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UDY

1.1 Introduction

This study focuses on the current South African curriculum when teaching environmental education (EE) in the Further Education and Training (FET) band. FET level means the teaching of EE at Grade 10, 11 and 12 levels. The importance of EE to the curriculum is of concern to our planet and in reducing the carbon footprint. Reducing the carbon footprint means dealing directly with the depletion of the natural environment in various forms - be it water shortage, land and air pollution, climate change, shortage of mineral resources, scarcity of biodiversity, unemployment, poverty, extinction of our fauna and flora and many other such environmental issues which have a direct bearing on education. By this the researcher means knowledge on, and of EE teaching and learning in order to save the depleting of the natural resources of the planet. EE ought to be the corner stone of any functional society producing responsible citizens who are conscious of the fact that most of our natural resources are non-renewable and should be managed wisely to ensure their sustainability. EE currently does not stand alone as an FET school subject in South Africa but is integrated into subjects such as life sciences, tourism, agriculture and geography.

This study argues that this integration of EE into other subjects renders its essence and importance ineffective for general though focused and sustainable, teaching and learning. The researcher advocates for EE to become an autonomous subject in the curriculum of secondary school education in South Africa. It is the researcher's belief that if EE stands alone, as a school subject it will receive both the scholastic and pedagogical attention it deserves in order to (a) respond to responsible citizenship, (b) avoid the depletion of the planet for the next generations and (c) educate learners with focused intensity EE as a leading subject for survival.

From a global perspective, EE is receiving attention at schools since the staging of world summits and conferences on EE such as the Kyoto Protocol, Tbilisi Declaration of 1978, and the more recent world summit on climate change held in Durban with its main focus being on sustainable environmental education. Organisations like the United Nations Education, Science and Cultural organisation (UNESCO) and World Health Organisation (WHO) have been in the forefront in encouraging countries to develop policies on sustainability and conservation of the environment.

Responding to the call the South African democratic government, informed by the country's Constitution of 1994 (section 24) and the Agenda 21 of the environmental policy, focuses on to the environment. The broad objective of the environmental policy is stated as being to fulfil the right to a safe, healthy environment and to a life of well-being in this context; growth and development within South Africa will be based on the principles of sustainability. This means that South Africa will be able to empower communities to improve their lives on permanent basis. For this reason, the teaching and learning at secondary school level, which the researcher regards as the final school level for preparation of an environmentally responsible adult, should therefore be strategically directed to EE in a more focused and serious perspective within the South African school curriculum as a stand-alone subject.

Dewey (1961) in his book, *Theories of Education*, states that occasionally children need to be alone and on their own. The argument presented in this study, however, is that learners will learn more by doing things together. By choosing what their peers would like to do, planning their work, helping one another do it, trying out various ways and means of performing the tasks, being involved and discovering what will facilitate the project, comparing and appraising the results, the youngsters would best develop their latent powers, their skill, understanding, self-reliance and cooperative habits. This implies that for EE to appeal to the culture and nature of the secondary school (FET) learners, the learners themselves ought to experience the importance and value of the environment as young responsible citizens focusing on the future generations. One of the ways

curriculum would be to embark on more co-operative and investigative ways of saving the planet - starting within the school, school community, and general environment as demonstrated through Bronfenbrenner's (1994) ecological theory of micro, meso and macro levels of ecological development. This means that EE ought to impact on the following: a) focused EE teaching and learning in the classroom, b) the respect for the school environment and c) the transferring of EE to the home and community is essential. The pedagogy of teaching and learning ought to contribute to the needs of the learners, with reference to environmental sustainability in a community. This can be done by focussing on issues relevant to the sustainability of our immediate environment and the impact it has on the society. More focused approaches in secondary schools (FET) level could embrace EE directed learning clubs, community engagement activities and experiments in caring for the environment, drama productions through visual and performing arts, poetry, debates, rap, art and visual media could also be used as possible multi-modal forms of embracing EE as a vital teaching and learning subject area.

As an integrated sub-section in the curriculum EE does not do justice to its goal of environmental importance and sustainability. However, by presenting EE as a stand-alone subject, where specialised subject, content and pedagogical knowledge is based on ecological teaching and learning education, attitude and skills would shape the young learner to become a responsible citizen in society.

1.3 Significance of the study

This study highlights the weakness in the teaching and learning of EE as an integrated section in the curricula as part of other subjects offered at FET level in secondary schools in South Africa. Its purpose becomes even clearer when one looks at the global trend and concerns on the environmental degradation together with the seriousness global countries display based on EE teaching and learning throughout the schooling system. The study revealed the approaches of other countries to EE and these countries provide useful suggestions on strategies and ideas that impact directly to the teaching and learning of EE as a stand-alone subject. This will be further elaborated on in Chapter two.

ought to receive preferential focus in all secondary curriculum at FET level. The researcher strongly argues that EE ought to be a stand-alone subject and taught from an informed position by a specialized teacher. Effective teaching and learning of EE together with a specific focus not merely as an entity to other school subject, but as an individual of the secondary (FET) school subject in the curriculum. This will impact significantly on the education for poverty alleviation, healthy sustainable environments, thus preserving scarce resources like minerals and water depletion impacting negatively on fauna and flora, something which will ultimately become a serious problem for the community, society and nation.

1.4 Statement of the research problem

This study highlights the magnitude of environmental problems globally (macro-level) and argues that the extent and impact begins at school level (micro-level). The researcher emphasises the Bronfenbrenner (1994) ecological model in the theoretical framework. This model informs this study as the study investigates all the five environmental systems, namely, microsystem (the child's immediate environment like his/her family and the school which influences and interacts with the child), secondly, the mesosystem, which are situations or events of two Microsystems which influence the child's development.

Thirdly, the exosystem can be called the community, the society and culture which impact directly and indirectly to the life of a child. Fourthly, this study will also refer to global or international contributions to the child's development which Bronfenbrenner (1994) call the macrosystem. Lastly, the chronosystem receives attention in this study. This system encompasses the dimension of time as it relates to a child's environments as an aging adult. This study looks at the child at school as a learner right until he/she finishes school and becomes an adult who is expected to act rationally and responsibly in managing the environment. The problem facing generations today and probably in future will be studied and highlighted.

and environmental disasters are experienced and in the depletion of the ozone layer causing climate change, the oil spillages that pollute the marine environments, the industrial emissions that pollute our air, warfare in countries resulting in the neglect and abuse of the environments, natural disasters like tornadoes, hurricanes, volcanoes, tsunamis and such catastrophes that are having devastating effects on a nation.

According to the 1999 National State Report of the Environment of South Africa, South Africa was responsible for about 1.2% of the total global warming effect in 1990 which placed it within the top ten contributing countries in the world. The carbon dioxide Equivalent₂ emission rate per person in South Africa (about 10 tons of carbon dioxide Equivalents per person per year) is above the global average of about 7 tons per person per year. This environmental dilemma cannot be tolerated and efforts to counteract it require seriousness at school based level. EE is one of the measures that can alleviate the catastrophe through education, knowledge, attitudes and skills.

At school (micro level), where this study is located, the researcher argues that there is no measurable and meaningful change in perceptions, behaviours and tendencies of teachers and learners towards obviating the environmental crisis, hence perpetual poverty and diseases in the community are evident. The researcher argues ignorance on the environment is symptomatic of the lack of knowledge, skills and attitudes pertaining to EE. If EE stands alone as a subject it would compel teachers to direct learners' attention and awareness to EE-related problems at a micro (school) and meso (community) level. The teacher as a specialist would educate learners from an informed position about problems of pollution, sanitation and environmental despoliation in the school and school community. This study intends to focus on a school (micro level) and offers pedagogical solutions to this serious problem.

1.5 Research questions

1.5.1 What is the possibility and challenges of EE as a stand-alone subject?

on environmental teaching as a stand-alone
(FET) level?

1.6 Methodology

This is a qualitative study, as it is located in a social scientific context. This means that the study is based on real people within real life situations with reference to education and schooling. In particular, this study is located at FET (Grade 10, 11 and 12), secondary school level. A qualitative study will inform the researcher in relation to teachers' and learners' thoughts about EE as an integrated subject and/or the possibility of EE being a stand-alone FET (Grade 10, 11 and 12) subject in the school curriculum. The study intends to develop an understanding of, an interpretation of teachers' and learners' thoughts, actions, beliefs and knowledge on EE. The interpretive paradigm therefore frames this study; therefore, a case study is best suited to this research.

