be valued more for our 'technical baggage' (Taylor, 1985, 101) than for our claims to provide a holistic view. Cognitive fragmentation encourages cultural disintegration. Geographers' fissiparous tendencies are promoted by the current emphasis on multidisciplinary teaching and research and greatly facilitated by the new organisational context which enables intramural shifts in disciplinary identities." (Holmes 2002:18)

7.1 Introduction

The third integral development line identified for this research, namely the trend in Geography towards cross-disciplinary linkages and how well this blends with EfS is considered in this chapter. According to Skole (2004:739), the trend to cross disciplinary boundaries is closely related to the challenges posed by 21st century global environmental change, advancing the need for integration of human and natural systems in research and in curricula. The quest for crossing disciplinary boundaries has developed into a major thrust due to the realisation that in many cases the problems to be addressed involve input from multiple disciplines (Baerwald 2010:495). Because of the inherent interdisciplinary nature of Geography, geographers can contribute towards such cross-disciplinary problem-solving and can also address this in undergraduate curricula. Although this approach also supports EfS, it might impact on priorities of departments in terms of teaching and research (Holmes 2002:7) and have implications in terms of maintaining the status and identity of Geography as a discipline (Ibid:9).

This chapter follows the structure of previous two chapters; however the focus in this chapter is on the cross-disciplinary linkages of Geography. The first part of the chapter provides the context of the contemporary trend in Geography to not only challenge disciplinary boundaries but to work across them as well. Some of the more notable manifestations of such cross-disciplinary linkages in undergraduate

Geography will be used as examples to illustrate this trend, and will specifically include links between Geography and Environmental Science/Management and GIS. A reflection on the linkages between these cross-disciplinary trends and EfS in undergraduate Geography is provided and thus sets the scene for an assessment of the situation in this regard in South Africa. As was the case for the previous two chapters, the methodology for the assessment in this chapter relies on the AQAL model, with consideration of information obtained through first, second and third person methodologies and perspectives in terms of integral states, types and levels. A synthesising analysis and discussion, with reference to the integral view, concludes this chapter.

7.2 Context of Geography's cross-disciplinary linkages

7.2.1 Interdisciplinary nature of Geography

Although the quest for inter-disciplinarity is not only linked to the discipline of Geography, as several other disciplines stake claims in this regard, there is agreement that the expressed need to link natural and human systems resonates with the human-environment identity of Geography (Skole 2004:742). The literature for the past 10 to 15 years provides many examples of geographers who refer positively to Geography's interdisciplinary nature and the ability of the discipline to facilitate integration of the sciences and humanities (e.g. Skole 2004, Baerwald 2010, Hedberg II et al 2017). However, the calls for inter-disciplinarity require integration across the total breadth of Geography, which contrasts with the increase in methodological and epistemological distance between physical and human geographers observed (and referred to numerously in this thesis and re-iterated by Hedberg II et al 2017:108). An extreme viewpoint is that of Johnston (2012:6-7), suggesting that as a result of the disciplinary divide, Geography departments should be dissolved, and the geographers specialising in the subfields of Geography should be integrated into the associated social and physical sciences.

According to Baerwald (2010:496), geographers are inclined to look beyond their own discipline and focus on study and research opportunities within other disciplines or fields – to the extent that this can be regarded as a unique characteristic of modern Geography. Unless a new perspective on the implications of the discipline's own 'intra-disciplinarity' – referring to the presence of science and humanities in one discipline (Evans and Randalls 2008:582) is developed, the extreme argument that Geography needs to dissolve (as implied by Johnston 2012) might be a reality. It stands to reason that Geography needs to come to grips with its own 'intra-disciplinarity' for the discipline to be able to take its place in interdisciplinary collaborations with other disciplines/fields. Such collaborations do not happen automatically but require several inputs, varying from practical (the need to share common research goals), to more esoteric (awareness of epistemological dimensions of knowledge claims across disciplines) (Simon and Graybill 2010:358).

7.2.2 Positioning Geography within cross-disciplinary collaborations

Building on the argument that the challenges to deal with 21st century environmental change will increasingly require focus on the coupling of human and natural systems, Skole (2004:739) argues that research and education are inevitably developing the need to extend beyond the confines of disciplinary boundaries. Although not necessarily implying the total disappearance of disciplines, more focus is required on making connections across disciplines, thus supporting the synthesis of studies that aim to improve linkages between decision making processes, technological developments and scientific endeavours (Ibid). The importance of cross-disciplinary collaboration resulted in development of a typology that distinguishes between multi-disciplinarity (with collaboration between two or more disciplines), inter-disciplinarity (with synthesis of two or more disciplinary approaches) and trans-disciplinarity (with integration of academic and non-academic practitioners) (Tress et al. 2003 cited Simon and Graybill 2010:358).

Characteristics of Geography such as its unbounded nature in terms of topics covered and approaches and methods (Baerwald 2010:497), continuously connects geographers with other disciplines. This sets the stage for multiple cross-disciplinary interactions and endeavours (Lave et al 2014:2-3), involving research as well as teaching and learning. Preparing undergraduate students to participate as geographers in cross-disciplinary work later on is not necessarily easy, and involves challenges as making choices between the depth that is achieved versus the breadth of coverage (Hedberg II et al 2017:108). Despite the thrust towards cross-disciplinarity, scholarly contributions on how Geography might address challenges as these by developing supportive teaching and learning approaches are still largely lacking (Ibid:109). Suggestions worth considering include providing opportunities for cross-disciplinary dialogue, setting requirements for a wider variety of course work and offering courses combining aspects of Human and Physical Geography (Lave et al 2014:6-7).

7.2.3 Geography and the impacts of shifting institutional realities

In association with the trend towards cross-disciplinary linkages, scholars observe that Geography is increasingly losing its administrative autonomy (Gibson 2007:97-98; Murphy 2007:124) and rather functions as part of bigger multidisciplinary academic units (Holmes 2002:9-13; Mather 2007:151-152). By 2015 the situation in the United Kingdom (UK) evolved to the extent that the majority of Geography departments could in fact be regarded as multidisciplinary. The international scene indicates a related trend, with Geography increasingly situated in institutional contexts that might affect its disciplinary integrity more negatively than positively (Hall et al 2015:58). Numerous concerns about this trend have been voiced – some regard it as indicative of Geography taking a back seat in terms of institutional politics and/or funding. On a deeper level these concerns relate to the evolution of the identity of Geography and its manifestation in institutional contexts (Ibid:57-58).

The trend of disciplinary based departments such as Geography to be either dismantled or reconfigured within the context of multidisciplinary units, needs to be contextualised in terms of the predominantly neo-liberal motivated restructuring of higher education institutions, which has become accepted practice in many parts of the world over the past couple of years (Wainwright et al 2014:410). The resulting impact of the neoliberal agenda on academia has been remarkably far reaching – to the extent that it transformed the meaningfulness of being an academic to sets of productivity measures and what can be contributed in terms of quantifiable deliverables such as numbers of graduates and publications. In a value-driven system like this, combined with the questioning of the internal coherence of Geography as a discipline and where it in actual fact belongs, Geography may easily become a victim of restructuring exercises, as have happened with a number of Geography departments in the UK (Chan 2011; Wainwright et al 2014) and in Australia (Holmes 2002).

7.3 Implications of cross-disciplinary linkages for undergraduate Geography

7.3.1 Cross-disciplinary linkages and teaching and learning in Geography

For geographers to be able to effectively participate in cross-disciplinary work at the interface of the human and natural sciences, a proper foundation in this regard in undergraduate Geography is advisable (Lave 2013:6-7). However, the approach to undergraduate Geography is determined by the various scholars working in individual Geography departments, and their specific envisioning of the discipline. This envisioning is not necessarily one of integration, with the existence of divergence between Human and Physical Geography the rule rather than the exception (Winkler 2014). This divergence is bound to affect undergraduate Geography in some or other way, with emphasis on the maintenance of diversity which is usually observed, but comes at the cost of moving towards an integrative narrative (the preferred option to address the 21st century challenges confronting the world). Attention to this deficit is overdue: Geography's sustainability as a discipline may indeed depend on the ability of geographers to forge cross-disciplinary linkages in the creation of learning experiences that are responsive to the needs of the 21st century (Whalley et al 2011:385).

Undergraduate Geography clearly needs to feed into and prepare students for roles in cross-disciplinary type of work. These students should have the opportunity to engage with epistemic pluralism in order to be able to master multiple academic methods and languages (Lave et al 2013:6-7). In this regard Clifford (2002:435) states that "… if we do not expect (or even want) students to integrate in circumstances where we have complete control, then how much less so can we expect a unitary discipline to survive, let alone thrive, when these students progress as the next generation?" According to Whalley et al (2011:385), this expectation requires exposure of students to real-world problem solving contexts in order to appreciate interactions between disciplines and/or study fields that are generally considered as being unconnected. In most Geography departments such pedagogies are not very well developed (Yarnal and Neff 2004:30). If Geography does not stand up to the occasion, it will "forgo an opportunity to take a central role in environmental science in the twenty first century" (Ibid:32).

7.3.2 Trade-offs between vocationalism and disciplinarity in Geography

Aligned with the thrust towards cross-disciplinarity, undergraduate Geography seems to be increasingly transformed through an emphasis on vocationalism (Arrowsmith et al 2011:365). This is associated with a growing demand for degrees that are market-related and framed by professional expectations, as Environmental Management, Environmental Science/Studies, GIS and RS (Dowling and Ruming 2013:204). With a view to employability, the curricula for these type of degrees are inclined not to focus exclusively on geographical knowledge, insights and skills, but also on competencies required in the workplace such as working in teams, communication in the workplace, how to do presentations and what assessment entails (Hennemann and Liefner 2010: 228). Debates on the balance between vocational skills and disciplinary orientation are therefore not uncommon, with fears expressed that the value of a disciplinary focussed background in Geography might be gradually eroded (Gibson 2007:97).

In the 21st century, Geography students are therefore clearly required to master much more than are presently offered by traditional knowledge focussed programmes (Arrowsmith et al 2011:367). Compared to the status quo, Geography curricula therefore need to "… become more outward-facing, more demand-led and more outcome orientated" (Whalley et al 2011:380). In this regard the Geography curriculum should not be viewed as a canon of topics and sun-topics to be studied in order to qualify as a competent geographer, but rather in terms of the different ways of knowing, discovering and doing that are associated with Geography (Sheppard 2004:744). Forging of cross-disciplinary linkages can contribute to this required transformation, provided that these linkages enhance and not undermine the 'geographical advantage'. Survey results reported by Hennemann and Liefner (2010:220) indeed show that the assumed flair of geographers for cross-disciplinary work is an important consideration why they are hired for jobs in the first instance.

7.3.3 Environmental Science/Management and GIS as examples

The inclusion of Environmental Science/Management and GIS in Geography departments aligns with the trend of increased disciplinary flux (Holmes 2002:13), coupled with the re-organisation of the knowledge landscape (Fairhurst et al 2003b:84). Consequently several structural changes in contemporary undergraduate Geography followed, also affecting the qualifications on offer (Fairhurst et al 2003a:98). These components add a distinct vocational flavour to Geography and enhance the cross-disciplinary thrust, with positive spinoffs for the marketability of the discipline. Although there are important reasons why Geography departments should incorporate teaching and learning of Environmental Science (Ibid:100), the prevalent technocentric, positivist view of Environmental Science does not blend well with the multi-paradigmatic, holistic view of Geography (Acott and McGibbon 2007:200-201). Geography and Environmental Management also share commonalities, but with the latter involving the application of formalised activities which students need to be able to use and which cannot be regarded as part of Geography either (Fairhurst at al 2003:101).

Inclusion of GIS in undergraduate Geography constitutes a trend of equal importance than for Environmental Science/Management (Ibid: 105), which is in line with the current emphasis in higher education on vocationalism (Whyatt et al 2011:233). Although there appears to be consensus that GIS should form part of the curriculum for undergraduate Geography students (Ibid), skills and thinking related to GIS are increasingly featuring in other disciplines as well (Tate and Unwin 2009:S3-S4). This points towards the utility of GIS in cross-disciplinary contexts, as suggested by Rickles and Ellul (2015:226), although it has to be acknowledged that it is not feasible to provide training to become a fully-fledged GIS practitioner within the confines of already overfull study programmes (Holmes 2002:12). In addition, challenges occur when viewing GIS only as a skill without a grasp of its ontological implications. This may lead to a lack of ability to decide when and how to use GIS in an appropriate way (Whyatt et al 2011: 235-236), which is illustrative of the type of issues that may be encountered when the offering GIS in cross-disciplinary contexts.

7.4 Geography's cross-disciplinary linkages and EfS at under-graduate level

7.4.1 EfS and the nexus between disciplinarity and cross-disciplinarity

Due to the complexity involved in dealing with issues and problems of a sustainability dimension, EfS relies on a holistic approach to familiarise students with the process to integrate knowledge, skills and insights across disciplinary boundaries

(Yarime et al 2012:102). Differences between disciplines in terms of methodologies and utilisation of explanatory models are likely to cause confusion and inhibit the value of such initiatives (Rasmussen and Arler 2010:42). It has to be understood that working towards the establishment of cross-disciplinary linkages should not be regarded in the sense that it is anti-disciplinary or that disciplines have to disappear, but rather the contrary: "… an effort to integrate disciplinary approaches in order to tackle complex problems" (Bursztyn and Drummond 2014:314). From the teaching and learning perspective, challenges in terms of reconciling disciplinary with cross-disciplinary approaches lies in striking a balance between specialisation and holism (Oksen et al 2009:312) and countering accusations of generalisation (Bursztyn and Drummond 2014:321).

Because philosophical and methodological approaches and assumptions about good scientific practice differ across disciplines (Rasmussen and Arler 2010:37-38), cross-disciplinary work is usually reserved for post graduate studies, when students can learn hands-on what it entails by participating in cross-disciplinary research teams (Oksen et al 2009:312-315). This does not imply that students need no exposure to cross-disciplinarity during their undergraduate studies. Geography has an important role to play in this regard due its inherent interdisciplinary nature, thus coined by Skole (2004:739) as "… great intellectual melting pot and the preeminent interdisciplinary environmental discipline" and by Youngblood (2007:2) as bridging discipline, involving "… domains so broad as to encompass the physical and social sciences as well as the humanities." Due these qualities, Geography can effectively fulfil the role of anchoring discipline in undergraduate environmental sustainability study programmes by structuring and facilitating the learning experience (Pretorius and Fairhurst 2015).

7.4.2 Cross-disciplinarity and vocationalism as context for EFS

In terms of Geography's qualities as bridging discipline, linkages forged within many departments/schools/centres between Geography and vocationally oriented fields of study as Environmental Science/Management and GIS, provide several new opportunities to advance EfS. On the negative side examples can be mentioned of linkages as referred to here that initiated a loss of identity of undergraduate Geography (i.e. Australia – Holmes 2002:12-13), or even replacement of Geography with Environmental Science (i.e. the USA – Rasmussen and Arler 2010:40). The approach in Environmental Science can vary from a natural/physical science position to a natural/social science position, with EfS rather aligned with the latter (Acott and McGibbon 2007:201). Although Environmental Management can be characterised as pragmatic/technical, its reliance on integration of different knowledge types provides better potential for alignment with EfS than Environmental Science (Rasmussen and Arler 2010:40). GIS is in a different category and while offering several possibilities in terms of EfS, this presents only one of several applications (Ellul 2015:191-192) and with GIS rather complementing than competing with Geography (Holmes 2002:11).

A vocational orientation in undergraduate Geography curricula may improve marketability and attract students for departments to remain financially viable. Although this may be the case, the emphasis on skills training and workplace requirements is regarded by some as detrimental to the discipline (Fairhurst et al 2003a:87). Fortunately several authors, including Arrowsmith et al (2011) and Whalley et al (2011), report extensively how Geography curricula can be designed and supported with appropriate learning experiences which do not impoverish Geography as a discipline, while at the same time enabling students to improve their employment opportunities. Incorporation of EfS has the potential to fulfil a complementary role in this regard due to amongst other things the link between Geography's human-environment identity and sustainability constructs and conceptualisations (Grinsted 2013). The value of EfS is that it is not focussed on skills transfer *per se*, but on integration of knowledge and skills associated with specific disciplines to empower students to take part in the transformation to sustainability (Mochizuki and Fadeeva 2010:392).

7.4.3 Cross-disciplinarity as contested territory versus potential for EfS

The long and short of the debate about disciplinary versus cross-disciplinary approaches is that the need to craft responses to the complex and pressing issues experience by humankind in the 21st century increasingly "… call for a broader understanding than isolated disciplines can offer" (Oksen et al 2009:310). This is highlighted by Bacon et al (2011:196) with their explanation that while disciplinary based approaches to EfS may serve to highlight the nature of the Earth's bio-geo-chemical cycles, it falls short in addressing the role of human society and aspects as culture and livelihoods. No wonder that cross-disciplinary approaches are regarded as one of the important characteristics of EfS (Mochizuki and Fadeeva 2010:393), while a variety of innovative pedagogical approaches, including project-, team- and inquiry-based teaching and learning are utilised in a deliberate effort to create "more holistic, integrated, collaborative problem-oriented approaches" (Bacon et al 2011:196).

Different pathways towards cross-disciplinarity in academia and science are indeed possible and actively pursued (Bursztyn and Drummond 2014:316), but contestation is evident due the ontological impasse associated with the need to promote specialisation on the one hand, while on the other hand subjected to increased pressure to address complex issues requiring more than specialised approaches (Ibid:320). Of concern is that although Geography brings an integrative perspective to the cross-disciplinary setting, this is not necessarily appreciated. In this regard Simon and Graybill (2010:361) reports that some collaborators in a cross-disciplinary project that they investigated perceive Geography to lack an articulate definition and to be too general to be able to make solid contributions. These types of objections to a large extent apply to EfS as well, due to its reliance on the contested concept of sustainability and being stigmatised in terms of generality and lack of a clear definition as well (Missimer et al 2017:32-33).

7.5 Exploring the connections: Geography's cross-disciplinary linkages and EfS at undergraduate level in South Africa

7.5.1 Context of exploration

The same protocol to establish the composition and sustainability contribution of modules/courses as explained in Chapter 4 has been utilised for the categortisation used in this chapter. The assumption has been made that the analysis of modules which include aspects of E (Environmental Science/Environmental Management), G (GIS/Cartography) and O (for 'Other' – specifically Meteorology and Tourism) would provide an indication of the manifestation of the trend towards cross-disciplinary linkages in undergraduate South African Geography. Note that although G has already been considered as part of the S-G subgroup, it is again considered in this chapter, but now in the context of its role in forging cross-disciplinary linkages. The information provided in Table 7.1 indicates that the trend towards cross-disciplinarity has a definite visibility in undergraduate South African Geography, exceeding the 50% level for seven departments, and even reaching as high as 71.2% (UP). The bulk of this contribution lies with E and G, and is spread across these two components in a roughly equal order of magnitude. E varies from 5% or less (Rhodes & NWU – Mfk) to as high as 47.7% (UZ), while G varies from 5% or less (Rhodes, UZ & UCT) to as high as 41% (NMMU).

7.5.2 Exterior, third person perspectives

The exterior, third person perspectives presented in this sub-section have been compiled based on data obtained through assessment of the undergraduate curricula of 17 Departments of Geography in South Africa (Annexure 1), as well as feedback obtained from a questionnaire (Annexure 2) that was completed by small groups of staff members associated with four Departments of Geography. The sustainability contribution being considered consists of the sum of the identified sustainability-focused and sustainability-related components for each module (refer to Sections 4.6.3 and 4.6.4). With reference to the nature of sustainability inclusion (integral state), the data in Table 7.2 indicates that the relative sustainability contribution for the E-G-O subgroup is higher than for the full curriculum for 13 of the 19 departments, although this difference is not very significant in some cases. For Univen, Unisa, NWU (Mfk), UKZN, WSU and Rhodes the opposite holds true, indicating that the sustainability contribution is not necessarily concentrated in the E-G-O subgroup only but spread in significant proportions over other parts of the curriculum as well.

Table 7.1*: Manifestation of the E-G-O subgroup in South African undergraduate Geography (2014-2015)*

Department	**Weights associated with the E-G-O subgroup in South African undergraduate Geography (2014-2015), as % of full curriculum**			
	(E+G+O)-%	E-%	G%	O-%
UP	71.2	8.2	37	26
UV (Bmf)	42.2	22.7	19.5	-
UV (QQ)	57.7	16.7	14.3	26.7
UJ	40	25	15	-
UZ	51.3	47.7	3.6	-
UL	42.1	14.8	27.3	-
Wits	42.9	32	10.9	-
Univen	22	5.5	16.5	-
Unisa	42.2	28.4	13.8	-
NWU (Potch)	33.1	6.3	26.8	-
NWU (Mfk)	27.7	3.7	24	-
UKZN	61.1	34.4	23.9	2.8
WSU	51.2	29.3	18.1	3.8
UFH	14.4	11.6	2.8	-
Rhodes	10	5	5	-
UWC	43	8.7	11.3	23
US	35.6	4.4	31.2	-
UCT	13.7	12.6	1.1	-
NMMU	56.1	15.1	41	-

Table 7.2*: Manifestation of sustainability contribution (%) – full curriculum compared with modules in E-G-O subgroup, South African undergraduate Geography (2014-2015)*

Department	Relative sustainability contribution (%)	
	Full curriculum	E-G-O subgroup
UP	17	19.9
UV (Bmf)	32.7	38.6
UV (QQ)	34	38.2
UJ	34.4	50
UZ	46.8	51.9
UL	18.6	30
Wits	39	54.6
Univen	30.6	26.7
Unisa	81.3	80
NWU (Potch)	28.7	41.1
NWU (Mfk)	18	8.8
UKZN	41.1	36.7
WSU	40.7	36.17
UFH	35	39.17
Rhodes	36.7	0
UWC	25.4	26.9
US	13.8	20
UCT	45	65.8
NMMU	21.6	21.7

The analysis of the nature of sustainability inclusion in the curriculum can be taken a step further by comparing the sustainability contribution of modules in which E, G and O feature separately, thus obtaining deeper insight regarding the integral state at stake. The reason for the comparison is because this contribution may vary significantly between these three types of modules. The comparison will reveal in which curriculum components sustainability are under- or over-represented or perhaps have a balanced occurrence, thus indicating where changes may be considered in future. The general pattern revealed by Figure 7.1 is that modules in which E components feature, are inclined to show a relatively high sustainability contribution. Modules in which O components feature also perform quite well, which specifically relates to the role of Tourism offerings. As already noted in Section 6.5.2, sustainability is largely under-represented in modules with G components, with exceptions presented by UCT and UFH, while Unisa and UKZN also do not fit the pattern 100%.

Consideration of the integral type (study year of sustainability inclusion) for the E-G-O subgroup in Figure 7.2, reveals a striking pattern. The bulk of the sustainability contribution features during the more advanced stages of the South African undergraduate Geography curriculum, with the pattern very similar to that for the H-P-I subgroup. Noteworthy in this regard is that 50% or more of the sustainability contribution associated with the E-G-O subgroup occurs at NQF level 7 for 13 Geography departments. As for the H-P-I subgroup (and to a lesser extent the S-G subgroup), the fact that the sustainability contribution tends to occur during more advanced NQF-levels is positive, pointing towards greater depth achieved while dealing with the full complexity of sustainability, thus increasing usefulness for EfS.

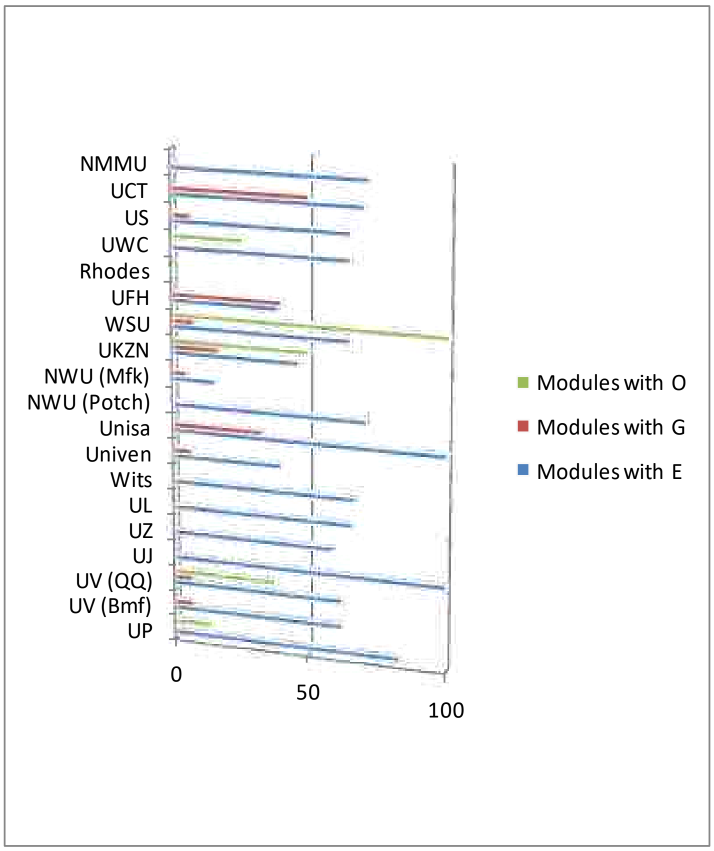

Figure 7.1: *Comparative sustainability contribution (%) for modules in which either a E, G or O component is present, South African undergraduate Geography (2014-2015)*

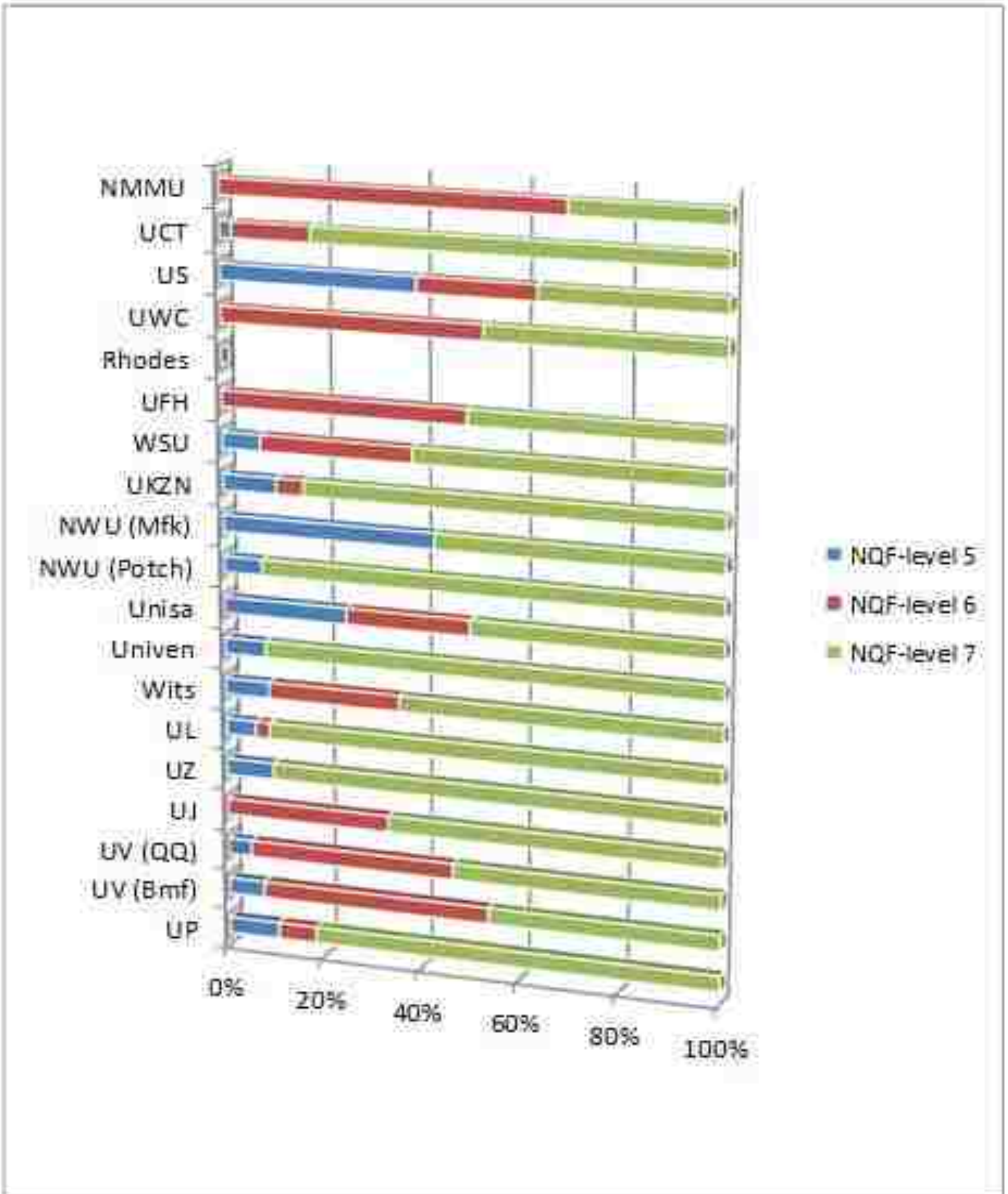

Figure 7.2: *Sustainability contribution (%) per NQF-level for modules in which E and/or G and/or O components are present, South African undergraduate Geography (2014-2015)*

7.5.3 Interior, first person perspectives

Interior, first person perspectives have been obtained during a series of individual interviews in order to obtain an outside view of individual, subjective intentions about Geography's cross-disciplinary linkages and EfS. The issue of striking a balance in the undergraduate Geography curriculum in terms of the discipline's integrity, vocational requirements and pressing needs, as 21st century sustainability challenges, was discussed first. Examples of major lines of thought that emerged during the interviews appear in Quote Box 7.1. The participating geographers clearly feel quite strongly about the issue at hand, and at the same time have diverging opinions about it. Two of the quotes refer to Geography's own intra-disciplinarity, specifically in terms of the challenges involved and alluding to the fact that the discipline struggles to maintain a balance in terms of its own intra-disciplinary and varied composition, which is impacting negatively on the discipline. Some of the quotes also refer to the issue of vocationalism, with negative spinoff that the discipline is compelled to offer modules demanded by industry, which might not necessarily be in line with the requirements of the discipline (GIS mentioned as example). But such involvement might not necessarily be negative for Geography, and with a balance indeed possible (as mentioned for Environmental Science/Management), depending how it is managed.

Quote Box 7.1 – First person perspectives: Geography's cross-disciplinary linkages and EfS
Striking a balance in the curriculum between the discipline's integrity and other needs and requirements A4: "… there are aspects of Geography which are pure Physical Sience and others which are Human Social Sience … those divisions would always be there, but that's what makes Geography … A variety of aspects and the contestations between these various aspects, which is not a bad thing, provided … we keep all the aspects going in this attempt to strike a balance. If we move into a situation where some aspects are dying, then there is a problem."

C1: "… the requirement to produce people for vocational kind of training ... can be done in ways which are unfortunate ... which mean that we direct a lot of the curriculum towards those things, you know. For example in GIS we've been with GIS people who've been pushing very strongly to get a certain kind of Plato accreditation and … they have to (do) that undergraduate here."

C2: "These are very important things. How do we ensure that the curriculum is balanced? Well, we have to actually go into a very deep and dark discussion of the value of Physical Sciences in Geography and the way in which it's valued … Physical Geography is not prepared to have that conversation. They are very arogant and they are not prepared to engage with a conversation and I think that they'll be the end of Geography."

D1: "… but we are moving now towards Geography and Environmental Management … we believe that the two can co-exist. We can do good in Environmental Science as well as in Geography … We view Environmental Management as industry focused. We view it as a professional degree and as vocational source. Students have got to leave here with a set of skills, practical skills that they can do to do Environmental Management.

Realities of addressing environmental/sustainability issues in the curriculum within a multi-inter-trans-disciplinary context

A4: "… at one stage it was even thought in the Department that we were leaning to much towards Environmental Science, towards … sustainability issues at the expense of purely Geographical issues and the argument … was that Environmental Science doesn't have a concrete theory the way Geography does and that if we lean to much towards that, we will begin to lose academic theorisation which is essential for our departments because we are at an academic institution."

E1: "We develop the subject and then these other focus areas sort of come in … and become important actually. I think in South Africa that is happening. I think it's a threat to the established practitioners … but at the same time the introduction of all that is providing the opportunities. So... It's how we deal with it actually. My sense, in South Africa, is that there's an increasing threat to Geography as such. Whether this is happening elsewhere, I'm not so sure."

D1: "… there are also students who have done Geography and Environmental Management and I find that those seems to be our strong students when they go to Masters and Phd … I mean, Environmental Management teamed along with Geography makes a very good professional."

A5: "If I or somebody decide ... I'm covering what you're covering is essentially the same thing, now the first question is … who should give it up? … Should they keep them and I should adjust mine? Whoever loses, will have to fill it up with something else which means they will have to redesign their curriculum slightly and people I found aren't really into that."

The second aspect about the trend towards cross-disciplinary linkages that formed part of the interviews relates to the realities of addressing environmental and/or sustainability issues in undergraduate Geography within a multi-inter-trans-disciplinary context. The specific requirement was to address if this presents an opportunity and/or a threat to Geography, as experienced in the department under consideration. Examples of some of the lines of thought that emerged appear in the second part of Quote Box 7.1. A trend in the observed responses is that geographers have concerns about the prospects and resulting outcomes of cross-disciplinary linkages. The first of these concerns, voiced by A4, is that the curriculum being offered might gradually lean towards Environmental Science, which may be at the expense of Geography. A5 is less negative but comments on the fact that adjustments/reworking in terms of the curriculum might be required, essentially a give and take situation, and not always with positive outcomes for Geography. E1 experiences it as a real threat to Geography and its practitioners (despite referring to some opportunities as well), while D1 is the only interviewee that's positive and refers to the fact that a graduate with Geography and Environmental Management is well equipped for the job market.

7.6.4 Interior, second person perspectives

In order to expand on the outside views obtained from individual interviews, focus groups were added to get an inside view of the collective interior by studying inter-subjectivities flowing from discussions. To facilitate comparison the same themes than for individual interviews were used. Quote Box 7.2 presents a snap-shot of crucial aspects of the discussions. Concerning the issue of striking a balance in the curriculum between the discipline's integrity and other needs and requirements (first part of Quote Box 7.2), Group F was rather sceptical, with F1 commenting that the type of integration required when addressing cross-disciplinary themes leads to superficiality, to the extent that themes are dealt with in a general way and may become meaningless. Group B was also sceptical, but from a different angle, with B3 commenting that delivering environmental managers has become too much of an end-goal in their department, which is at the expense of opportunities for the other sub-disciplines of Geography.

Quote Box 7.2 – Second person perspectives:
Geography's cross-disciplinary linkages and EfS

Striking a balance in the curriculum between the discipline's integrity and other needs and requirements

F1*: … the more you integrate these things at undergraduate level, the more superficial you are making it. We see the value of it if you bring the different specialists together at a later stage, the one knows exactly how cities work, the other about climate, etc. and then you have the IT (read: GIS?) guy that assists in putting all these things together To say that we now need to do all these things with our Geography students, expecting them to understand all this complexity, implies they will eventually know something about very little.

B3*: I have questions about environmental management as an end-of pipe aim in our department. This is terms of our honors in which it still feature prominently, serving as building block for ... although we have moved away from it a bit … I think we can still do more in our department to acknowledge other sub-disciplines in geography and not only Environmental Management."

J9*: I think environmental management did Geography a lot of good in terms of student numbers … but what about the teachers, since now there is a lot of things there that are not meant for them …

H3: "Yes, we have constantly debates about ... you know we're losing the classic part of Geography ..."

H3: "The problem is that one starts to get people who have emphasis which is so far removed from traditional Geography that it can become a problem."

Realities of addressing environmental/sustainability issues in the curriculum within a multi-inter-trans-disciplinary context

F2*: This is the reason why many departments changed their names, to be able to claim EIA, Environmental Management … It was a survival strategy. F1*: Actually a marketing strategy and the reason why we kept the name of our department as Geography … the guys here are beyond it.

F1*: Management is a science in its own right, so you actually need specialists in this regard … but this is where the superficiality slips in … with these interdisciplinary programs the students learn so much that eventually they know a little bit about many things, almost as a horizontal big picture.

B3*: This is exactly what makes Geography such a fantastic field … because you are involved with so many other (fields) … and I think that is what gives geographers their edge, because you have that broader perspective on everything in society.

J9*: The challenge with EfS is to bring sustainability into all your modules without losing any of the knowledge of your own subject … some of the subject knowledge that you wanted to convey as a geographer …

H3: "… that geographers will say, but we're already doing sustainability …"

* Researcher translated from Afrikaans

Concerning the realities of addressing environmental and/or /sustainability issues in the curriculum within a multi-inter-trans-disciplinary context (second part of Quote Box 7.2), Group F continues to show a more sceptical approach, with participants elaborating further on the aspect of superficiality in interdisciplinary programs, with the quote supplied for F1 serving as example – alluding to sufficient scope in a 'horizontal' sense (i.e. in terms of coverage), but a lack of verticality (i.e. in terms of depth). Group F also refers to the reality of possible name changes associated with such collaborations, with departments in order to market such bigger units, with F2 viewing it as a 'survival strategy', while F1 views it from the perspective of marketing. The views flowing from Group B are on a less sceptical note, with B3 commenting that the ability and potential of Geography to connect with a large number of fields and disciplines, is exactly what makes Geography attractive and gives geographers their edge.

7.5.5 Quality assessment

In terms of the integral methodological framework utilised for this research, the quality of the results are associated with the mapping of the research space in terms of quadrants, levels, lines, states and types (refer to Sections 3.6.3 and 3.6.4), combined with the selection of appropriate methodologies for each of the AQAL quadrants (refer to Section 3.6.3). Triangulation and cross-correlation of results obtained through these different methodologies, each representative of a different aspect of reality, consequently addresses matters related to the quality of results. For the exploration of the connections between the trend towards cross-disciplinary linkages and EfS in undergraduate Geography in South Africa, triangulation and cross-correlation between the following findings obtained through various methodologies and from various perspectives, co-support and feed into each other, this pointing towards validity and trustworthiness:

- Mapping of sustainability contributions for the various departments: Confirming manifestation of the trend toward cross-disciplinary in Geography through inclusion of the E-G-O subgroup, with much higher relative sustainability weightings for E (and to an extent O) than for G.

- Individual interviews: Expressing reservations about the challenges involved in such linkages and that Geography can be harmed in the process, but at the same time acknowledging the potential involved and that success will depend on how the process is managed.

- Focus groups: Expanding on the reservations expressed about the challenges involved in such linkages, but linking it to issues as generalisation, superficiality and an over-focus on certain vocations, although pointing to advantages associated with collaborations with other study fields as well.

7.5.6 Analysis and discussion

Consideration of the trend towards cross-disciplinary linkages in undergraduate Geography in South Africa revealed a significant presence of the E-G-O subgroup. This aligns with reports in the literature over the recent past of geographers referring positively to the interdisciplinary nature of the discipline and its ability to facilitate integration between the sciences and humanities (e.g. Hedberg II et al 2017). In order for the discipline to take its place in interdisciplinary collaborations however, it will first need to come to grips with its own ‘intra-disciplinarity’. Given the methodological and epistemological distance between physical and human geographers this is easier said than done, but needs to be addressed – as referred to in the interviews. Other issues referred to in the interviews and focus groups, such as the curriculum being dictated by vocational demands, the curriculum leaning towards other field of study and departments disappearing into bigger units or having to change names are not uniquely South African and have been reported for other countries as well.

The analysis provided in this chapter indicates that the sustainability contribution in the E-G-O subgroup is largely concentrated in modules with E components (and to an extent O components as well), while under-represented in modules with G components. Although this might appear to be attractive from the point of view of EfS, the approach in Environmental Science can vary from a natural/physical science position to a natural/social science position, with EfS better aligned with the latter than the former. Due to its reliance on integration of different knowledge types Environmental Management might provide better potential for alignment with EfS than Environmental Science. The prevalent technocentric, positivist view of Environmental Science also does not blend well with the multi-paradigmatic, holistic view of Geography. Despite these considerations, the fact that similar to the H-P-I subgroup (and to a lesser extent the S-G subgroup), the bulk of the sustainability contribution features during the more advanced stages of the E-G-O subgroup, enhances its utility in general and specifically in terms of EfS.

7.6 Integral view of the trend towards cross-disciplinary linkages and EfS in undergraduate Geography in South Africa

Integral Theory maintains that before the importance of mutual understanding between different and/or conflicting perspectives is not fully recognised, it will not be possible to address the issues associated with 21st century global environmental change effectively (Esbjörn-Hargens 2005:6). From this perspective it stands to reason that forging of cross-disciplinary linkages may be beneficial to Geography, since it serves to broaden the scope of the practitioners involved, leads to contact with other disciplines/fields of study and increases the marketability and visibility of Geography. On the other hand it is a development with high stakes, and depending how it is managed and implemented, it may be to the detriment of Geography, with several possibilities in this regard reported on during the interviews and focus groups conducted for this research.

The stand-off in Geography between the challenges involved to come to grips with its own 'intra-disciplinarity', versus participating in inter-disciplinary contexts obtain a new dimension if viewed from the perspective of Integral Theory. Adoption of an approach through which reality is not explored in a compartmentalised way but within the context of the integral realms of the self (subjectivity), culture (inter-subjectivity) and nature (objectivity) may contribute towards development of a comprehensive integrative narrative for Geography. In this way it will be easier not to deal with issues related to 21st century global environmental change through a reductionist approach that either over-focuses on objectivity and/or over-values rationality and for Geography to co-operate with related fields while having clarity on its own position, role and potential contribution.

The variety of modules and approaches in the E-G-O subgroup, together with the variation in the sustainability contribution between modules that have E, G and O components, present several challenges to blend into an integrative narrative. This is because the modules in this subgroup are not tied to a specific identity of Geography, but have rather been included because they illustrate how Geography fits in with cross-disciplinary trends. From the teaching and learning perspective challenges with inclusion of such related study fields (or elements of them), are associated with blending disciplinarity with cross-disciplinarity, balancing specialisation and holism and countering accusations of generalisation. Differences in philosophical and methodological approaches further complicate matters, but are less challenging to accommodate within an integral approach.

7.7 Concluding remarks

This chapter reviewed the manifestation of EfS as part of the trend towards cross-disciplinary linkages in Geography from various perspectives. The context of the trend towards inter-disciplinarity in Geography was firstly reviewed, with reference to the implications for the discipline as such as well as its role in EfS. The connections between Geography and Environmental Science/Management and GIS were specifically considered. The inherent interdisciplinary nature of Geography continuously connects geographers with other disciplines, thus setting the stage for multiple cross-disciplinary interactions/endeavours, in research, teaching and learning. Exposing undergraduate students to cross-disciplinarity is not necessarily an easy task, involving choices between the depth achieved versus the breadth of coverage. Careful navigation and planning is therefore required in the planning and implementation of such study programmes to prove that allegations of superficiality of such approaches are unfound.

Exploration of undergraduate South African Geography curricula revealed that the trend towards cross-disciplinary linkages have a clear footprint in undergraduate Geography curricula in South Africa for modules with E components, and less clear but still notable for modules with G and O components. Further investigation revealed that modules with E components show the highest sustainability contribution, followed by modules with O components and then modules with G components. It may therefore appear that inclusion of the E component in the undergraduate Geography curriculum could be beneficial due to their relative high sustainability contribution. However, the technocentric, positivist view of Environmental Science does not blend well with the multi-paradigmatic, holistic view of Geography, thus limiting the potential benefits of this field of study for Geography, while Environmental Management, with its reliance on integration of different knowledge types is better aligned.

Triangulation and cross-correlation between the methodologies and various perspectives used to investigate relationships between the trend towards cross-disciplinarity and EfS in South African undergraduate Geography provided results supporting each other, pointing towards validity and trustworthiness. Further rigour flowed from consideration of integral state (sustainability), integral type (study year) and integral level (depth). Regarding the relationship between the trend towards cross-disciplinarity and EfS (integral development line), the importance of striking a balance in the undergraduate Geography curriculum in terms of the discipline's integrity, vocational requirements and pressing needs as 21st century sustainability challenges, is crucially important and cannot be emphasised enough. The following chapter concludes the exploration of the development lines that have been identified in the relationship between EfS and undergraduate Geography, with the focus shifting to the need for merged identities for Geography as pathway to EfS.

Chapter 8: Merged identities for Geography as pathway towards EfS

"Many of us not only seek to understand human–environment interactions at a range of spatio-temporal scales (so the narrative goes); we also do so in a 'synthetic' way, paying close attention to how economy, state action, community dynamics and biophysical processes interact. According to this narrative, one of Geography's unique contributions to understanding is the refusal either to study society and environment separately or to focus on just one or other thread within the human-nature tapestry" (Castree 2016:341)

8.1 Introduction

This chapter deals with the last of the four integral development lines that have been identified for the purpose of this thesis, namely the quest to merge disciplinary identities and to conceptualise Geography as a discipline with a single, merged identity. The potential synergies between this re-visioned conceptualisation of Geography and EfS are also explored. The nature of this merged (unity) position is such that it confronts the historical failure to establish correspondence between specifically the human-environment and spatial-chorological identities, as well as related sub-identities of Geography (Turner 2002:64). If better linkage between these identities can be established, geographers will indeed be in a position to project Geography academically and scientifically in terms of a strong integrative narrative. This will put the discipline not only in a better position to contribute to EfS, but also at the forefront of knowledge creation in the era of 21st century environmental change and being recognised for its role in this regard, as envisaged by Skole (2004).

Since this is the first of the two chapters comprising the concluding part of this thesis, the structure of this chapter differs slightly from that of the preceding three chapters. Chapters 5, 6 and 7 dealt with existing development lines, whereas this chapter deals with a possible future development line. The researcher proposes that the future development line for Geography is that of an integrated and merged identity as this will enable an enhanced role for Geography in the context of EfS. The chapter commences with the notion of a merged identity for Geography and is critically evaluated in terms of historical context, recent developments and its nexus with EfS. A brief assessment of the status of and views held of the notion of a merged identity for Geography and its nexus with EfS then follows, utilising the AQAL methodology. The chapter concludes with an analysis and discussion of an envisaged integrated framework for undergraduate Geography in South Africa in order to be able to strengthen its role in EfS, together with reference to teaching and learning implications.

8.2 The notion of a merged identity for Geography

8.2.1 Historical context and evolution over time

The identity associated with Geography has been the topic of debate ever since the origin of modern academia (Peet 1998 cited Turner 2002:53). Historically not a single, but two competing identities have been at stake, namely the spatial-chorological and the human-environment identity. Unity between the identities only emerged artificially during stages when one vision dominated over the other (Reynaud 1974 cited Glick 1983:92). The debate in the 19th century focused on which identity would be privileged in projecting the discipline’s value (but without eliminating the other) – Taaffe (1974:16). During the 20th century the situation changed to the extent that at various stages it rather seemed as if the one identity attempted to overwhelm the other (Turner 2002:54). In practice the fluctuations between phases of coherence and non-coherence did not serve the discipline well, and threatened not only Geography’s position in academia but also its practice in a more general sense (Ibid:55).

Towards the end of the 20th century, when the spatial-chorological identity dominated Geography, arguments were put forward for reconsideration of the human-environment identity, and the need for balance between the two identities (Goudie 1986:454). Subsequent developments can be related as much to the discipline than to the restructuring of the academic landscape. Important in this context was the major revision of the architecture according to which the systematic sciences was organised (Turner 2002:61). Whereas the spatial-chorological identity could not obtain the required acclaim (Unwin 1992:210), the human-environment identity gained acceptance through recognition of the so-called ‘integrated sciences’ (Kates et al 2001:641-642). These developments, however, did not stop some geographers (e.g. Goudie 1986; Unwin 1992; Gober 2000) to express the need to unite the identities of Geography, in correspondence with the logic applied in academic contexts to partition knowledge.

8.2.2 Recent developments and perspectives

Despite the call for unity of the two identities, as alluded to in the previous sub-section, arrangements for an integrated identity appear to be challenging (Turner 2002:63). Suggestions that the spatial-chorological identity should be the core of Geography, with the human-environment identity featuring on the edges, or the other way round, are no longer tenable (Unwin 1992:203). Although geographers might be comfortable in making connections between the two identities, it has not yet been demonstrated that logical, valuable abstractions will follow from the coupling of the spatial-chorological and human-environment identities. Although it might be considered to be naive to suggest that references to Geography have always included both human and physical aspects, it has become essential to have mutually accepted common ground or run the risk of losing the central characteristics of Geography (Sharpe 2009:129-130).

Developments in the 21st century indeed indicate a ‘turn’ in Geography to synthesis and holism, along with for example the critical turn, the cultural turn and the computational turn (Sui and DeLyser 2012:112). Sui and DeLyser identify three 21st century trends supporting this turn to synthesis and holism: (1) calls for a unified Geography as new identity (Matthews and Herbert 2004), (2) calls for a new synthesis (Gober 2000), and (3) calls for studying the Earth integratively (Castree 2016). As conceptual framework, Sui and DeLyser (2012:112) propose hybrid geographies to capture this synthesis and holism. Castree (2016:341) takes this forward by suggesting that common ground is not required to only connect information ontologically, but rather to explore notions of engaged pluralism, involving various types of geographical skills and insights while moving away from dualisms as ‘fact-value’, ‘is-ought’ and ‘object-subject’.

8.2.3 The nexus between a merged identity for Geography and EfS

Important to highlight is that unlike the perception held by many geographers, EfS is not a new field or approach at all, but can be regarded as perpetuation of an enduring tradition in Geography (Bennett 2013:100). This becomes clear when considering that the focus of EfS involves understanding of the essential characteristic of nature-society interactions, with this understanding that involves “interaction of global processes with the ecological and social characteristics of particular places and sectors.” (Kates et al. 2001:641). Many scholars will agree that this is indeed close to what is put forward not only by Geography’s human-environment identity, but also relates to the spatial-chorological identity (Bennett 2013:102). Despite this overlap, the literature contains reports to the effect that Geography failed to secure its position in EfS as essential component in the quest for a more sustainable world (Eflin 2004:339-340; Turner 2005:244). The question to be addressed is then what exactly Geography’s contribution in this regard should be?

Bennett (2013:108) asserts that the failed performance by Geography to position itself as role player in EfS could probably be ascribed to the fragmented nature of the discipline. The only way to achieve a more integrated understanding of sustainability in Geography would be to address the lack of intra-disciplinary dialogue in Geography, as illustrated in a practical way for land change science and political ecology by Turner and Robbins (2008). This improved dialogue will lead to a better understanding between not only the human-environmental and spatial-chorological identities of Geography, but also sub-identities as Human and Physical Geography and perspectives as positivism and criticality. In terms of EfS, Geography is indeed uniquely positioned because of its diverging perspectives, strong methodological focus and variety of epistemologies. But this contribution will only materialise with increased purposeful dialogue and more understanding between the different voices in Geography.

8.3 Status of the nexus between EfS and a merged identity for Geography in South Africa

8.3.1 Context of exploration

The current reality is that the identities that can be distinguished in South African undergraduate Geography do not reflect a position of unity. As a result, the curriculum of none of these departments can serve as example in this regard. The closest examples of the unity/merged position are probably for modules with I-components, referring to Thematic/Integrated Geography. These modules attempt to look at issues being studied from the perspective of Human and Physical Geography, and may also include elements of space/place/scale/spatial variation as well as some form of exposure to an analytical component as well. The same protocol to establish the composition and sustainability contribution of modules/courses as explained in Chapter 4 has been utilised for the categortisation used in this chapter. The %-contribution of the I-component to undergraduate South

African Geography is supplied in Table 8.1.It is clear that this contribution is not very high, although featuring in the curricula of all the departments. Unisa and Rhodes feature the most prominent (I > 30%), with UCT, NWU (Potch) and Univen also appearing to give more than average attention to this development line.

Table 8.1: *Manifestation of the I subgroup in South African undergraduate Geography (2014-2015)*

Department	Weights associated with the I subgroup in South African undergraduate Geography (2014-2015), as % of full curriculum
UP	6.4
UV (Bmf)	4.1
UV (QQ)	3
UJ	9.4
UZ	15
UL	6.3
Wits	12.3
Univen	18.8
Unisa	39.4
NWU (Potch)	22.3
NWU (Mfk)	14.3
UKZN	11.7
WSU	8.8
UFH	11.6
Rhodes	35
UWC	15.9
US	4.4
UCT	23.4
NMMU	8.5

8.3.2 Exterior, third person perspectives

Similar to chapters 5, 6 and 7, the exterior, third person perspectives presented in this sub-section are based on data from assessment of the undergraduate curricula of South African Departments of Geography (Annexure 1) and feedback from a questionnaire (Annexure 2) completed by small groups of staff from four

Departments of Geography. The sustainability contribution consists of the sum of sustainability-focused and -related components for each module (refer to Sections 4.6.3 and 4.6.4). In terms of the nature of sustainability inclusion (integral state), Table 8.2 indicates that the relative sustainability contribution for the I-subgroup is higher or almost equal than for the full curriculum for 15 of the 19 departments, with the differences quite big for many of these departments.

Table 8.2: *Manifestation of sustainability contribution (%) – full curriculum compared with modules in I subgroup, South African undergraduate Geography (2014-2015)*

Department	**Relative sustainability contribution (%)**	
	Full curriculum	**I subgroup**
UP	17	73.5
UV (Bmf)	32.7	22.5
UV (QQ)	34	22.5
UJ	34.4	25
UZ	46.8	45
UL	18.6	65
Wits	39	92.1
Univen	30.6	80
Unisa	81.3	100
NWU (Potch)	28.7	57.3
NWU (Mfk)	18	61.4
UKZN	41.1	53.8
WSU	40.7	82.5
UFH	35	60
Rhodes	36.7	55
UWC	25.4	37
US	13.8	36.7
UCT	45	73
NMMU	21.6	46.7

The pattern revealed by Figure 8.1 indicates without a doubt that if searching for a sustainability contribution, the probability is high to rather find it in modules of the I subgroup than in other components of the curriculum. Wits, Unisa, WSU and Univen rate the highest (80% +) in terms of the sustainability contribution for modules in this subgroup. UP, UCT, UL and NWU (Mfk) also rate relatively high (60-79% contribution), with NWU (Potch), UZ, NMMU, Rhodes and UKZN in the third place with contributions varying from 40% to 59%. Although the data is not supplied here again since it overlaps to an extent with what has been supplied in Chapter 5, the bulk of the sustainability contribution similarly features during the more advanced stages of the South African undergraduate Geography curriculum. In terms of the I subgroup, this relates to the observation from the interviews and focus groups that departments tend to prefer engagement with basics during the introductory study tears, while preferring to attempt integration during the senior undergraduate years.

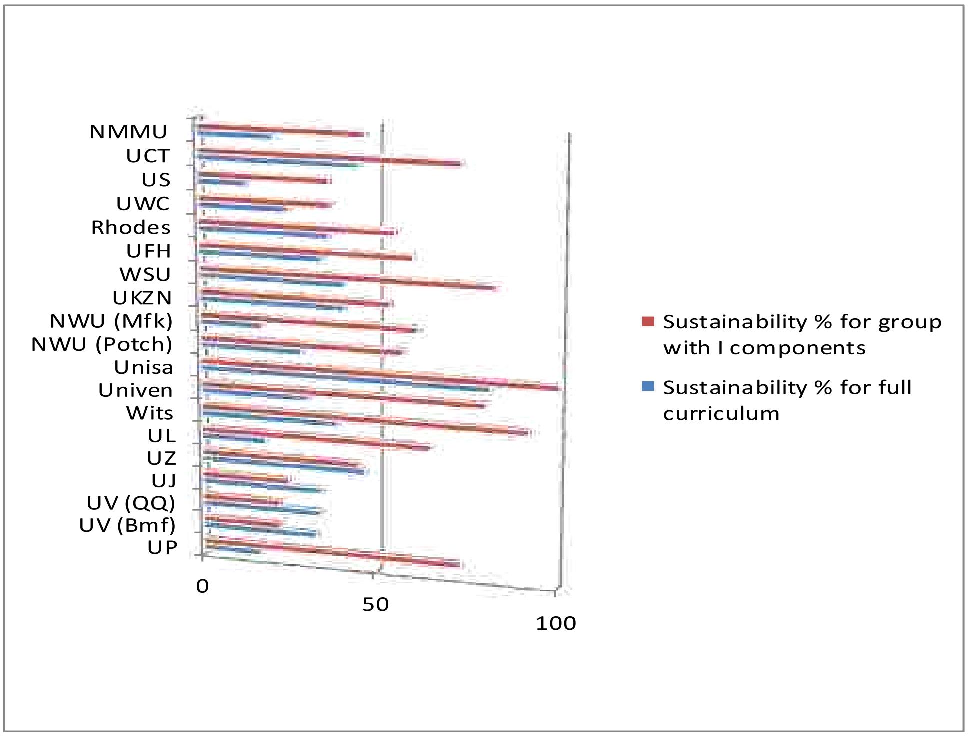

Figure 8.1: *Sustainability contribution (%) – full curriculum compared with modules in the I subgroup, South African undergraduate Geography (2014-2015)*

8.3.3 Interior, first person perspectives

Interior, first person perspectives have been obtained during individual interviews to obtain an outside view of individual, subjective intentions on two themes about the notion of merged identities for Geography: firstly the role of EfS and the possibility of merged identities (Quote Box 8.1) and secondly the issue of Geography under reconfiguration (Quote Box 8.2).

Concerning the first theme, participants had to reflect on the lack of a unified identity as a weakness of Geography, versus its methodological diversity as an asset to contribute to better understanding of the changing planet. The line of argumentation that emerged clearly indicates that this methodological diversity is indeed seen as an asset (e.g. C1 & D1), but this depends on how it is managed. The fear is expressed that this multi-faceted character is not managed very well, and may be tearing the discipline apart (e.g. E1). Later on the discussion required participants to consider the feasibility of a merged identity for Geography, associated realities and a possible role for EfS. The sentiments expressed are supportive of integration of topics/themes to varying degrees (e.g. C1), although the idea of a merged identity is not really supported (e.g. A4). In terms of integration, the potential of sustainability is indeed acknowledged (e.g. D1, J1)

Concerning the second theme, participants had to reflect on Geography's failure to contribute to sustainability science, with consideration of the possible role of the fragmented nature of the discipline in this. The argument forwarded here is that sustainability topics might be seen as already covered by Environmental Science/ Management, so that Geography need not do it (e.g. J1 and A4). At the same time the importance of EfS is acknowledged (e.g. J1), and the need for Geography to change (e.g. A5). Later on the discussion required participants to consider if mutual conceptualisation of human-nature interaction and rejection of society/nature dualism can support Geography to leverage its diversity to uniquely contribute to address the world's sustainability crisis. In this regard the need for development of specialists to deal with the middle ground is acknowledged/supported (e.g. C1 and E1), while the view is also expressed that if the geographers do not see the need for change, nothing will happen (e.g. C2).

Quote Box 8.1 – First person perspectives:
EfS and a merger of Geography's identities

Lack of a unified identity as weakness of Geography, versus its methodological diversity as an asset

C1: "I think it's totally an asset. I just think that we should stop, or surely in our department, seeing them as like two different parts. They should be part of the same thing and undergraduate students should have, when they come out of third year, they should have done GIS, they should have done Climatology, they should have done Urban Studies … and the links between those things."

E1: "… and I think the multi-faceted divisions in Geography – People may regard that as a strength … my sense is it's tearing the discipline apart. I really think so … I don't think the methodological issues will be strong enough to hold things together, but I think the core … of the discipline, … it's so multi-faceted, so divided that it's difficult to propagate, to advance …"

D1: "It's the nature of the beast. You'll have to understand Physical Geography … Human phenomena as well as how space manifests itself. In many departments that I've been, I've always found that tension. It doesn't have to be negative, but it's just the reality, you know. I mean, even if you go to Chemistry you'll find this Inorganic Chemistry and Organic Chemistry."

A5: "Human Geographers and Physical Geographers bump heads for a number of different reasons and it's because the fundamental way in which we view the world, differs … It's not a subject issue, it's a personality issue regarding individuals that are drawn to the different areas. That is where the problem comes in."

Feasibility of a merger of Geography's main identities and the possible facilitating role that EfS may play

C1: "My ideal would be that you'd have Geography I, II and III. They're just the streams where you would do all the aspects of Geography."

D1: "I'll support sustainability education. It's not an opposing idea or threat because we are already doing it."

J1: "… but, for me, when I teach the topic of Sustainability and Sustainable Development, I feel more a Geographer than a Geomorphologist when I teach that course."

A4: "And so we are not heading to a situation where we make us one, no I don't think we are going to get there any time soon, however in teaching at the undergraduate level, we should ensure that there is a balance in terms of how these things are integrated to the benefit of the undergraduate students."

A5: "Whatever aspect it has to be, it has to be a Human environment theme that's going to link the two. It's only by tutoring and acknowledging both aspects as important that a merger will actually be achieved. The practical aspect of it though, is a completely different question, because like I said the two Sciences do approach it in a fundamentally different kind of way. So, but it has to be a Human Environment theme to unify."

Quote Box 8.2: First person perspectives:
Geography under reconfiguration

Geography's failure to contribute to sustainability science

C1: "Well, just because the teaching is undervalued in universities, you know … but your promotion is based on how much you publish, right. So, teaching becomes consigned to a very marginal thing, right. Which is partly contributing to this kind of modularisation … and … atomisation, because you just want to take your teaching and like – I have done that now – and move on."

J1: "But I think as a Geographer and I'm still guilty of this, I still, sort of, put Sustainability and Sustainable Development, I put it on the Environmental Sciences shelf before I put it on the Geography shelf."

A4: "but for now I think what's happening is that Sustainability is married to Environmental Science. So in most Geography departments' sustainability Science will be seen for some time to come as part of Environmental Science...and Environmental Management and that sort of fields."

J1: "I think to me there are no hindrances deliberately. My view is just human consciousness and.... we are correct, Sustainability Science now is becoming an "in" thing. It's still not fully embraced, but is coming up very strongly as an integrating, you know, field of science."

A5: "Geography has changed, if it's not changing now, Its gonna have to change soon. The landscape of the world is changing quite rapidly and Geography will have to find a new niche to occupy this."

Mutual conceptualisation of human-nature interaction and rejection of society/nature dualism

C1: "I would not say a specialisation, but also develop specialists in the mutual conceptualisation aspect and not seeing it only as like the physical environment as conceptualised and the human environment as conceptualised. Yes, I think that we are well placed to do that, definitely … We don't actually have to develop it. It is there."

E1: "... my sense is that undergraduate training needs to have that more or less fifty-fifty balance between the Physical dimension and Human dimension or Social dimension. So that provides the grounding and the base for the interaction … My perspective is … It's difficult for someone to start interacting at middle terrain without being reasonably firm on the other domains really."

C2: "I wondered to myself if we shouldn't let Geography be demised and let it go, free-fall, you know, and actually just start thinking about ways we can use other disciplines to promote this agenda. Because it's over to the practitioners of the discipline to do something about it. Now if most of the practitioners don't actually see a problem in it and they're quite happy with what they are doing, you are not going to be...you're not a popular one, by standing up and say listen we're not contributing to Sustainability as we should, because we are too fragmented, ... or, we are not committed to critical thinking and we committed to a banking positivist model and it's breaking the discipline down.

A5: "But it will take communication and, I think, that's still the stumbling block between the two different divisions. That communication between the Physical side and the Human side … If those differences can be solved and if they can find a nice common ground then I think Geography can place itself as quite a big role player in sustainability."

8.3.4 Interior, second person perspectives

In order to expand on the outside views from individual interviews, focus groups were added to get an inside view of the collective interior by studying inter-subjectivities during discussions. To facilitate comparison the same themes about the notion of merged identities for Geography than for individual interviews were used: firstly the role of EfS and the possibility of merged identities (Quote Box 8.3) and secondly the issue of Geography under reconfiguration (Quote Box 8.4).

For the first theme, participants had to reflect on the lack of a unified identity as a weakness of Geography, versus its methodological diversity as an asset to contribute to better understanding of the changing planet. The debate on this aspect concluded that a balancing act is at stake here, and that the specific context will determine the outcome (e.g. F2). At the same time the value of multi-disciplinarity and how it actually gives Geography its edge, was endorsed (e.g. B3). Later on the discussion required them to consider the feasibility of a merged identity for Geography, associated realities and a possible role for EfS. The ensuing debate covered the need for specialisation versus integration, leading to the suggestion that themes can be used to integrate, but at senior levels of study, once the basics have been dealt with at junior levels (e.g. B1).

The second theme provided the participants with an opportunity to reflect on Geography's failure to contribute to sustainability science, with consideration of the possible role of the fragmented nature of the discipline in this. Feedback indicated that it might be related to preferences of individuals to get involved or not (e.g. F2 and F3) and/or that people might not see the integrative value of sustainability as crucial for or as part of Geography (e.g. B1, B2 and B3). It has also been alluded to that geographers might be 'shy' to identify themselves as such. Later on the discussion required them to consider if mutual conceptualisation of human-nature interaction and rejection of society/nature dualism can support Geography to leverage its diversity to uniquely contribute to address the world's sustainability crisis. Contrary to individual interviews, the focus groups did not address this topic directly and provided a variety of unrelated responses. It is not clear why, but might be the culmination of their general scepticism about the topics discussed.

Quote Box 8.3 – Second person perspectives: EfS and a merger of Geography's identities
Lack of a unified identity as weakness of Geography, versus its methodological diversity as an asset B3*: *(Referring to the diversity aspect)* … This is exactly our strong point … giving our students the 'edge', as I have already referred to … the ability to think in terms of multidisciplinarity F2*: … It is both a weakness and strength, since it depends how you view it en in which context you find yourself in. Some departments will accommodate different sub-disciplines of Geography in order to make these known to students, while other departments may focus only on a selection of these … F3*: … Something to take into account is that these things rather develop organic, it is not the result of a specific decision, but out decisions in fact are taken against the backdrop of a specific context H1: "I've always been trying to be sliding the divides, making sure that your positivist approaches are being either supported or complimented by, you know, a more human orientated, more qualitative approach in order to bring out the wholeness of it"
Feasibility of a merger of Geography's main identities and the possible facilitating role that EfS may play B1*: … so I think I will stay with may viewpoint that we need geographers that are specialised in specific fields … B1*: … The one extreme is to have these silos of topics not speaking to each other, which is not really what we want. The other extreme is to weave so much between what you are doing that the student does not retain the foundations to understand any of the disciplines involved. The solution might perhaps be to take themes as sustainability to highlight connections while teaching within the context of the silos ...

B1*: ... It varies, maybe on the basis of year levels, senior more thematic, junior not thematic ...

F1*: … No, it is rather as a diamond which has different facets … I think that is what makes this subject so unusual ,,,

J5*: If you put Geography in EfS, you will lose your Geography focus and you will move to sustainability science. If you put EfS in Geography, you work EfS into the context of your curriculum en use sustainability principles in a geographical context, so your main focus will still be on Geography

* Researcher translated from Afrikaans

Quote Box 8.4 – Second person perspectives: Geography under reconfiguration

Geography's failure to contribute to sustainability science

B1*: … People are shy to be referred to as geographers …

B2*: … I think it is about the perception of Geography ... I think the definition of Geography was perhaps traditionally just too narrow ...

B2*: … *(Referring to integration)* … it is not seen as part of Geography ….; B1*: … or as Geography …; B3*: … although it is the core of what we do ….

F2*: … I cannot speak on behalf of other geographers, but this is actually about individual preferences … things that you may be interested in or not interested in …

F3*: … in think the people rather keep to the geography identity ... It depends on where you find yourself.

J8*: In any subject the educational aspect of it is quite small … if you think about a subject, you rather think in terms of its applications.

H3: "Geography can only contribute a certain amount to sustainability"

Mutual conceptualisation of human-nature interaction and rejection of society/nature dualism

B1*: … What I think is ... there are different branches of Geography ... also different cultures, so that one can easily become alienated ...

B1*: … What I do not like of our Geografie conference is ... when you go there, there are six sessions, and every branch of Geography attends its own session ... but this is the opposite what we want ...

B3*: … I think a pride needs to be established with Geography students to practice under the banner of Geography as well and to identify as a geographer. Geography should not be seen as a means to an end but as a aim on its own.

F3*: … What Geography can offer in terms of sustainability? I think the fact that Geography is a sythesising discipline ... as in a way of thinking ...

F1*: … I think Geography has a contribution to deliver … not only in terms of 'environment', but also social awareness … if considering what is happening in Europe and in the USA with the intolerance of people in unsustainable contexts.