Yin (2009) defines a case study as *an empirical inquiry about a contemporary phenomenon (e.g. a case), set within its real-world context . especially when the boundaries between phenomenon and context are not clearly evident* (Yin, 2009: p.18). This study will investigate strategies that educators apply when teaching environmental education as an integrated subject. The study will concentrate on one secondary school, reviewing pedagogically its impact on teaching the eco-club, an initiative of Wildlife and Environmental Society of South Africa (WESSA), in conjunction with the Department of Education (DOE). WESSA has adopted this school and established an eco-club which it mentors, as a non-government organisation (NGO). The aim of WESSA is to educate both teachers and learners about the environmental friendly practises presently used worldwide to address environmentally problems. In other words this case study will investigate the attitudes and feelings of teachers and learners on EE as a stand-alone subject.

The researcher chose a case study method as the focus is manifested within a particular context. According to Shavelson and Towne (2002) a case study should address a description that is, what is happening in conventional school teaching and learning and why and how EE is taught as an integrated entity in subject areas such as life sciences, life orientation, geography and agriculture. This method would be what (Yin, 2009) calls a descriptive case study. The researcher

se study method because it favours the collection
pared with relying on derived data+ (Bromley 1986,
p.23).

The planning of this study was easy, as (Adelmann et al, 1980) suggest, the particular circumstances being the minimum disruption to participants, access to people, ownership and release of data is therefore context specific. The advantage of a case study research as a skill is it provides a unique example of real people in real situations, enabling readers to understand ideas more clearly than simply by presenting them with abstract theories or principles. Case studies can penetrate situations in ways that are not always susceptible to numerical analysis, and observe effects in real contexts.

Therefore knowledge gained from this study should be able to inform learners, teachers, teacher training institutions and communities about the real issues that present themselves through effective EE teaching and learning.

1.6.1 Research design

Mouton (2008, p.55) defines a research design as simply, a plan or blueprint of a research. According to Yin (1984, p.28) a research design is the logical sequence that connects the empirical data to a study's initial research questions and ultimately to its conclusions. The researcher has chosen a case study method as a research design for the purposes of this study. Yin (1984) lists four important components of a research design which will impact on the presentation of this study, namely:

- **A study's questions.** The appropriate questions being the how, which this study addresses with regard to the impact on micro, meso and macro levels of study, and the question of why, which the study ought to give greater priority for EE curriculum at FET secondary school level.
- **Its propositions, if any.** As Yin (1984) says each proposition directs attention to something that should be examined, in the case of this study it is the curriculum review that will be studied in terms of integration of EE as

subject. **Its unit of analysis** reviews the CAPS documents and learners use with regard to environmental education.

- **The logic linking data to the proposition.** The study addresses this aspect by using a technique which Yin calls *pattern-matching*, whereby learners' knowledge of environmental issues and challenges for those in the WESSA eco-club and those who are not members of the WESSA eco-club is compared.

The criteria for interpreting the findings will be done through the empirical study after data has been gathered, collated and analysed according to the patterns or themes that manifest themselves (is revealed through the data analysis).

1.6.2 Data collection techniques

Document

The researcher refers to the Curriculum and Policy Statement (CAPS) document to show how EE has been integrated in three school subjects, namely, Life Sciences Tourism and Physical Sciences at FET level. The CAPS document is the Department of Education's (DOE) document which explains what the educator requires to teach and assess in a particular subject.

Population

The site of the study was in one high school in Mdantsane in the East London Education district in the Eastern Cape. In addition WESSA was also piloting the EE programme for the youth environmental awareness at that particular site.

Interviews

Semi-structured interviews for teachers

The researcher interviewed teachers who taught specifically those subjects (in the FET level) where EE is integrated. They were life sciences, physical science and

...hing each subject area per phase (FET) were
...views were tape-recorded and questions focussed
on the manner that those teachers taught and assessed the integrated EE part in
the mentioned school subjects.

Semi-structured interviews for learners

The researcher interviewed two groups of learners. The first group consisted of the three WESSA eco club members. Those learners were interviewed separately from the respective grades 10, 11 and 12. Each learner was doing the already mentioned four subjects that reflect the integration of EE in their curricula. The second group consisted of three non-WESSA eco club learners. Those learners were interviewed separately, representing each of the three grades, namely grade 10, 11 and 12 and three subject areas respectively. In total six learners were interviewed and tape-recorded. The focus of the learners' interviews were similar to the teachers' as the study wanted to ascertain the thinking and responses in harmony to the asked questions for both groups.

1.6.3 Proposed interview questions for both teachers and learners

Question 1: Do you think your teachers pay attention to environmental education?
Why?

Question 2: Do you think EE must be a standalone subject? Why?

Question 3: Do you think a specialised teacher is required for environmental education? Why?

1.7 Reliability and validity of interviews

Neuman (1997, p.138) defines reliability as meaning that the information provided by indicators does not vary as a result of characteristics of the indicator, instrument, or measurement device itself. Cohen (2000, p.117) describes reliability as essentially a synonym for consistency and replicability concerned with precision and accuracy. In the case of this study the main indicators are the interviews (semi-structured) which the interviewer presented without any manipulation. The researcher presented the interpretations to both the teachers and learners so as to confirm the data collected responses to them as correct.



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tells us whether an indicator actually captures the which we are interested+ (Neuman, 1997). Validity of the study goes hand in hand with its reliability. A valid study should be reliable and vice versa.

Bless, Higson and Smith (2000, p.80) differentiate between internal and external reliability. Internal reliability is concerned with the question, %to the observed changes in the dependant variables actually relate to changes in the independent variable?+ External validity asks if the results obtained from the sample of participants apply to all subjects in the population being studied.

Furthermore, Neuman (1997, p.142) states when he differentiates among four types of validity measurement as face, content, criterion and construct, that the researcher will measure validity through face confirmation. Face validity according to Neuman (1997), %is a judgement by the scientific community that the indicator really measures the construct.+ This means that on the face of it, it answers whether the people believe that the definition and method of measurement fit. The study presented captured narratives as a report back for validity and reliability purposes.

1.8 Data analysis

Document

The DOE document for CAPS was analysed in order to ascertain the integration of EE content material at FET level in Grade 10, 11 and 12. Three school subjects namely life sciences, tourism and physical sciences were investigated and supported by the interviews of the three teachers who were teaching these school subjects.

Teachers' interviews

The researcher analysed the interview narratives of teachers according to specific themes namely (1) EE content knowledge, (2) teachers' teaching strategies and (3) personal competence of teaching EE in an integrated way. Furthermore, the analysis of the teachers' contribution and challenges to EE perceived as a stand-



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in Grade 10, 11 and 12 levels informed this study. of methods and ability of teaching EE.

Learner interviews

The researcher compared the learners' responses, and knowledge of the environment by thematising the following (1) importance of EE (2) content knowledge of EE (3) knowledge of comparative tabulated form of WESSA eco club members versus non WESSA eco club members.

1.9 Ethical Considerations

The researcher obtained the ethics informed consent to conduct the study, as a requirement from the University of Fort Hare (UFH). A consent letter informing the school principal of the study and requesting permission to undertake the study in the school was written. Furthermore, the principal was informed as to which teachers and learners were participating in the study. Moreover, the teachers and learners who were selected to participate in the study were given a letter (to sign) for the study requesting their participation in the research. The other letter was submitted to the East London office of WESSA in Beacon Bay. The application to undertake research in a public school was applied for through the Department of Education (DoE).

The researcher observed and respected the Ethics code of conduct of privacy, confidentiality, anonymity when undertaking research of this nature. As the researcher was an insider/outsider researcher, (explained below) the professional ethical principles were applied to prevent bias. The confirmation of reliability, validity and accuracy of the interviews were tape recorded and the interpretation of the data collected was verified with the teachers and learners. The participants could withdraw their participation at any time without prejudice.

According to Bryman and Burgess (2009) the researcher can either be an insider, sharing the characteristic, role, or experience under study with the participants, while the outsider stays out of the participants. He shares no commonality with the studied population.

Asselin (2003) has suggested that it is best for the insider researcher to gather data with her or his eyes open+assuming that she or he knows nothing about the phenomenon being studied. Rose (1985, p. 77) concurred that, there is no neutrality. There is only greater or less awareness of one's biases and if you do not appreciate the force of what you're leaving out, you are not fully in command of what you're doing.+

The insider-outsider, on the other hand, investigates anyone whether a participant, team, friend or not. The researcher in this study was an insider-outsider as he was a teacher in the school studied.

1.11 Conclusion

This chapter alluded to the background, significance, statement of the problem, questions, methodology and ethical considerations of the study. Chapter outlines are to follow.

1.12 Chapter Outlines

Chapter 1: Gives a brief overview of the study with relation to the background, significance, problem statement, research questions, literature review, methodology, research design and ethical procedures required.

Chapter 2: Review of relevant literature in environmental education, with emphasis on the theoretical, ecological model of Bronfenbrenner.

Chapter 3: Since the study is a case study research, data will be collected in one school piloting the WESSA program of environmental education. Data will be

with teachers and learners in the FET level, namely, using the case studies techniques and a CAPS document of the Department of Basic Education.

Chapter 4: The interpretation of data will be shaped by the interviews and CAPS document analysis of the data collected from chapter 3.

Chapter 5: The conclusion of the study in relation to the findings, recommendations, limitations and further research based on this topic will be discussed in this closing chapter.

THE RESEARCH STUDY

2.1 Introduction

Schreiber and Kimberly (2011) define literature review as "a thorough, critical analysis of others' thoughts, theories and research on a particular subject (EE in the case of this study) that should eventually lead to your research questions" (Schreiber and Kimberly, 2011, p.32).

The purpose of a literature review is to investigate what other academics are saying about the subject (EE). In this study the researcher reviewed literature and journal articles on the theoretical framework and specifically, on Bronfenbrenner's ecological model, which forms the theoretical basis of this study, as mentioned in Chapter 1.

The researcher reviewed journal articles on the integration of environmental education and its shortcomings in South Africa. The researcher also draws on information available, especially on national and global perspectives on EE, as a point of departure for this study.

2.2 Theoretical framework

This study is theoretically framed on Bronfenbrenner's ecological theory which advocates that an individual's development is reflective of five environmental systems, namely, microsystem, mesosystem, exosystem, macrosystem, and chronosystem (Bronfenbrenner, 1986). These systems will be presented and defined in terms of Bronfenbrenner's (1994) ecological theory with reference to the terminology of the **microsystem** as being the family, classroom, or systems in the immediate environment in which a person is operating. The **mesosystem** is the interaction of two microsystems such as the connection between a child's home and school. The **exosystem** is an environment in which an individual is indirectly involved and is external to his experience, yet it affects him anyway i.e. a child's parents' workplace. The **macrosystem** is the larger cultural context such as the ideas and beliefs of world countries towards EE.

The successful implementation of EE begins with a focus towards integrating Bronfenbrenner's ecological systems as a theoretical basis for this study. In other words, the need of human at each ecological level is addressed succinctly to contribute to a sustainable environment. This will be discussed in depth to demonstrate the relevance of this theory to this particular study.



Figure 2.1: A visual presentation of Bronfenbrenner's ecological model (Bronfenbrenner, 1986)

Christensen, who clearly endorses the value of Bronfenbrenner's Development Ecology Model, comments that the theory deals with relationships between people and the subsystems which constitute our lives and our world+ (Christensen, 2010). He acknowledges that people develop within a context. Against this background, the researcher contends that learners who are consistently influenced within the environmental context are likely to learn and teach others positively. For purpose of this study the emphasis will be on the MICROSYSTEM that consequently has a ripple effect on the meso, exo and macrosystems.

The illustration will now be succinctly unpacked.

The diagram above alludes to the importance and value of EE firstly at a microsystems level (refer to the inner circle indicating the child's relationship with school, family, church, neighbourhood, peers and health services). It attempts to

ful and sustainable education can be achieved
the youth in environmental awareness not just at
school but even in their communities.

Other authors cite examples of communities (micro-level) who do gardening while assisted by learners as prescribed in the school curriculum. They suggest that this practice does not just help learners to be stakeholders in their own communities but it also seems to encourage communities to commit themselves to greening the environment. These authors contend that other programs focus on civic activism and participatory action which are related to the monitoring of the environment, city community gardening and neighbourhood revitalization (Schulsler & Krasny, 2007).

The mesosystem as shown in the diagram comprises the linkages and processes taking place between two or more settings containing the young person. In other works it shows the relation between family and school, school and church, etc. The mesosystem is in essence a system of Microsystems.

The third circle in the diagram is the exosystem. (Paquette and Ryan, 2001) write that the exosystem may be considered as the outermost layer in the child's environment. It comprises of cultural values, customs, and laws (Berk, 2000). The effects of larger principles defined by the macrosystem have a cascading influence throughout the interactions of all other layers. For example, if it is the belief of the culture that parents should be solely responsible for raising their children, that culture is less likely to provide resources to help parents. This, in turn, affects the structures in which the parents function. The parents' ability or inability to carry out that responsibility toward their child within the context of the child's microsystem is likewise affected.

The macrosystem consists of the overarching pattern of micro, meso and exosystems characteristic of a given culture or subculture, with particular reference to the belief systems, bodies of knowledge, material resources, customs, life-styles, opportunity structures, hazards, and life course options that are embedded in each of these broader systems. The macrosystem may be thought as a blueprint for a particular culture or subculture+ (Bronfenbrenner, 1994, p.40). This therefore means as shown in the diagram, the macrosystems

child and other people locally and beyond, that the issues. The researcher in this study will refer to international practices of EE to illustrate this fact.

The last layer in the drawing shows the chronosystem which reflects on the time factor of socio-historical conditions and life events. (Härkönen, 2003) describes the **chronosystem** as a description of the evolution, development or stream of development of the external systems in time.

In conclusion the study emphasises the microsystem, but it also shows how it is related to other systems. In other words no single system can sustain the development of a child ecologically alone from other systems.

Criticism of Bronfenbrenner's Ecological Theory

Bronfenbrenner believes that a child's biology is a primary environment that influences his development that is his immediate family and community. He says if there is any change or conflict in any one of the ecological layers the development will be rippled. That implies that the child must not just look at his immediate environment only but also at the possibility of interaction with the larger environment as well. The world around the child helps or hinders the child's development. Bronfenbrenner also alludes to the level of support by the public to the struggling families as being another deficit-factor.

Bronfenbrenner also sees the instability and unpredictability of family life which has been created by our economy as destructive to a child's development. He claims that children do not have the constant mutual interaction as adults are busy working throughout the day. Therefore he feels that schools and teachers have to provide that stable long-term relationship which, unfortunately, may be difficult as they do not stay with children for a long time.

Finally, he pleads for the lobbying of political and economic policies that support the importance of parents' roles in their children's development. The researcher also shares (Dede and Johnson, 2001) sentiments because the success of environmental education depends entirely on this complex interaction of Bronfenbrenner's layers. Each layer must talk to the next.

in the 21st century

The researcher paraphrased a paper from the Journal of Environmental Education volume 25 of 2008 on recommendations regarding the implementation of EE as concluded at the 4th International Conference on Environmental Education, held in Ahmedabad, India, on 26-28 November 2007. It should be noted and appreciated most of its content has been copied as it is, unchanged as the researcher felt that it would lose its meaning and purpose.

From Tbilisi to Ahmedabad

Recommendations guiding EE were first developed in Tbilisi, Georgia in 1977. This was followed by the 1987 Moscow conference which recommended institutional strategies and action plans to strengthen EE. In 1997 in Thessaloniki, Greece the stakeholders again met and debated EE and sustainable development then in 2002 the World Summit on Sustainable Development, a United Nations Decade on Education for Sustainable Development (UNDESD), 2005-2014 was launched, based on earlier recommendations in Chapter 36 of *Agenda 21*. The 4th International Conference on Environmental Education was held in Ahmedabad, India in 2007 with its basis on UNDESD.