* Researcher translated from Afrikaans

8.3.5 Quality assessment

As for the analyses and results reported in Chapters 5, 6 and 7, triangulation and cross-correlation of results obtained through the different methodologies associated with the AQAL model, each representative of a different aspect of reality, addresses matters related to the quality of results. For the exploration of the connections between the ideal of a merged identity for Geography and EfS in undergraduate Geography in South Africa, triangulation and cross-correlation between the following findings obtained through various methodologies and from various perspectives, co-support and feed into each other, this pointing towards validity and trustworthiness:

● Mapping of sustainability contributions for the various departments: Confirming the very limited manifestation of the idea of a merged/united identity for Geography in terms of the I subgroup.

● Individual interviews: Acknowledging the value of more integration, but expressing the continued need for specialists coupled with doubt about the feasibility of a merged identity.

● Focus groups: Expanding on the reservations expressed about feasibility of a merged identity and to an extent not responding directly to discussion topics, indicative that the matters discussed were not regarded as that important.

8.3.6 Integral view of EfS and a merged identity for Geography

Turner (2002:64) expresses his idea of a possible merged identity (or unity position for Geography as follows: "An alternative position seeks to merge the spatial-chorological and human-environment identities in such a way that they are homologous, friendly to the discipline's traditions, and consistent with the rationale of the systematic sciences. This merger would enable the retention of geography's breadth and bridging qualities and avoid the transaction costs of creating new fields of study." Taking this position implies that the historical contestation between different identities in Geography will be addressed. If better balance between Human and Physical Geography (and their sub-fields) and also between the human-environment and spatial-chorological identities can be achieved, geography's usefulness as integrated science will be much clearer, while the probability of retaining focused Geography study programs will be higher. A merged position and/or a drive to achieve it is clearly not evident when assessing the South African undergraduate Geography curriculums. This manifested through the relative low contribution of the I-subgroup in the curriculum and is supplemented by the general unenthusiastic reaction towards the idea in the interviews and focus groups.

Application of Geography to Integral Theory offers a comprehensive approach for facilitation of exchanges between different viewpoints (Eddy 2005:152), from which lack of intra-disciplinary discourse in Geography can benefit, and which can assist in breaking down or at least soften the various divides in the discipline. Applying the process of QA mapping illustrates the relevance of Integral Theory to facilitate more communication/ understanding across the divides in Geography (Haigh 2013:176). The bulk of traditional Human/Physical Geography fits into the (social) scientific, collective exterior quadrant (LR). In contrast, modern Social and Cultural Geography belongs to the interior, collective quadrant (LL), while the new wave of Affective Geographies belong to either the UL or UR quadrant, depending whether it has a subjective or objective slant. In order to understand any phenomenon completely, Integral Theory maintains that perspectives and viewpoints from all these different quadrants are equally valid and need to be considered. The explanatory power of this framework for Geography and the way geographers look at the world is huge, but if geographers do not see the need to change their ways, it cannot be forced on them.

8.4 Framework for an enhanced role of Geography in EfS in South Africa

Through the Lucerne Declaration on 'Geographical Education for Sustainable Development' (2007), Geography has committed itself as a discipline on an international level to the comprehensive support and promotion of the paradigm of sustainable development in all educational contexts and on all levels (Haubrich et al 2007). This declaration points out that almost all of the action themes for the UNDESD have a geographical dimension, for example environment, biodiversity, climate change and intercultural understanding. For this reason "... it is necessary that the paradigm of sustainable development will be integrated into geography research and teaching at all levels and in all regions of the world in the right manner" (Ibid: 28).

In the South African context, the geographers who were involved with this research did not really seem knowledgeable about the Lucerne Declaration, so that this declaration and its intentions most probably had a minimal impact on South African undergraduate Geography curricula. The referred to geographers are mostly not anti-sustainability, but can see no reason why they should specifically include sustainability or give preference to it over and above other topics or themes. Similar to the situation in other countries, for example in Denmark (Grindsted 2015a:327), it is therefore understandable that sustainability rather features implicitly than explicitly in South African undergraduate curricula. Despite this limitation, the curricula of most departments host a significant sustainability contribution, although much of it can be regarded as sustainability related rather than sustainability focussed.

During the course of this research it therefore became clear that geographers, at least in South Africa, might misunderstand the global sustainability drive with many interpreting it as an additional or new sub-discipline or suggesting that it is too vague to take note of or promotes superficiality at the cost of being able to specialise. Many South African geographers however fail to comprehend that if Geography is presented as a truly holistic subject, with a strong integrative narrative which counters the potential divides in the discipline, it would feed directly into and support EfS. The relationship between EfS and Geography can be mutually beneficial with EFS providing assistance to Geography by supplying the integrative, binding narrative that is presently lacking in our discipline.

The results of the analyses conducted for this research and the insights obtained through engagement with a vast amount of literature, culminated in the development of the 12-point plan for an enhanced role of Geography in EfS that is presented in Figure 8.2. The recommended interventions support a balanced approach to the discipline, the need for a stronger integrative narrative, analytic techniques in a supportive role and careful engagement with cross-disciplinary contexts.

8.5 Implications for teaching and learning in Geography

The suggested twelve-point plan for an enhanced role of Geography in EfS (Section 8.4 and Figure 8.2) holds several implications for teaching and learning in Geography, including assessment practices and related matters. A suitable pedagogy associated with this plan might involve teaching and learning within real-life contexts through observation, critical analysis and evaluation (Pretorius 2012:171). Contextual learning can also be considered, implying that learning and context should preferably not be separated, as students may experience knowledge

Identity of Geography or trend in discipline		Suggested action
Human-Environment identity	1	Encourage more integration between Human and Physical Geography with the development of thematic focus areas in curricula.
	2	Launch deliberate initiatives to develop and implement a stronger, more foussed human-environment pedagogy.
	3	Explore the potential of 'hybrid geographies' to build creative connections between Physical and Human Geography and to integrate different perspectives.
Spatial-chorological identity	1	Utilise space and spatiality as integrative theme to build relations between the spatial-chorological and the human-environment identity.
	2	Ensure that GIS is applied in theoretical Geography modules and not offered as stand-alone skills-based modules.
	3	Encourage the use of mixed-methods that cross the divide between analytical and critical approaches, thereby advancing methodological hybridity.
Trend towards cross-disciplinary linkages	1	Build and actively propagate the role of Geography as a discipline with the specific role to form a bridge between the Physical/Natural and the Human/Social Sciences.
	2	Develop a stronger integrative narrative for Geography in order to improve its positioning and standing in cross-disciplinary contexts.
	3	Design balanced and relevant Geography curricula through which employment objectives can be served, but without compromising the integrity of the discipline
Towards a merged identity for Geography	1	Work towards mutually accepted common ground between different sub-divisions in Geography.
	2	Promote acceptance of all identities in Geography as equally important , thereby subscribing to inclusivity of identities rather than exceptionalism.
	3	Use a stronger, integrated disciplinary narrative for Geography to address the lack of intra-disciplinary dialogue.

Figure 8.2: *Twelve-point plan for an enhanced role for Geography in EfS*

as the end product and not as part of their learning experience. Adoption of these types of practices will result in transformation towards enhanced learning experiences (deeper and more meaningful), which can be regarded as a spinoff, although unforeseen/unplanned, associated with implementation of the various interventions listed in Figure 8.2.

Active learning pedagogies are suited to support the development of higher order thinking skills required to achieve integration between the different identities and sub-identities in Geography, while ensuring that sufficient depth is achieved. This is necessary to counter allegations of superficiality of integrative approaches in Geography. Depth achieved is therefore not simply associated with the learning material being dealt with, but also related to the type of engagement that students have with it through formative and summative assessment. Since assessment can be regarded as one of the main drivers of the learning process, it has an important role to play in the realisation of the envisaged outcomes of the twelve-point plan for an enhanced role of Geography in EfS.

Examples of active pedagogies include problem-based, project-based and inquiry-based learning, all of which allow students to engage in critical reflection, to get acquainted with integration of varied materials and approaches and to gain experience with the assessment of interactions between and in the natural and human made/altered environments as well as among aspects of human activity, all of which are or can easily be linked to place-based contexts. This type of approach overlaps with and feeds directly into EfS, and can therefore assist in breaking the moulds of teaching and learning that presently support ‘unsustainability’, and which have became entrenched in institutions over a long period of time (Sipos et al 2008).

8.6 Concluding remarks

This chapter considered the notion of a merged identity for Geography as a pathway towards EfS. The first part of the chapter was devoted to a contextualisation of what exactly a merged identity implies, with a review of its historical context, evolution over time, present position and nexus with EfS. It is important to understand that this identity refers to an envisaged future position, since it has not gained sufficient stature as yet to take its place alongside the other existing identities/sub-identities that can be distinguished in the discipline of Geography.

Exploration of the I-subgroup provides an indication of the present status of the notion of a merged identity in South African undergraduate Geography. Although a clear footprint for this subgroup can be distinguished for one or two departments, it is generally not very well developed in South Africa. If present, however, it is bound to be characterised by a relatively high sustainability contribution, which is usually concentrated towards the more advanced undergraduate levels. Application of Integral Theory confirms the relevance of the approach followed in the I-subgroup to facilitate more communication/understanding across the divides in Geography.

Triangulation and cross-correlation between the methodologies and various perspectives used to probe the status of the notion of a merged identity for Geography and how it relates to EfS provided linked results, which points to validity and trustworthiness. Consideration of integral state (sustainability), integral type (study year) and integral level (depth) ensured futher rigour. Based on the culmination of evidence at this stage, a twelve-point plan for Geography to strengthen its role in EfS is presented, accompanied by an outline of the implications for teaching and learning. This chapter concluded the exploration of the development lines that have been identified in this thesis on the relationship between Geography and EfS, with the next chapter that concludes this thesis with an overview of the research and synopsis of the major results.

Chapter 9: Conclusion

“If geography is to regain its human-environment birth right, the discipline must undertake a fundamental restructuring. Failing to do so will cause us to forgo an opportunity to take a central role in environmental science in the twenty first century.”
(Yarnal and Neff 2004:33)

9.1 Introduction

This research aimed to suggest suitable approaches for undergraduate Geography in South Africa to not only strengthen its alignment to EfS, but also to strengthen Geography as a discipline in the 21st century. A multi-paradigmatic research approach has been followed, using research methods from various paradigms in an integrative fashion to highlight the research problem from various angles. The research utilised the methodological framework of Integral Theory with its ability to integrate the four dimension-perspectives with the major methodological families, thus allowing engagement with the world’s full diversity. Utilising the AQAL model of Integral Theory, the 1st, 2nd and 3rd person perspectives obtained on the status and potential of EfS in South African undergraduate Geography have been analysed and the results subjected to critical reflection. This chapter highlights the key results that have been obtained and maps ideas on the future of Geography in EfS.

Since this is the last and concluding chapter of this thesis, a unique structure is adopted in order to be able to focus on specific key findings and recommendations and to relate these to the set aim and objectives of the thesis. To start off with, key findings and recommendations on the status of EfS in undergraduate Geography in South Africa are presented. This is followed with a section in which the EfS-Geography nexus is unpacked in terms of the main identities of as well as recent trends in the discipline, interspersed with recommendations on key issues. This leads to a section in which the major recommendation is presented and motivated, namely that Geography will only succeed to achieve a more prominent position in EfS if the discipline adopts a new, merged identity. The second last section will reflect on the research process which has been followed, with a concluding statement which rounds off the chapter.

9.2 Status of EfS in undergraduate Geography in South Africa

The results of the assessment of the undergraduate Geography curriculum in South Africa (2014-2015) in terms of the inclusion of sustainability presented and analysed in Chapter 4, indicate that the explicit sustainability contribution to the undergraduate curricula of the majority of Geography departments in South Africa is regarded to be very low, to the extent of insignificance. Relying on the sustainability categories identified by the *Sustainability Tracking, Assessment and Rating System (STARS)*, the average sustainability-focused and sustainability-related contribution towards the undergraduate curriculum of Geography departments is estimated to be 22.9%. However, significant variations are observed between departments, with the sustainability-focused contribution per department varying from as low as 0% to as high as 31.35%, and the sustainability-related contribution from as low as 5% to as high as 50%.

To become a noteworthy role player in EfS, the relatively low percentage contribution of sustainability to the curriculum, especially the sustainability-focussed category, needs to be addressed. Due to the fragmented, dualistic nature of the undergraduate curricula of many departments, this will not be an easy transformation, although not impossible. Embarking on this transformative journey will increase the potential for intra-disciplinary discourse, more understanding across the various divides in the discipline and working towards a central, unified disciplinary narrative. Before this will be possible, a shift in the generally prevailing mind set of South African geographers in academia will be required. Firstly in terms of current approaches and divides in the discipline, which generally do not seem to bother most South African geographers much and secondly in terms of their view of sustainability, which they regard as an implicit rather than explicit theme which is dealt with in Geography in a way equally, but not more important than other themes.

9.3 Integral perspectives on the Geography-EfS nexus

9.3.1 The human-environment identity

The nature-society nexus serves as focus of the undergraduate curricula of many South African Geography departments, with a clear division between Physical Geography and Human Geography. This division aligns with the ontological dichotomy of the European tradition, with the resulting layered approach of understanding the world largely damaging to Geography's integrative narrative. Recent trends indicate the need for restructuring, so that the discipline can improve its alignment with the integrative nature-society narrative, which includes the need to engage with as many as possible of the forms of enquiry that are available to frame the issues Earth and humankind are grappling with. In line with the new turn to synthesis and holism, so-called 'hybrid geographies' are well placed to give form to the required synthesis by displacing boundaries and working towards creation of something ontologically new.

For Geography to be recognised in academia as a truly integrated discipline, some choices regarding curriculum composition are therefore required. The discipline cannot continue to perpetuate separateness and sub-disciplinary specialisation, while at the same time presenting itself in terms of a narrative of integration. As a result of the entrenched dualism between Physical and Human Geography, coupled with the weak integrative narrative, the development and implementation of human-environment pedagogy in the discipline is weak, with a resulting limited contribution to EfS. Similar to the international scene, South Africa bears testimony to the paradox that although sustainability themes are accepted and expected to be central to educating geographers, there is a significant reluctance among geographers to use sustainability in an explicit way in curricula, although they are not specifically against such inclusion.

Turning the focus to South African undergraduate Geography, the frequently reported ontological dualism between Human and Physical Geography manifests very clearly, which aligns with the value attached to specialisation in one of these sub-disciplines (or further sub-specialisations) to be recognised/rewarded as such. Integrated/Thematic Geography provides opportunity for the human-environment identity to fully develop, but is still in a developmental phase at South African universities and seems to be regarded as superficial and too general to be of value – a viewpoint expressed during focus groups and interviews for this research. The situation at South African universities is that ‘basics’ are covered during introductory studies, with integration reserved for more advanced phases of undergraduate studies, which is a positive development and indicates that some value is attached to the need for more integrative approaches.

9.3.2 The spatial-chorological identity

Although it was rooted in locational theories, the spatial sub-identity is no longer focussed on spatial patterns and regularities. The nomothetic approach and theoretical constructs as central place theory are also not that prominent anymore. The contemporary version of the spatial sub-identity rather acknowledges that space and place matters and provides theory-led descriptions of spatial patterns and behaviour. Although the search is still for order, it is no longer only spatial-geometrical aspects that are at stake. Despite these contemporary developments, some scholars still regard this identity within a quantitative, positivist context, which highlights the existence of another divide in Geography, namely the separation of spatial-analytical geographies from social, cultural, and political geographies. Recent work on methodological hybridity, however, clearly reveals the pseudo nature of the latter perceived dualism.

Theoretically undergraduate Geography curricula provide ample scope for the integrated manifestation of the spatial-chorological and human-environment identities, but in practice this is more problematic. The spatial approaches frequently ‘disappear’ within the so-called hidden curriculum, partly related to expectations of students who are more interested in the issues (related to the human-environment) being dealt with than in their geographical properties. The trend towards a fragmented undergraduate offering based on sub-disciplines at this stage still prevents the spatial-chrological identity to achieve its potential as an integrative force in the discipline. In addition recurring antipathy about spatial science, with quantitative analysis included, continues to haunt Geography with a related decline being reported in the attention paid to spatial science/quantitative analysis in undergraduate Geography.

The trend in undergraduate Geography curricula is that spatial science and quantitative analysis are associated with the inclusion of GIS. However, GIS is frequently taught in dedicated skills-based modules, whereas from a teaching and learning perspective it would be better if GIS could be imbedded theory modules, thus allowing students to experience the connection between GIS and problem-solving. Assessment of the spatial-chorological identity in South African undergraduate Geography revealed a lower than expected presence of the S-G subgroup of modules. This aligns with reports on the declining status of spatial science/quantitative analysis in undergraduate Geography. Concerning the presence of sustainability in the S-G subgroup, this research indicated that the sustainability contribution largely occurs in modules with S components, while under-represented in modules with G components.

9.3.3 Linkages with cross-disciplinarity

Characteristics of Geography such as its unbounded nature in terms of topics covered and approaches and methods, continuously connects geographers with other disciplines. Geographers are therefore inclined to look beyond their own discipline towards study and research opportunities associated with other disciplines – to the extent that this can be regarded as a unique characteristic of modern Geography. Effective participation in cross-disciplinary endeavours, however, requires integration across the total breadth of Geography, which contrasts with the increase in methodological and epistemological distance between physical and human geographers being observed. This does not mean that Geography needs to dissolve (as implied by some scholars), but that a new perspective is required on the implications of the discipline's own 'intra-disciplinarity'. Geography needs to come to grips with its own 'intradisciplinarity' for the discipline to be able to take its place in interdisciplinary collaborations with other disciplines/fields

The trend towards cross-disciplinary linkages is associated with the fact that Geography is increasingly losing its administrative autonomy and rather functions as part of bigger multidisciplinary academic units, which might affect the disciplinary integrity of Geography rather negatively than positively. These reconfigurations also need to be contextualised in terms of the predominantly neo-liberal motivated restructuring of higher education institutions, which has become practice in many parts of the world over the past couple of years. In this value-driven system, combined with questioning of the internal coherence of Geography as a discipline and where it belongs, Geography may easily become a victim of restructuring exercises, as have happened with a number of Geography departments in the UK and Australia.

For geographers to effectively participate in cross-disciplinary work at the interface of the human and natural sciences, a proper foundation in this regard in undergraduate Geography is advisable. In sync with the thrust towards cross-disciplinarity, undergraduate Geography is increasingly transformed through an emphasis on vocationalism. A balance needs to be obtained in the curriculum between vocational and disciplinary requirements. Inclusion of Environmental Science/Management and GIS in Geography departments aligns with the trend of increased disciplinary flux.

Challenges follow since the technocentric, positivist view of Environmental Science does not blend well with the multi-paradigmatic, holistic view of Geography. Although Geography and Environmental Management share commonalities, the latter involves application of formalised activities which cannot be regarded as part of Geography.

In terms of the Geography's qualities as bridging discipline, linkages forged within many departments/schools/centres between Geography and vocationally oriented fields of study as Environmental Science/Management and GIS, provide several new opportunities to advance EfS. On the negative side examples can be mentioned of linkages as referred to here that initiated a loss of identity of undergraduate Geography. Consideration of the trend towards cross-disciplinary linkages in undergraduate Geography in South Africa revealed a significant presence of modules in the E-G-O subgroup. The sustainability contribution in this subgroup is largely concentrated in modules with E components (and to an extent O components as well), while under-represented in modules with G components.

9.4 EfS: Missed opportunity or life-line for Geography?

9.4.1 Current shortcomings

Although some geographers view the human-environment theme as a suitable vehicle to link Geography and EfS, criticisms by others regarding the validity of sustainability (and especially sustainable development) as a concept, presents a dilemma. Additional observations include that sustainability rather features implicitly in Geography, or that other concepts may be better suited to study geographical phenomena. Matters are complicated due to rivalry between different political ecologies of what to regard as the correct skills, knowledge and attitudes in different EfS approaches. On a practical level, the incorporation of sustainability in undergraduate Geography curricula faces a few challenges. Chief amongst these is the need to consider exactly how sustainability will be incorporated, so that it can fulfil expectations of an integrative, meta-narrative and not slip into the position of yet another sub-discipline.

Although there are not that many fully developed proposals available yet that back a reorientation of undergraduate Geography curricula to EfS, geographical dimensions such as place, space and scale, together with the capacity of Geography for achieving synthesis, are recognised as crucial elements of sustainability teaching and learning. In terms of the 21st century environmental crisis faced by humankind, the shifts considered necessary for society to move towards more sustainable production and consumption provides an exciting context for sustainability teaching, learning and research in Geography, although these are only possibilities yet to be explored – depending on the willingness of geographers to participate. Initiatives as these might be jeopardised, however, since sustainability themes seem to rather feature in an implicit way than in an explicit way in Geography curricula, which has already been referred to.

In terms of geography’s cross-disciplinary linkages and EfS, contestation is evident due the ontological impasse associated with the need to promote specialisation on the one hand, while on the other hand subjected to increased pressure to address complex issues that require an integrative perspective. Although Geography brings an integrative perspective to the cross-disciplinary setting, it is worrying that this is not necessarily appreciated. This is supported in a variety of cross-disciplinary projects that point towards a perception that Geography lacks an articulate definition and is too general to be able to make solid contributions. These types of concerns to a large extent apply to EfS as well, due to its reliance on the contested concept of sustainability and being stigmatised in terms of generality and lack of a clear definition.

9.4.2 Towards a merged identity

Despite calls for unity of the two major identities of Geography, arrangements for an integrated identity appear to be challenging. Although geographers might be comfortable in making connections between the two identities, it has not yet been demonstrated that logical, valuable abstractions will follow from the coupling of the spatial-chorological and human-environment identities. Although it might be naive to suggest that references to Geography always have to include both human and physical aspects, it has become essential to have mutually accepted common ground or run the risk of losing the central characteristics of Geography. The failed performance by Geography to position itself as role player in EfS could probably be ascribed to the fragmented nature of the discipline. The only way to achieve a more integrated understanding of sustainability in Geography would be to address the lack of intra-disciplinary dialogue in Geography. In the context of South African Geography, exploration of the I-subgroup provides an indication of the present status of the notion of a merged identity in the undergraduate curricula of departments. Although a clear footprint for this subgroup can be distinguished for one or two departments, it is generally not very well developed in South Africa. If present, however, it is characterised by a relatively high sustainability contribution, which is usually concentrated towards the more advanced undergraduate levels.

9.4.3 Integral strategies as approach

In the current academic milieu that Geography finds itself in, characterised by issues as turf wars between disciplines and clashing perspectives such as positivist, modern and postmodern, recognition of the multi-dimensional nature of reality by Integral Theory offers a useful perspective. In the context of engaging students with the issues that the world is currently grappling with, the relevance of the integral perspective lies in its exploration of the multiple ways of getting to know the multi-dimensional nature of reality through various paths of inquiry, without pre-postulating ontological structures. From this perspective the AQAL model is of particular value, since consideration and inclusion of the elements of this model is bound to result in more multi-faceted teaching and learning spaces than can be achieved by most current approaches. Serious consideration is therefore required to adopt the integral way of thinking and doing as framework while navigating Geography towards a more comprehensive, integrative disciplinary narrative.

9.5 Reflection on the research process

As for all research, the progress with this project had its highlights and lowlights, but the purpose of this section is not to provide detailed reflection on the process, but to share a few particular crucial moments. The reading and pondering about a suitable philosophical approach and associated methodological framework proved to be a challenge, but once the decision was made to use Integral Theory, the research immediately became more focussed and purposeful. On a personal level the researcher could relate to the cosmology underlying this philosophy. The idea that all perspectives have value and need to be considered and valued also fit in with the researchers' personal value and belief system. On a practical level the consideration and selection of appropriate methodologies and making sure of a balanced approach was also very meaningful and provided the necessary backing and certainty about the choices being made. So this was really experienced as a highlight of the researchers' journey.

On the other hand, the researcher experienced a negative reaction from the Geography community to the questionnaire that was sent out to all departments to complete. Although a few completed the questionnaire and sent it back together with feedback on the assessment template that was compiled for the curriculum of every department, the vast majority of departments appeared to be unwilling to participate, although they initially indicated their willingness. While one could appreciate that this might be due to issues such as time, the researcher experienced a high level of disbelief concerning the topic of this research. Negative feedback was also received in some instances on the choice of methodology, implying that the researcher should have visited each department to validate the methodology used for the research before they would be willing to participate. While this did affect the researcher negatively in the initial stages, the feedback provided was able to support many arguments presented in this thesis.

The overall engagement with the Geography community through individual interviews and focus groups made up for the negative questionnaire experience, with mutually beneficial conversations which occurred in most instances. In this regard it is interesting to note the following feedback which was received from one of the interviewees on the interview schedule and approach, which helped to restore the confidence of the researcher:

> “I (didn’t happen?) to say that I find the way you asked me questions are really relevant for where we're at the moment and I think that this will be incredibly valuable for us, thinking through how we move forward with our curriculum, you know. So, very excited to see what comes out. Not everybody wants to engage in something like this. Yes ..., I am very excited. It appears to be very philosophical, theoretical. Other people just want to get the job done. Yes and maybe think that this in not immediately applicable to what I do on a day to day basis and that's part of the resistance that I think is there, is that we...you have to ask people to make a shift and I think no one will make that shift.” (Interviewee C1)

9.6 Closing statement

This research is the culmination of the researcher's career of engagement with teaching and learning in Geography over a period of more than thirty years. This eventually linked with the idea of Geography that is well-positioned to make a contribution towards the global movement of EfS. All academic disciplines should form part of this movement, as they will benefit from the 21st century move to address global environmental issues. Geography, however, occupies a special position, as its inherently integrated nature touches on many of the aims of EfS, and can thus greatly support EfS, while allowing Geography to evolve to a more relevant discipline. The question, however concerns what the true nature of Geography is and/or should be and if the discipline is practiced accordingly.

The fact is that although Geography is presented to academia as an integrated science, this research has shown that this remains a theoretical ideal, since most undergraduate students are introduced to a fragmented discipline which lacks an integrative disciplinary narrative. This first image becomes a lasting image, affirmed by the fact that staff members in Geography departments also mostly teach, do research and get recognition according to their sub-specialisations, thus supporting a fragmented understanding of their discipline.

This research affirmed that Geography requires a reconfiguration in terms of its main identities, away from dualism and towards more integration. This will be required by Geography in order to ensure that the discipline can play a leading role in the increasingly cross-disciplinary context in which research and problem-solving is conducted to be relevant in the 21st century. This forms part of an important debate in Geography, however many South African geographers either disregard integration or are completely unaware of the need for integration. It is up to them to respond and decide how they want to contribute or not – hopefully this thesis serves as a wake-up call.

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Annexure 1: Curriculum assessment sheets for Geography departments

1.1 University of Pretoria (Society of South African Geographers 2010, 2011; University of Pretoria 2014a, 2014b, 2014c)						
Name of department	Department of Geography, Geo-informatics and Meteorology (GGM)					
Mission/vision	The department strives to be a national leader in education and research that is recognised internationally for academic excellence in the fields of Geography, Geo-informatics, Meteorology, Earth Observation and Environmental Sciences. These fields revolve around the central theme "The sciences concerning our changing living environment".					
Role in MIT	Over the past decade the department sought to strengthen ties with allied disciplines in the broad fields of Earth Sciences, Urban Studies, Social Sciences, Environmental Sciences, Geo-informatics and Meteorology. Part of this is reflected in the study programmes in Earth and Environmental Sciences that are presented in addition to the more focused Geography and Meteorology training.					
Disciplinary focus areas in department	Environmental Sciences, Geomorphology, Geo-informatics, Meteorology, RS and Social Geosciences					
Degrees offered	**BSc Environmental Sciences** Training in spatial analytical techniques (GIS and RS), gives graduates the ability to analyse environmental issues. An exciting subject is the study of the impacts of global warming and climate change, including adaptation and mitigation strategies. Research on the impacts of climate change on human health, agriculture and natural resources prepares graduates to be relevant in their local circumstances and internationally competitive. **Core modules** 1st level: ENV101, GGY156, GGY166, WKD164 2nd level: GGY283, GGY252 3rd level: ENV301, GGY361, GIS310, GIS320	**BSc Meteorology** Meteorologists and atmospheric scientists are interested in the physics and dynamics of the atmosphere. UP meteorologists specialise in dynamic meteorology and are involved in cutting-edge research on numerical weather prediction. They are also involved in community projects where water supply is established at rural schools. UP is the only institution in sub-Saharan Africa presenting Meteorology degrees. **Core modules** 1st level: WKD155, WKD164 2nd level: WKD261, WKD263, GIS220, GMA220 3rd level: WKD352, WKD356, WKD361, WKD366	**BSc Geo-informatics** Aim of degree: To produce scientists with knowledge of the environment and development problems, combined with know-ledge of GIS and associated computer technology, with skills to apply this in support of the various disciplines involved in environmental management. Focus: GIS and associated technologies and their applications. **Core modules** 1st level: ENV101, GGY156, GGY166, GIS120, CMC110, WKD164 2nd level: GIS220, SUR220, GGY283, GMA220 3rd level: GIS310, GMC310, GIS320, GMA320, GMT320	**BSc Geography** Natural science components: Geomorphology, Biogeography, Climatology and Meteorology. Human science aspects: Focus on solutions to problems confronting society. Spatial science aspects: Location and distribution of cities and human activities, and the processes, patterns, problems and potential answers associated with these activities. Geography is a planning and management science, aimed at improving the quality of life of all people. Curriculum strengths are Geomorphology, environmental change, urban development and land reform.	**BSc Geography core modules** 1st level: ENV101, GGY156, GGY166, CMC110, WKD164 2nd level: GGY283, GGY252, GGY266, GIS220 3rd level: ENV301, GGY356, GGY361, GGY366, GIS310, GIS 320	**BA General core modules** 1st level: Select any 4 disciplines and do 2 semester modules from each of these plus 1 other module 2nd level: Select any 3 of the 4 disciplines did at first-year level and 2 semester modules from each of these 3rd level: Select any 2 of the 3 disciplines did at second-year level and do 2 semester modules from each of these **BA with specialisation in Geography core modules** 1st level: ENV101, GGY156, GGY166, CMC110, WKD164 2nd level: GIS221/GGY283, GGY252, GGY266 3rd level: ENV301, GGY356, GGY361/363, GGY366
First level modules **72 credits**	ENV101 (8 credits) Intr. to Environmental Sciences **0.5E + 0.5I; 1SF** **Credits: 4E + 4I; 8SF**	GGY156 (8 credits) Aspects of Human Geography **1H; 0.25SR + 0.75NS** **Credits: 8H; 2SR + 6NS**	GGY166 (8 credits) S.A. Geomorphology **1P; 1NS** **Credits: 8P; 8NS**	GIS120 (12 credits) Geo-informatics **1G; 1NS** **Credits: 12G; 12NS**	GMC110 (12 credits) Cartography **1G; 1NS** **Credits: 12G; 12NS**	WKD155 (16 credits) Atmospheric structure and processes **M; NS** **Credits: 16M; 16NS**
	WKD164 (8 credits) Climate and weather of Southern Africa **0.5P + 0.5M; 1NS** **Credits: 4P + 4M; 8NS**					
Second level modules **148 credits**	GGY252 (12 credits) Process Geomorphology **1P; 1NS** **Credits: 12P; 12NS**	GGY265 (12 credits) Geomorph. of built environment **0.5P + 0.5E; 0.5SR + 0.5NS** **Credits: 6P + 6E; 6SR + 6NS**	GGY266 (24 credits) City structure, env. and society **0.75H + 0.25I; 0.25SR + 0.75NS** **Credits: 18H + 6I; 6SR + 18NS**	GGY283 / GIS221 (12 credits) Introductory GIS **1G; 1NS** **Credits: 12G; 12NS**	GIS 220 (12 credits) Geographic data analysis **1S; 1NS** **Credits: 12S; 12NS**	GMA220 (16 credits) RS **G; NS** **Credits: 16G; 16NS**
	SUR210 (16 credits) Surveying **1G; 1NS** **Credits: 16G; 16NS**	SUR220 (16 credits) Surveying **1G; 1NS** **Credits: 16G; 16NS**	WKD261 (14 credits) Physical Meteorology **1M; 1NS** **Credits: 14M; 14NS**	WKD263 (14 credits) Introduction to dynamic Meteorology **1M; 1NS** **Credits: 14M; 14NS**		
Third level modules **284 credits**	ENV301 (18 credits) Human-environment interactions **0.5E + 0.5I; 1SF** **Credits: 9E + 9I; 18SF**	GGY356 (18 credits) Sustainable development **0.75I + 0.25E; 1SF** **Credits: 13.5I + 4.5E; 18SF**	GGY361/363 (18 credits max.) Env./Applied Geomorphology **0.5P + 0.5E; 0.5SR + 0.5NS** **Credits: 9P + 9E; 9SR + 9NS**	GGY366 (18 credits) Development frameworks **1H; 1NS** **Credits: 18H; 18NS**	GIS310 (24 credits) GIS **1G; 1NS** **Credits: 24G; 24NS**	GIS320 (24 credits) Spatial analysis **S; NS** **Credits: 24S; 24NS**
	GMA320 (24 credits) RS **1G; 1NS** **Credits: 24G; 24NS**	GMC310 (24 credits) Geometrical and space geodesy **1G; 1NS** **Credits: 24G; 24NS**	GMT320 (24 credits) Geo-informatics project **1G; 1NS** **Credits: 24G; 24NS**	WKD352 (18 credits) Atmospheric vorticity and divergence **1M; 1NS** **Credits: 18M; 18NS**	WKD356 (18 credits) Climate and community **0.5E + 0.5M; 1SR** **Credits: 9E + 9M; 18SR**	WKD361 (20 credits) Quasi-geostrophic analysis **M; NS** **Credits: 20M; 20NS**
	WKD366 (36 credits) Fundamentals of weather forecasting **1M; 1NS** **Credits: 24M; 24NS**					
30 modules in total: Estimate of curriculum composition, every module taken as 1 unit Human Geography (H) = 2.5 modules (8%); Physical Geography (P) = 3.75 modules (13%); Integrated/Thematic Geography (I) = 2 modules (7%); Environmental Science/Management (E) = 2.75 modules (9%); Spatial/Quant/Qual (S) = 2 modules (7%); GIS/Cartography (G) = 10 modules (33%); Meteorology (M) = 7 modules (23%)						
504 credits in total: Estimate of curriculum composition, relative to credit loading of modules H = 44 credits (8.7%); P = 39 credits (7.7%); I = 32.5 credits (6.4%); E = 41.5 credits (8.2%); S = 36 credits (7.1%); G = 180 credits (35.7%); M = 131 credits (26%)					Stand-alone modules: 22/30 Credits: 380/504 = 75.4%	Mixed modules: 8/30 Credits: 124/504 = 24.6%
Sustainability breakdown: Sustainability focused (SF) = 3 modules (44 credits); Sustainability related (SR) = 2.5 modules (41 credits); Not sustainability focused or related (NS) = 24.5 modules (419 credits) In terms of modules: SF = 10%; SR = 8%; NS = 82% In terms of credits: SF= 8.9%; SR = 8.3; NS = 82.8%						

1.2 University of the Free State (Society of South African Geographers 2010, 2011, 2012, 2013; University of the Free State 2014a, 2014c, 2014e)

Name of department	Department of Geography – Bloemfontein Campus					
Mission/vision	This is a focused and dynamic department, with students more than just numbers. Students are exposed to real-world issues, and are taken on excursions to expose them to practical environmental and developmental problems. GIS features strongly in undergraduate as well as postgraduate programmes of the department.					
Role in MIT	At present, this department resides in the Faculty of Natural and Agricultural Sciences, but also caters for students from the Faculty of Humanities.					
Disciplinary focus areas in department	None specifically mentioned, but can be deduced to include Environmental Geography, Environmental Management and GIS, amongst others.					
Degrees offered	**BSc learning programmes in Geosciences field of interest:** The learning programmes in Geography and Environmental Sciences include properties and processes in the Earth and on the surface and encompass a holistic study of the human environment and accompanying interactions/relationships. The programmes are aimed at students interested in various aspects of the environment and can lead to specialisation as environmentalists. Careers in these sciences are divergent because all institutions involved with resource utilisation are legally obliged to examine impacts of their activities on the environment. The connection of geographical information and computer technology simplifies the storage, processing, modelling and presentation of information and expedites decision making. **BA Geography and Environmental Management:** Graduates can be employed by the state, non-governmental organisations and the private sector as geographers, development planners and managers, land-use planners, urban managers, environmental managers and GIS users. **BA general:** The Bachelor of Arts degree offers students a broadly formative education that is useful in any occupation requiring a culturally developed perspective. It provides students who intend specialising in a particular discipline with a meaningful context; it is beneficial to people in any leadership position.					
	BSc Geo-informatics AND **BSc Geography & Env. Sciences**	Core: GEO114, GEO124 GEO214, 224, 234, GIS224 GEO314, 324, 334, GIS324	**BSc Geography & Statistics** AND **BSc Geography & Agro-Meteorology**	**BA Geography & Env. Man.** AND **BA General**	Core: GEO114, 124 GEO214, 224 & 234, GIS224 GEO314, 324, 334, 344, GIS324	
First level modules (All 16 credits)	GEO114 Introduction to Physical Geography **0.5P + 0.2I + 0.15S + 0.15G; 0.2SR + 0.8NS** **Credits: 8P +3.2I + 2.4S +2.4G; 3.2SR + 12.8NS**		GEO124 Introduction to Human Geography and Cartography **1H; 1NS** **Credits: 16H; 16NS**			
Second level modules (All 16 credits)	GEO214 Urban development **0.67H + 0.33S; 0.67SR + 0.33NS** **Credits: 10.7H + 5.3S; 10.7SR + 5.3NS**	GEO234 Process Geomorphology and geomorphologic hazards **0.75P + 0.25E; 0.25SR + 0.75NS** **Credits: 12P + 4E; 4SR + 12NS**	GEO224 Environmental Studies **1E; 1SR** **Credits: 16E; 16SR**	GIS224 GIS **1G; 1NS** **Credits: 16G; 16NS**		
Third level modules (All 16 credits)	GEO314 Applied urban development and spatial transformation **0.8H + 0.2S; 1NS** **Credits: 12.8H + 3.2S; 16NS**	GEO334 Environmental Geomorphology **0.75P + 0.25E; 0.25SR + 0.75NS** **Credits: 12P + 4E; 4SR + 12NS**	GEO324 Environmental Management and analysis **1E; 1SF** **Credits: 16E; 16SF**	GEO344 Rural Geography **0.75H + 0.25I; 0.25SR + 0.75NS** **Credits: 12H + 4I; 4SR + 12NS**	GIS334 GIS **1G; 1NS** **Credits: 16G; 16NS**	

Estimate of curriculum composition, every module taken as 1 unit, every unit = 16 credits
<u>11 modules; 176 credits</u>
Human Geography (H) = 3.22 modules (51.5 credits); Physical Geography (P) = 2 modules (32 credits); Integrated/Thematic Geography (I) = 0.45 modules (7.2 credits); Environmental Science/Management (E) = 2.5 modules (40 credits); Spatial/Quant/Qual (S) = 0.68 modules (10.9 credits); GIS/Cartography (G) = 2.15 modules (34.4 credits)
H = 29.3%; P = 18.2%; I = 4.1%; E = 22.7%; S = 6.2%; G = 19.5%

Stand-alone versus mixed composition
Stand-alone modules: 5/11 = 45.5% Mixed modules: 6/11 = 54.5%

Sustainability breakdown
Sustainability focused (SF) = 1 module (16 credits); Sustainability related (SR) = 2.6 modules (41.6 credits); Not sustainability focused or related (NS) = 7.4 modules (118.4 credits)
In terms of modules/credits: SF = 9%; SR = 23.7%; NS = 67.3%

1.3 University of the Free State (Society of South African Geographers 2010, 2011, 2012, 2013; University of the Free State 2014b, 2014d, 2014e)

Name of department	Department of Geography – QwaQwa Campus					
Mission/vision	This is a focused and dynamic department, with students more than just numbers. Students are exposed to real-world issues, and are taken on excursions to expose them to practical environmental and developmental problems. GIS features strongly in undergraduate as well as postgraduate programmes of the department.					
Role in MIT	At present, this department resides in the Faculty of Natural and Agricultural Sciences, but also caters for students from the Faculty of Humanities.					
Disciplinary focus areas in department	None specifically mentioned, but can be deduced to include Environmental Geography, Environmental Management and GIS, amongst others.					
Degrees offered QuaQua	**BSc Environmental Geography:** Same as for the BSc learning programmes in the Geosciences field of interest offered at the Bloemfontein campus. **BA General:** Same as for the BA offered at Bloemfontein, but makes provision for inclusion of Tourism as second major, which appears to be offered as well by the department on this campus.					
	BSc learning programmes in Geosciences field of interest: The learning programmes in Geography and Environmental Sciences include properties and processes in the Earth and on the surface and encompass a holistic study of the human environment and accompanying interactions/relationships. The programmes are aimed at students interested in various aspects of the environment and can lead to specialisation as environmentalists. Careers in these sciences are divergent because all institutions involved with resource utilisation are legally obliged to examine impacts of their activities on the environment. The connection of geographical information and computer technology simplifies the storage, processing, modelling and presentation of information and expedites decision making. **BA general:** The Bachelor of Arts degree offers students a broadly formative education that is useful in any occupation requiring a culturally developed perspective. It provides students who intend specialising in a particular discipline with a meaningful context; it is beneficial to people in any leadership position.					
	BSc Environmental Geography; Core: GEO114, 124; GEO214, 224, 234, GIS224 GEO314, 324, 334,GIS324		**BA General with Geography and Tourism; Core:** GEO114, 124; GEO214, 224, TRM214, 224 GEO314, 324, TRM314, 324			
First level modules (All 16 credits)	GEO114 Introduction to Physical Geography **0.5P + 0.2I + 0.15S + 0.15G; 0.2SR + 0.8NS** **Credits: 8P +3.2I + 2.4S +2.4G; 3.2SR + 12.8NS**		GEO124 Introduction to Human Geography and Cartography **1H; 1NS** **Credits: 16H; 16NS**			
Second level modules (All 16 credits)	GEO214 Urban development **0.67H + 0.33S; 0.67SR + 0.33NS** **Credits: 10.7H + 5.3S; 10.7SR + 5.3NS**	GEO234 Process Geomorphology and geomorphologic hazards **0.75P + 0.25E; 0.25SR + 0.75NS** **Credits: 12P + 4E; 4SR + 12NS**	GEO224 Environmental Studies **1E; 1SR** **Credits: 16E; 16SR**	GIS224 GIS **1G; 1NS** **Credits: 16G; 16NS**	TRM214 Introduction to tourism; **1T; 0.5SR + 0.5NS** **Credits: 16T; 8SR + 8NS**	TRM224 Tourism: Safety and security; **1T; 1NS** **Credits: 16T; 16NS**
Third level modules (All 16 credits)	GEO314 Applied urban development and spatial transformation **0.8H + 0.2S; 1NS** **Credits: 12.8H + 3.2S; 16NS**	GEO334 Environmental Geomorphology **0.75P + 0.25E; 0.25SR + 0.75NS** **Credits: 12P + 4E; 4SR + 12NS**	GEO324 Environmental Management and analysis **1E; 1SF** **Credits: 16E; 16SF**	GEO344 Rural Geography **0.75H + 0.25I; 0.25SR + 0.75NS** **Credits: 12H + 4I; 4SR + 12NS**	GIS334 GIS **1G; 1NS** **Credits: 16G; 16NS**	TRM314 Tourism, development & policy **1T; 0.5SR + 0.5NS** **Credits: 16T; 8SR + 8NS**
	TRM324 Tourism and local Development; **1T; 0.5SR + 0.5NS** **Credits: 16T; 8SR + 8NS**					

Estimate of curriculum composition, every module taken as 1 unit, every unit = 16 credits
15 modules; 240 credits
Same as Bloemfontein, but if the four modules on tourism are taken into account, the allocated percentage weights differ as follows:
H = 21.5%; P = 13.3%; I = 3%, E = 16.7%; S = 4.5%; G = 14.3%; T = 26.7%

Stand-alone versus mixed composition
Stand-alone modules: 9/15 = 60% Mixed modules: 6/15 =40%

Sustainability breakdown
With four Tourism modules added to the modules as offered at Bloemfontein, with four of these Tourism modules having an estimated SR weight of 0.5 each, the picture changes to SF = 1 module (16 credits); SR = 4.1 modules (65.6 credits); NS = 9.9 modules (158.4 credits)
In terms of modules/credits: SF = 6.6%; SR = 27.5%; NS = 65.9%

1.4 University of Johannesburg (Society of South African Geographers 2010, 2011, 2012, 2013; University of Johannesburg 2014a, 2014b, 2014c)						
Name of department	Department of Geography, Environmental Management and Energy Studies					
Mission/vision	Research/teaching strengths of department: GIS, RS, Environmental Management and urban studies (housing/education/energy issues). The department's undergraduate students study Geography or Environmental Management and come from the faculties of Science, Humanities, Management and Education. The department prides itself to integrate research with undergraduate teaching. Final year undergraduate students undertake small research projects and are assigned a supervisor within the department and then work together to develop a 'mini' proposal, collect data, analyse it and write up a research report with a short literature review. Students gain a lot from this experience, which can be applied to the world of work once they graduate or help them prepare for post graduate studies.					
Role in MIT	Students conduct research within the wider field of interest of staff in the department. Research that can inform policy and/or offer solutions to real world problems is encouraged. Within the fields of Environmental Management, Energy Studies and GIS/RS, an interdisciplinary approach is encouraged. All students are expected to manage their time and studies, as self-study is part of any induction into a research career. While the department has strength in quantitative research, with assistance offered by UJ's Statkon, students can follow a qualitative approach if that suits their research question better.					
Disciplinary focus areas in department	Deduced to be Geography, Environmental Management and Energy Studies, although not specifically mentioned. Within the fields of Environmental Management, Energy Studies and GIS/RS an interdisciplinary approach by students in research is encouraged.					
Degrees offered	**BA (Geography):** To provide students with abilities to demonstrate problem solving skills in soil erosion, land degradation, ecological changes in the environ-ment (biosphere and atmosphere) and interrelationships between the human and physical-environmental related aspects. Team work and personal responsibility towards the planning and management of the human and physical environment, is enhanced. Practical skills are developed by doing research on a problem, which includes exercises involving the gathering, ordering, analysis and interpretation of data, as well as formulation of a synthesis and concluding evaluation. Re-flection on the research and decisions flowing from it, concludes the process.	**BA (with specialisation in Geography and Anthropology)**	Geography 1A and 1B Geography 2A and 2B Geography 3A and 3B	**BSc (Life and Environ-mental Sciences):** This qualification is designed for well-rounded, broad education to equip graduates with the knowledge base, theory and methodology of Life and Environmental Sciences. Purpose: To develop scientists who can identify, evaluate and solve problems in Life and Environmental Sciences and who will be able to apply initiative and responsibility in related academic/professional con-texts in SA and internationally. Since this programme focuses on the principles and theory of Life and Environmental Sciences and possible applications thereof, students acquire relevant competence/research ability, serving as basis for entry into the labour market or post-graduate studies and professional practice and training.	Botany and Geography Zoology and Geography Geology and Geography	**Botany/Zoology/Geology and Geography** YR1: GGR1A01, GGR1B01 YR2: GGR2A10, GGR2B10 YR3: GGR3A10, GGR3B10
		BA (Development Studies): Second major can be Geography	Second major 1A and 1B Second major 2A and 2B Second major 3A and 3B (2nd major can be Geography)		Zoology and Environmental Management Geology and Environmental Management (phasing out) Geography and Environmental Management Botany and Environmental Management (Phasing out)	**Zoology/Geology and Environmental Management** YR1: GGR1A01, GGR1B01 YR2: ENM2A10, GGR2B10 YR3: ENM3A10, ENM3B10
		BA (Geography)	From departmental information on website: Geography 1A and 1B Geography 2A and 2B Geography 3A and 3B			**Geography and Environ-mental Management** YR1:GGR1A01, GGR1B01 YR3: ENM2A10, GGR2A10, GGR2B10 YR4: ENM3A10, ENM3B10, GGR3A10, GGR3B10
First level modules	GGR1A01/GGR01A1 (24 credits) Introduction to Human Geography **0.6H + 0.2S + 0.2G; 1NS** **Credits: 14.4H + 4.8S + 4.8G; 24NS**	GGR1B01/GGR01B1 (24 credits) Climatology and Geomorphology **0.75P + 0.25I; 0.25SR + 0.75NS** **Credits: 18P + 6I; 6SR + 18NS**	GGR1A2E and GGR1A1E: Not considered, for extended degree (12 credits each) To develop student's understanding of Human Geography by investigating critical population issues, human settlements and economies		GGR1BEX: Not considered, for extended degree (15? credits) Climatology and Geomorphology: To instruct students in the basics of climatology and geomorphology	
Second level modules	GGR2A10/GGR02A2 (24 credits) Pedography and Biogeography **0.75P + 0.25I; 0.25SR + 0.75NS** **Credits: 18P + 6I; 6SR + 18NS**	GGR2B10/GGR02B2 (24 credits) Economic and Population Geography **0.75H + 0.25I; 0.25SR + 0.75NS** **Credits: 18H + 6I; 6SR + 18NS**	ENM2A10 (16 cedits) Environmental Management 2A **1E; 1SF** **Credits: 16E; 16SF**			
Third level modules	GGR3A10/GGR03A3 (24 credits) Geo-informatics **1G; 1NS** **Credits: 24G & 24NS**	GGR3B10/GGR03B3 (24 credits) Urban Geography and the South African city **0.75H + 0.25S; 1NS** **Credits: 18H + 6S; 24NS**		ENM3A10 (16 credits) Env.Management 3A **1E; 1SF** **Credits: 16E; 16SF**	ENM3B10 (16 credits) Env.Management 3B **1E; 1SF** **Credits: 16E; 16SF**	
9 modules in total: Estimate of curriculum composition, every module taken as 1 unit Human Geography (H) = 2.10 modules (23.4%); Physical Geography (P) = 1.5 modules (16.7%); Integrated/Thematic Geography (I) = 0.75 modules (8.3%); Environmental Science/Management (E) = 3 modules (33.3%); Spatial/Quant/Qual (S) = 0.45 modules (5%); GIS/Cartography (G) = 1.2 modules (13, 3%)						
192 credits in total: Estimate of curriculum composition, relative to credit loading of modules H = 50.4 credits (26.2%); P = 36 credits (18.8%); I = 18 credits (9.4%); E = 48 credits (25%), S = 10.8 credits (5.6%); G = 28.8 credits (15%)				**Stand-alone versus mixed composition** Stand-alone modules: 4/9; Credits: 72/192 = 37.5% Mixed modules: 5/9; Credits: 120/192 = 62.5%		
Sustainability breakdown: Sustainability focused (SF) = 3 modules (48 credits); Sustainability related (SR) = 0.75 modules (18 credits); Not sustainability focused or related (NS) = 5.25 modules (126 credits) In terms of modules: SF = 33.3%; SR = 8.3%; NS = 58.4% In terms of credits: SF= 25%; SR = 9.4%; NS = 65.6%						

<table>
<tr><td colspan="7">1.5 University of Zululand (Society of South African Geographers 2011, 2012, 2013; University of Zululand 2014a, 2014b, 2014c)</td></tr>
<tr><td>Name of department</td><td colspan="6">Department of Geography and Environmental Studies</td></tr>
<tr><td>Mission/vision</td><td colspan="6">This department strives to be in the forefront in providing quality career focused programmes through teaching, research, scholarship and community outreach. Mission statement: (a) To provide access to students from diverse backgrounds to an enabling and caring learning and teaching environment; (b) To respond to the global demand for human resource development by training graduates in relevant programmes; (c) To generate knowledge through research in Geography and to disseminate it through publications, teaching and development in partnership with the community and other constituencies.</td></tr>
<tr><td>Role in MIT</td><td colspan="6">Strong indications of linkages with Environmental Sciences are evident in the curriculum. This department is part of the Earth Sciences Group in the Faculty of Science and Agriculture.</td></tr>
<tr><td>Disciplinary focus areas in department</td><td colspan="6">Although not specifically mentioned, can be deduced to be Human Geography, Physical Geography, Environmental Management and Environmental Science.</td></tr>
<tr><td>Degrees offered</td>
<td>A three-year double major programme leading to a BSc degree

In double major qualifications in the first year of study, students usually take modules in four different disciplines. At the second level of study students must choose modules from two, three or four different subjects (major subjects) from which they will then take two subjects as majors in their third year.

The total credit value of a three year qualification is at least 384 (twenty four 16-credit semester modules), provided that
(i) at least 120 credits are at NQF level 7,
(ii) at least 120 credits are at NQF level 6,
(iii) no more than 96 credits are at NQF level 5</td>
<td>Common curriculum (Degree based on majors)

The Earth Sciences group incorporates the disciplines of Geography and Hydrology

Allowed combinations:
Geography and Botany, Physics, Hydrology, Statistics or Zoology

Geography BSc stream (Co-majoring with Science Faculty Majors):
YR1: SGES111, SGES112
YR2: SGES211, SGES212 OR SGES222
YR3: SGES311 OR SGES321, SGES331 OR SGES341, SGES312, SGES322</td>
<td>BA Development Studies

South Africa is a developing country. Many of its people live in poverty. Development Studies offers students the opportunity to gain a better understanding of the development problems facing “Third World” countries in general and South Africa in particular, thus enabling them to contribute meaningfully towards their resolution by applying knowledge of development techniques.

Geography modules included:
YR2: SGES111 and SGES112 as options for inclusion
YR3: SGES211 and SGS212 as options for inclusion</td>
<td>Three-year focused programme leading to a BA in Environment, Planning and Development

This qualification is aimed at producing graduates who intend to become planners who will liaise with developers. The qualification leads from a foundation in the social sciences, development studies and geographical sciences and is followed by sound grounding in all aspects of environmental planning. With this qualification, learners will be qualified to enter the field of environmental planning at a technical level, but are recommended to continue their studies at honours level in the various sub-disciplines</td>
<td>Geography modules included in the BA Environment, Planning and Development:

YR1: SGES111, SGES112

YR2: SGES211, SGS212 and SHYD222 as options for inclusion

YR3: SGES311, SGES331, SGES312, SGES322</td>
<td>Geography B.A stream (Co-majoring with Arts Faculty majors):

YR1: SGES111, SGES112
YR2: SGES211, SGES212
YR3: SGES311, SGES331, SGES 312, S22</td></tr>
<tr><td>First level modules (All appear to be 16 credit semester modules)</td>
<td colspan="2">SGES111
Introduction to Physical and Environmental Geography
0.6P + 0.4E; 0.4SR + 0.6NS
Credits: 9.6P + 6.4E; 6.4SR + 9.6NS</td>
<td colspan="2">SGES112
Introduction to Human Geography
0.75H + 0.25I; 0.25SR + 0.75NS
Credits: 12H + 4I; 4SR + 12NS</td>
<td></td><td></td></tr>
<tr><td>Second level modules (All appear to be 16 credit semester modules)</td>
<td>SGES211
Global landforms and Cartography
0.6P + 0.4G; 1NS
Credits: 9.6P + 6.4G; 16NS</td>
<td colspan="2">SGES212
Demographics, health and sustainable development
0.5H + 0.5I; 0.5SF + 0.5NS
Credits: 8H + 8I; 8SF + 8NS</td>
<td>SGES222
Hydrometeorology
1E; 1NS
Credits: 16E; 16NS</td>
<td>SHYD222
GIS
Not considered here since it is offered by the Department of Hydrology</td>
<td></td></tr>
<tr><td>Third level modules (All appear to be 16 credit semester modules)</td>
<td colspan="2">SGES311
Urban environment and recreation planning
0.75H + 0.25I; 0.25SR + 0.75NS
Credits: 12H + 4I; 4SR + 12NS</td>
<td>SGES312
Environmental Management
1E; 1SF
Credits: 16E; 16SF</td>
<td>SGES321
Atmospheric processes and pollution
1E; 0.5SR + 0.5NS
Credits: 16E; 8SR + 8NS</td>
<td>SGES322
Environmental fieldwork and research
0.5E + 0.5S; 1SR
Credits: 8E + 8S; 16SR</td>
<td></td></tr>
<tr><td></td>
<td>SGES331
Land use and natural resource management
0.6E + 0.4I; 1SR
Credits: 9.6E + 6.4I; 16SR</td>
<td colspan="2">SGES341
Climate dynamics, weather variability and prediction
0.75E + 0.25I; 0.25SR + 0.75NS
Credits: 12E + 4I; 4SR + 12NS</td>
<td></td><td></td><td></td></tr>
<tr><td colspan="7">Estimate of curriculum composition, every module taken as 1 unit, every unit = 16 credits
11 modules in total (176 credits) – Note: The GIS module is offered by another department, namely Hydrology
Human Geography (H) = 2 modules (32 credits); Physical Geography (P) = 1.2 modules (19.2 credits); Integrated/Thematic Geography (I) = 1.65 modules (26.4 credits); Environmental Science/Management (E) = 5.25 modules (84 credits); Spatial/Quant/Qual = 0.5 modules (8 credits); GIS/Cartography = 0.4 modules (6.4 credits)
Estimate of composition in terms of modules/credits: H = 18.2%; P = 10.9%; I = 15%; E = 47.7%; S = 4.6%; G = 3.6%</td></tr>
<tr><td colspan="7">Stand-alone versus mixed composition
Stand-alone modules: 3/11 = 27.3% Mixed modules: 8/11 = 72.7%</td></tr>
<tr><td colspan="7">Sustainability breakdown: Sustainability focused (SF) = 1.5 modules (24 credits); Sustainability related (SR) = 3.65 modules (58.4 credits); Not sustainability focused or related = 5.85 modules (93.6 credits)
In terms of modules/credits: SF = 13.6%; SR = 33.2%; NS = 53.2%</td></tr>
</table>

1.6 University of Limpopo (Society of South African Geographers 2010, 2011, 2012, 2013; University of Limpopo 2011, 2014a, 2014b)						
Name of department	Department of Geography and Environmental Studies					
Mission/vision	**Vision:** To produce capable environmental practitioners for solving environmental problems especially in sub-Saharan Africa. **Mission:** To train competent and functional geographic and environmental professionals for sub-Saharan Africa through teaching, research and community engagement. **Motto:** Caring for the Environment. **Why study here?** Since most environmental/resource problems are due to human exploitation of resources, with solutions to these problems of importance, study programmes offered provide students with knowledge/understanding of: • What these human/physical resources are, their spatial organisation, measurement/recording/mapping of their characteristics and using RS/GIS/Computer Assisted Cartography (CAC); • Interrelations between people (demographic/social/economic characteristics) and the physical environment (atmosphere/lithosphere/soil/vegetation/hydrosphere); • Implications of these interactions for environmental management. Students will therefore obtain knowledge and holistic understanding of human impacts on the physical environment and the consequences/management of such impacts.					
Role in MIT	Geography and Environmental Studies is concerned with the study of the total environment, meaning the study of human populations, their social and economic activities and the effect of their activities on the natural/physical environment (land, soil, vegetation, water bodies and lower atmosphere), with emphasis on the integrated/systems approach in the study of: • Interrelationships among components of the natural environment; • How human activities modify natural environments; • Consequences of such human modifications; • How environmental managers can intervene to control human activities and to mitigate their negative consequences. The department also offers service modules to other departments in their school and to other faculties.					
Disciplinary focus areas in department	• Modules offered cover the systematic fields of Physical and Human Geography (including the regional geographies of South Africa, Africa and the World) and applied fields as Applied Geomorphology, Climatology, water resources, tourism, and natural resource ecology, Environmental Management, RS and GIS. • Advanced post-graduate training is only through research and available to full- and part-time students. Available specialisations include Geomorphology, Climatology, Biogeography (the Geography of soils and vegetation), natural resource ecology, waste management, tourism studies, surface water resources, population, Settlement and Transport Geography. • Training is supported by modules on research methods and analytical techniques and by field/laboratory training in CAC, RS and GIS, and in environmental and social impact assessments of development projects in the Limpopo Province.					
Degrees offered	The undergraduate programme offers a four-year training, leading to a BSc in Environmental and Resource Studies	YR 1 Sem 1: Geog101, 111 and 121 Sem 2: Geog102, 112 and 122	YR2 Sem 1: Geog201, 211, 221 and 231 Sem 2: Geog202, 212, 222, 242 and 252		YR3 Geog301, 311, 321, 331, 341 and 351 Geog302, 312, 322, 332, 352 and 362	
First level modules **90 credits**	GEOG101 15 credits Sem 1 Introduction to the physical environment **0.5P + 0.5E; 0.2SR + 0.8NS** **Credits: 7.5P + 7.5E;** **3SR + 12NS**	GEOG111 15 credits Sem 1 Cartography techniques and elementary surveying **1G; 1NS** **Credits: 15G; 15NS**	GEOG121 15 credits Sem 1 Air photo reading and interpretation **1G; 1NS** **Credits: 15G; 15NS**	GEOG102 15 credits Sem 2 Introduction to the human environment: People, land and space **0.8H + 0.2S; 1NS** **Credits: 12H + 3S; 15NS**	GEOG112 15 credits Sem 2 Regional studies: S.A. people, space and environment **0.8H + 0.2I;** **0.2SR + 0.8NS** **Credits: 12H + 3I;** **3SR + 12NS**	GEOG122 15 credits Sem 2 Modern cartographic applications **1G; 1NS** **Credits: 15G; 15NS**
Second level modules **112.5 credits**	GEOG201 15 credits Sem 1 Introduction to Geomorphology **1P; 1NS** **Credits: 15P; 15NS**	GEOG211 15 credits Sem 1 CAC **1G; 1NS** **Credits: 15G; 15NS**	GEOG221 7.5 credits Sem 1 Disease ecology and Medical Geography **0.5P + 0.5E; 0.2SR + 0.8NS** **Credits: 3.75P + 3.75E; 1.5SR + 6NS**		GEOG231 15 credits Sem 1 Quantitative techniques I **1S; 1NS** **Credits: 15S; 15NS**	
	GEOG202 15 credits Sem 2 Regional studies: Africa and world - People, space and environment **0.35P + 0.35H + 0.3I; 0.4SR + 0.6NS** **Credits: 5.25P + 5.25H + 4.5I; 6SR + 9NS**	GEOG212 15 credits Sem 2 Introduction to GIS and RS **1G; 1NS** **Credits: 15G; 15NS**	GEOG222 7.5 credits Sem 2 Demographics and population studies **0.8H + 0.2S; 0.2SR + 0.8NS** **Credits: 6H + 1.5S; 1.5SR + 6NS**		GEOG242 7.5 credits Sem 2 Economic Geography **0.8H + 0.2S; 1NS** **Credits: 6H + 1.5S; 7.5NS**	GEOG252 15 credits Sem 2 Introduction to Climatology **1P; 1NS** **Credits: 15P; 15NS**
Third level modules **127.5 credits**	GEOG301 15 credits Sem 1 Applied Geomorphology **1P; 1NS** **Credits: 15P; 15NS**	GEOG311 7.5 credits Sem 1 RS **1G; 1NS** **Credits: 7.5G; 7.5NS**	GEOG321 7.5 credits Sem 1 Tourism studies **0.9H + 0.1S; 1NS** **Credits: 6.75H + 0.75S; 7.5NS**	GEOG331 15 credits Sem 1 Quantitative techniques II **1S; 1NS** **Credits: 15S; 15NS**	GEOG341 7.5 credits Sem 1 Settlement Geography **0.8H + 0.2S; 0.2SR + 0.8NS** **Credits: 6H + 1.5S;** **1.5SR + 6NS**	GEOG351 15 credits Sem 1 Applied Climatology **1P; 1NS** **Credits: 15P; 15NS**
	GEOG302 15 credits Sem 2 Environment and resource planning and management **0.5E + 0.5I; 1SF** **Credits: 7.5E + 7.5I; 15SF**	GEOG312 7.5 credits Sem 2 GIS application **1G; 1NS** **Credits: 7.5G; 7.5NS**	GEOG322 15 credits Sem 2 Natural resource ecology **0.5E + 0.4I + 0.1S; 1SF** **Credits: 7.5E + 6I + 1.5S; 15SF**	GEOG332 7.5 credits Sem 2 Solid waste management **1E; 1SF** **Credits: 7.5E; 7.5SF**	GEOG352 7.5 credits Sem 2 Impact Studies **1E; 1SF** **Credits: 7.5E; 7.5SF**	GEOG362 7.5 credits Sem 2 Soil genesis & Geomorphology **1E; 1NS** **Credits: 7.5E; 7.5NS**
27 modules in total: Estimate of curriculum composition, every module taken as 1 unit Human Geography (H) = 5.25 modules (19.5%); Physical Geography (P) = 5.35 modules (19.8%); Integrated/Thematic Geography (I) = 1.4 modules (5.2%); Environmental Science/Management (E) = 5 modules (18.5%); Spatial/Quant/Qual (S) = 3 modules (11%); GIS/Cartography (G) = 7 modules (26%)						
330 credits in total: Estimate of curriculum composition, relative to credit loading of modules H = 54 credits (16.4%); P = 76.5 credits (23.2%); I = 21 credits (6.3%); E = 48.75 credits (14.8%); S = 39.75 credits (12%); G = 90 credits (27.3%)						
Stand-alone versus mixed composition Stand-alone modules: 16/27; Credits: 202.5/330 = 61.4 % Mixed modules: 11/27; Credits: 127.5/330 = 38.6%						
Sustainability breakdown: Sustainability focused (SF) = 4 modules (45 credits); Sustainability related (SR) = 1.4 modules (16.5 credits); Not sustainability focused or related (NS) = 21.6 modules (268.5 credits) In terms of modules: SF = 14.8%; SR = 5.2%; NS = 80% In terms of credits: SF= 13.6%; SR = 5%; NS = 81.4%						