How Environmental Education evolved from 1977 to 2007

The delegates in Tbilisi in 1977 recommended that EE should be lifelong, integrated, active and inclusive. This conference also acknowledged that EE should address the complex and multi-dimensional issues of the environment. This marked the beginning of the realisation that EE is basically education for sustainable development (ESD) and emphasised important listed changes in EE namely:

- Changes in thinking about education and learning resulting to changes in pedagogy and methods of teaching and learning of EE.
- Changes in leadership and partnerships from the two agencies of UNESCO and UNEP to several international and national NGOs with universities also playing an active role.

ing the environment-development relationship. The
e focused on socio-economic development while in
Greece 1997 conference stressed on poverty education for sustainability.
At present the focus is on inter-relationships among environment, society,
culture and economics. We now see issues of equity and social justice
becoming prominent. EE is also concerned with risk and disaster
management issues as the world faces climate change challenges.

- Changes in communications and access to knowledge. Internet emerged as far back as 1997 and today it has become the most important tool of communication and provider of knowledge and education. This means South Africa like many other international countries should follow the example by implementing technology at its best in (environmental) education.
- Changes in emphasis on issues. In Tbilisi focus was on pollution and population growth, in 1987 it was on poverty and sustainable development and in 1997 and today on global climate change. Countries in their political agenda have realized that global climate change has contributed to issues of health, the right to education, poverty, pollution, business responsibility, consumption and production, biodiversity loss, water quality and quantity, energy, gender and environmental ethics, for instance.
- Changes in sites of learning and participation in learning. In 1987 schools and environmental organizations were the only EE learning sites, but in 1997 people in business, local government, community development and other areas joined forces. Presently EE and ESD lead in the health and disaster relief sectors. New learning sites are complemented by new media and methodologies to widen the spectrum and influence of EE to various countries.

The changes in EE have seen the implementation of EE programmes projects, EE networks and partnerships have been formed, conferences, workshops and meetings on EE have been held and EE in general has undergone a systematic metamorphosis which South Africa is part of. It is however disappointing that

The world still experience all these forms of inequity, justice, South Africa included. The planet has gone even worse with this climate change crisis of which developed countries mainly are culprits.

A New Sense of Urgency and a Need for a New Paradigm

The researcher contends that only sustainable EE can bring about the change that we need as robustly as possible. This requires a paradigm shift in our strategy of teaching and learning EE. This study in particular is deliberating on that change when it calls for the complete autonomy and focus on EE as a stand-alone subject.

The world, according to UNESCO, UNEP and Government of India (2007), requires the specific changes that the recommendations (made in Ahmedabab) suggest, but demands fundamental changes in the creation, transmission and application of knowledge in all spheres and at all levels.

The researcher agrees with the initiatives made in the 4th International Environmental Education Conference as quoted below:

- Reaffirms the recommendations made by the 3rd International Environmental Education Conference and the United Nationsq *International Implementation Scheme* for the Decade of Education for Sustainable Development that education must be recognised as an effective driver of change in conjunction with other drivers, such as ethical actions, government policies and regulations, economic incentives and technology.
- Applauds governments that have instituted policies and frameworks for environmental education and ESD, and urges all countries to give greater priority to funding and supporting the implementation these policies and frameworks. We urge citizens to hold governments accountable for this implementation.
- Supports the work of communities, groups and institutions that are working towards a secure and sustainable world, and urge these groups to build on and extend their work within a broad partnership framework.

ch continuously for new paradigms and innovations answers for creating sustainable futures. We must stimulate learners in all sectors of society to envision and create new development paths, networks and social practices to achieve sustainability.

- Urges everyone to learn from history, nature and natural systems to develop understandings of how to respect and live within the limits of nature, and to evolve social, production, technological and economic systems that are creative, innovative, equitable and sustainable.
- Promotes education that builds capacity to engage critically with contemporary (unsustainable) development discourses and practices and that nurtures and strengthens dialogue and advocacy skills.
- Endorses education for the achievement of equitable and sustainable livelihoods for all people. Such education develops the knowledge, skills and talents necessary for participating with dignity in a range of sustainable livelihood strategies (including employment, self-employment, entrepreneurship and other forms of work). Innovative livelihood strategies, not based on exploitation of nature or other people, need to be developed in all societies around the globe.
- Endorses Gandhi's (1993) words that 'there is enough in the world for everyone's need, but not for anyone's greed' and recognises that there are people who are still unable to meet their basic needs, people living within their needs, and systems that are turning greed into need. Environmental education must recognise and critically engage the tension between needs and greed.
- Encourages the use of monitoring and evaluation practices that are designed to be a valuable learning process for all involved. A learning-oriented view of monitoring and evaluation can build capacity as well as identify best practices.
- Supports the concept of a Planetary Fund for Environmental Education for building sustainable societies through the development of policies, programmes and initiatives that are equitable, and that are supported and sustained over the long term.



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ested changes in several areas of thinking and

A. Change thinking about education and learning

- Promote earth system literacy and systemic thinking skills in EE to understand the nature of interdependency within the human family, the biotic community and the planet's life-sustaining processes that explain the causes and solutions for the critical challenges we face.
- Orient education towards preparing people to mitigate, live with and adapt to a new risk environment given the way that climate and ecosystem functions are changing.
- Redirect education, which is a social process, towards bringing change in lifestyles (in consonance with sustainable consumption and production), building social cohesion and respect for cultural diversity, directing organisational practices towards sustainability and towards including all people in all walks of life at all stages of the lifelong learning process.
- Take an integrated approach to environmental education so that it can be a process of transformation. Teaching and learning should make use of diverse methodologies and be sufficiently flexible to cater to the various needs of learners in different cultures, contexts and nations. Such teaching and learning should incorporate ethical and critical reflection and creative thinking and learning approaches (such as those that characterise arts, design and creative cultural fields) and be inclusive of various approaches to learning. Educators and learners should explore and draw on local environments and knowledge critically and creatively to inform their work.
- Use education to enhance dialogue among educators, community members and leaders, and empower and encourage people to actively participate in civil society. Develop capacity to engage with wider power relations and the effects of power in society.
- Employ pedagogies in schools and other formal learning institutions as a means of integrating EE and ESD principles and transformative learning approaches

curriculum and all aspects of the school/formal learning curriculum. It will develop clear direction for formal education curriculum development to enhance progression in environmental learning over time.

- Use non-formal education practices to enhance ties and strengthen the relationship between formal education and the local community.
- Help people to review values in relation to policy and behaviour through mandatory interdisciplinary and/or trans-disciplinary courses of learning for sustainability that employs new research and pedagogical approaches. Such courses can be developed (for formal and non-formal learning contexts), shared and reviewed within a learning network approach.
- Design monitoring and evaluation of EE and sustainability practices in such a way that these processes can become a valuable learning process for all involved. A learning-oriented view of monitoring and evaluation has the potential to build capacity for critically reflective practices and educational and social change.

B. Change patterns of leadership and partnership formation

- Base partnerships on a common vision and principles of equity, the ultimate goal of which is the benefit of communities, the public good and the sustainability of life.
- Bridge gaps between different groups, ministries, sectors (particularly public-private), student leadership and youth movements, as well as other stakeholders through new partnerships that develop understandings and actions to achieve sustainable practices.
- Encourage new initiatives and organisations where needed, and work towards building synergies through, for example, the use of active coalitions.
- Generate educational practices and research that lead to solutions for cross-border environmental problems and stronger environmental education and ESD practices at local, national and global levels through inter-country and regional exchanges and cooperative support within a partnership framework.

relationship based on accountability, and the modelling and demonstration of new practices.

- Support the media and other communication and educational organisations to embrace sustainability practices and to lead by example.
- Implement and develop strategies that enable decision-makers to make informed and accountable evidence-based decisions in the interest of the public good and the sustainability of life.
- Encourage interested countries from different regions to work in collaboration with UNESCO, UNEP and other UN organisations to continue providing the leadership necessary to exchange knowledge and experience and identify practical ways of working together, including the development of national policy frameworks, pilot programmes and demonstration projects for wider benefit.