1.7 University of the Witwatersrand (Society of South African Geographers 2010, 2011, 2012, 2013; University of the Witwatersrand 2014a, 2014b, 2014c)					
Name of department	School of Geography, Archaeology and Environmental Studies				
Mission/vision	This school is one of the most productive research units at Wits. Staff members contribute to local and international publications and serve on editorial boards of prestigious journals. This school has an excellent reputation locally and internationally as one of the leaders in African scholarship on issues as sustainability, climate change, urban social and environmental justice, tourism and development. Undergraduate programmes are offered in Geography and Archaeology and postgraduate degrees in Physical Geography, Human Geography, Environmental Studies, Archaeology, Rock Art Studies and Paleo-archaeology. In line with the vision of being a 'TOP 100' University, the geographers would like their school to be a 'TOP 100' School or at least preferred choice for research and study of Geography in South Africa, if not Africa.				
Role in MIT	This school regards themselves as leaders in Rock Art Studies, Paleo-archaeology, the Stone Age, pre-colonial farming and herding societies and the formation of modern cultural identities during the last five hundred years. They have links with the Evolutionary Studies Institute, as well as with the School of Geoscience, the Rock Art Research Institute and the School of Animals, Plants and Environmental Science.				
Disciplinary focus areas in department	The undergraduate Geography courses offered in this school are described as wide-ranging, exciting and relevant to contemporary issues in South Africa and in the world. Postgraduate specialisations include Physical Geography, Human Geography, Environmental Studies, Archaeology, Rock Art Studies and Paleo-archaeology.				
Degrees offered	**BA in Geography and Environmental Studies**	A BA degree consists of two major subjects and 16 additional courses. A course runs for a semester (half of the academic year). For each course students have to submit essays/assignments and write tests, with an exam at the end of the term. A major is a subject taken from first to third year, which means the same subject is studied during first, second and third year. Each year different aspects of the subject are covered and the degree of difficulty and complexity increases as students become more specialised in the subject. For a BA students will be required to take eight courses in each year of study.	**BSc in Geography and Environmental Studies** Points Structure The BSc curriculum is based on a system of points. Each unit carries a number of points, defined by level and duration. You are required to complete 396 points of which 240 points must be achieved from level II and level III, including 72 points from a level III unit (major). The points are structured as follows: Level I = 36 points Level II = 48 points Level III = 72 points	**Bachelor of Science in the field of Natural Sciences** YR1: GEOG1000 YR2: Environmental Sciences and Sustainability II, incl. GEOG2011 and GEOG2013 YR3: Environmental Sciences and Sustainability III, incl. GEOG3020 and GEOG3023 Aquatic Science III, incl. GEOG3018	**Bachelor of Science in the field of Geographical and Archaeological Sciences** YR1: GEOG1000 YR2: At least two recognised majors from Geography YR3: At least two recognised majors from Geography
First level modules **32 points in total**	GEOG1000 – Geography I (36 points) **:** An introductory, year-long course for students intending to major in the subject and for those taking it as a stand-alone course. Two fields of study are offered, namely Physical Geography and Human Geography. GEOG1000 consists of 4 sub-courses.				
	Physical Geography: Climatology, Geomorphology, Geology and Biogeography		Human Geography: Dev. issues, Urban Geography (incl. early settlements) and Rural Studies		
	Landscapes of Southern Africa (8 points): Introduction to Physical Geography and processes shaping and modifying the Earth's surface **0.75P + 0.25I; 0.25SR + 0.75NS** **Points: 6P + 2I; 2SR + 6NS**	Environmental Change (8 points): Seeks to develop understanding of the history and nature of the Human-Environment sub-discipline of Geography **0.5I + 0.5E; 1SR** **4I + 4E; 8SR**	Space and Society (8 points): Aims to provide understanding of some of the concepts, definitions and debates in Urban Geography **1H; 1NS** **Points: 8H; 8NS**	Atmospheric Science (8 points): Aims to provide understanding of the concepts of Climatology. **1P; 1NS** **Points: 8P; 8NS**	
Second level modules **(To pass 4 courses to be able to advance to Geography 3)** **60 points in total**	GEOG2010 (12 points): Earth and atmospheric processes II **0.75P + O.25E; 1NS** **Points: 9P + 3E; 12NS** **OR** GEOG2015 (12 points): Thinking geographically: Concepts and practices in Human Geography **0.2S + 0.8H; 0.2SR + 0.8NS** **Points: 2.4S + 9.6H; 2.4SR + 9.6NS**		GEOG2013 (12 points): Geographic Information Systems, Science and Mapping **0.2S + 0.8G; 1NS** **Points: 2.4S + 9.6G; 12NS**	GEOG2011 (12 points): Introduction to climate change and society II **0.5I + O.5E; 1SF** **Points: 6I + 6E; 12SF**	
			GEOG2012 (12 points): Environmental governance **0.4I + 0.6E; 1SF** **Points: 4.8I + 7.2E; 12SF**		
Third level modules **162 points in total**	GEOG3021 (18 points): Advanced Atmospheric Science 1E; **0.2SR + 0.8NS** **Points: 18E; 3.6SR + 14.4NS** **OR** GEOG3023 (18 points): Theory and practice in Sustainability Science and sustainable development **0.5I + 0.5E; 1SF** **9I + 9E; 18SF**	GEOG3017 (18 points): GIS and RS **1G; 1NS** **Points: 18G; 18NS** **OR** GEOG3025 (18 points) Urban futures: The political economy of population and scarcity **1H; 0.25SR + 0.75NS** **Points: 18H; 4.5SR + 13.5NS**	GEOG3024 (18 points): Environmental monitoring and modelling **1E; 1SR** **Points: 18E; 18SR** **OR** GEOG3019 (18 points): Economic Geography **0.9H + 0.1S; 1NS** **Points: 16.2H + 1.8S; 18NS**	GEOG3020 (18 points): Climate and environ-mental change **0.5P + 0.5E; 1NS** **Points: 9P + 9E; 18NS** **OR** GEOG3022 (18 points): City cultures **1H; 1NS** **Points: 18H; 18NS**	
	GEOG3018 (18 points): Fundamentals of Conservation Biogeography **0.3P + 0.3I + 0.4E; 1SF** **Points: 5.4P + 5.4I + 7.2E; 18SF** According to the faculty yearbook, this is a third level, 18 point module, although the website of the department lists it as a second level module				
18 modules in total: Estimate of curriculum composition, every module taken as 1 unit Human Geography (H) = 4.7 modules (26.1%); Physical Geography (P) = 3.3 modules (18.3%); Integrated/Thematic Geography (I) = 2.45 modules (13.6%); Environmental Science/Management (E) = 5.25 modules (29.2%); Spatial/Quant/Qual (S) = 0.5 modules (2.8%); GIS/Cartography (G) = 1.8 modules (10%)					
254 points in total: Estimate of curriculum composition, relative to loading of modules in terms of points H = 69.8 points (27.5%); P = 37.4 points (14.7%); I = 31.2 points (12.3%); E = 81.4 points (32%); S = 6.6 points (2.6%); G = 27.6 points (10.9%)					
Stand-alone versus mixed composition Stand-alone modules: 7/18; Points: 106/254 = 41.7% Mixed modules: 11/18; Points: 148/330 = 58.3%					
Sustainability breakdown: Sustainability focused (SF) = 4 modules (60 points); Sustainability related (SR) = 2.9 modules (38.5 points); Not sustainability focused or related (NS) = 11.1 modules (155.5 points) In terms of modules: SF = 22.2%; SR = 16.1%; NS = 61.7% In terms of points: SF= 23.6%; SR = 15.2%; NS = 61.2%					

1.8 University of Venda (Nethengwe, 2014; Society of South African Geographers 2010, 2011, 2012; University of Venda 2014)						
Name of department	Department of Geography and Geo-Information Sciences					
Mission/vision	Situated within the School of Environmental Sciences, the niche of this department is the analysis of the spatial organisation of the human and physical environments. The processes that influence this are analysed as the basis of understanding major environmental issues in all the disciplines relevant to the school. ● Vision: To be a centre of excellence in tertiary education in Geography and Geo-information Sciences in South Africa and to contribute to sustainable rural and regional development of southern Africa. ● Mission: To offer training and tertiary education in Physical and Human Geography and Geographical Information Sciences, while engaging in research and community work in order to respond to the development needs of the region, nation and Southern Africa.					
Role in MIT	The department's major focus is spatial science and to provide mapping services, education and training in GIS and RS, Surveying and Geomatics. The department serves the school, the university and the northern region (Vhembe District) of the Limpopo Province and South Africa. The main objective of the undergraduate programme is to provide students with a strong background in order to be able to work as environmental and geo-information scientists.					
Disciplinary focus areas in department	Tourism Geography, rural development planning, population and demography, industrial and settlement studies, Applied Geomorphology, Climatology, Biogeography, Geography and Geo-Information Science are specific fields of study.					
Degrees offered	**Bachelor of Environmental Science**	**Bachelor of Environmental Management**	**Bachelor of Urban and Regional Planning**	**Certificate in GIS**	**Geography as major in a BA, BSc and Bed**	**Geography can also be taken as a minor in degree programs**
Modules	The structure of the modules that constitute the programme provides a broad introduction to major world environments and associated techniques in the first year. In the second year students are introduced to theoretical thrusts and methodology. In the third year students begin to specialize. Throughout the three year programme students acquire skills in critical thinking and analysis, innovative problem solving, communication skills, research skills, community service and leadership skills. Of significance is the development of skills in research, computing, mapping and map analysis, GIS and RS. The undergraduate programme also emphasises career path development and prepares students for postgraduate and further study.					
First level modules (All 16 credits)	SEM1 GEO 1520 Introduction to Cartography, map analysis and aerial photograph interpretation **1G; 1NS** **Credits: 16G; 16NS**	SEM1 GEO 1541 Integrated study of major world environments 1 **1P; 1NS** **Credits: 16P; 16NS**	SEM2 GEO 1620 Elements of RS and Geomatics **0.8G + 0.2E; 0.2SF + 0.8NS** **Credits: 12.8G + 3.2E; 3.2SF + 12.8NS**	SEM2 GEO 1641 Integrated study of major world environments 2 **1I; 1SF** **Credits: 16I; 16SF**		
Second level modules (All 16 credits)	SEM1 GEO 2541 Spatial organisation of society **1S; 1NS** **Credits: 16S; 16NS**	SEM1 GEO 2542 Quantitative and qualitative research methods **1S; 1NS** **Credits: 16S; 16NS**	SEM2 GEO 2641 Patterns and processes in Physical Geography **1P; 1NS** **Credits: 16P; 16NS**	SEM2 GEO 2642 Themes on the Geography of Africa **1I; 1SR** **Credits: 16I, 16SR**		
Third level modules (All 16 credits)	SEM1 GEO 3541 Geography of South Africa **1I; 1SR** **Credits: 16I; 16SR**	SEM1 GEO3542 Geomorphology **1P; 1NS** **Credits: 16P; 16NS**	SEM1 GEO3543 Biogeography **0.33P + 0.33E + 0.34S; 1SR** **Credits: 5.3P + 5.3E + 5.4S; 16SR**	SEM1 GEO3544 Population and demography **0.8H + 0.2S; 0.2SR + 0.8NS** **Credits: 12.8H + 3.2S; 3.2SR + 12.8NS**	SEM1 GEO3545 Settlement and industrial development **1H; 0.2SR + 0.8NS** **Credits: 16H; 3.2SR + 12.8H**	
	SEM2 GEO3641 RS and GIS **1G; 1NS** **Credits: 16G; 16NS**	SEM2 GEO3642 Climatology **0.8P + 0.2E; 0.2SR + 0.8NS** **Credits: 12.8P + 3.2E; 3.2SR + 12.8NS**	SEM2 GEO3643 Geography of tourism **0.8H + 0.2E; 0.2SR + 0.8NS** **Credits: 12.8H + 3.2E; 3.2SR + 12.8NS**	SEM2 GEO3644 Rural Geography and development **0.8H + 0.2I; 0.2SR + 0.8NS** **Credits: 12.8H + 3.2I; 3.2SR + 12.8NS**		
Estimate of curriculum composition, every module taken as 1 unit, every unit = 16 credits **17 modules in total (272 credits)** Human Geography (H) = 3.4 modules (54.4 credits); Physical Geography (P) = 4.13 modules (66.1 credits); Integrated/Thematic Geography (I) = 3.2 modules (51.2 credits); Environmental Science/Management (E) = 0.93 modules (14.9 credits); Spatial/Quant/Qual = 2.54 modules (40.6 credits); GIS/Cartography = 2.8 modules (44.8 credits) Estimate of composition in terms of modules/credits: H = 20%; P = 24.3%; I = 18.8%; E = 5.5%; S = 14.9%; G = 16.5%						
Stand-alone versus mixed composition Stand-alone modules: 11/17 = 64.7% Mixed modules: 6/17 = 35.3%						
Sustainability breakdown: Sustainability focused (SF) = 1.2 modules (19.2 credits); Sustainability related (SR) = 4 modules (64 credits); Not sustainability focused or related = 11.8 modules (188.8 credits) In terms of modules/credits: SF = 7.1%; SR = 23.5%; NS = 69.4%						

1.9 University of South Africa (Society of South African Geographers 2010, 2011, 2012, 2013; University of South Africa 2014a, 2014b, 2014c)						
Name of department	Department of Geography					
Mission/vision	● VISION The vision of this department is the promotion of Geography as a discipline through research, teaching and community engagement in the School of Environmental Sciences in the College of Agriculture and Environmental Sciences within the University of South Africa. ● MISSION This department is committed to harness the rich and unique spatio-temporal perspective of Geography on the relationship between humankind, the environment and its sustainability, in the promotion and execution of tuition, research and community engagement.					
Role in MIT	● Why study Geography? Do you care about the environment in which you live? Do you sometimes wish you could swop your desk for the outdoors? Do you want to contribute to reconstruction, transformation and sustainable development in South Africa in the new millennium? Would you like to know more about the interesting mosaic of physical and cultural patterns on the earth surface? If your answer is "yes", enrol for Geography at Unisa. ● Geography at Unisa is a major in a number of generic degrees. In addition, many of the individual Geography modules are compulsory in a variety of vocational programmes. The department is the coordinator of a suite of multi-inter-trans-disciplinary undergraduate degrees in Environmental Management.					
Disciplinary focus areas in department	“Geography”, no disciplines/sub-disciplines evident.					
Degrees offered	**BA/BSc/BBA/BEd with Geography as major/minor**	**BA with specialisation in Environmental Management**	**BSc with specialisation in Environmental Management**	**Geography modules can also be taken as electives in a number of programmes offered by other departments/ colleges**		
First level modules (All 12 credits)	GGH1501 SEM 1&2 Know your world: Introduction to Geography **0.7I + 0.2G + 0.1S; 1SR** **Credits: 8.4I + 2.4G + 1.2S; 12SR**	GGH1502 SEM 1&2 World issues: A geographical perspective **1I; 1SF** **Credits: 12I; 12SF**	GGH1503 SEM 1&2 Our living world **0.5E + 0.5I; 1SF** **Credits: 6E + 6I; 12SF**			
Second level modules (All 12 credits)	GGH2601 SEM 1&2 The African challenge: People and environment **1I; 1SR** **Credits: 12I; 12SR**	GGH2602 SEM 1&2 The Geography of services provision **0.8I + 0.2S; 1SR** **Credits: 9.6I + 2.4S; 12SR**	GGH2603 SEM 1&2 The interpretation of maps, aerial photographs and satellite images **1G; 1NS** **Credits: 12G; 12NS**	GGH2604 SEM 1&2 People and the natural environment: Use and impact **0.5E + 0.5I; 1SF** **Credits: 6E + 6I; 12SF**	GGH2605 SEM 1&2 Environmental Politics **1E; 1SR** **Credits: 12E; 12SR**	GGH2606 SEM 1&2 Geography of tourism **0.45H + 0.45I + 0.1S; 1SR** **Credits: 5.4H + 5.4I + 1.2S; 12SR**
Third level modules (All 12 credits)	GGH3701 SEM 1&2 State of the environment in Southern Africa **0.45E + 0.45I + 0.1S; 1SR** **Credits: 5.4E + 5.4I + 1.2S; 12SR**	GGH3702 SEM 1&2 Spatial economic development **0.7H + 0.3S; 1NS** **Credits: 8.4H + 3.6S; 12NS**	GGH3703 SEM 1&2 Introduction to GIS **1G; 1NS** **Credits: 12G; 12NS**	GGH3704 SEM 1&2 Development of urban space **0.8H + 0.2S; 1SR** **Credits: 9.6H + 2.4S; 12SR**	GGH3705 SEM 1&2 Environmental evaluation and impact assessment **1E; 1SF** **Credits: 12E; 12SF**	GGH3707 SEM 1&2 Ecotourism **0.5E + 0.5I; 1SR** **Credits: 6E + 6I; 12SR**
	GGH3708 SEM 1&2 Environmental awareness and responsibility **0.6E + 0.4I; 1SF** **Credits: 7.2E + 4.8I; 12SF**					
Estimate of curriculum composition, every module taken as 1 unit, every unit = 12 credits **16 modules in total (192 credit**s) Human Geography (H) = 1.95 modules (23.4 credits); Physical Geography (P) = 0 modules (0 credits); Integrated/Thematic Geography (I) = 6.3 modules (75.6 credits); Environmental Science/Management (E) = 4.55 modules (54.6 credits); Spatial/Quant/Qual = 1 module (12 credits); GIS/Cartography = 2.2 modules (26.4 credits) Estimate of composition in terms of modules/credits: H = 12.2%; P = 0%; I = 39.4%; E = 28.4%; S = 6.2%; G = 13.8%						
Stand-alone versus mixed composition Stand-alone modules: 4/16 = 25% Mixed modules: 12/16 = 75%						
Sustainability breakdown: Sustainability focused (SF) = 5 modules (60 credits); Sustainability related (SR) = 8 modules (96 credits); Not sustainability focused or related = 3 modules (36 credits) In terms of modules/credits: SF = 31.3%; SR = 50%; NS = 18.7%						

1.10 North-West University
(Potchefstroom Campus; Society of South African Geographers 2011, 2012, 2013; North-West University 2014a, 2014b, 2014d)

Name of department	Subject Group Geography and Environmental Management in the School of Geo- and Spatial Sciences					
Mission/ vision	Undergraduate training aims to provide a theoretical foundation in Human and Physical Geography, while post graduate training focuses on different environmental management approaches and tools.					
Role in MIT	Geography can be taken as a major for a BA, BSc or BCom, and has been grouped with Geology and Regional and Urban Planning in this school.					
Disciplinary focus areas in department	Human Geography, Physical Geography, Environmental Management, GIS and Cartography.					
Degrees offered	**BA (Humanities) -** Geography and the humanities **BA (Development and Mana-gement) -** Geography and Public Management **BA (Social Sciences) –** Environment and Society All three these degrees with Geography as one of majors	**BSc (Environmental and Biological Sciences)** With Geography in various combinations	Geography and Geology Geography and Zoology Geography and Botany Geography and Computer Science	**BSc (Geo and Spatial Sciences)** With Geography in various combinations	**B.Art. et Scien. Planning (Qualification code 118101)** Urban and Regional Planning with Geography and Environ-mental Management - curriculum code N184P in yearbook	**BCom** With Geography as major in various combinations **BSc (Tourism)** With Geography as major combined with Zoology and Botany
First level modules	GGFS112 Sem 1 12 credits Introduction to Physical Geography **1P; 1NS** **Credits: 12P; 12NS**		GGFS121 Sem 2 12 credits Introduction to Human Geography **0.6H + 0.2S + 0.1I + 0.1E; 0.2SR + 0.8NS** **Credits: 7.2H + 2.4S + 1.2I + 1.2E; 2.4SR + 9.6NS**			
Second level modules	GGFS212 Sem 1 16 credits Physical Geography **0.6P + 0.2S + 0.2I; 0.2SR + 0.8NS** **Credits: 9.6P + 3.2S + 3.2I; 3.2SR + 12.8NS**		GGFS222 Sem 2 16 credits Human Geography **1H; 1NS** **Credits: 16H; 16NS**			
Third level modules	GGFS312 Sem 1 32 credits GIS and RS **1G; 1NS** **Credits: 32G; 32NS**		GGFS322 Sem 2 32 credits Applied Geography **0.7I + 0.2E + 0.1S; 0.45SF + 0.45SR + 0.1NS** **Credits: 22.4I + 6.4E + 3.2S; 14.4SF + 14.4SR + 3.2NS**			

Estimate of curriculum composition, every module taken as 1 unit
6 modules: Human Geography (H) = 1.6 modules (26.7%); Physical Geography (P) = 1.6 modules (26.7%); Integrated/Thematic Geography (I) = 1 module (16.7%); Environmental Science/Management (E) = 0.3 modules (5%); Spatial/Quant/Qual (S) = 0.5 modules (8.2%); GIS/Cartography (G) = 1 module (16.7%)

Estimate of curriculum composition, relative to loading of modules in terms of credits
120 credits: Human Geography (H) = 23.2 credits (19.3%); Physical Geography (P) = 21.6 credits (18%); Integrated Geography (I) = 26.8 credits (22.3%); Environmental Science/Management (E) = 7.6 credits (6.3%); Spatial/Quant/Qual (S) = 8.8 credits (7.3%); GIS/Cartography (G) = 32 credits (26.8%)

Stand-alone versus mixed composition
Stand-alone modules: 3/6; Credits: 60/120 = 50% Mixed modules: 3/6; Credits: 60/120 = 50%

Sustainability breakdown
Sustainability focused (SF) = 0.45 modules (14.4 credits); Sustainability related (SR) = 0.85 modules (20 credits); Not sustainability focused or related (NS) = 4.7 modules (85.6 credits)
In terms of modules: SF = 7.3%; SR = 14.5%; NS = 78.2% AND In terms of credits: SF = 12%; SR = 16.7%; NS = 71.3%

1.11 North-West University
(Mafikeng Campus; Society of South African Geographers 2011, 2012, 2013; North-West University 2014c, 2014e)

Name of department	Subject Group Geography and Environmental Science in the School of Environmental and health Sciences					
Mission/ vision	This subject group is dedicated to teaching, research and environmental development.					
Role in MIT	Geography can be taken as a major for a BSc and has been grouped with Biochemistry, Biological Sciences, Microbiology, Nursing and Nursing Sciences in this school.					
Disciplinary focus areas in department	Fields offered in the department include GIS, RS, Rural, Human and Physical Geography.					
Degrees offered	**BSc (Geography)** With all Geography modules	**BSc (Biology - Geography)** With all Geography modules	**BSc (Computer Science - Geography)** With all Geography modules		**BSc (Chemistry - Geography)** With all Geography modules	
First level modules	GEOM113 Sem 1 12 credits Introduction to Physical Geography **0.6P + 0.1E + 0.1S + 0.2G; 0.1SR + 0.9NS** **Credits: 7.2P + 1.2E + 1.2S + 2.4G; 1.2SR + 10.8NS**		GEOM123 Sem 2 12 credits Introduction to Human Geography **0.5H + 0.1I + 0.2S + 0.2G; 0.2SR + 0.8NS** **Credits: 6H + 1.2I + 2.4S + 2.4G; 1.2SR + 10.8NS**			
Second level modules	GEOM214 Sem 1 8 credits Aspects of Human Geography **0.8H + 0.2S; 1NS** **Credits: 6.4H + 1.6S; 8NS**	GEOM215 Sem 1 8 credits Geographical statistics and computers **1S; 1NS Credits: 8S; 8NS**	GEOM224 Sem 2 8 credits Aspects of Physical Geography **1P; 1NS Credits: 8P; 8NS**	GEOM225 Sem 2 8 credits Aerial photography and RS **1G; 1NS Credits: 8G; 8NS**		
Third level modules	GEOM314 Sem 1 16 credits Advanced Human Geography **1H; 1NS Credits: 16H; 16NS**	GEOM317 Sem 1 16 credits Advanced Physical Geography **0.8P + 0.2E; 0.2SR + 0.8NS** **Credits: 12.8P + 3.2E; 3.2SR + 12.8NS**		GEOM328 Sem 2 16 credits GIS **1G; 1NS** **Credits: 16G; 16NS**	GEOM329 Sem 2 16 credits The Geography of African Development **1I; 1SF** **Credits: 16I; 16SF**	

Estimate of curriculum composition, every module taken as 1 unit
10 modules: Human Geography (H) = 2.3 modules (23%); Physical Geography (P) = 2.4 modules (24%); Integrated/Thematic Geography (I) = 1.1 modules (11%); Environmental Science/Management (E) = 0.3 modules (3%); Spatial/Quant/Qual (S) = 1.5 modules (15%); GIS/Cartography (G) = 2.4 modules (24%)

Estimate of curriculum composition, relative to loading of modules in terms of credits
120 credits: Human Geography (H) = 28.4 credits (23.7%); Physical Geography (P) = 28 credits (23.3%); Integrated Geography (I) = 17.2 credits (14.3%); Environmental Science/Management (E) = 4.4 credits (3.7%); Spatial/Quant/Qual (S) = 13.2 credits (11%); GIS/Cartography (G) = 28.8 credits (24%)

Stand-alone versus mixed composition
Stand-alone modules: 5/10; Credits: 56/120 = 46.7% Mixed modules: 5/10; Credits: 64/120 = 53.3%

Sustainability breakdown
Sustainability focused (SF) = 1 module (16 credits); Sustainability related (SR) = 0.5 modules (5.6 credits); Not sustainability focused or related (NS) = 8.5 modules (98.4 credits)
In terms of modules: SF = 10%; SR = 5%; NS = 85% AND In terms of credits: SF = 13.3%; SR = 4.7%; NS = 82%

1.12 University of Kwazulu-Natal (Society of South African Geographers 2010, 2011, 2012, 2013; University of Kwazulu-Natal 2014a, 2014b)						
Name of department	The Department/Cluster of Geography in the School of Agricultural, Earth and Environmental Sciences					
Mission/vision	This department/cluster realises the importance of providing students with a broad Geography education, combined with skills development opportunity with a view of future careers. Human Geography is regarded to be concerned with understanding the human world and its interaction with physical, built, and symbolic landscapes, while Physical Geography draws on basic concepts in and the functioning of environmental systems. Cartographic theory and map skills are regarded as integral components of enquiry.					
Role in MIT	Geography is perceived to be studying spatial interactions between people and their physical and socio-economic environments from diverse, changing interdisciplinary perspectives. Drawing on the African indigenous knowledge system of Ubuntu – the essence of humanness and shared interconnectedness with each other, animals and nature – it is acknowledged that human well-being and quality of life is a shared undertaking which must respect the ecological limits of a finite planet.					
Disciplinary focus areas in department	The department/cluster consists of four components: Human Geography, Physical Geography/Environmental Sciences, Environmental Management and GIS and Earth Observation. Environmental Management is an applied branch of Geography and deals with understanding the way people impact on and manipulate ecosystems and resources and seeks ways to prevent or reduce negative impacts by deliberate intervention. GIS and RS are also applied branches of Geography. These tools concentrate on earth observation using state of the art satellite/airborne image information and satellite/airborne image information and the development of spatial data integration methods. The modules on offer provide a wide variety of concepts and themes in Human and Physical Geography and Geomatics that are studied at higher levels. Applications include areas such as rural and urban development, Environmental Management and GIS. Although global applications are possible, the focus is on *Africa as a spatial context.* The African continent is a unique place with diversity of history, knowledge systems, resources and experiences and with a need for resolution of numerous problems. Contextual examples from Africa are therefore included as part of the module themes. The undergraduate courses on offer are relevant to future environmental planners, urban and rural planners and managers.					
Degrees offered	**B Soc Sc Geography and Environmental Management** The degree is structured around a core of Geography, Environmental Sciences and Environmental Management modules that must be taken to third level	YR1, SEM1: GEOG110 YR1, SEM2: ENVS120 YR2, SEM1: ENVS210 YR2, SEM2: ENVS211, GEOG220 YR3, SEM2: ENVS322 YR3: At least two from GEOG301, GEOG314, GEOG325 in SEM1; GEOG330, ENVS316 in SEM2	**B Soc Sc (General Studies) With Geography major**	**(A)** YR1, SEM1: GEOG110 YR1, SEM2: ENVS120 YR2, SEM1: ENVS210 YR2, SEM2: ENVS211, GEOG220 (recommended) YR3: Three from GEOG301, GEOG314, GEOG325, ENVS322 and one from ENVS314/315/316	**(A) BSc Majoring in Geography/Environmental Science/Environmental and Earth Sciences** **(B) BSc Life and Earth Sciences (LES Stream)** With Geography and Environmental Science as major	**(B)** YR1: GEOG110, ENVS120 YR2: GEOG220, ENVS210, ENVS 211 YR3: ENVS322 At least two from ENVS314, ENVS315, ENVS316, GEOG301 At most one from ENVS318, GEOG330
First level modules (All 16 credits)	ENVS120 Environmental systems **0.3P + 0.1I + 0.3E + 0.1S + 0.2G; 0.2SR + 0.8NS** **Credits: 4.8P + 1.6I + 4.8E + 1.6S + 3.2G; 3.2SR + 12.8NS**		GEOG110 Human Environments **0.6H + 0.2I + 0.1S + 0.1G; 0.4SR + 0.6NS** **Credits: 9.6H + 3.2I + 1.6S + 1.6G; 6.4SR + 9.6NS**			
Second level modules (All 16 credits)	ENVS210 Biophysical environments of Southern Africa **0.5P + 0.5E; 0.1SR + 0.9NS** **Credits: 8P + 8E; 1.6SR + 14.4NS**		ENVS250 Introduction to RS **0.2E + 0.8G; 0.2SR + 0.8NS** **Credits: 3.2E + 12.8G; 3.2SR + 12.8NS**	ENVS211 GIS **1G; 1NS** **Credits: 16G; 16NS**	GEOG220 Geographies of urban and rural change **0.7H + 0.3S; 0.4SR + 0.6NS** **Credits: 11.2H + 4.8S; 6.4SR + 9.6NS**	
Third level modules (All 16 credits)	ENVS314 Biogeography and climatic change **0.5P + 0.5E; 1NS** **Credits: 8P + 8E; 16NS**	ENVS315 Soil erosion and land degradation **0.5I + 0.5E; 1SF** **Credits: 8I + 8E; 16SF**	ENVS316 GIS and RS **1G; 1NS** **Credits: 16G; 16NS**	ENVS318 Atmospheric Science **0.2I + 0.8E; 0.2SR + 0.8NS** **Credits: 3.2I + 12.8E; 3.2SR + 12.8NS**	ENVS319 Global environmental change **0.3I + 0.7E; 0.4SR + 0.6SF** **Credits: 4.8I + 11.2E; 6.4SR + 9.6SF**	ENVS322 Environmental Management **1E; 1SF** **Credits: 16E; 16SF**
	ENVS350 Geospatial data infrastructures **0.4S + 0.6G; 1NS** **Credits: 6.4S + 9.6G; 16NS**	ENVS360 Applied env. GIS and RS **0.4E + 0.6G; 0.4SR + 0.6NS** **Credits: 6.4E + 9.6G; 6.4SR + 9.6NS**	ENVS390 Research in the Environmental Sciences **1E; 0.5SR + 0.5NS** **Credits: 16E; 8SR + 8NS**	GEOG301 Tourism studies **0.2I + 0.3E + 0.5T; 0.5SR + 0.5SF** **Credits: 3.2I + 4.8E + 8T; 8SR + 8NS**	GEOG314 Land issues and rural development in SA **0.6H + 0.4I; 0.5SR + 0.5NS** **Credits: 9.6H + 6.4I; 8SR + 8NS**	GEOG330 Sustainable cities and development **0.8H + 0.2I; 0.5SR + 0.5NS** **Credits: 12.8H + 3.2I 8SR + 8NS**
Estimate of curriculum composition, every module taken as 1 unit, every unit = 16 credits **18 modules in total (288 credit**s) Human Geography (H) = 2.7 modules (43.2 credits); Physical Geography (P) = 1.3 modules (20.8 credits); Integrated/Thematic Geography (I) = 2.1 modules (33.6 credits); Environmental Science/Management (E) = 6.2 modules (99.2 credits); Spatial/Quant/Qual = 0.9 modules (14.4 credits); GIS/Cartography = 4.3 modules (68.8 credits); Tourism (T) = 0.5 modules (8 credits) Estimate of composition in terms of modules/credits: H = 15%; P = 7.2%; I = 11.7%; E = 34.4%; S = 5%; G = 23.9%; T = 2.8%						
Stand-alone versus mixed composition Stand-alone modules: 4/18; Credits: 64/288 = 22.2% Mixed modules: 14/18; Credits: 224/288 = 77.8%						
Sustainability breakdown: Sustainability focussed (SF) = 3.1 modules (41.6 credits); Sustainability related (SR) = 4.3 modules (68.8 credits); Not sustainability focused or related = 10.6 modules (177.6 credits) In terms of modules/credits: SF = 14.4%; SR = 23.9%; NS = 61.7%						

1.13 Walter Sisulu University (Walter Sisulu University 2014a, 2014b)						
Name of department	Department of Environmental Sciences, but states that it offers Geography					
Mission/vision	This department is regarded as one of the most vibrant in the Faculty of Science, Engineering and Technology. It is situated at the NMD campus (Mthatha) and offers undergraduate and postgraduate programmes in Environmental Sciences and Geography. The mission of the department is to become a centre of excellence in both teaching and research in the Environmental Science field, and aims to give young people in the Eastern Cape the hope and opportunity of aspiring to and realizing their economic and scientific dreams and job opportunities. The department also aims at equipping its graduates with entrepreneurial skills to become self-reliant after graduating. Goals of the department: ● to build the department as research centre, with well-equipped laboratories and well-qualified, competent staff, focussing on basic and applied research relevant to both the Eastern Cape and the Nation ● to achieve excellence in teaching and helping with outreach programmes where possible ● to attract well qualified, motivated staff ● to attract top of the notch students to programmes ● to produce top class students who are in the position to contribute to nation-building					
Role in MIT	The mission of the department is to become a centre of excellence in both teaching and research in the Environmental Science field.					
Disciplinary focus areas in department	Environmental Science/Studies/Management and Geography					
Degrees offered	**BSc Environmental Studies** The aim of the programme is to produce graduates that can be involved and participate in finding solutions to contemporary environmental issues. At the completion of the programme students should be able to understand, model, analyse, evaluate and solve different environmental challenges.		**Bachelor of Education (FET): Natural Sciences** With Geography as option for academic grounding in Geography as a school subject up to second year level.			
First level modules (All 16 credits)	SEM1 GEO1101 Introduction to environmental survey techniques **1G; 1NS** **Credits: 16G; 16NS**	SEM1 GEO1102 Introduction to physical environment **0.9P + 0.1E; 0.1SR + 0.9NS** **Credits: 14.4P + 1.6E; 1.6SR + 14.4NS**	SEM2 GEO1201 Introduction to environmental survey techniques **0.8G + 0.2E; 0.1SR + 0.9NS** **Credits: 12.8G + 3.2E; 1.6SR + 14.4NS**		SEM2 GEO1203 Introduction to human environment **0.6H + 0.1I + 0.2E + 0.1S; 0.3SR + 0.7NS** **Credits: 9.6H + 1.6I + 3.2E + 1.6S; 4.8SR + 11.2NS**	
Second level modules (All 16 credits)	SEM1 GEO2101 Environmental survey techniques **1S; 1NS** **Credits: 16S; 16NS**	SEM1 GEO2102 Atmosphere and terrain analysis **0.6P + 0.4E; 1NS** **Credits: 9.6P + 6.4E; 16NS**	SEM2 GEO2201 Environmental survey techniques **1S; 1NS** **Credits: 16S; 16NS**	SEM2 GEO2203 Environment and development **0.5I + 0.5E; 0.5SR + 0.5SF** **Credits: 8I + 8E; 8SR + 8SF**	SEM2 GEO2204 Soil Science **0.9E + 0.1G; 0.4SR + 0.6SF** **Credits: 14.4E + 1.6G; 6.4SR + 9.6SF**	
Third level modules (All 16 credits)	SEM1 GEO3101 GIS **1G; 1NS** **Credits: 16G; 16NS**	SEM1 GEO3102 Terrestrial resources management **0.7E + 0.3I; 1SF** **Credits: 11.2E + 4.8I; 16SF**		SEM1 GEO3103 Tourism and ecotourism **0.2H + 0.2E + 0.6T; 0.4SR + 0.6SF** **Credits: 3.2H + 3.2E + 9.6T; 6.4SR + 9.6SF**		SEM1 GEO3106 Research methodology **1S; 1NS** **Credits: 16S; 16NS**
	SEM2 GEO3201 GIS **1S; 1NS** **Credits: 16S; 16NS**	SEM2 GEO3204 Rural resources management **0.5E + 0.5I; 0.5SR + 0.5SF** **Credits: 8E + 8I; 8SR + 8SF**	SEM2 GEO3205 Social impact analysis **1E; 1SF** **Credits: 16E; 16SF**			
Estimate of curriculum composition, every module taken as 1 unit, every unit = 16 credits **16 modules in total (256 credits)** Human Geography (H) = 0.8 modules (12.8 credits); Physical Geography (P) = 1.5 modules (24 credits); Integrated/Thematic Geography (I) = 1.4 modules (22.4 credits); Environmental Science/Management (E) = 4.7 modules (75.2 credits); Spatial/Quant/Qual (S) = 4.1 modules (65.6 credits); GIS/Cartography (G) = 2.9 modules (46.4 credits); Tourism (T) = 0.6 module (9.6 credits) Estimate of composition in terms of modules/credits: H = 5%; P = 9.4%; I = 8.8%; E = 29.3%; S = 25.6%; G = 18.1%; T = 3.8%						
Stand-alone versus mixed composition Stand-alone modules: 7/16 = 43.8% Mixed modules: 9/16 = 56.2%						
Sustainability breakdown: Sustainability focussed (SF) = 4.2 modules (67.2 credits); Sustainability related (SR) = 2.3 modules (36.8 credits); Not sustainability focused or related = 9.5 modules (152 credits) In terms of modules/credits: SF = 26.3%; SR = 14.4%; NS = 59.3%						