C. Change how we understand environmental issues

- Base EE on an understanding of the inter-related dynamics of environment, society, culture and economics, and an understanding of the nature and causes of risks and issues that impact on socio-ecological relations, systems and structures at local, national and global levels.
- Recognise the multi-faceted nature of environmental issues, and mainstream them across all disciplines and sectors as a priority.
- Use education to develop capacity for democratic participation in Earth governance through building understandings of the relationship between ethical principles (such as those outlined in the Earth Charter), legal instruments, multilateral agreements and national policy frameworks in all areas related to sustainable development.
- Integrate education processes as a substantive part of environmental management and sustainable development plans and strategies in all sectors and organisations concerned with environmental change and sustainable development.

new practices from communities and educational about conservation, innovation and transformation that can be part of a knowledge commons for wider adaptation and/or replication to broaden knowledge of environmental issues and risks and how to respond to them.

D. Change how we conceptualise and engage with the environment–development relationship

- Orient thinking and educational practices that deal with the environment towards concepts and practices of *sufficiency* and *sensibility*, in addition to the current focus on *efficiency*.
- Integrate a philosophy of care (for oneself, one another, future generations and the larger living world), peace, truth, justice, tolerance and kindness amongst people, nations and generations in ways that are informed by values such as those presented in the Earth Charter into environmental education and ESD actions and practices. Also, acknowledge the need for critical ethical reflection in education.
- Treat environment as intrinsic to development decisions and not as externality. Educators should engage with decision-makers and other stakeholders to include full environmental and social cost accounting in development decisions so all can learn how to avoid past developmental mistakes.
- Use EE to build capacity to engage critically with contemporary (unsustainable) development discourses and practices, particularly amongst the poor, marginalised and vulnerable, and amongst development thinkers and planners.
- Build capacity for achieving equitable and sustainable livelihoods, and the knowledge, skills and talents necessary for participation in a range of livelihood strategies (including work, self-employment, entrepreneurship and new forms of work). New, more sustainable livelihood strategies are required in all parts of the world, amongst rich and poor.

to the development agenda, on an *equal par* with and provide adequate resources for the education and learning processes needed for this mainstreaming.

- Bridge the gap between environment and development through effective use of information and research findings, collaborative planning processes (e.g. scenario planning strategies), and systemic and critical thinking.

E. Change how knowledge is viewed and our communication practices

- Adapt and use systemic, critical and creative thinking and holistic approaches to knowledge that are grounded in sustainability practices to facilitate ESD in schools, communities and societies.
- Value traditional wisdom and indigenous knowledge for their potential contribution to re-thinking practices and opportunities for sustainability. Accept a multiplicity of knowledge systems as legitimate in the educational process since many of the solutions may be inherent in knowledge systems practiced in indigenous and traditional systems, now and historically.
- Strengthen and extend educational processes based on exploration, negotiation, deliberation and dealing with risks and challenges, as these are the basis of a critical mass of people's and community knowledge and coping systems.
- Value conflict, dissonance and diverse points of view in the learning process as a legitimate basis for knowledge creation and learning. Use active networks to link up and juxtapose a plurality of sources and points of view.
- Provide citizens and learners with a dynamic space to share visions, educational practices and resources through applications of information and communication technology (ICT) and other communication mechanisms, systems of portals and other decentralised communication strategies (e.g. radio). Through this, facilitate joint monitoring and evaluation of the status of the Earth, the status of human and non-human governance processes and provide a self-validating and democratic knowledge commons. Make efforts to link up the knowledge of communities not digitally connected to ensure inclusivity in the creation of such a knowledge commons.

...acy (including dialogue) skills to enable better
... regional, national, global) and critical and positive
approaches to change. Identify and develop opportunities for developing advocacy
skills for change towards sustainability goals.

F. Change sites of learning and participation patterns and practices

- Review and change existing educational structures, roles and forms to allow for effective environmental education and ESD practices.
- Create and strengthen new opportunities for participation in sustainability practices through integrated communication between various stakeholders including the educators, media, communities, men and women and youth groups.
- Create and extend educational efforts to mobilise diverse groups to participate in planning at different levels to regain control over resources to meet livelihood needs and ensure sustainability of ecological systems.
- Strengthen and extend learning capability through participation in communities of practice and networks oriented to existing and new sustainability practices.
- Carefully design and agree upon the components of assessment and evaluation as these are interconnected. All stakeholders should be part of this process so that criteria and processes are transparent, inclusive and change oriented.
- Integrate emancipatory, participatory and other transformative research approaches into international, national and institutional research agendas.
- Emphasise and value the role of teacher education as a catalyst for orienting educators to sustainability practices and real world concerns.
- Draw on the surrounding socio-ecological and cultural environment as a setting for learning and support learning in these settings with appropriate mediation practices.
- Contribute directly to hands-on action and change through environmental education and ESD practice. These recommendations were adopted by the



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caution and caution against viewing curriculum
ic.

The view of the environment in Lesotho has gradually changed from one of exploitation to one of conservation and this may be attributed to the formalisation of environmental learning. At this point environment was viewed in the context of the biophysical environment. At an international level, EE gained prominence as numerous conferences and workshops attempted to define EE in broader terms (UNEP 1972). This culminated in the Tbilisi declaration which explicitly stated the objectives of EE, namely awareness, knowledge, attitudes, skills and participation (UNESCO 1977).

Development in environmental learning came with the view that EE also encompassed socio-ecological and socio-cultural dimensions which cannot be ignored (O'Donoghue & Russo, 2004). This was the foundation for the emergence of the concept of education for sustainable development. The present view of education for sustainable development promotes and encourages action-based environmental learning and requires teachers to be active in transforming learners' attitudes and values by involving them in addressing environmental problems in their communities.

The curriculum of EE in Lesotho emphasises changing attitudes in problem solving skills in their communities. It is community based and teachers are expected to inculcate this culture to the learners. In Lesotho, like in South Africa, EE has been integrated in other subjects and weakened or reduced to biophysical aspects of the curriculum with little reference to other facets of the environment.

Learning about, in and for the environment

Molapo et al. (2012) contend that environmental learning has been identified as having three dimensions: learning about, learning in and learning for the environment. Learning about the environment focuses on key environmental knowledge and understanding of the ecological functioning of the environment. Learning in the environment encourages interactions and experiences in the environment, enabling learners to develop positive attitudes and values towards stewardship of the environment. These learners learn to protect, save and

holistically as encompassing the biophysical, environment (O'Donoghue & Van Rensburg, 1995); learning for the environment may be viewed as action towards a radical transformation of the environment. However, the Lesotho national curriculum has a narrow view of the environment, focusing mainly on the biophysical. Molapo et al. (2012) defined education for the environment as action towards solving problems in the natural environment. The following information therefore focuses on the Lesotho national curriculum which is scholarly literature that informs this study.

2.4.2 Methodology

The researchers used both the qualitative and quantitative methods. They studied three teachers and learners in three schools; hence their approach is that of a case study. They collected data on teachers aimed at finding perceptions of teachers on the intended curriculum.

Data instruments used were content analysis of the secondary school, classroom observations, and teacher interviews.

2.4.3 Analysis

The intended curriculum

The official curriculum documents from the National Curriculum Development Centre (NCDC) (2003) and the University of Cambridge International Examinations (CIE) were analysed. The relevant sections were the objectives and content topics for junior secondary science as well as aims and content topics for senior secondary biology. Only those aims, objectives and content topics that made reference to the natural environment were selected. To enable us to categorise environmental learning into learning about, in and for the environment, we had to analyse the associated learning outcomes of every content topic as the content was just presented as a list of topics. The Table 2.1 (below) gives a summary of the criteria used for deciding whether objectives and learning outcomes pertained to learning about, in or for the environment.

conducted using the same three categories about, the curriculum did not include objectives to describe the intentions of the curriculum.

Table 2.1: Criteria for allocating objectives and/or learning outcomes to the categories about, in or for the environment

Category	Description	Key verbs and/or verb-noun combinations	Example objective/aim	Example learning outcome
About	Knowledge and understanding of the environment	Know, demonstrate knowledge, identify (where the object is clearly theoretical), explain	Demonstrate the knowledge and understanding of interactions between living things with their environment	List agents of soil erosion
In	Encouraging interactions and experiences in the environment for the development of positive attitudes and values towards	Demonstrate or develop awareness and appreciation, demonstrate positive attitudes and values; identify examples of good and bad practice in the environment	Demonstrate positive attitude and values in caring for the environment	Identify how human beings endanger the environment through dumping and pollution
For	Learners taking action for the protection and conservation of the environment; active and informed participants in environmental decision-making	Initiate, participate, demonstrate (where the object is clearly practical), apply knowledge in practical contexts	Be able to participate appropriately in environmental activities	Demonstrate methods of controlling soil erosion

A number of themes were identified that would allow interpretation of a teacher's classroom practice and an observation schedule was compiled to assist the observer in focusing on different aspects of environmental learning.

Results

Analysis of the junior secondary science curriculum and the senior secondary biology curriculum provided information as to what constitutes the intended curriculum in Lesotho schools with regard to environmental learning. Analysis of six teachers' classroom practice and of the interviews conducted with the teachers produced data concerning the implementation of the intended curriculum (Molapo et al, 2012).

Intended curriculum

The biophysical environment was found in the aims, objectives and content topics with their related learning outcomes of each curriculum. The intention is that learners carry out activities for a sustainable environment armed with the knowledge about the environment. These three objectives were interpreted as theoretical exercises that could be done through pictures in a book, or identified by memorising causes of environmental changes. There was, however, no indication that learning would lead to the development of positive attitudes and values, as research has shown it often happens when learning in the environment occurs (Gurevitz, 2000).

Objectives refer to learning for the environment and it is hoped that Science would be one of the subjects that makes provision for learners to act on issues in the environment and to solve environmental problems.

The aims stated in the senior secondary schools which refer to learning in the environment were emphasised with the purpose of raising awareness for the learners to take action and care for the environment. However, the teachers were still left in the dark as they required more guidance in carrying out that task.

Classroom observations

Observations of six teachers in action as well as subsequent interviews produced data with regard to the implementation and interpretation of the intended curriculum. These teachers were observed teaching junior secondary science classes senior secondary biology classes.

They were all teaching the same topics. Each teacher was observed several times as topics could not be taught in one lesson. Categories provided information as to what teachers emphasised in their teaching. Learners learnt to read directly from the textbook. This was followed by short, closed-ended questions, like: What is soil erosion? What are the causes of soil erosion? These questions were based on factual recall and are the type of questions about the environment that may be asked in tests or examinations.

There were also questions that required understanding, for example, Ntina asked learners to explain how running water causes soil erosion. Learners' involvement was in reading and answering the teacher's questions, for those who were selected to read or give responses. While both lessons observed covered topics on the environment, Ntina's lessons were aimed at developing knowledge about the environment. There was little opportunity for learners to discuss environmental issues or to engage in problem-solving activities. As the lessons were classroom-based, learners never had the opportunity to explore environmental problems outside the classroom. Learners' everyday knowledge was often used, for example, when they were asked if they had seen the sign *Collect-a-Can*. Ntina continued to tell them that the cans are collected to be used again, drawing into the lesson some of the learners' everyday experiences.

Bokang's lessons were conducted in the classroom using question/answer discussions with learners, in addition to direct instruction. She asked simple factual type questions that related to everyday life. For example, she asked for things that pollute land and the responses were papers, dust in the classrooms, tins, peels, plastics, bottles and boxes.

Learners also learnt new things in the lessons such as paper production. There was some indication that learners were able to apply knowledge learnt when they

plastic bags left lying around. As with Ntina's lessons, all lessons focused on the environment. These lessons were also aimed at developing knowledge with regard to the environment. Bokanga's lessons provided more opportunity for learners to discuss environmental issues, but no opportunity to engage in problem-solving activities. Like Ntina, the lessons were classroom-based and learners never had the opportunity to explore environmental problems outside the classroom.

Some of the questions required some discussion like explaining how water causes soil erosion. Learners were also taught about paper production although their schools were still littered. Very little attention was given to action-based learning.

Learners also learned new things in the lessons when taught about paper production. There was some indication that learners were able to apply knowledge learnt when they explained the dangers of plastic bags left lying around. Many topics on the environment were covered. These lessons were also aimed at developing knowledge with regard to the environment but again without any exposure to outdoor activities and problem-solving activities.

One lesson also addressed social issues like the learner who complained about dagga abuse.

Another teacher taught about pollution and the dangers of fire as a pollutant. Such lessons were just pumping out knowledge to the learners and not necessarily about and in the environment.

The implemented curriculum: teacher interviews

Interviews with teachers were conducted in order to understand the reasons for doing what they did and to gain a better understanding of why they did what they did. These interviews focused on getting responses from teachers regarding their teaching about, in and for the environment. The researchers wanted to understand why teachers did not use the outdoors when teaching topics related to the environment. It was also important to establish the teachers' views concerning behavioural changes within the context of their teaching strategies. In addition, the researchers wanted to know whether teachers thought their teaching strategies were appropriate or not appropriate towards the environment.

reasons for teaching the way they did. Many of the ways in which they interpreted the curriculum which they justified as according to curriculum guidelines rather than on the basis of taking a more active approach to environmental education.

Objective constraints

A number of reasons teachers gave were classified as objective constraints to teaching in or for the environment. Which teachers could not change within the context of teaching and learning in Lesotho schools?

Things like time were identified by all teachers as a constraint. Another factor was costs; hence parents could not afford trips. Examination preparation forced teachers to teach about the environment. Assessment was done through written examinations and teachers had to train learners for the process. Public perception on low performing school was immensely negative.

Teachers in Lesotho taught both contextualised and decontextualised curriculum topics in the same manner, whether the curriculum was local or not. They appeared to welcome the de-contextualised topics in the syllabus as it exonerated them from implementing a more action-oriented approach to their teaching thus ignoring that curriculum content is a given and teachers have to operate within those constraints without choice.

Teachers favoured the involvement of parents in their children's learning: Parents were required to play a role of developing responsible citizens, and teachers alone could not do that. Teachers taught school subject while parents were expected to teach proper behaviour towards the environment. Teachers felt that parents were asking too much from them, even in what was their responsibility.

Subjective constraints

Subjective constraints were the views and attitudes of teachers that determine whether a particular aspect is considered a constraint or not, such as overcrowded classes for teachers who taught about the environment and that was a drawback in outdoor education as big numbers could not be managed easily.

unfamiliarity of teachers with their environment: environment because, according to them, learners observed environmental problems on a daily basis and were therefore familiar with their environment. Teachers saw value in staying in classrooms. Content knowledge to teachers took precedence over acquisition of skills.

2.4.4 Discussion and conclusion

Lesotho's intended national curriculum envisages learners who are multi-skilled to address the vulnerable Lesotho environment and who have the ability to participate in the country's decisions as critical and action-oriented citizens (NCDC, 2003). It also expects learners to be well informed about national and global environmental problems. Most importantly, the curriculum envisages learners who have the expertise, knowledge and ego to solve environmental problems.

Classroom practice should engage the learner as a whole: mind, elaborating comprehensive knowledge and skills (cognitive domain) and the soul (affective domain), develop the personal and social attitudes and values (NCDC 2003, p.22).

The intended curriculum therefore recognised and took into account global and national sustainable development aspirations. The curriculum goals are aligned with the goals of Agenda 21 developed at the Rio Earth Summit (1992). Children should be incorporated into all policies for environment and development at local, regional and national levels and, in particular, for the involvement of the youth in decision-making processes (Ansell 2006, p.115-35). These goals are encapsulated, to a large extent, in the aims and objectives of both curricula.

The three researchers concluded that the interviews with teachers experienced a number of constraints that limited their ability to engage with action-oriented approaches to environmental learning. Objective constraints, which are strikingly similar to constraints identified in Britain (Cotton 2006a, p.67-93) prevent teachers from teaching in and for the environment.

The subjective constraints discussed in this article are, however, different from the subjective constraints described by Cotton (2006a) in that the teachers in this

change learners' attitudes and values, but they could be done with learners. Both classroom observations and interviews revealed that teachers relied on content knowledge in environmental education. They relied on the traditional chalk-and-talk approach in their teaching and unfortunately, that was encouraged in the learning outcomes of both syllabi. They held the belief that outdoor education would make very little or no difference as they knew problems in their environment. This notion needs to be changed. While Cotton (2006a) reports on the emphasis on learning for the environment in the international arena.