1.14 University of Fort Hare (Society of South African Geographers 2010, 2011, 2012, 2013; University of Fort Hare 2014a, 2014b)							
Name of department	Department of Geography and Environmental Science (G & Env)						
	Department of Geographical Information Systems (GIS)						
Mission/ vision	G & Env	The department is committed to academic excellence. Its undergraduate degree programme is balanced between Physical and Human Geography, with emphasis on their integration, particularly through field studies. The postgraduate programme is strongly conceptually and deductively informed, thereby providing a rich theoretical foundation for empirical research.					
	GIS	Through our programme we: • Lay down the foundation of understanding the functionality of GIS. • Give an insight of what GIS is all about by means of workshops and practical sessions. • Explain where and how GIS is applied in our everyday life. • Use specific GIS software to analyse and manipulate spatial data from a variety of sources (Satellite images; Maps; Aerial photographs)					
Role in MIT	G & Env	Academic staff members bring strategic skills and talents to the department, including local and international academic training, professional education qualifications, multi-faceted lecturing and learning experiences, dedicated commitment to research and a drive towards social justice and community development.					
	GIS	GRS cc, a Grahamstown-based training and consulting firm, has been teaching GIS at the second and third year levels as a full BSc major credit under contract from 1999. In keeping with the multi-disciplinary nature of GIS and the wide-spread applications of GIS as a tool for decision support, students co-major in a range of other subjects, including Geology, Geography, Statistics, Mathematics, Computer Science, Chemistry, Botany, and Zoology. As from 2001 an Honours course in Applied RS and GIS has also been offered.					
Disciplinary focus areas in depart-ment	G & Env	Physical and Human Geography, with emphasis on their integration. Geography is the science that deals with the Earth and its life - the description of land, sea, air (also climate) - and the distribution of plant and animal life (including humans and industries). In other words agricultural, industrial and other forms of land use are of concern. Special attention is given to environmental management and care.					
	GIS	GIS, RS					
Degrees offered	G & Env	**BSc (Geography)** Meaningful combinations: Geography: Botany, GIS, Geology, Computer Science, Zoology, Chemistry		**BA with Geography**	**B Soc Sciences with Geography**		
	GIS	**BSc with GIS** Meaningful Combinations: Botany, Computer Science, Entomology, Geography, Geology, Physics, Statistics, Zoology					
First level modules **32 credits**	G & Env	GEG111 16 credits Geomorphology, Economic Geography and Population Geography (Introduction to Human Geographies I) **0.4H + 0.1S + 0.5P; 0.4SR + 0.6NS** **Credits: 6.4H + 1.6S + 8P; 6.4SR + 9.6NS**		GEG121 16 credits Climatology, Settlement Geography and Regional Geography (Introduction to Human Geographies II) **0.5H + 0.5P; 1NS** **Credits: 8H + 8P; 16NS**			
	GIS	---		---		Not considered	
Second level modules **48 credits**	G & Env	GEG211 24 credits Pedology, Population, Climatology, Settlement Geography, Environmental Studies **0.4H + 0.4P + 0.2E; 0.2SF + 0.1SR + 0.7NS** **Credits: 9.6H + 9.6P + 4.8E; 4.8SF + 2.4SR + 16.8NS**		GEG221 24 credits Economic Geography, Geomorphology, Statistics for Geographers, GIS and RS **0.3H + 0.2P + 0.1E + 0.4S; 0.2SR + 0.8NS** **Credits: 7.2H + 4.8P + 2.4E + 9.6S; 4.8SR + 19.2NS**			
	GIS	GIS 211 24 credits Introduction to mapwork and GIS		GIS 221 24 credits Functionality of GIS		Not considered	
Third level modules **64 credits**	G & Env	GEG312 16 credits Economic Geography and geographical research **0.5H + 0.5S; 0.4SR + 0.6NS** **Credits:** **8H + 8S; 6.4SR + 9.6NS**	GEG313 16 credits Biogeography **0.4P + 0.3I + 0.3E;** **0.6SR + 0.4NS** **Credits: 6.4P + 4.8I + 4.8E;** **9.6SR + 6.4NS**	GEG322 16 credits Geomorph. and Climatology **0.4P + 0.3I + 0.3E;** **0.6SR + 0.4NS** **Credits: 6.4P + 4.8I + 4.8E;** **9.6SR + 6.4NS**	GEG323 16 credits Settlement Geography and geographical research **0.5H + 0.25S + 0.25G; 0.4SR +0.6NS** **Credits: 8H + 4S + 4G; 6.4SR + 9.6NS**		
	GIS	GIS312 16 credits GIS database design and management	GIS313 16 credits Spatial analysis	GIS322 16 credits Introduction to RS	GIS323 16 credits GIS project management	Not considered	

8 modules in total: Estimate of curriculum composition, every module taken as 1 unit
Human Geography (H) = 2.6 modules (32.5%); Physical Geography (P) = 2.4 modules (30%); Integrated/Thematic Geography (I) = 0.6 modules (7.5%); Environmental Science/Management (E) = 0.9 modules (11.3%); Spatial/Quant/Qual (S) = 1.25 modules (15.6%); GIS/Cartography (G) = 0.25 modules (3.1%)

144 credits in total: Estimate of curriculum composition, relative to loading of modules in terms of credits
H = 47.2 credits (32.8%); P = 43.2 credits (30%); I = 9.6 credits (6.7%); E = 16.8 credits (11.6%); S = 23.2 credits (16.1%); G = 4 credits (2.8%)

Stand-alone versus mixed composition
Stand-alone modules: 0/8; Credits: 0/144 = 0%   Mixed modules: 8/8; Credits: 144/144 = 100%

Sustainability breakdown: Sustainability focused (SF) = 0.2 modules (4.8 credits); Sustainability related (SR) = 2.7 modules (45.6 credits); Not sustainability focused or related (NS) = 5.1 modules (93.6 credits)
In terms of modules: SF = 2.5%; SR = 33.8%; NS = 63.7%
In terms of credits: SF= 3.3%; SR = 31.7%; NS = 65%

1.15 Rhodes University (Society of South African Geographers 2010, 2012; Rhodes University 2014a, 2014b)					
Name of department	Department of Geography (Geog)				
	Department of Environmental Science (Env)				
Mission/ vision	Geog	Mission: To promote Geography within the Eastern Cape and Southern Africa as an integrative and relevant discipline that can play a central role in guiding and affecting environmental and development related policies.			
	Env	Vision: To lead and advance knowledge development, capacity building and communication for sustainable human-environmental systems. Mission: To ggenerate knowledge and new practices, skills and understanding of complex, dynamic human-environmental systems in Africa and the world through excellence in teaching, learning, research and community engagement.			
Role in MIT	Geog	The department aims to encourage students to be self-motivated critical thinkers and to provide them with opportunities to acquire specialist skills within a broader geographical training. They aim to deliver well-equipped graduates who can to contribute to regional and national development. The department supports staff and students wishing to engage in fundamental or applied research of an international calibre that is relevant to the needs of Africa. The department strives to maintain contacts with all tiers of government and community organisations, to assist and advise them through applied research.			
	Env	This relatively small department is dedicated to advancing inter- and trans-disciplinary science and learning aimed at understanding and managing complex human-environmental/social-ecological systems, with a focus on Africa. They take a trans-interdisciplinary, social justice approach to environmental and development challenges and improving the management and governance of social-ecological systems. They attract students and co-researchers from a variety of academic disciplines (natural and social scientists), and also work with partners outside of the university. They recognise different epistemological departure points and draw on a variety of frameworks and qualitative/quantitative research methods. They are committed to finding ways to communicate and facilitate the uptake of their research into policy and practice and place a strong emphasis on community engagement and service learning as an important pillar of higher education.			
Disciplinary focus areas in depart-ment	Geog	The department regards Geography as an integrative and relevant discipline.			
	Env	This department started in 1998 as a cross-departmental Environmental Science Programme, established to facilitate learning opportunities for students interested in environmental issues. They are interested in human-environment interactions and in the governance and sustainable management of complex social-ecological systems. They recognise that living in the 21st century is associated with a globalised and rapidly changing world, characterised by numerous interconnected environmental and social challenges.			
Degrees offered	Geog	Geography is a six-semester subject that may be taken as a major for the degrees of BSc, BA, BJourn and BSocSc.			
	Env	Environmental Science is a four-semester subject which may be taken as a major for the degrees of BSc, BEcon, BJourn and BA.			
First level modules **Equal credits**	Geog	EAR101 SEM1 Introduction to earth systems **0.7P + 0.3E; 1NS**	GOG102 SEM2 Introduction to global development **0.7H + 0.3I; 0.4SR + 0.6NS**		
	Env	----	----	Not considered	
Second level modules **Equal credits**	Geog	GOG201 SEM1 Space and place in Southern Africa 1 **0.3H + 0.3P + 0.4I; 0.4SR + 0.6NS**	GOG202 SEM2 Space and place in Southern Africa 2 **0.3H + 0.3P + 0.4I; 0.4SR + 0.6NS**		
	Env	ENV201 Foundations of Environmental Science	ENV202 Global environmental problems and policies	Not considered	
Third level modules **Equal credits**	Geog	GOG301 SEM1 Environment and development in Africa **1I; 1SR**	GOG302 SEM2 Geography in theory and practice **0.35H + 0.35P + 0.3G; 1NS**		
	Env	ENV301 Environmental monitoring and monitoring systems	ENV302 Integrated Environmental Management for sustainability	Not considered	
Estimate of curriculum composition, every module taken as 1 unit, every unit = 1 credit **6 modules in total (6 credit**s) Human Geography (H) = 1.65 modules (1.65 credits); Physical Geography (P) = 1.65 modules (1.65 credits); Integrated/Thematic Geography (I) = 2.1 modules (2.2 credits); Environmental Science/Management (E) = 0.3 modules (0.3 credits); Spatial/Quant/Qual = 0 modules (0 credits); GIS/Cartography = 0.3 modules (0.3 credits) Estimate of composition in terms of modules/credits: H = 27.5%; P = 27.5%; I = 35%; E = 5%; S = 0%; G = 5%					
Stand-alone versus mixed composition Stand-alone modules: 1/6; Credits: 1/6 = 16.7% Mixed modules: 5/6; Credits: 5/6 = 83.3%					
Sustainability breakdown: Sustainability focussed (SF) = 0 modules (0 credits); Sustainability related (SR) = 2.2 modules (2.2 credits); Not sustainability focused or related = 3.8 modules (3.8 credits) In terms of modules/credits: SF = 0%; SR = 36.7%; NS = 63.3%					

1.16 University of the Western Cape (Society of South African Geographers 2010, 2011, 2012, 2013; University of the Western Cape 2014a, 2014b)						
Name of department	Department of Geography and Environmental Studies					
Mission/vision	The vision of this department is to be the recognised training and research centre for Africa in spatial information management in order to understand and manage geographical phenomena and processes to advantage of the Southern African community. In the discipline of Geography and Environmental Studies, the relationship between humans and their environment as manifesting in earth's space and places are studied. The department's mission is therefore to provide training and do research on the phenomena/problems emanating from this interaction through three relevant thematic focuses, namely environmental studies, urban studies and development studies, a methodological focus on geographical analysis skills and practical application of computer information technology and a regional focus on Africa and South Africa.					
Role in MIT	Geography can be taken as a subject within several different degree programmes, in the Faculty of Arts and Social Sciences and the Faculty of Science Thematic focuses: Environmental studies, urban studies and development studies, geographical analysis skills and computer information technology					
Disciplinary focus areas in department	Geography, Environmental Studies, Geographical Information Technology, urban and regional analysis, disaster and risk reduction					
Degrees offered	**BA Development and environment** ***First Year*** Geo-Environmental Science 124(16), 154(16) Optional: Socio-informatics 114(12), 144(12) ***Second Year*** Geography and Environmental Studies 225(16), 265(16) Optional: Socio-informatics 224(16), 254(16), 262(8) ***Third year*** Optional: Geography and Environmental Studies 314(12), 323(12), 358(16), 363(16)	**BA Socio-informatics Option1: Information systems** ***First Year*** Socio-informatics 114(12), 144(12) Optional: Geo-Environmental Science 124(16), 154(16) ***Second Year*** Socio-informatics 224(16), 254(16), 262(8) Optional: Geography and Environmental Studies 214(16) OR 225(16) AND 265(16)	***Third year*** Socio-informatics 314(18), 334(18), 354(18), 364(18) Optional: Geography and Environmental Studies 314(12), 323(12), 358(16), 363(16)	**BA Socio-informatics Option2: Geo-informatics** ***First Year*** Socio-informatics 114(12), 144(12) Geo-Environmental Science 124(16), 154(16) ***Second Year*** Socio-informatics 224(16), 254(16) Geography and Environmental Studies 214(16) Geographical information technology 211(16), 241(16), 242(16)	***Third year*** Socio-informatics 314(18), 334(18), 354(18), 364(18) Geographical information technology 311(16), 312(16), 341(16), 342(16)	**BSc Geo-informatics** ***First Year*** Geo-Environmental Science 124(16), 154(16) ***Second Year*** Geographical information technology 211(16), 241(16), 242(16) Geography and Environmental Studies 214(16) Optional: Socio-informatics 224(16), 254(16), 262(8) ***Third year*** Geographical information technology 311(16), 312(16), 341(16), 342(16) Optional: Socio-informatics 314(18), 334(18), 354(18), 364(18)
First level modules	124 (16 credits) Introduction to human-environmental systems **0.3H + 0.3P + 0.2I + 0.1S + 0.1G; 0.4SR + 0.6NS** **Credits: 4.8H + 4.8P + 3.2I + 1.6S + 1.6G; 6.4SR + 9.6NS**		154 (16 credits) Introduction to earth systems science **0.7P + 0.1I + 0.2G; 0.1SR + 0.9NS** **Credits:11.2P + 1.6I + 3.2G; 1.6SR + 14.4NS**			
Second level modules	211 (16 credits) Earth observation **1G; 1NS** **Credits: 16G; 16NS**	214 (16 credits) GIS **1G; 1NS** **Credits: 16G; 16NS**	225 (16 credits) Urban and tourism development **1H; 1NS** **Credits: 16H; 16NS**	241 (16 credits) Spatial data management **1S; 1NS** **Credits: 16S; 16NS**	242 (16 credits) Digital photogrammetry **1G; 1NS** **Credits: 16G; 16NS**	265 (16 credits) Environmental Studies **0.4P + 0.1I + 0.3E + 0.2S; 0.6SR + 0.4NS** **Credits: 6.4P + 1.6I + 4.8E + 3.2S; 9.6SR + 6.4NS**
Third level modules	311 (16 credits) Spatial data acquisition **1S; 1NS** **Credits: 16S; 16NS**	312 (16 credits) Spatial analysis **1S; 1NS** **Credits: 16S; 16NS**	314 (12 credits) Geography of tourism **0.8H + 0.2I; 0.2SR + 0.8NS** **Credits: 12.8H + 3.2I; 3.2SR + 12.8NS**	323 (12 credits) The South African city **0.8H + 0.1I + 0.1S; 0.2SR + 0.8NS** **Credits: 12.8H + 1.6I + 1.6S; 3.2SR + 12.8NS**	341 (16 credits) Spatial modelling **1S; 1NS** **Credits: 16S; 16NS**	342 (16 credits) Earth observation **1G; 1NS** **Credits: 16G; 16NS**
	358 (16 credits) Environmental Studies **0.3P + O.3I + 0.4E; 0.7SR + 0.3NS** **Credits: 4.8P + 4.8I + 6.4E; 11.2SR + 4.8NS**		363 (16 credits) Geographic communication **0.3S + 0.7G; 1NS** **Credits: 4.8S + 11.2G; 16NS**			
16 modules total: Estimate of curriculum composition, every module taken as 1 unit Human Geography (H) = 2.9 modules (18.1%); Physical Geography (P) = 1.7 modules (10.6%); Integrated/Thematic Geography (I) = 1.0 modules (6.3%); Environmental Science/Management (E) = 0.7 modules (4.4%); Spatial/Quant/Qual (S) = 4.7 modules (29.4%); GIS/Cartography (G) = 5.0 modules (31.2%)						
256 credits in total: Estimate of curriculum composition, relative to credit loading of modules H = 46.4 credits (18.1%); P = 27.2 credits (10.6%); I = 16 credits (6.3%); E = 11.2 credits (4.4%); S = 75.2 credits (29.4%); G = 80 credits (31.2%)						
Stand-alone versus mixed composition Stand-alone modules: 9/16; Credits: 144/256 = 56.3% Mixed modules: 7/16; Credits: 112/248 = 43.7%						
Sustainability breakdown: Sustainability focused (SF) = 0 modules (0 credits); Sustainability related (SR) = 2.2 modules (35.2 credits); Not sustainability focused or related (NS) = 13.8 modules (220.8 credits) In terms of modules: SF = 0%; SR = 13.8%; NS = 86.2% In terms of credits: SF = 0%; SR = 13.8%; NS = 86.2%						

1.17 University of Stellenbosch (Society of South African Geographers 2010, 2011, 2012, 2013; University of Stellenbosch 2014a, 2014b, 2014c, 2014d, 2014e, 2014f)						
Name of Department	Department of Geography and Environmental Studies					
Mission/vision	Located in the Faculty of Arts, this department is uniquely positioned to produce critical, socially-informed research and education in post-apartheid South Africa.					
Role in MIT	This is a research led department committed to quality research and publication in areas including: Biophysical Geography; critical environmental studies; Human, Historical and Cultural Geography; Urban Geography, Planning and Architecture; Heritage; tourism planning and development; GIS; land issues; geographical names and critical geographies of development.					
Disciplinary focus areas in department	Geography, Environmental Studies, Tourism Studies: UWC's undergraduate majors in Geography and Environmental Studies and Tourism Studies and its postgraduate programmes in Geography prepare students for careers in academia, industry, government and non-profit sectors. Students are exposed to a variety of approaches across a range of exciting areas in both Human and Physical Geography and in related interdisciplinary fields. The programmes critically explore the interrelations between people, place and environment in Africa as well as in the global context.					
Degrees offered	Undergraduate programme (BA) Geography stream	Undergraduate programme (BA) Tourism stream				
First level modules						
Geography (All 15 credits)	GES111 15 credits Introductory Human Geography **0.6H + 0.1I + 0.3S; 0.1SR + 0.9NS** **Credits: 9H + 1.5I + 4.5S; 1.5SR + 13.5NS**		GES121 15 credits Introductory Physical Geography **0.8P + 0.2G; 1 NS** **12P + 3G; 15NS**			
"Environmental & Sustainability Studies" modules that can be included, hosted by various departments	ESS111 5 credits Introduction to the environment (Dept. of Geography and Env. Studies)	ESS112 5 credits Politics of the environment (Dept. of Political Studies)	ESS121 5 credits Adaptive resource management (Dept. of Biodiversity and Conservation Biology)	ESS122 5 credits Introduction to Environmental Law (Dept. of Public Law and Jurisprudence)	ESS131 5 credits Industrial ecology Dept	ESS132 5 credits Environmental and sustain-ability case study (Dept. of Geography and Env .Studies)
	NOT CONSIDERED					
Second level modules						
Geography (All 10 credits)	GES211 10 credits Catchment studies **0.8P + 0.2I; 0.1SR + 0.9NS** **Credits: 8P + 2I; 1SR + 9NS**	GES212 10 credits Global and local mobility's **0.8H + 0.2S; 1NS** **Credits: 8H + 2S; 10NS**	GES213 10 credits Maps, aerial photos and satellite imagery **1G; 1NS** **Credits: 10G; 10NS**	GES221 10 credits Critical issues in urban studies **0.6H + 0.3I + 0.1S; 0.3SR + 0.7NS** **Credits: 6H + 3I + 1S; 3SR + 7NS**		GES223 10 credits Climatology **0.8P + 0.2E; 0.2SR + 0.8NS** **Credits: 8P + 2E; 2SR + 8NS**
Tourism (All 10 credits)	TOU211 10 credits The tourism industry **0.2I + 0.8T; 0.2SR + 0.8NS** **Credits: 2I + 8T; 2SR + 8NS**	TOU212 10 credits Tourism and economic development **0.3I + 0.7T; 0.3SR + 0.7NS** **Credits: 3I + 7T; 3SR + 7NS**	TOU221 10 credits Environmental impacts of tourism **0.4I + 0.4E + 0.2T; 0.8SR + 0.2NS** **Credits: 4I + 4E + 2T; 8SR + 2NS**		TOU222 credits Socio-cultural impacts of tourism **0.4I + 0.6T; 0.4SR + 0.6NS** **4I + 6T; 4SR + 6NS**	GES222 10 credits Global population crises **1H; 0.2SR + 0.8NS** **10H; 2SR + 8NS**
"Environmental & Sustainability Studies" modules that can be included, hosted by various departments	ESS212 10 credits	ESS221 10 credits	NOT CONSIDERED Only by special permission for inclusion in BA			
Third level modules						
Geography (All 10 credits)	GES311 10 credits Contemporary environmental issues **1E; 0.6SF + 0.4SR** **Credits: 10E; 6SF + 4SR**	GES313 10 credits Sustainable rural livelihoods **0.3H + 0.7I; 0.7SF + 0.3SR** **Credits: 3H + 7I; 7SF + 3SR**	GES322 10 credits Coastal environments **0.4E + 0.6I; 0.6SR + 0.4NS** **Credits: 4E + 6I; 6SR + 4NS**	GES321 10 credits Problematising the city in Africa **0.7H + 0.3S; 1NS** **Credits: 7H + 3S; 10NS**	GES323 10 credits GIS **1G; 1NS** **Credits: 10G; 10NS**	GES328 10 credits Political Geography of land **1H; 0.2SR + 0.8NS** **Credits: 10H; 2SR + 8NS**
Tourism (All 10 credits)	TOU311 10 credits Tourism planning **0.2I + 0.8T; 0.2SR + 0.8NS** **Credits: 2I + 8T; 2SR + 8NS**	TOU322 10 credits Analytical techniques for tourism **0.3S + 0.3G + 0.4T; 1NS** **Credits: 3S + 3G + 4T; 10NS**	TOU341 10 credits Debates and issues in tourism **0.2I + 0.8T; 0.2SR + 0.8NS** **Credits: 2I + 8T; 2SR + 8NS**	TOU321 10 credits Tourism marketing **1T; 1NS** **Credits: 10T; 10NS**		
"Environmental & Sustainability Studies" modules that can be included, hosted by various departments	ESS311 15 credits Youth development and environmental citizenship (Dept. of Biodiversity and Conservation Biology)	NOT CONSIDERED Only by special permission for inclusion in BA				
22 modules in total: Estimate of curriculum composition, every module taken as 1 unit Human Geography (H) = 5 modules (22.7%); Physical Geography (P) = 2.4 modules (10.9%); Integrated/Thematic Geography (I) = 3.6 modules (16.4%); Environmental Science/Management (E) = 2 modules (9.1%); Spatial/Quant/Qual (S) = 1.2 modules (5.4%); GIS/Cartography (G) = 2.5 modules (11.4%); Tourism (T) = 5.3 (24.1%)						
230 credits in total: Estimate of curriculum composition, relative to credit loading of modules H = 53 credits (23%); P = 28 credits (12.2%); I = 36.5 credits (15.9%); E = 20 credits (8.7%); S = 13.5 credits (5.9%); G = 26 credits (11.3%); T = 53 credits (23%)						
Stand-alone versus mixed composition Stand-alone modules: 4/22; Credits: 40/230 = 17.4% Mixed modules: 18/22; Credits: 190/230 = 82.6%						
Sustainability breakdown: Sustainability focused (SF) = 1.3 modules (13 credits); Sustainability related (SR) = 4.5 modules (45.5 credits); Not sustainability focused or related (NS) = 16.2 modules (171.5 credits) In terms of modules: SF = 5.9%; SR = 20.5%; NS = 73.6% In terms of credits: SF= 5.6%; SR = 19.8%; NS = 74.6%						

1.18 University of Cape Town (Society of South African Geographers 2010, 2011, 2012, 2013; University of Cape Town 2014a, 2014b, 2014c)						
Name of department	Department of Environmental and Geographical Sciences					
Mission/vision	The department is committed to improving knowledge, understanding and management of the interactions between humans and their social, biological and physical life-support systems, with the aim to enhance or encourage the values conducive to the sustainability of these systems in the future.					
Role in MIT	Environmental and Geographical Science at UCT is an interdisciplinary major with focus on human-environment relations. It is an applied discipline with a focus on a range of skills associated with both the natural and social sciences. The student is offered a sound theoretical and practical training in subjects that foster an integrated approach to the study of the complex relationship between society and the environment. It gives students a unique view of both natural and social science aspects of the relationship between people and the environment and, in so doing, helps develop a wide range of skills. Owing to its highly multi-disciplinary nature, students become broadly informed about the world around them, both in terms of formative processes and analytical perspectives. To understand such social organization and social practices and the environmental consequences of these requires the theoretical interpretations of such disciplines as economics, sociology, political studies, anthropology, archaeology, history, psychology and law. Students in the Humanities can therefore find a very comfortable and relevant intellectual ‘home’ in Environmental and Geographical Science.					
Disciplinary focus areas in department	Environmental and Geographical Science at UCT is founded on the following three fundamental academic teaching and research nodes: 1. Human Geography (including Urban and Development Studies) 2. Sustainability Science and Environmental Management 3. Physical Geography (including Climate Change Science, RS and Quaternary Studies)					
Degrees offered	The department offers a number of degrees for students registered in either the Faculties of Science or Humanities.	Major in Environmental and Geographical Science as part of the BSc degree.	Major in Environmental and Geographical Science as part of the BA degree.			
First level modules (18 credits each)	GEO1009F/AGE1004H/EGS1004S Introduction to Earth and Environmental Sciences **0.8P + 0.2E; 0.1SR + 0.9NS** **Credits: 14.4P + 3.6E; 1.8SR + 16.2NS**		EGS1003S Geography, development and environment **0.5H + 0.3I + 0.2S; 1SR** **Credits: 9H + 5.4I + 3.6S; 18SR**			
Second level modules (24 credits each)	EGS2013F The physical environment **0.5P + 0.3I + 0.1S + 0.1G; 0.5SR + 0.5NS** **Credits: 12P + 7.2I + 2.4S + 2.4G; 12SR + 12NS**		EGS 2014S Contemporary urban challenges in the South African city **0.8H + 0.2I; 0.4SR + 0.6NS** **Credits: 19.2H + 4.8I; 9.6SR + 14.4NS**			
Third level modules (36 credits each)	EGS3012S Atmospheric Science **1P; 1NS** **Credits: 36P; 36NS**	EGS 3020F Environmental change and challenge **0.3P + 0.4I + 0.3E; 0.35SF + 0.35SR + 0.3NS** **Credits: 10.8P + 14.4I + 10.8E; 12.6SF + 12.6SR + 10.8NS**		EGS 3021F Sustainability and the environment **0.6I + 0.4E; 1SF** **Credits: 21.6I + 14.4E; 36SF**		EGS 3012S Geographic thought **0.9H + 0.1S; 1NS** **32.4H + 3.6S; 36NS**
8 modules total: Estimate of curriculum composition, every module taken as 1 unit Human Geography (H) = 2.2 modules (27.5%); Physical Geography (P) = 2.6 modules (32.5%); Integrated/Thematic Geography (I) = 1.8 modules (22.5%); Environmental Science/Management (E) = 0.9 modules (11.25%); Spatial/Quant/Qual (S) = 0.4 modules (5%); GIS/Cartography (G) = 0.1 modules (1.3%)						
228 credits in total: Estimate of curriculum composition, relative to credit loading of modules H = 60.6 credits (26.6%); P = 73.2 credits (32.1%); I = 53.4 credits (23.4%); E = 28.8 credits (12.6%); S = 9.6 credits (4.2%); G = 2.4 credits (1.1%)						
Stand-alone versus mixed composition Stand-alone modules: 1/8; Credits: 36/228 = 15.8% Mixed modules: 7/8; Credits: 192/228 = 84.2%						
Sustainability breakdown: Sustainability focused (SF) = 1.35 modules (48.6 credits); Sustainability related (SR) = 2.35 modules (54 credits); Not sustainability focused or related (NS) = 4.3 modules (125.4 credits) In terms of modules: SF = 16.9%; SR = 29.4%; NS = 53.7% In terms of credits: SF= 21.3%; SR = 23.7%; NS = 55%						
Overall rating by researcher: Spatial/Quant/Qual focus = 1/5; Geo-information science focus = 0.5/5; Human-environment focus within sub-disciplines = 5/5; Human-environment focus within themes= 2.5/5; Exploration of linkages with environment-related and other sciences = 1/5; Sustainability coverage = 3/5; Merging of dominant identities associated with Geography: Method A = 1/5, approaching 1.5; Method B = 0.5/5						

1.19 Nelson Mandela Metropolitan University
(Society of South African Geographers 2011, 2012, 2013; Nelson Mandela Metropolitan University 2014a, 2014b)

Name of department	Geography Cluster, Department of Geosciences
Mission/vision	**Vision:** To generate and impart geological and geographical knowledge that is relevant and responsive to local, national and global sustainable development needs through the creation of environmental and spatial awareness. **Mission:** The Department strives to develop an atmosphere in which its vision is attainable; through excellence in teaching and research.
Role in MIT	Geographical research in the department focus on Land Degradation, particularly soil erosion, vegetation change and invasions, and implications for climatic change; urban agriculture and sustainable development issues in urban environments. GIS and RS are commonly used as tools in many of the research projects undertaken. Geographical research in the department focus on political, urban and physical geography (including GIS and RS).
Disciplinary focus areas in department	Geology and Geography The Geology courses offered cover basic topics such as structural geology, palaeontology, mineralogy, sedimentary geology, igneous petrology, stratigraphy, plate tectonics and metamorphism, and the nature and origin of economically important mineral deposits. Geographical research in the department focus on land degradation, particularly soil erosion, vegetation change and invasions, and implications for climatic change; urban agriculture and sustainable development issues in urban environments. GIS and RS are commonly used as tools in many of the research projects undertaken. Geology research in the department focuses on the structural geology of the Cape Fold Belt in the Eastern Cape, and the sedimentary geology of the Cape Super Group, Karoo Sequence, and Uitenhage Group. Geography research in the department focuses on political, urban and physical geography (including GIS and RS).

Degrees offered	**BSc Environmental Sciences**	**BSc (Geography)**	**BSc Geosciences (Geography and Geology)**		**BA Social Sciences and Humanities, with Geography as a major**	
First level modules (31 credits for level)	GEO111 Term: 1 Credits: 7 Introduction to Economic and Settlement Geography **0.7H + 0.3S; 1NS** **Credits: 4.9H + 2.1S; 7NS**	GEN101 Term: 2 Credits: 8 Introduction to Meteorology and Climatology **0.7P + 0.3I; 0.3SR + 0.7NS** **Credits: 5.6P + 2.4I; 2.4SR + 5.6NS**		GEN102 Term: 3 Credits: 8 Introduction to Geomorphology **0.8P + 0.2S; 1NS** **Credits: 6.4P + 1.6S; 8NS**	GIS101 Term: 4 Credits: 8 Introduction to GIS and Cartography **1G; 1NS** **Credits: 8G; 8NS**	
Second level modules (40 credits for level)	GEN211 Term: 1 Credits: 10 Pedo-Geomorphological studies **0.6P + 0.4E; 1NS** **Credits: 6P + 4E; 10NS**	GEO212 Term: 2 Credits: 10 Economic and Development Geography **0.8H + 0.2S; 0.1SR + 0.9NS** **Credits: 8H + 2S; 1SR + 9NS**	GIS211 Term: 3 Credits: 10 Introduction to Cartography and GIS **1G; 1NS** **Credits: 10G; 10NS**	GEN212 Term: 4 Credits: 10 Society and environment **0.7I + 0.3E; 1SF** **Credits: 7I + 3E; 10SF**		
Third level modules (75 credits for level)	GIS301 Term: 1 Credits: 15: GIS **1G; 1NS** **Credits: 15G; 15NS**	GEN301 Term: 2 Credits: 15 Geomorphology **0.2S + 0.8G; 1NS** **Credits: 3S + 12G; 15NS**	GIS304 Term: 3 Credits: 15 Photogrammetry and RS **1G; 1NS** **Credits: 15G; 15NS**	GEN313 Term: 4 Credits: 15 Environmental resource management **1E; 1SF** **Credits: 15E; 15SF**	GEO302 Term: 2 Credits: 15 Urban Social Geography **0.6H + 0.2I + 0.2S; 0.2SF + 0.8NS** **Credits: 9H + 3I + 3S; 3SF + 12NS**	

13 modules total: Estimate of curriculum composition, every module taken as 1 unit
Human Geography (H) = 2.1 modules (16.2%); Physical Geography (P) = 2.1 modules (16.2%); Integrated/Thematic Geography (I) = 1.2 modules (9.2%); Environmental Science/Management (E) = 1.7 modules (13.1%); Spatial/Quant/Qual (S) = 1.1 modules (8.5%); GIS/Cartography (G) = 4.8 modules (36.8%)

146 credits in total: Estimate of curriculum composition, relative to credit loading of modules
H = 21.9 credits (15%); P = 18 credits (12.4%); I = 12.4 credits (8.5%); E = 22 credits (15.1%); S = 11.7 credits (8%); G = 60 credits (41%)

Stand-alone versus mixed composition
Stand-alone modules: 4/13; Credits: 55/146 = 37.7% Mixed modules: 9/13; Credits: 91/146 = 62.3%

Sustainability breakdown: Sustainability focused (SF) = 2.2 modules (28 credits); Sustainability related (SR) = 0.4 modules (3.4 credits); Not sustainability focused or related (NS) = 10.4 modules (114.6 credits)
In terms of modules: SF = 16.9%; SR = 3.1%; NS = 80%
In terms of credits: SF= 19.2%; SR = 2.4%; NS = 78.4%

1.20 References used to undertake the curriculum assessment

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Annexure 2: Invitation to participate, instructions and questionnaire sent to Geography departments

To:
....
HoD: Department of …………………………….
……………………………………….

From:
Mr RW Pretorius
Department of Geography
Calabash 0-035
Science Campus
University of South Africa
pretorw@unisa.ac.za
084 727 5022

xx March/April 2015

Request to participate in the data gathering process for PhD

I am a staff member of the Department of Geography at the University of South Africa (Unisa) and registered for a PhD in Geography at the same institution. The title of my thesis is: *Repositioning Geography in Education for Sustainability: The South African Higher Education context.*

The research problem I am addressing is that although Geography is well placed to contribute to acquisition of the skills required in the 21st century, the discipline seems to be markedly absent in Education for Sustainability (EfS) and associated discourses. This research therefore aims to suggest a suitable approach (or approaches) according to which undergraduate Geography in South Africa will be able to strengthen its position in EfS.

The supervisor for this research is Prof UJ Fairhurst. Her contact details are as follows: joanfair@global.co.za; 082 371 2656; 011 783 4051

The co-supervisor for this research is Prof MD Nicolau. Her contact details are as follows: nicolmd@unisa.ac.za; 082 695 7551; 011 471 2084

The Unisa ethical clearance reference number for this research is 2013/CAES/143.

An important element of the research process comprises an exploratory enquiry of the undergraduate curriculum offered by each of the 17 Departments of Geography in South Africa. Associated with this, an information sheet has been compiled for each department, which includes estimates of the relative contribution of various elements towards their undergraduate curriculum.

I hereby kindly request the cooperation of your department with the data gathering process for this research in the following way:

- verification of the details for your department in the accompanying information sheet
- feedback on the provided estimates of the elements contributing towards the undergraduate curriculum of your department
- providing a collated response on the attached questionnaire dealing with the relationship between teaching and learning of Geography and EfS in your department

I realize the time involved in dealing with this request and will therefore really appreciate your cooperation. Your time investment will hopefully be rewarded with the positive spinoffs of this research in terms of a better alignment of Geography with EfS.

Please do not hesitate to contact me should you have any questions or want to clarify any matters relating to this research.

Rudi W Pretorius
Unisa student number: 5384966

Annexure 2.1: Background of the research

Research problem and aim

Although Geography is considered to be an ideal discipline for the advancement and promulgation of the notion of sustainability, the literature indicates that the discipline seems to be markedly under-represented in Education for Sustainability (EfS) and associated discourses. This research investigates this issue in the South African context and aims to suggest a suitable approach (or approaches) according to which undergraduate tertiary Geography would be able to strengthen its position in EfS.

View of sustainability and EfS

Although it is acknowledged that various definitions of "sustainability" exist, this research subscribes to the interdisciplinary nature of sustainability, focussing on interaction between people (their well-being, culture, the economy etc.) and their physical environment (including resources), while seeking to balance environmental, economic and social concerns without compromising any of these aspects (Liu 2011:246). New approaches to education and capacity building are the foundation for responding to the sustainability challenges of the 21st century, and are closely related to environmental change (O'Brien et al 2013:51). EfS is associated with this and aims to align the principles, values and practices of sustainability with teaching and learning in order to encourage changes in behaviour that will either create or lead to greater sustainability (Bonney 2012:7-9).

Research objectives

The objectives of this research are as follows:

- to conduct an exploratory enquiry on the composition of undergraduate Geography curricula in South Africa
- to gauge and critically reflect on different manifestations of sustainability and EfS in undergraduate Geography in South Africa
- to critically examine the different approaches to EfS in undergraduate Geography in South Africa, referring to the main identities of and recent trends in the discipline
- to suggest and motivate a suitable academic position for strengthening the role of undergraduate Geography in South Africa in EfS
- to map the implications of this suggested position in terms of teaching and learning in undergraduate Geography in South Africa.

Value of the research

The value of this research lies in the exploration of the border territory between EfS and the discipline of Geography. Undergraduate Geography could gain significantly from the infusion of new developments in EfS. Similarly, the teaching and learning sciences could benefit from the experience gained with the implementation of the transformative teaching and learning approaches associated with EfS in Geography.

Annexure 2.2: Guide to the information sheet compiled for the department

Abbreviations used

H: Human Geography
P: Physical Geography
I: Integrated/thematic Geography (a blend of Human and Physical Geography)
E: Environmental Science/Management
S: Spatial Science and/or quantitative/qualitative analysis
G: GIS/RS/Cartography
T: Tourism (if applicable)
M: Meteorology (if applicable)
SF: Sustainability focused
SR: Sustainability related
NS: Not sustainability focused or related

Elements of a typical estimate of the composition of a module

GEOG302 15 credits Sem 2	Informative: Module code and credits (only supplied of modules carry different credit weights)
Environment and resource planning and management	Informative: Module title
0.5E + 0.5I; 1SF	Composition estimate, module regarded as 1 unit, irrespective of credit weighting Interpretation of this example: 50% (or 0.5 of 1) of module is estimated to align with Environmental Science/Management and 50% (or 0.5 of 1) with Integrated/Thematic Geography Following the semicolon, 1SF means the whole module can be regarded as sustainability focused. If 50% of the module was sustainability focused and the other 50% not sustainability focused or related, it would have been indicated as follows: 0.5SF + 0.5NS
Credits: 7.5E + 7.5I; 15SF	This line has been added for departments with varying credit weighting between modules. Since the module in the example carries 15 weights, with its composition estimate 0.5E + 0.5I; 1SF, this can be expressed as follows in terms of credits: 7.5E + 7.5I; 15SF

Function of the cells at the bottom of the information sheet

In these cells the composition estimates for each of the undergraduate modules in the department are added up, in order to provide a grouped estimation of the contribution towards P, H, I, E, S, G, T (if applicable), M (if applicable), SF, SR and NS. If all the modules carry the same credit weighting, this process is straightforward. In the case where the credit weighting between 999modules differ, a conversion to take this into account, has to be applied.

Annexure 2.3: Instructions for completion of the questionnaire

This research requires the participation of a small group of staff members from …………………………………………….... to provide a collated response to the accompanying questionnaire.

The purpose of the questionnaire is to obtain the opinions of a selected group of staff members who have reflected on the relationship between EfS and the teaching and learning of Geography at undergraduate level in this department.

A group response is required, and therefore not a response per individual. There are no specific right or wrong answers as the honest opinions of the group of staff members are sought.

When setting up the group, the following criteria for representativeness should be followed as far as possible: Seniority, NQF level/s of teaching in which participants are involved, field/s of expertise/specialisation, age, race and gender. In order to gauge the validity of results, a summary of participants in terms of these criteria need to be provided.

Each participant has to complete a separate consent form, and all the consent forms have to be sent back to the researcher together with the collated response to the questionnaire.

The responses to the questions can be recorded in this document, or else a separate Word document can be created, numbering the responses according to the allocated numbers in the questionnaire.

The questions are arranged in the following seven categories:
- Nature of your undergraduate curriculum (Q1, 2 & 3)
- Inclusion of sustainability aspects in your curriculum (Q4, 5, 6 & 7)
- Dealing with the global environmental crisis in your curriculum (Q8, 9 & 10)
- Purpose of your curriculum and accommodation of EfS (Q11, 12 & 13)
- Practicalities concerning EfS in your curriculum (Q14, 15 & 16)
- A role for EfS in the context of your curriculum (Q17, 18 & 19)
- Concluding question (Q20)

To focus your responses, a brief introductory paragraph has been included as background for each of the categories.

Annexure 2.4: Questionnaire

Nature of your undergraduate curriculum

Background: As discipline, Geography has many interpretations, leading to attempts to classify it and to reflect on its purpose. Although Geography is perceived to bridge the human and physical sciences, this has not always been regarded as an asset. The broadness of Geography curricula has been both scorned and celebrated, resulting in creation of hierarchies of geographic method (physical vs. human, spatial vs. environmental, for example). But the core traditions seem to have remained: spatial analysis, area studies, people/land relationships and earth science. (Bonney 2012:11-14)

Question 1
Please rate the disciplinary approaches/trends as listed in the table below in terms of the strength of their influence on the nature of your undergraduate curriculum (Scaling factors: 1 = very weak influence, 2 = weak influence, 3 = moderate influence, 4 = strong influence, 5 = very strong influence).

Disciplinary approaches/trends influencing the nature of your undergraduate curriculum	Strength of influence (1-5, 1 = very weak, ..., 5 = very strong				
	1	2	3	4	5
1.1Focus on Spatial Science and/or quantitative/ qualitative analysis					
1.2 Geo-information science focus					
1.3 Human-environment focus, mainly within sub-disciplines					
1.4 Human-environment focus, mainly within themes					
1.5 Exploration of linkages with environment-related and other sciences					
1.6 Sustainability as theme					
1.7 Merging of dominant identities associated with Geography					

Question 2
Give a brief motivation for strength of the influence that you indicated in the previous question for each of the disciplinary approaches/trends possibly determining the nature of your undergraduate curriculum.

Motivation, choice for 1.1:
Motivation, choice for 1.2:
Motivation, choice for 1.3:
Motivation, choice for 1.4:

Motivation, choice for 1.5:
Motivation, choice for 1.6:
Motivation, choice for 1.7:

Question 3
Please rate the extent to which your undergraduate curriculum incorporates each of the basic perspectives from which reality can be viewed as listed in the table below (Scaling factors: 1 = to a very small extent, 2 = to a small extent, 3 = to a moderate extent, 4 = to a large extent, 5 = to a very large extent).

Basic perspectives from which reality can be viewed (Haigh 2013:175-176)	Extent of incorporation in curriculum (1-5, 1 = to a very small extent, ..., 5 = to a very large extent)				
	1	2	3	4	5
3.1 Focus on subjectivity, the inward view of the self, through the thoughts, beliefs, feelings, emotions and values of the individual: the individual interior					
3.2 Focus on inter-subjectivity, the realm of cultural presumptions, based on the beliefs, values and culture of the collective: the social interior					
3.3 Focus on the behavioural exterior, with objectivity based on the empirical manifestation of phenomena					
3.4 Focus on social and physical exteriors, with inter-objectivity based on externally observable structures/systems					

Inclusion of sustainability aspects in your curriculum

Background: The international literature suggests that although Geography and sustainability ought to connect well, sufficient research based evidence concerning Geography-led EfS is lacking. (Liu 2012:249-256)

Question 4
What is the perspective of your department on sustainability and its incorporation in your undergraduate curriculum?

Question 5
Give examples, if any, of the incorporation of sustainability in your undergraduate curriculum.

Question 6
Is your department involved with any undergraduate sustainability focused/related degree programmes? If so, provide the details of such programmes and explain the nature of your involvement.

Question 7

Please rate the importance that you attach (or would attach) to inclusion of the perspectives listed in the table below when dealing with sustainability in your undergraduate curriculum (Scaling factors: 1 = very low importance, 2 = low importance, 3 = moderate importance, 4 = high importance, 5 = very high importance).

Perspectives that can be taken on dealing with sustainability (Brown 2005:9-25)	Importance attached to inclusion in curriculum (1-5, 1 = very low importance, ..., 5 = very high importance)				
	1	2	3	4	5
7.1 Mindfulness of the role of the individual experience, subjectivity and consciousness in sustainability initiatives					
7.2 Mindfulness of individual behaviours significantly contributing to, or working against sustainability initiatives					
7.3 Understanding of and respect for cultural nuances and how these relate to the success/ failure of sustainability initiatives					
7.4 Incorporation of and openness to the functional fit of systems and subsystems (nature, society and groups) and how these operate together to create the totality of our life worlds					

Dealing with the global environmental crisis in your curriculum

<u>Background:</u>

There is agreement that 21st century global environmental change holds huge challenges in terms of science and policy, requiring more than existing frameworks, approaches and methods. In this regard two challenges seem to be highly relevant: the integration of the social and the natural sciences and the production of knowledge that is relevant to society. (O'Brien 2010:587-588)

Question 8

Provide examples (for example in terms of content/assessment/pedagogy) of how your undergraduate curriculum engages students with the perceived 21st century challenges associated with global environmental change.

Question 9

How is the aspect of responding to the challenges posed by global environmental change (in terms of reacting to it or doing something about it) addressed in your undergraduate curriculum?

Question 10
Please rate the extent to which each of the value-based environmental perspectives as listed in the following table, influence the way in which your undergraduate curriculum engages students with the global environmental crisis (Scaling factors: 1 = to a very small extent, 2 = to a small extent, 3 = to a moderate extent, 4 = to a large extent, 5 = to a very large extent).

Value-based environmental perspectives - based on the eight 'ecological selves' identified by Esbjörn-Hargens (2005:22-30) in terms of Integral Theory	Extent of influence on how curriculum engages students with the global environmental crisis (1-5: 1 = to a very small extent, ..., 5 = to a very large extent)				
	1	2	3	4	5
10.1 *Eco-guardian* (romantic ethos), focus on a return to the lost ecological paradise, emphasis on unseen forces and ancestral ways.					
10.2 *Eco warrior* (heroic ethos), focus on assertion of the self over systems and nature, emphasis on obtaining power and not being constrained.					
10.3 *Eco-manager* (stewardship ethos), focus on maintaining order and adhering to laws, with a sense of duty to do what is right so that the future will hold nature's bounty.					
10.4 *Eco-strategist* (rational ethos), focus on desire to make things better and to accomplish this through competition, often by using technology to enhance living standards.					
10.5 *Eco-radical* (equality ethos), focus on the liberation of all humans and animals from greed and domination, with sharing of resources and promotion of community and unity.					
10.6 *Eco-holist* (holistic ethos), focus on overlapping dynamic systems, while simultaneous acknowledgement of conflicting truths and honouring the value of all perspectives.					

Value-based environmental perspectives - based on the eight 'ecological selves' identified by Esbjörn-Hargens (2005:22-30) in terms of Integral Theory	Extent of influence on how curriculum engages students with the global environmental crisis (1-5: 1 = to a very small extent, ..., 5 = to a very large extent)				
10.7 *Integral ecologist* (inclusive ethos), focus on the self as part of a conscious whole, while emphasising meta-theories and multidimensionality to deal with complexity.					
10.8 *Eco-sage* (unity ethos), focus on unity with nature and subtle ways of connecting with the natural realm.					

Overall aim of your curriculum and accommodation of EfS

<u>Background:</u> The unique contribution of Geography in terms of sustainability studies may be defined in terms of a continuation of Geography's human-environment position, but with a new goal in mind. (Bennett 2013:109-110; Grinsted 2013)

Question 11
What is the overall aim of your undergraduate curriculum and in which way is this linked to the empowerment of students to deal with the sustainability challenges posed by 21st century global environmental change?

Question 12
With reference to the approach/es been followed and aspects been emphasized in your undergraduate curriculum, what is the potential to contribute to the improvement of student's insight regarding sustainability – and if negative, what are the reasons suppressing such potential?

Question 13
Please rate the extent to which the modes of interacting and ways of knowing the world, as listed in the table below, feature in support of achieving the overall aim of your undergraduate curriculum (Scaling factors: 1 = to a very small extent, 2 = to a small extent, 3 = to a moderate extent, 4 = to a large extent, 5 = to a very large extent).

Modes of interacting and ways of knowing the world in teaching/learning contexts, as identified by Esbjörn-Hargens (2007:8-11) in terms of Integral Theory	Extent of inclusion in support of achieving the overall aim of the undergraduate curriculum (1-5: 1 = to a very small extent, ..., 5 = to a very large extent)				
	1	2	3	4	5
13.1 Contemplative enquiry					
13.2 Critical reflection					

13.3 Somatic/embodied (to an extent experiential) knowing					
13.4 Skillful action					
13.5 Practical application					
13.6 Active observation					
13.7 Connective encounters					
13.8 Perspectival embrace					
13.9 Ethical participation					
13.10 Scaled dynamism					
13.11 Sustainability in a holistic sense					
13.12 Ecological flourishing					

Practicalities concerning EfS in your curriculum

Background: Although the human-environment tradition of Geography offers a baseline for sustainability studies, this does not exclude inclusion of spatial studies, with many authors emphasising the need to be able to use spatial tools in sustainability problem-solving. (Bonney 2012:15; Grinsted 2013)

Question 14
What are your views on the most suitable/relevant pedagogies for teaching and learning Geography at undergraduate level in your department and in which way are or would these pedagogies support EfS?

Question 15
What are your ideas on the challenges associated with the required multi-inter-trans-disciplinary linkages in terms of EfS? How is this aspect currently taken into account in undergraduate Geography in your department or how do you think can it be accommodated in future?

Question 16
Concerning undergraduate Geography in your department, how and to what extent are you addressing the transformative goal of EfS, which is to empower individuals to change their frames of reference or worldviews? How important do you think it is to pay attention to this aspect?

A role for EfS in the context of your curriculum

Background: Given the long-standing division between Physical and Human Geography, associated with a division between positivist and critical Geography and a lack of intra-disciplinary dialogue, the challenge to EfS is to bridge this divide in terms of relevant teaching and learning endeavours without sacrificing scientific rigour, thus pointing the way towards a more integrated and geographical understanding of sustainability. (Bennett 2013:108-109)

Question 17
Explain briefly what aspects of EfS are or would firstly be supportive of and/or secondly in opposition to the current approach in your undergraduate curriculum.

Question 18
Linked to Question 17, what do you think of the suitability of EfS as approach in your undergraduate curriculum, whether already incorporated, considering to do it or not thinking about it?

Question 19
Why would it be difficult (or easy) to incorporate EfS in undergraduate Geography in your department, or, if it is already incorporated, share your successes and challenges.

Question 20
In the light of your response to the questionnaire as a whole, provide reasons why you think the (potential) contribution by Geography does not feature very prominently in literature reporting on EfS, and if and how this underperformance needs to be addressed.

References underpinning the formulation of the questionnaire

Bennett, D.E., 2013. Geography and the emergence of Sustainability Science: Missed opportunities and enduring possibilities. *The Geographical Bulletin*, 54, 99-112.

Bonney, M.J., 2012. *An empirical analysis of the role of Geography in sustainability education*. Thesis (MSc). Southern Illinois University.

Brown, B.C., 2005. Theory and practice of integral sustainable development. Part 1 Quadrants and the practitioner. *AQAL*, 1 (2), 1-36.

Esbjörn-Hargens, S., 2005. Integral ecology: The what, who, and how of environmental phenomena. *World futures: The Journal of New Paradigm Research*, 61 (1-2), 5-49.

Esbjörn-Hargens, S. and Foucaultii, M., 2007. Integral teacher, integral students, integral classroom: Applying integral theory to education. AQAL: Journal of Integral Theory and Practice, 2 (2), 1-42.

Grinsted, T.S., 2013. From the human-environment theme towards sustainability - Danish Geography and Education for Sustainable Development. *European Journal of Geography*, 4(3), 6-20 October 2013.

Haigh, M., 2013. AQAL Integral: a holistic framework for pedagogic research. *Journal of Geography in Higher Education*, 37 (2), 174-191.

Liu, L., 2011. Where in the world of sustainability education is US Geography? *Journal of Geography in Higher Education*, 35 (2), 245-263.

O'Brien, K., 2010. Responding to environmental change: A new age for Human Geography? *Progress in Human Geography*, 35 (4), 542-549.

O'Brien, K., Reams, J., Caspari, A., Dugmore, A., Faghihimani, M., Fazey, J., Hackmann, H., Manuel-Navarrete, D., Marks, J., Miller, R., Raivio, K., Romero-Lankao, P., Virj, H., Vogel, C. and Winiwarter, V., 2013. You say you want a revolution? Transforming education and capacity building in response to global change. *Environmental Science and Policy*, 28, 48-59.

Turner, B.L., 2002. Contested identities: Human-Environment Geography and disciplinary implications in a restructuring academy. *Annals of the Association of American Geographers*, 92 (1), 52-74.

Annexure 2.5: Consent form for questionnaire

CONSENT FORM

TITLE OF RESEARCH PROJECT: Repositioning Geography in Education for Sustainability - The South African Higher Education context

Dear Dr/Prof/Mr/Mrs/Miss/Ms ____

Department of ____

Date: ....… / ......… / 20.......

AIM AND OBJECTIVES OF THE STUDY

Aim: This research aims to suggest a suitable approach (or approaches) according to which undergraduate tertiary Geography in the South African context would be able to strengthen its position in Education for Sustainability (EfS). Such an approach (or approaches) should make provision to prepare students in an integrated way to face the challenges posed by the changing worlds of work and everyday living, as well as acquiring the skills that are required to earn a living in the twenty-first century.

Objectives:

- to conduct an exploratory enquiry on the composition of undergraduate Geography curricula in South Africa
- to gauge and critically reflect on different manifestations of sustainability and EfS in undergraduate Geography in South Africa
- to critically examine the different approaches to EfS in undergraduate Geography in South Africa, referring to the main identities of and recent trends in the discipline
- to suggest and motivate a suitable academic position for strengthening the role of undergraduate Geography in South Africa in EfS
- to map the implications of this suggested position in terms of teaching and learning in undergraduate Geography in South Africa.

RESEARCH PROCESS

- This study requires participation of a small group of staff members from this department to provide a collated response to the accompanying questionnaire.
- The purpose of the questionnaire is to obtain the reflection of the selected group of staff members on the relationship between EfS and teaching and learning of Geography at undergraduate level in this department.
- A group response is required, and therefore not a response per individual.
- There are no specific right or wrong answers, the honest reflection of the group of staff members is required.
- When setting up the group of staff members, the following criteria regarding representativeness need to taken into account as far as possible: Seniority, NQF level/s of teaching in which paticipant are involved, field/s of expertise/specialisation, age, race and gender, gender.
- In order to gauge the validity of results, a summary of participants in terms of the latter representativeness criteria, need to be provided.

CONFIDENTIALITY

Results will be reported in formats making it impossible to link it to specific individuals.

WITHDRAWAL CLAUSE

Participants are welcome to withdraw at any stage of the process and they do not need to respond to any of the questions or participate in any discussions they do not feel comfortable with**.**

POTENTIAL BENEFITS OF THE STUDY

The value of this study lies in its exploration of the border territory between EfS and Geography. Undergraduate Geography could gain significantly from the infusion of new developments in EfS. This can enrich the learning experience of Geography students, thus not only preparing them for the worlds of work and everyday living, but also delivering a new breed of motivated Geography academics and researchers, from which the discipline can benefit at large. Similarly the teaching and learning sciences could benefit from the examples and practical experience provided by the development, implementation and evaluation of the transformative teaching and learning approaches associated with EfS.

USAGE OF DATA

The data being collected will be used for the purpose of writing a PhD thesis as well as compilation of publications and presentations following from it in future.

CONTACT INFORMATION

Student: Rudi Pretorius, Department of Geography, Unisa Science Campus, Florida
pretorw@unisa.ac.za; 084 727 5022; 011 4713680
Supervisor: Prof UJ Fairhurst, Department of Geography, Unisa Science Campus, Florida
joanfair@global.co.za; 082 3712656; 011 783 4051
Co-Supervisor: Prof MD Nicolau, Department of Geography, Unisa Science Campus, Florida
nicolmd@unisa.ac.za; 082 695 7551; 011 47/1 2084

CONSENT

I, the undersigned, ………………………………………………………..… (full name and surname) from the Department of ....have read the above information relating to the project and declare that I understand it. I have been afforded the opportunity to discuss relevant aspects of the project with the project leader, and hereby declare that I agree voluntarily to participate in the project.

I indemnify the University of South Africa and any employee or student of the university against any liability that I may incur during the course of the project.
I further undertake to make no claim against the University of South Africa in respect of damages to my person or reputation that may be incurred as a result of the project/trial or through the fault of other participants, unless resulting from negligence on the part of the university, its employees or students.

I have received a signed copy of this consent form.

Signature of participant: ....
Signed at ………………………………… on …………………………………

WITNESSES

1 ....

2 ....

Annexure 3: Protocol for focus groups and interviews

Protocol for focus groups at selected Departments of Geography and for interviews with a selection of geographers at universities in South Africa on Geography and Education for Sustainability

Introduction

I am Rudi Pretorius, a PhD student in Geography at the University of South Africa (Unisa). You can get hold of me at 084 727 5022 or by sending an email to pretrorw@unisa.ac.za. The title of my thesis is: *Repositioning Geography in Education for Sustainability: The South African context.*

The supervisor for this research is Prof UJ Fairhurst (joanfair@global.co.za; 082 371 2656) and the co-supervisor Prof MD Nicolau (nicolmd@unisa.ac.za; 082 695 7551). The Unisa ethical clearance reference number for this research is 2013/CAES/143.

Research problem and aim

Although Geography is considered to be an ideal discipline for the advancement and promulgation of the notion of sustainability, the literature indicates that the discipline seems to be markedly under-represented in Education for Sustainability (EfS) and associated discourses. This research aims to suggest a suitable approach (or approaches) according to which undergraduate tertiary Geography in the South African context would be able to strengthen its position in EfS.

View of sustainability and EfS

Although it is acknowledged that various definitions of “sustainability” exist, this research subscribes to the interdisciplinary nature of sustainability, focussing on interaction between people (their well-being, culture, the economy etc.) and their physical environment (including resources), while seeking to balance environmental, economic and social concerns without compromising any of these aspects (Liu 2011:246). New approaches to education and capacity building are the foundation for responding to sustainability challenges of the 21st century, and are closely related to environmental change (O’Brien et al 2013:51). EfS is associated with this and aims to align the principles, values and practices of sustainability with teaching and learning in order to encourage changes in behaviour that will either create or lead to greater sustainability (Bonney 2012:7-9).

Research objectives

The objectives of this research are as follows:

- to conduct an exploratory enquiry on the composition of undergraduate Geography curricula in South Africa
- to gauge and critically reflect on different manifestations of sustainability and EfS in undergraduate Geography in South Africa
- to critically examine the different approaches to EfS in undergraduate Geography in South Africa, referring to the main identities of and recent trends in the discipline

- to suggest and motivate a suitable academic position for strengthening the role of undergraduate Geography in South Africa in EfS
- to map the implications of this suggested position in terms of teaching and learning in undergraduate Geography in South Africa.

Value of the research

The value of this research lies in the exploration of the border territory between EfS and the discipline of Geography. Undergraduate Geography could gain significantly from the infusion of new developments in EfS. Similarly, the teaching and learning sciences could benefit from the experience gained with the implementation of the transformative teaching and learning approaches associated with EfS in Geography.

Research process

For the purpose of this research, an assessment of the undergraduate curriculum at 17 Departments of Geography in South Africa has been undertaken. The results of this assessment have been provided to departments for verification, together with a questionnaire on different approaches to EfS in undergraduate Geography, to be completed per department.

For the next phase, departments with curriculums representing different approaches have been selected for focus groups and follow-up interviews. To expand the scope, a number of other South African geographers have been identified for additional interviews. The purpose with this phase is to obtain in-depth reflections on the relationship between EfS and the main positions and trends in Geography.

The focus groups and interviews will be conducted by a facilitator – in all probability the researcher. There are no specific right or wrong reflections, with the focus groups that will allow opportunity to debate the various reflections as well. Some preparation in terms of the accompanying schedule of topics is advisable.

In setting up the focus groups and selecting participants for interviews, the following criteria for representativeness will be taken into account: Seniority, NQF level/s of teaching involved with, field/s of expertise/specialisation, age, race and gender. A summary of participants in terms of these criteria will be compiled.

The focus groups and interviews will be arranged according to the following six categories:

- Sustainability themes in undergraduate Geography (Topics 1 & 2)
- Geography's human-environment identity and EfS (Topics 3 & 4)
- Geography's spatial-chorological identity and EfS (Topics 5 & 6)
- Geography's cross-disciplinary linkages and EfS (Topics 7 & 8)
- EfS and a merger of Geography's identities (Topics 9 & 10)
- Geography under reconfiguration? (Topics 11 & 12)

In order to facilitate the discussion during the focus groups and interviews, a brief introductory paragraph has been included for each of the categories.

IMPORTANT: For focus group and follow-up interviews, participants are requested to respond in terms of the undergraduate Geography curriculum

of the department that they are currently affiliated with. In reporting of results, names of participants and/or departments and/or universities will not be revealed.

Sustainability themes in undergraduate Geography

Background: Although sustainability features in many ways in Geography curricula, it appears to be an inherently contested concept. Departments may therefore be hesitant to promote sustainability explicitly, partly due to the criticisms associated with it. Despite this, most geographers would be inclined to admit that sustainability is important and somehow need to be dealt with in Geography. (Grinsted 2013)

Topic 1
Ways in which sustainability themes materialise in this department's undergraduate curriculum

Topic 2
The potential of this department's undergraduate curriculum to contribute to EfS and factors either enhancing or hindering realisation of this potential

Geography's human-environment identity and EfS

Background: Geography's human-environment identity features prominently in the literature. This positions Geography well in terms of sustainability due to links with the physical, social and human sciences. For EfS this is a good combination, since integration of these sciences leads to a thorough understanding of environmental change and its impacts, together with insights about the perceptions, values and ethics related to these issues. (Bennett 2013:108; Bonney 2012:15; Turner 2002)

Topic 3
Existence of associations between the human-environment identity and EfS in this department's undergraduate curriculum: Inevitable or not necessarily?

Topic 4
Transitions required in the human-environment identity of Geography in order to stay relevant in view of the challenges of 21st century environmental change, as experienced through this department's undergraduate curriculum
Geography's spatial-chorological identity and EfS

Background: Integration of space, nature and people is a fundamental abstraction of differentiation between areas. This leads to geographical insights, and together with associated methodologies make it possible to view and interpret environmental problems and risks in terms of spatiality. Since non-geographical methodologies are not suitable to lead to an understanding of spatial dynamics, sustainability may act as a common ground bridging the divide between the spatial-chorological and human-environment identities. (Grinsted 2013; Johnston et al 2014:16-17)

Topic 5
Existence of associations between the spatial-chorological identity and EfS in this department's undergraduate curriculum: Artificial or part and parcel of Geography?

Topic 6
Transitions required in the spatial-chorological identity of Geography in view of developments in ICTs, the need for theory based analyses and demands of 21st century sustainability challenges, as experienced through this department's undergraduate curriculum

Geography's cross-disciplinary linkages and EfS

<u>Background:</u> In many universities Geography is a front-runner in creation of inter-disciplinary linkages and forming multi-disciplinary departments and schools, through which the environmental and sustainability agendas seem to be served well. In this way analytical tools and selected disciplinary insights are shared with a range of non-geographers. In the long-run, however, this may be at a cost to undergraduate curricula focusing on the discipline's intellectual core. (Holmes 2002:2;19)

Topic 7
Striking a balance in the undergraduate Geography curriculum in terms of the discipline's integrity, vocational requirements and pressing needs such as the 21st century sustainability challenge, as experienced in this department

Topic 8
Realities of addressing environmental/sustainability issues in the undergraduate Geography curriculum within a multi-inter-trans-disciplinary context: Opportunity and/or a threat to Geography's intellectual core, as experienced in this department?

EfS and a merger of Geography's identities

<u>Background:</u> Knowledge and insight in the context of Geography support EfS and differ from other disciplines. A narrow focus is less suitable to unfold sustainability issues at multiple scales. The ideal would be a merger between Geography's spatial-chorological and human-environment identities, with closer integration between perspectives from the natural, social and human sciences. The question is how achievable this is, given the internal divisions and fragmented nature of discourse that plague the discipline. (Bennett 2013:100; Grinsted 2013; Turner 2002: 64)

Topic 9
Lack of a unified identity as weakness of Geography, versus its methodological diversity as an asset to contribute to better understanding of the changing planet, with reference to this department's undergraduate curriculum

Topic 10
Feasibility of a merger of Geography's main identities, the realities associated with such a merger and the facilitating role that EfS may or may not be able to play in this regard, with reference to this department's undergraduate curriculum

Geography under reconfiguration?

Background: During the dawn of the 21st century, the new field of "sustainability science" gained more prominence. Research in this field focuses on meeting human needs while sustaining the planet's life support systems. Although its proponents argue that it is a novel approach, merging the natural and social sciences as well perspectives on various scales, this is largely also what geographers busy themselves with to understand human-environment relations. (Bennett 2013:99-100; Komiyama & Takeuchi 2006)

Topic 11
Geography's failure to contribute to sustainability science, possibly due to its fragmented nature, thus inhibiting shared understanding of the diverse perspectives on 21st century environmental change, with reference to this department's undergraduate curriculum

Topic 12
Mutual conceptualisation of human-nature interaction and rejection of society/nature dualism as prerequisite for Geography to leverage its diversity of perspectives to provide a unique contribution in terms of the world's sustainability crisis, with reference to this department's undergraduate curriculum

References underpinning focus groups and interviews

Bennett, D.E., 2013. Geography and the emergence of Sustainability Science: Missed opportunities and enduring possibilities. *The Geographical Bulletin*, 54, 99-112.

Bonney, M.J., 2012. *An empirical analysis of the role of Geography in sustainability education*. Thesis (MSc). Southern Illinois University.

Grinsted, T.S., 2013. From the human-environment theme towards sustainability - Danish Geography and Education for Sustainable Development. *European Journal of Geography*, 4(3), 6-20 October 2013.

Holmes, J.M., 2002. Geography's emerging cross-disciplinary links: Process, causes, outcomes and challenges. *Australian Geographical Studies*, 40 (1), 2-20.

Johnston, R., Harris, R., Jones, K., Manley, D., Sabel, C.E. and Wang, W.W., 2014. Mutual 9misunderstanding and avoidance, misrepresentations and disciplinary politics: Spatial science and quantitative analysis in (United Kingdom) geographical curricula. *Dialogues in Human Geography*, 4(1), 3-25.

Komiyama, H. and Takeuchi, K., 2006. Sustainability science: building a new discipline. *Sustainability Science*, 1 (1), 1-6.

Liu, L., 2011. Where in the world of sustainability education is US Geography? *Journal of Geography in Higher Education*, 35 (2), 245-263.

O'Brien, K., Reams, J., Caspari, A., Dugmore, A., Faghihimani, M., Fazey, J., Hackmann, H., Manuel-Navarrete, D., Marks, J., Miller, R., Raivio, K., Romero-Lankao, P., Virj, H., Vogel, C. and Winiwarter, V., 2013, You say you want a revolution? Transforming education and capacity building in response to global change. *Environmental Science and Policy*, 28, 48-59.

Turner, B.L., 2002. Contested identities: Human-Environment Geography and disciplinary implications in a restructuring academy. *Annals of the Association of American Geographers*, 92 (1), 52-74.