This attitude revealed teachers' poor understanding of experiential learning as learners should not just observe the environmental issues but also engage in activities related to the problem. That will help them not to rely solely on absorbing knowledge but, instead, towards developing positive attitudes towards the environment

The findings of this study raise a number of important points namely:

- Teachers are not entirely to blame for their failure to implement the intended curriculum. Failure in curriculum implementation is often due to the incompatibility between expectations of the curriculum developers and the practical demands of classroom teaching. New curricula often present views and strategies that do not match teachers' views and strategies (Cotton 2006a, p. 67-83, Jansen 2001, p. 242-6). In an EE context, to overcome this would require appropriate environmental learning for teachers. Unless teachers fully understand what it means to learn about, in and for the environment, it is unlikely that they will be able to promote environmental education in Lesotho schools.
- The Lesotho curriculum does not make clear how teachers should educate for the environment. To achieve this, the intended curriculum should provide stronger guidelines for environmental education teaching and learning through action and problem-solving methods.
- This Lesotho study helped to shape the focus and content for this particular research study.

in the South African school curriculum

Addressing the EE issue in the school curriculum Le Grange (2012) gives suggestions on how environmental education could overcome some of the challenges like global warming by appealing to the moral regeneration known as humanity or *ubuntu* in the classroom. He tells us that his article had a desire to address the question of humanity in the classroom by tracing how moral obligation is defined from disparate environmentalist (or non-environmentalist) positions. Le Grange further explores what insights the traditional African value, *ubuntu*, might bring to our understanding of moral obligation vis-à-vis non-human nature. Moreover, implications for moral education guided by *ubuntu* will be explored (Le Grange, 2012).

Moral obligation may be one strategy that may address the problem regarding EE as one of the stand-alone FET secondary school subjects in the curriculum. This study will review Le Grange's theory based on moral obligation as a philosophical underpinning for interventions needed at school and school community level to address challenges that impede on the environment.

The researcher also provided comments on the dissertation of Mokhele (2007) entitled *Opportunities to learn EE: A case study of Mpumalanga province.* The researcher studied the implementation of Curriculum 2005 in the Mpumalanga schools and concluded that:

- The integration of EE in primary school in 1996 was a good idea.
- There are methods of teaching and learning that made sense to EE which were overlooked in the Mpumalanga province.
- Literature on *opportunities to learn* made her aware of the current trends of EE in various other provinces.
- As a limitation in her study, Mokhele (2007) could not interview learners as she wished because of time constraints and therefore left out the significant factor in the study.
- She managed to uncover a wide spectrum of opportunities to learn EE in Mpumalanga.

- Government and non-government bodies is a key factor in providing opportunities to learn in EE. She recommended that provinces harness the EE resources with NGOs quickly in order to realize the goal of the successful teaching and learning of EE.
- She also recommended the establishment of the Environmental Education Coordinator at school, district or even provincial level who would monitor and direct EE instruction.
 - The researcher also recommended serious professional development of teachers to meet EE development.

The researcher concludes this study by reiterating that collaboration in solving EE crisis is the only solution.

2.6 Curriculum 2005 and Environmental Education

Lotz-Sistika (2012) looked at the status of EE in the curriculum of South Africa the Outcomes Based Education (OBE) and the curriculum 2005. This education system came to redress the wrongs of the apartheid system. For the first time, according to Lotz-Sistika (2012), environmental education was included in the formal education.

However Lotz-Sistika's (2012) study investigated the impact EE had on education. She used a case study method of two schools in the Lusikisiki district. She hoped that this study would, among other things, help teachers to implement EE integration in the curriculum accordingly. Teachers themselves had had no training in EE yet and such a study, it was hoped, could also address that problem.

Lotz-Sistika used the qualitative method to interview her population over a period of six months using the focus group interviews, interviews, observation and document analysis instruments.

In her literature review she referred to documents showing international and national trends in EE, policies and strategies of improving the status of EE in the 21st century. She also looked at the national scenario citing the integration in the

approach of teaching and learning. Furthermore she
countries like Botswana and the impact they have made in
EE. She spoke about the Tbilisi principles as the benchmark for EE at international
level.

Lotz-Sistika (2012) also looked at what educators could do to implement the
integration of EE emphasising that motivation plays an important role.

In using the case study method of qualitative approach Lotz-Sistika (2012)
sampled two schools in the Lusikisiki area, a private school and a public school.
She interviewed a large population of twelve educators, learners from each class
of the schools, parents and education officials.

After analysing her data Lotz-Sistika (2012) made the following findings:

- Few educators were professionally qualified.
- The class sizes were unmanageable
- Many teachers did not even understand the concept of EE.
- Many interviewed teachers were also not confident with Curriculum 2005
and OBE.
- Many teachers were in realisation that the status of their environment was
not up to scratch but had no means to arrest the situation.
- The parents and the community seemed very willing to assist when asked
by teachers in EE.
- Many educators, however, felt that the Department of Education was not
giving them any support in relation to in service training and training forum
to introduce them to the fast becoming changes in education.
- Learners that were interviewed were generally unable to explain what they
understood by the term 'environment' however they seemed to be keen on
learning about it.

Lotz-Sistika (2012) in her conclusions recommended the following:

professional development opportunities given to

- (b) There is also a serious need for support networks from all the schools stakeholders, namely, parents, Department of Education, NGOs and business.
- (c) Schools must be assisted to develop their own policies in EE integration.
- (d) There should be sufficient provision of learner material in schools.

In response the researcher of this study reiterates that the situation at Lusikisiki is similar to that throughout the country. EE, even today with the implementation of the CAPS education system, has not yet received the necessary attention, hence the call of this study for an autonomous EE.

2.7 Environmental Education as a teaching and learning subject

Almers (2013) suggests that two paradigms should be followed when attempting to change the attitudes of people to sustainability and responsible citizenry. She calls these paradigms "moralistic and educational". She describes the moralistic paradigm as the one that aims to improve the moral behaviour of learners while the educational one is there to motivate the learners to take a standpoint on learning. She described and analysed aspects of commitment, willingness and courage to act, knowledge about consequences and root causes of problems.

Furthermore Almers (2013) refers to the knowledge about a capability to develop visions and possible solutions to a problem, knowledge about how to influence and change conditions, and finally to be able to put this knowledge into practice. Teachers of EE can be able to make a meaningful and permanent change in the attitudes of learners. This concurs with Le Granges (2012) views on ubuntu and moral obligation.

development (ESD)

Education for Sustainable Development (ESD) is about how education should be planned to serve the real life situation without compromising the societal and environmental values of future generation. That is what environmental education is all about.

Yasin and Rahman (2011) refer to Problem Oriented Project Based Learning (POPBL) as an approach promoting sustainable education. Sustainable education wants individuals to realise the interdependence and interconnectedness between a human being and his environment. Sustainability also incorporates socio cultural issues like poverty, inequality and peace.

POPBL starts with the analysis of a research problem followed by its design to solve the problem under study. It purports to develop the learners' analytic skills and ability to argue and present solutions and answers to challenging questions. This approach would obviously be perfect for environmental education. Problems related to our environment that we grapple with daily could receive the attention they deserve in teaching and learning.

2.9 Environmental Education from a global perspective

The researcher also recommends ideas of effective teaching and learning of EE as developed by The North American Association for Environmental Education (NAAEE) (1998) as its guidelines for excellence. The NAAEE (1998) recommends that all materials and activities have:

- Fair and accurate information describing environmental problems, topics, and conditions, and in reflecting the diversity of perspectives on them;
- Material about the natural and built environments, ecological concepts, and attitudes and values are presented in sufficient depth;
- An emphasis on skill building including creative and critical thinking;
- An orientation towards civic responsibility;



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that create an effective learning environment and instruction, multiple intelligences, and relevant topics; and

- Well designed and easy to use materials.

(North American Association for Environmental Education, 1998)

2.10 Environmental Education in the United States

McKeown-Ice (2000) states that Disinger and Howe (1990) claim that, "Teacher education programme in EE remains relatively scarce and poorly developed." A study at international level has been undertaken in five countries namely Australia, Austria, Finland, Germany and Norway and alarming discoveries were made that teacher training in EE is the weakest point.