Annexure 4: Consent form for focus groups and follow-up interviews

CONSENT FORM
TITLE OF RESEARCH PROJECT: Repositioning Geography in Education for Sustainability - The South African Higher Education context

Dear Mr/Mrs/Miss/Ms/Dr/Prof ____

Department of ____

Date ....… / ....… / 20......

AIM AND OBJECTIVES OF THE STUDY

Aim: This research aims to suggest a suitable approach (or approaches) according to which undergraduate tertiary Geography in the South African context would be able to strengthen its position in Education for Sustainability (EfS). Such an approach (or approaches) should make provision to prepare students in an integrated way to face the challenges posed by the changing worlds of work and everyday living, as well as acquiring the skills that are required to earn a living in the twenty-first century.

Objectives:

- to conduct an exploratory enquiry on the composition of undergraduate Geography curricula in South Africa
- to gauge and critically reflect on different manifestations of sustainability and EfS in undergraduate Geography in South Africa
- to critically examine the different approaches to EfS in undergraduate Geography in South Africa, referring to the main identities of and recent trends in the discipline
- to suggest and motivate a suitable academic position for strengthening the role of undergraduate Geography in South Africa in EfS
- to map the implications of this suggested position in terms of teaching and learning in undergraduate Geography in South Africa.

RESEARCH PROCESS

- This study requires your participation in a focus group and/or interview to obtain your reflections on the relationship between EfS and teaching and learning of Geography at undergraduate level in the department that you are currently affiliated with.
- The focus group and/or interview will be conducted by a facilitator, most probably the researcher.
- The focus group and/or interview is about your opinion, there are no specific right or wrong answers. Some preparation in term of the focus group and follow-up interview guide that will be supplied up front is advisable, but not essential.
- The focus group will allow opportunity to debate the various reflections.

- When setting up the focus groups and/or selecting participants for interviews , the following criteria regarding representativeness will be taken into account as far as possible: Seniority, NQF level/s of teaching in which paticipants are involved , field/s of expertise/specialisation, age, race and gender.
- In order to gauge the validity of results, a summary of the focus group and interview participants in terms of the latter representativeness criteria, will be compiled.

NOTIFICATION THAT VOICE RECORDINGS WILL BE REQUIRED

All interview sessions will be voice recorded to facilitate the transcribing process of the data being gathered.

CONFIDENTIALITY

Results will be reported in formats making it impossible to link it to specific individuals and/or to specific departments at specific universities.

WITHDRAWAL CLAUSE

You are welcome to withdraw at any stage of the process and you do not need to respond to any of the questions or participate in any discussions you do not feel comfortable with**.**

POTENTIAL BENEFITS OF THE STUDY

The value of this study lies in its exploration of the border territory between EfS and Geography. Undergraduate Geography could gain significantly from the infusion of new developments in EfS. This can enrich the learning experience of Geography students, thus not only preparing them for the worlds of work and everyday living, but also delivering a new breed of motivated Geography academics and researchers, from which the discipline can benefit at large. Similarly the teaching and learning sciences could benefit from the examples and practical experience provided by the development, implementation and evaluation of the transformative teaching and learning approaches associated with EfS.

USAGE OF DATA

The data being collected will be used for the purpose of writing a PhD thesis as well as compilation of publications and presentations following from it in future.

CONTACT INFORMATION
Student: Rudi Pretorius, Department of Geography, Unisa Science Campus, Florida
pretorw@unisa.ac.za; 084 727 5022; 011 4713680
Supervisor: Prof UJ Fairhurst, Department of Geography, Unisa Science Campus, Florida
joanfair@global.co.za; 082 3712656; 011 783 4051
Co-Supervisor: Dr MD Nicolau, Department of Geography, Unisa Science Campus, Florida
nicolmd@unisa.ac.za; 082 695 7551; 011 47/1 2084

CONSENT
I, the undersigned, ………………………………………………………………… (full name and surname) have read the above information relating to the project and have also heard the verbal version, and declare that I understand it. I have been afforded the

opportunity to discuss relevant aspects of the project with the project leader, and hereby declare that I agree voluntarily to participate in the project.

I indemnify the University of South Africa and any employee or student of the university against any liability that I may incur during the course of the project.

I further undertake to make no claim against the university in respect of damages to my person or reputation that may be incurred as a result of the project/trial or through the fault of other participants, unless resulting from negligence on the part of the university, its employees or students.

I have received a signed copy of this consent form.

Signature of participant: ....

Signed at ………………………………… on …………………………………

WITNESSES

1 ....

2 ....

Annexure 5: Ethical clearance for research

UNISA university of south africa

2013-11-01

Ref. Nr.: 2013/CAES/143

To:
Student: RW Pretorius
Supervisor: Prof UJ Fairhurst
Department of Geography
College of Agriculture and Environmental Sciences

Student nr: 5184066

Dear Prof Fairhurst and Mr Pretorius

Request for Ethical approval for the following research project:

Repositioning Geography in Education for Sustainability: The South African context

The application for ethical clearance in respect of the above mentioned research has been reviewed by the Research Ethics Review Committee of the College of Agriculture and Environmental Sciences, Unisa. Ethics clearance for the above mentioned project (Ref. Nr.: 2013/CAES/143) is **approved** after careful consideration of the documentation submitted to the Ethics committee. The Ethics committee wishes to emphasizes the approval is for the duration of the research project only.

Please be advised that the committee needs to be informed should any part of the research methodology for the laboratory experiments as outlined in the Ethics application (Ref. Nr.: 2013/CAES/143), change in any way. In this instance a memo should be submitted to the Ethics Committee in which the changes are identified and fully explained.

The Ethics Committee wishes you all the best with this research undertaking.

Kind regards,

Prof E Kempen,
CAES Ethics Review Committee Chair

UNISA university of south africa

PROF L LABUSCHAGNE
EXECUTIVE DIRECTOR: RESEARCH DEPARTMENT
***Tel**: +27 12 429 6368 / 2446* ***Fax**: +27 12 429 6960*
***Email**: llabus@unisa.ac.za*
***Address**: Theo van Wijk Building, 10th Floor, Office no. 50 (TvW 10-50)*

25 February 2014

Mr RW Pretorius
Department of Geography
College of Agriculture and Environmental Sciences

Dear Mr Pretorius

PERMISSION TO DO RESEARCH INVOLVING UNISA STAFF, STUDENTS OR DATA

A study into Repositioning of Geography in Education for Sustainability: The South African Context

Your application regarding permission to conduct research involving Unisa staff, students or data in respect of the above study has been received and was considered by the Unisa Senate Research and Innovation and Higher Degrees Committee (SRIHDC) on 13 February 2014.

It is my pleasure to inform you that permission has been granted for this study as set out in your application.

We would like to wish you well in your research undertaking.

Kind regards

PROF L LABUSCHAGNE
EXECUTIVE DIRECTOR: RESEARCH

Open Rubric

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Telephone: +27 12 429 3111 Facsmile: +27 429 12 429 4150
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Annexure 6: Notification of amendment to methodology

To:
Prof. E. Kempen
CAES Ethics Review Committee Chair

From:
Mr RW Pretorius
Department of Geography
Calabash 0-035
Science Campus

14 November 2014

Notification of amendment of methodology for previously approved ethics application for PhD: 2013/CAES/143 and SRIHDC approval dated 13 February 214

In terms of the original application, ethics approval was granted on the basis of conducting interviews with targeted geographers at all South African universities (which includes Unisa) and focus group interviews with Unisa Geography students.

The realities associated with this study, necessitated the following slight amendments to the methodology:

1) The interviews will still be conducted, but will be supplemented with a questionnaire. There are Geography Departments at 17 South African Universities (which includes Unisa), so 17 interviews and 17 questionnaires are at stake.
2) The Geography Departments of four of these universities have been selected (of which Unisa is one) for more in-depth study. A focus group with follow-up interviews will be conducted at each of these universities. These

focus groups will re-consider the themes already covered by the questionnaire, but in more depth.

3) Using information in the open domain (yearbooks, websites and newsletters) a desk top study has been added of the undergraduate Geography curriculums offered by the 17 Geography Departments in South Africa. This information will be verified during the planned interview with a targeted geographer at each of the departments.

The intended questionnaire and focus group schedule, as well as consent forms, accompany this memorandum.

I trust that these amendments, which are in line with the original application and approval, will comply with requirements and meet with your approval.

Rudi W Pretorius
St no: 5384966

Annexure 7: Summary of participants

	Level of appointment	**Race**	**Gender**	**Type of participation**
Institution A				
Participant A1	Prof	W	M	QG
Participant A2	L	C	F	QG
Participant A3	L	W	M	QG
Participant A4	SL	C	M	II
Participant A5	L	W	M	II
Institution B				
Participant B1	SL	W	M	FG
Participant B2	L	W	F	FG
Participant B3	L	W	M	FG
Institution C				
Participant C1	L	W	F	II
Participant C2	Associate Prof	W	M	II
Institution D				
Participant D1	SL	B	M	II
Institution E				
Participant E1	Prof	C	M	II
Institution F				
Participant F1	Prof	W	F	FG
Participant F2	Prof	W	M	FG
Participant F3	Prof	W	M	FG
Participant F4	SL	C	M	FG
Participant F5	L	W	M	FG
Institution G				
Participant G1	Prof	W	M	QG
Participant G2	Associate Prof	W	F	QG
Participant G3	SL	W	M	QG
Participant G4	SL	W	M	QG

	Level of appointment	Race	Gender	Type of participation
Institution H				
Participant H1	SL	C	M	FG
Participant H2	SL	C	M	FG
Participant H3	SL	W	M	FG
Institution I				
Participant I1	Associate Prof	W	M	QG
Participant I2	SL	B	M	QG
Participant I3	L	B	M	QG
Institution J				
Participant J1	Prof	B	M	II
Participant J2	L	W	M	II
Participant J3	L	W	F	FG, QG, II
Participant J4	L	W	F	FG, QG, II
Participant J5	L	W	F	FG, QG, II
Participant J6	L	W	F	FG, II
Participant J7	L	W	F	FG, II
Participant J8	L	W	M	FG, QG, II
Participant J9	L	W	M	FG, QG, II
Total number of participants = 36; Total number of institutions = 10				
Abbreviations used				

Type of participation:	**Race:**	**Level of appointment:**	**Gender:**
QG = Questionnaire Group	W = White	L = Lecturer	M = Male
FG = Focus Group	B = Black	SL = Senior lecturer	F = Female
II = Individual Interview	C = Coloured	Assoc = Associate	
	I = Indian	Prof = Professor	

Annexure 8: Relevant publication

The Role of Geography in Multi-inter-trans-disciplinary Study Programmes for Environmental Sustainability

Rudi Pretorius and Joan Fairhurst

Abstract

The sustainability challenge requires universities to create spaces in which the disciplinary mould can be substituted for transformational learning. "Transformative" implies emphasis on new ways of "being" and of thinking about the environment, facilitated by integration of a multitude of disciplines and perspectives. Due to its flexible, all-inclusive and integrative nature, Geography can offer much for sustainability education. The reality is that Geography lags in its contribution to study programmes in this field. This paper reflects on the role of Geography in facilitating transformative learning encounters for environmental sustainability. The focus is on the multi-inter-trans-disciplinary undergraduate programme in environmental management offered by the University of South Africa (Unisa) through open and distance learning. The view that environmental sustainability study programmes may benefit from an anchor discipline to provide structure and to facilitate the transformative learning experience, is debated. The value of Geography in this regard is highlighted, with reference to the experience gained from implementing this particular Unisa study programme. An outline is provided of how Geography can fulfill an anchor role in such study programmes, while maintaining its integrity as discipline. The paper will be useful to higher education practitioners involved in the implementation, offering and/or coordination of environmental sustainability study programmes, with specific reference to open and distance learning.

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W. Leal Filho (ed.), *Transformative Approaches to Sustainable Development at Universities*, World Sustainability Series, DOI 10.1007/978-3-319-08837-2_29

Keywords
Multi-inter-trans-disciplinarity · Sustainability study programmes · Transformative learning · Geography · Case study · Open and distance learning

1 Introduction

1.1 The Context of Sustainability Education and Environmental Sustainability Study Programmes

Nearing the end of the United Nations Decade of Education for Sustainable Development (UN DESD), a notable response of higher education institutions world-wide has been to implement a variety of study programmes focused on environmental sustainability (UNESCO 2012). Since these study programmes cover a wide spectrum of approaches, the need clearly exists for a flexible view of what Education for Sustainable Development (ESD) entails in different contexts, as expressed in the Bonn Declaration (UNESCO 2009). In sync with changing views of sustainability, such study programmes should reflect the move from technology and management towards integration between environmental, social and economic sustainability, with emphasis on cultural change (Liu 2011). Due to the persisting trend in academia of discipline based clusters guarding their turf, together with institutionalisation, the required transition from offering traditional science to offering integrated sustainability science, remains a challenge (Yarime et al. 2012).

1.2 Multi-inter-trans-disciplinarity as Setting for Environmental Sustainability Study Programmes

Dealing with the various sustainability-related issues the world faces, requires problem-solving skills regarding the integrated human-nature system, now recognized as a multi-inter-trans-disciplinary field of endeavour (Wiek et al. 2011). "Multidisciplinarity" implies purposeful combinations of disciplines, "interdisciplinarity" common ground between two (and more) disciplines and "transdisciplinarity" collective understanding of issues across disciplinary boundaries (Brown et al. 2010). Regarding problem-solving, multidisciplinarity involves collaboration using distinct disciplinary approaches, while inter- and transdisciplinarity involves dissolution of boundaries between disciplines, although not necessarily doing away with them (Cairns 2004). The move towards inter- and transdisciplinarity provides a frame of reference to prepare students to deal with sustainability issues (Brundiers et al. 2010). The success achieved however, still requires substantiation (Remington-Doucette et al. 2013), with the value of disciplinary grounding not to be underestimated (Mansilla and Duraising 2007).

1.3 Aim, Methodology and Value of Chapter

Firstly, this chapter links with Remington-Doucette et al. (2013) by exploring the value of disciplinary grounding in multi-inter-transdisciplinary environmental sustainability study programmes, with Geography as case in point. A critical assessment is provided of the view that such study programmes could benefit from an anchoring discipline (in this case Geography) to facilitate the transformative learning experience. Secondly this chapter acknowledges the growing need for locally relevant interpretations of ESD (UNESCO 2012), with focus on an environmental sustainability study programme tailored for the African context and utilizing a contextually relevant teaching and learning mode, namely open and distance learning (ODL).

Under scrutiny is the multi-inter-trans-disciplinary undergraduate study programme in Environmental Management (EM) offered by the University of South Africa (Unisa), an ODL institution. Geography is the major for this study programme, which is coordinated by the Department of Geography. This programme is reviewed in case study format, with focus on process rather than product. A case study approach is valuable as it allows detailed description and analysis of the study programme in the contextual setting it is offered, while allowing critical reflection. Following the case study, concluding thoughts are provided on the value of an anchor discipline in environmental sustainability study programmes.

This chapter contributes to the debate on incorporation of multi-inter-trans-disciplinarity into functional, locally relevant environmental sustainability study programmes, with reference to the value that linkage to specific disciplines can play. The case study being presented furthermore adds to the body of knowledge and experience on the unique challenges faced with implementation of ESD in varied contexts, and how these challenges can be addressed to serve the purpose of transformative learning towards more sustainable living most effectively.

2 Transformative Views of Sustainability Education

2.1 Supporting Sustainability Education with Transformative Learning

Transformative learning, with ultimate goal to guide individuals to realize the necessity of changing their worldviews, is more and more regarded to be central to ESD (Sipos et al. 2007). This has implications for ESD in terms of the required competences, the type of learning to take place and the design of associated learning experiences. Challenges in this regard include the difficulty to facilitate or design transformative encounters as a series of unconnected learning experiences, while a holistic, integrative approach is rather required. In addition, resistance may be encountered since students are challenged to leave their comfort zones. It is unfortunate that transformative learning, with its conception of a holistic role for higher education in terms of the need to address sustainability related issues, i.e. risk and uncertainty, is at odds with the market oriented new liberal notion of higher education focusing on producing productive capacity for the market economy (Blake et al. 2013).

2.2 A Transformative Pedagogy for Environmental Sustainability Study Programmes

A definite move can be distinguished towards adopting transformative sustainability learning (TSL) as the overarching pedagogy for environmental sustainability study programmes (Sipos et al. 2007). Such study programmes need to move beyond a mere focus on knowledge, skills and values relevant to sustainable development, to rather focus on learning geared towards asking relevant critical questions, clarifying values, envisioning more sustainable futures, thinking systemically, responding through applied learning and exploring interactions between tradition and innovation (Tilbury 2011). However, to implement the associated facilitating critical pedagogy, implies major shifts in order to accommodate the required critical reflexivity and level of multi-inter-trans-disciplinarity, while practicing experiential and place-based learning. Viewing ESD as simply an addition of sustainability related content to existing study programmes is no longer and in actual fact has never been, a viable approach (UNESCO 2012).

2.3 Realities and Implications in Terms of a Multi-inter-trans-disciplinary Context

In order to achieve the objectives set in terms of TSL, it is crucial for environmental sustainability study programmes to be developed, refined and offered within a multi-inter-trans-disciplinary context. The traditional unidirectional, hierarchical and reproductive approaches to teaching and learning within disciplinary silos are still found at far too many institutions of higher education. Failing to lead students to address sustainability problems in a holistic way tends to perpetuate these problems instead of contributing to solutions (Wals 2010). Rigid academic structures seem to work against more holistic ways of considering how the world functions, and have to be softened significantly. However, a balance should be struck, since some level of disciplinary knowledge always seems to be necessary as it has the potential to provide valuable input when addressing sustainability issues. The options for sharing and collaboration between disciplines through a multi-inter-trans-disciplinary approach, therefore seems to be the obvious route to follow (Stock and Burton 2011).

3 A Place for Geography in Environmental Sustainability Study Programmes

3.1 Nature of the Discipline of Geography

Geography can be considered in terms of two theoretical positions: "spatial-chorological" and "human-environment" (Turner 2002). Unification and an integrated identity seem difficult without favouring one of these positions above the other. Corresponding to increased awareness of environmental issues, and in sync with diversification of Geography into sub-fields, the human-environment position gained momentum since the latter part of the twentieth century, and is continuing to do so. The value of the human-environment position is that it presents a synthesis derived from integration of natural and human phenomena and processes. The generally accepted advantage of Geography so defined has to do with its power to supply relevant explanations and to be of value in terms of real-world problem-solving. However, the divergence between Physical Geography, with its natural science linkages and Human Geography, experimenting with various ways of knowing, continues to contest the ideal of unity in the discipline.

3.2 Geographical Perspectives and Sustainability Education

Recent advances in understanding sustainability and its achievement, with increased depth in studying its various dimensions, have led to rediscovery of the value of Geography. This specifically refers to the way environmental issues (physical/human) are dealt with by Geography within place-based contexts (Kates and Dasgupta 2007). Liu (2011) emphasises the relationship between Geography and Sustainability Science, both addressing human-environment interactions. Geography therefore supports ESD well, although there is variation in coverage (depth/scope) of sustainability concepts within various offerings by different higher education institutions (Higgitt et al. 2005). Ideally speaking geographers should be trained to step back from the detail and consider the bigger picture (Aplin and Batten 2004), which is valuable when dealing with sustainability issues. In addition, in terms of their integrative skills, their ability to adopt flexible approaches and to take location and scale into account, geographers have much to offer to this field.

3.3 Extent to Which Geography Features in Sustainability Education

Despite the logic of a prominent role for Geography in ESD, evidence concerning decisive action by the discipline in this regard is lacking (Higgitt et al. 2005; Liu 2011). Although the strong connection between Geography and ESD appears to offer an agenda for Geography, geographers seem to be under the impression that to provide only information on environmental processes is sufficient, whereas increasing awareness or insight regarding sustainability requires much more. The disciplinary boundaries of Geography are also regarded as potentially constraining achievement of multi-inter-trans-disciplinarity, because these boundaries are perceived as sustaining the discipline and not promoting ESD. According to Bednarz (2006) it appears as if Geography does not provide the amount and depth of input towards ESD that it is expected to do. The dichotomy between Physical Geography and Human Geography may be a contributing factor, with both regarding the linkage with ESD the responsibility of the other.

3.4 Possible Roles for Geography in Environmental Sustainability Study Programmes

Due to its nature, Geography is in a position to contribute to sustainability study programmes, especially through forging multi-inter-trans-disciplinary linkages (Holmes 2002). But this strength poses risks to the reproductive capacity of the discipline. In a multi-inter-trans-disciplinary context, Geography is pressured to provide tools and selections of geographical insights for vocational programmes, which may be at expense of attention to the requirements of the discipline. Following Aplin and Batten (2004), the value that Geography can add to environmental sustainability study programmes is not necessarily only interdisciplinarity, but also to address human-environment interactions and to incorporate spatio-temporality. As the human-environment position has a long standing in Geography, multi-inter-trans-disciplinarity need not necessarily be seen as threat but rather opportunity to link the human-environment approach, spatial technologies and measurements/observations enabled through it.

4 Case Study: The Undergraduate Study Programme in Environmental Management Offered by the University of South Africa (Unisa)

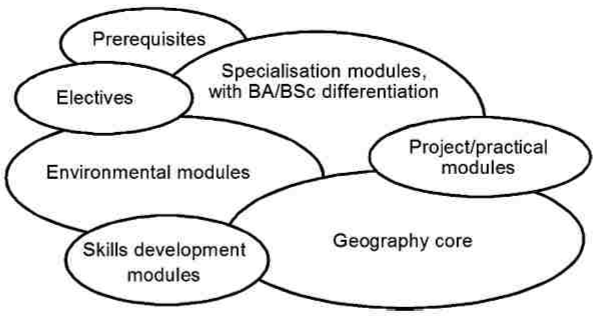
4.1 Contextual Setting: Unisa and the Context of Open and Distance Learning (ODL)

Although Unisa was regarded as one of the pioneers of classical distance education more than 100 years ago, the institution has since developed into a major role player in the ODL context (Tait 2008). In terms of student numbers, more than 300,000 students are enrolled across eight semi-autonomous colleges (Unisa 2012). With the vision "Towards the African University in the service of humanity", Unisa has joined the global call for greater sustainability by implementing several initiatives in support of the green campus drive. Since 2007 teaching and learning at Unisa has been transformed to optimise and streamline interaction between students and the university, with various innovations such as the increased use of appropriate information and communication technology (ICT) solutions, including a move towards e-learning (Unisa 2007). In this way student-peer and student-lecturer interaction is increasingly facilitated through the online learning platform (referred to as a virtual learning environment or VLE), known as myUnisa. Progress in this regard, however, has been constrained by amongst other things issues concerning access to ICT's by many students in South Africa (Oyedemi 2012) as well as general inadequate levels of computer literacy of students. However, in terms of not only its size, but also its pooled resources, experience and capacities, Unisa is in a position to provide crucial inputs in terms of ESD in Southern Africa and beyond (Unisa 2005).

4.2 Aim, Structure and Unique Elements of This Study Programme

The undergraduate EM Programme at Unisa was implemented in 2000. This was in response to an industry need for a B-degree preparing students to enter this field. The basic structural components of this programme are shown by the diagram in Fig. 1. Underlying this programme is the recognition of the value of multi-inter-trans-disciplinarity, the need for an integrated approach and a focus on the management of human decision-making about the environment. This programme differentiates between a BA and a BSc degree, and in this way recognises the value of specialisation in either the biophysical or the social sciences. Contributing to multi-inter-trans-disciplinarity in this programme is the fact that modules from six of the Colleges in Unisa feature in the curriculum. This spectrum of modules adds to the richness of the programme and is crucial in order to support the aims in terms of sustainability. In this regard the EM Programme at Unisa was one of the first, and remains one of the few multi-inter-trans-disciplinary study programmes at this institution. The most unique aspect of this programme is that it is offered through ODL, which increases its accessibility to potential students. Since remaining in their jobs and/or communities while studying, the opportunity exists for students to directly apply what they learn. Due to the urgency of the environmental dilemma, this synergy between learning and application, is invaluable.

Fig. 1 Structural elements of the Unisa EM Programme



4.3 Reflection on the Role of Geography in This Study Programme

The Department of Geography was the driving force behind the implementation of the EM programme at Unisa, and has since its inception been responsible for managing, maintaining and coordinating it. Noteworthy is that the major subject for the EM Programme is Geography as well, with its inter- and multidisciplinary nature, integrative approach and sensitivity towards place and scale (Aplin and Batten 2004) complementing the overarching sustainability theme of this programme. Together with the implementation of the EM Programme, the Geography curriculum was redesigned in order to no longer provide separate options for BA and BSc students. This demanded integration of Human and Physical Geography and utilisation of environmental sustainability as the overall focus for undergraduate Geography. In addition, the curriculum was re-organised around themes or problems as foci for the various modules instead of the traditional arrangement in terms of the sub-disciplinary fields of specialisation in Geography. A global, continental and national focus was adopted for respectively the first, second and third levels of study, with skills integrated with the presentation of theory. Depending on the choices made by students, Geography can make up anything from 11 to 14 of the 30 required modules, and therefore acts as not only a binding force but also provides direction and a definite focus throughout all the levels of the EM programme.

4.4 Reflection on the Implementation Experience with This Study Programme

A pertinent issue during the development and implementation of the EM Programme concerns the existence of institutional silos, leading to turf protectionist and "territorial" behaviour and working against the cooperation and integration required by ESD. Referred to by Jucker (2002) as the shadow curriculum, this phenomenon can be a major constraint for successfully implementing ESD. Despite this constraint, the efforts of the Department of Geography to make cooperation possible in order to contribute meaningfully to ESD, kept the EM Programme on track. This determination also ensured survival of this programme during the restructuring of Unisa in the mid-2000s in terms of semi-autonomous colleges, together with the hiccups experienced while migrating from the "old" to the "new" structure. In this regard the EM Programme survived the test of time, being one of only a few long standing successful structured degrees at Unisa. In terms of student numbers, Zietsman and Pretorius (2006) observed a gradual increase over time, with students from all over South Africa and further afield. The fact that the EM Programme is perceived as successful has been assisting to raise the profile of the Department of Geography (as programme coordinators) and the discipline of Geography, thus contributing to safeguard the future existence of the department and the programme.

4.5 Reflection in Terms of Achievement of Multi-inter-trans-disciplinarity by This Study Programme

The aspect of multidisciplinarity is covered in the EM Programme in that environmental sustainability is not studied in only one, but in several of the participating disciplines (Geography, Economics, Law, Education, Development Studies, etc.), but without any real sharing of perspectives, methods and ways of knowing between the different disciplines. The controversy usually associated with inter- and transdisciplinarity because of the accompanying perceived dissolution of disciplinary boundaries, does not apply in the case of the Unisa EM Programme. This is because the discipline of Geography provides sufficient scope for coverage of inter- and transdisciplinary linkages through: (1) a focus on real-world issues (that are inherently interdisciplinary) in the curriculum, and (2) by moving assessment beyond the confined university boundaries to place-based applications that are part of the student's life-worlds, thus linking with the transdisciplinary agenda of integrating academic knowledge with that from other stakeholders. Problematic at Unisa is that because of departementalisation, modules from different disciplines in the EM Programme do not always speak to each other or to the overall aim of the programme in terms of fostering increased sustainability, which is a shortcoming to be addressed.

4.6 Reflection in Terms of Facilitation of Transformative Learning by This Study Programme

Transformative learning has been implemented as pedagogical approach feeding into changes required towards a more sustainable living in a number of the modules constituting the EM programme. This is specifically the case with many of the Geography modules, but not for the programme as a whole, because of the difficulties involved in prescribing to other disciplines *how* they should teach their modules and for that matter also *what* they should teach in them. Regarding the Geography modules, a definite move from first order to second and third order learning can be distinguished (Bateson 1972, as referred to by Sterling 2011), which links with and supports transformative learning for sustainability. The pedagogy in these modules is therefore no longer content driven and focussed on information transfer within accepted frameworks, but geared towards shifting the way of thinking and doing that frames student's perceptions of and their interaction with the world. This is achieved by using various forms of inquiry based teaching and learning within authentic contexts, as reported by Pretorius (2012). Allowing students to use their own living environments as authentic spaces for assessment tasks, Pretorius (2012) shows how this contributes to a shift in how they experience themselves and phenomena in the world around them, which in effect points towards transformative learning (Cranton 2009).

4.7 Concluding Reflection on the Role of Disciplinary Grounding in This Study Programme

The fact that the Department of Geography at Unisa is one of a few lone-standing, unmerged Geography Departments in South Africa and even further afield, for example Australia (Holmes 2002), puts it in a unique position in terms of its involvement with the EM Programme. This is in contrast to the trend for Geography Departments to become part of multidisciplinary schools or departments, but which usually comes at a cost to the intellectual core of Geography and which can eventually threaten disciplinary survival. The approach at Unisa instead capitalised on the interdisciplinary nature of Geography as a major strength and opportunity, rather than to consider other options (Fagan and Jacobs 1998). In this way the EM Programme could be structured with Geography as anchor discipline since it provides the multi-inter-trans-disciplinary linkages required for transformational sustainability learning. Apart from one or two modules (e.g. on impact assessment and environmental politics) which is not Geography, but had to be developed for the EM Programme, the integrity of the discipline of Geography at Unisa could be maintained. This in line with Abbott's (2001) viewpoint that interdisciplinary studies depend on specialised disciplines to feed into generation of new theories and methods, although this can be contested in terms of emerging ways of knowledge creation which are not discipline based, such as critical theory.

5 Discussion of Key Issues

This reflective chapter on the Unisa EM Programme and the role of Geography as anchor discipline, contributes to the pool of experience on ESD in different contexts, for which the need has been expressed during the UN DESD (UNESCO 2012). Situated in a relative rigidly structured mega ODL institution and in the technological challenged Global South, the experience obtained during the almost 15 years that this programme has been running, provides a unique perspective on ESD, with a number of important lessons that have been learnt.

5.1 Facilitation of Multi-Inter-Trans-Disciplinarity in Environmental Sustainability Study Programmes

The multi-inter-trans-disciplinary nature of environmental sustainability study programmes leads to several issues to be addressed, as illustrated by the EM Programme offered by Unisa. These include facilitation of collaboration between disciplines, transcendence of disciplinary boundaries, balance between "mainstream" and "service" teaching and the degree of maintenance versus dilution of disciplinary identity (Holmes 2002). At Unisa, implementation of the EM Programme was not accompanied by mergers between academic departments and also not really influenced by moves towards vocational training, therefore less initial antagonism was experienced, although some opportunistic buy-in did in fact occur. However, creation of a separate Department of Environmental Sciences later on, did in fact cause some issues. These could be settled by allocating responsibility for the field of environmental management to the Department of Geography for undergraduate qualifications, and to the Department of Environmental Sciences for postgraduate qualifications. Important is that mutual agreement led to a trade-off, and that ESD could continue unhindered at the institution.

5.2 The Need for a Transformative Pedagogy in Environmental Sustainability Study Programmes

"Sustainability education must therefore be prepared to deconstruct and reconstruct all aspects of teaching and learning" (Sipos et al. 2007). This process is to be accompanied by a move towards student-centered learning, through which students get responsibility in the active acquisition and processing of knowledge. Unisa is in a fortunate position that the ODL business model adopted after restructuring in 2004 is supportive of student-centeredness, with increased effort to optimise university-student, lecturer-student and student-student interaction (Unisa 2007). The type of changes that are required in order to be able to truly implement transformative sustainability learning (TSL) as pedagogy, are featuring in a number of the modules forming part of the Geography major of the Unisa EM programme. Examples of these strategies include inquiry based learning, analysis of case studies and project based work. The increased use of well-planned learning experiences through e-learning creates opportunities to improve on the collaborative aspects of leaning and the co-construction of knowledge, but presents challenges in terms of issues such as access to ICT's and relatively low levels of ICT literacy.

5.3 Pros Versus Cons of an Anchor Discipline in Environmental Sustainability Study Programmes

As shown by the Unisa example, several advantages may be associated with an anchor discipline in environmental sustainability study programmes. Chief among these is the structure thereby provided to such study programmes, assisting to organize and direct the learning experience in an integrated way over the total study period. For the EM Programme at Unisa this function is fulfilled by the Geography major. In the rigidly structured ODL institution with little room for implementation of new offerings, this was the obvious route to go. However, Geography at Unisa went through a major re-curriculation process prior to implementation of the EM Programme. This meant re-arranging the curriculum in terms of themes and within a problem-based context rather than according to traditional sub-disciplines. In this way Geography could assist in supporting the aims of ESD in terms of transforming to sustainability. A similar role can be fulfilled by other suitable disciplines, such as the emerging field of Sustainability Science (Benessia et al. 2012). A disadvantage of utilizing an anchor discipline, is that its presence may be perceived negatively as overpowering, but with careful facilitation this issue can be successfully down-managed.

6 Concluding Remarks

The Unisa undergraduate EM Programme provides a model of how an existing discipline (in this case Geography) can re-invent itself to serve both the reproductive capacity of the discipline and the agenda of transformation to sustainability in an innovative way. All in all, the EM Programme can be regarded as a success story, contributing towards not only institutionalisation of sustainability, but also providing Geography as discipline with an uncontested and acknowledged role in this regard at Unisa. Some sacrifices had to be made, such as substitution of core modules by the Department of Geography to provide service modules for the EM Programme not offered in any other department. In addition, coordination of the programme and related administrative tasks became the responsibility of the Department of Geography. However, in the long run it became a win-win situation from which the Department of Geography and ESD hugely benefitted. Geography at Unisa now serves the purpose of a major in the academic discipline as well as for the multi-inter-trans-disciplinary EM Programme.

For the Unisa programme, multi- and interdisciplinarity have been implemented with a fair amount of success, while inclusion of transdisciplinarity remains challenging. Due to the central coordination of this programme by the Department of Geography, it was possible to address some of the issues related to the multi-inter-transdiciplinary nature of the programme. To this end, the inter- and multidisciplinary linkages provided by Geography proved to be very useful. Although the model of using an anchor discipline for the EM Programme works well in terms of the ODL and Global South context of Unisa, there is no best way to implement sustainability in academic programmes (Remington-Doucette et al. 2013). Differing institutional contexts have to be considered and dealt with to design and successfully implement locally relevant environmental sustainability study programmes. The transformation toward e-learning provides the next challenge for the EM Programme, but includes the opportunity to improve on the transdisciplinary dimension of sustainability through collaboration and sharing within an online learning environment.

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