There is a perception that teachers are well prepared to teach the subject. Students that were asked about why there is such less enthusiasm cited the following reasons:

- (1) Institutions rate the programmes as poor or inadequate. They worry so much about whether EE should be integrated into their curriculum or taught as a separate subject. The survey found that EE was integrated in science subjects generally.
- (2) EE is often treated in a shallow manner dealing more with awareness, knowledge and persuasion than with the goal of participation and other environmental action strategies.

Recommendations:

- National standards or guidelines for the EE component of pre-service teacher preparations programmes should be developed.
- Coalitions of EE and teacher preparation faculty should work with the state teacher certification officer or committees to include EE in initial teacher certification guidelines.

ould actively promote the hiring of faculty with
in EE.

- The EE community should develop and implement an awareness programme for academic advisors associated with colleges, schools and departments of education.
- Some more research needs to be done.

The researcher suggests that this can also be done in South Africa as the situation seems to be the same as that of many global countries.

2.11 Environmental Education in Finland

This literature reviews the journal article by Jeronen, Jeronen, and Hanna Raustia, (2008) on the case study of Nature Schools (NS) in Finland in an attempt to explain how Finnish education system addresses EE matters. The study presents EE models used in Finland and describes the aims of NSs.

EE and sustainable development education (SDE) in Finland was promoted through a national strategy of 1992 which introduced the national curriculum for primary and secondary schools with the theme "Responsibility for the environment, well-being, and sustainable future" with the objective of raising children who would be conscious of their environment. According to the Finnish national core curriculum for basic education (2004, p.39) the pupils should:

- understand the prerequisites for human well-being, the necessity of environmental protection, and relationships between the two;
- learn to observe changes taking place in the environment and human well-being, to clarify the causes and consequences of these changes and to act for the good of the living environment and enhanced well-being;
- learn to evaluate the impacts of their consumption and daily practices, and adopt the courses of action required by sustainable development;

being in their own communities and to understand
for, well-being at a global level;

- come to understand that, through their choices, individuals construct both their own futures and our common future; learn to act constructively for a sustainable future

The National core curriculum for upper secondary schools, (2003, p. 28. 29) emphasised sustainable development on students by addressing the following:

- exploring the effects of human activity on the environment and changes that have occurred in the way human beings adapt their environments during cultural evolution;
- analysing global environmental hazards and their causes as well as means to correct the course of development;
- exploring problems related to population growth, poverty and hunger;
- assessing the cycles of substances and energy in the environment and production systems and learning how to save energy and raw materials;
- pondering on the characteristics of economic growth that would not be based on an increase in consumption of energy and raw materials and on the bearing of economic stability on environmental protection and people's well-being;
- studying business enterprises and technologies that fulfill the principles of sustainable development and learning how to exercise the means of influence available to consumers;
- determining the ways in which human activities can be adjusted to their environments respecting the cultural heritage and without endangering natural diversity;
- rehearsing the practices of sustainable lifestyles and determining their structural prerequisites.

ional core curricula and some EE models are quite teaching of EE at schools (Cantell, 2003). Some Finnish environmental educators supported by environmental philosophers have also presented that ethical issues should be taken into account more carefully than has been done until now at schools e.g. Jeronen, 1995; Jeronen & Kaikkonen, 1995, 1996; Rajakorpi & Salmio, 2001; Jeronen & Kaikkonen, 2002; Rydén, 2007.

Finland experienced its first nature excursions and trips in the 1950s as just an informal part of camp schools. They were added to the official program in the 1970s. then, the number of nature schools has increased, but quite slowly. In 1992, there were 5 nature schools that have grown today to 28.

Nature studies in schools usually belong to a primary or secondary school with one to two teachers sharing the responsibility to teach EE and they also act, beside their own job as a class or subject teacher, as teachers in the nature or environmental school. The Finnish nature and environmental schools get visits often from neighbourhood schools. The nature and environmental schools get their funding from the local municipality similarly to all primary and secondary schools in Finland.

In their programmes these schools teach the principles of Agenda 21. Their common educational goal is to focus on the knowledge of nature, nature exercises, acquiring nature information and study skills. These NSs encourage a sustainable way of life and environmental responsibility. The aim is to make pupils understand that human beings are a part of nature and therefore they should be sensitive and interested in the environment.

The teaching and learning methods make learners active participants in the learning process by doing, investigating, travelling, playing and solving problems. Teachers aim to encourage environmental values and knowledge.

Models in Environmental Education Used in Finland

In Finland, the basis of education is provided by constructivist pedagogy which means that the role of pupils as constructors of their own knowledge is

The teacher acts as a guide, and her or his main task is to assess the progress and needs of the pupils. Future orientation and direction is also important, because the pupils in school will now become citizens who will live long in future.

The most widely known and used EE models in Finland are (Cantell & Koskinen, 2004; Willamo, 2005) the Environmental behaviour model (Hungerford & Volk, 1990), the Onion model (Käpylä, 1995), the Tree model (Palmer, 1998), the House model (Jeronen & Kaikkonen, 2002) and the Model of Education for Sustainable Development (Åhlberg, 2005).

In *the Environmental behaviour model*, Hungerford and Volk (1990) describe the development of an environmentally responsible citizen with three variables linked to each other. The most important variable at the entry level is environmental sensitivity, which means an emphatic attitude toward nature. It develops based on experiences of nature in childhood with focus on knowledge of ecology, androgyny, and attitudes toward pollution, technology and economy occupy minor roles.

Knowledge of ecology includes knowledge about the basic processes of nature, such as population ecology and material cycle. Androgyny means behavioural qualifications, e.g. great sensitivity, empathy and self-confidence. Ownership variables are the most important for the development of responsible behaviour. In-depth knowledge of environmental issues and the ecological and social consequences of human action promote environmentally responsible behaviour.

The drawing of an *onion model* follows:

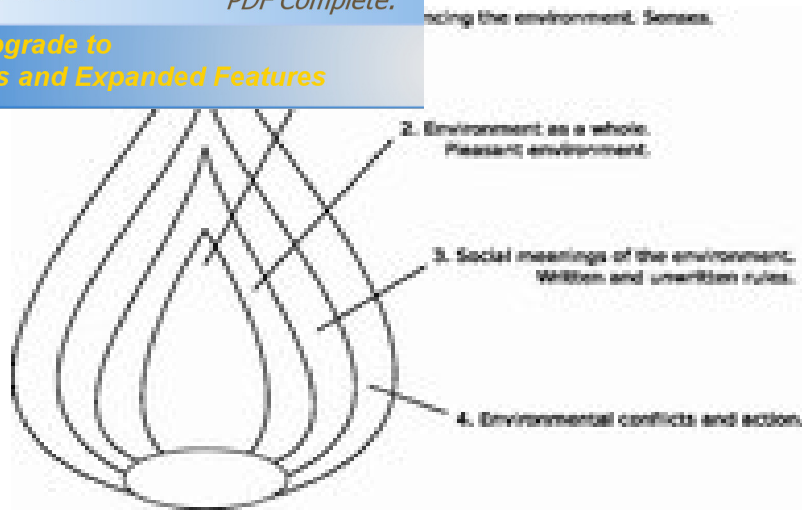


Figure 2.2: The Onion model (Käpylä, 1995) cited in Jeronen et al (2008).

This illustration shows the onion model, so named because it is shaped like an onion. It shows that the aim of EE is to support understanding of cultural meanings through emotions and affections. This model emulates Bronfenbrenner's theory which forms the basis of this study.

At the core of the model there is a person with her or his experiences. Käpylä (1995) argues that experiences cannot be divided into physical and spiritual parts, because human beings see meaningful issues instead of physical objects. The meanings of observations are understood through experiences, and experiential knowledge is non-theoretical and non-reflected. Responsible environmental behaviour develops step by step through three phases: entry-level variables, ownership variables and affecting variables. Successful EE includes strategies for knowing, feeling, willing and, if possible, also for action (Käpylä, 1995).

In the next model called *Tree model*, implications for EE come from different ideologies or perspectives on the causes of environmental problems (Palmer, 1998). Palmer recommends that all the components of the EE model should be addressed in a systematic way. It means that education about the environment, in the environment and for the environment should go alongside, and be interlinked with, issue-based, action-orientated, and socially critical education. This is an illustration of Palmer's (1998) *tree model*.

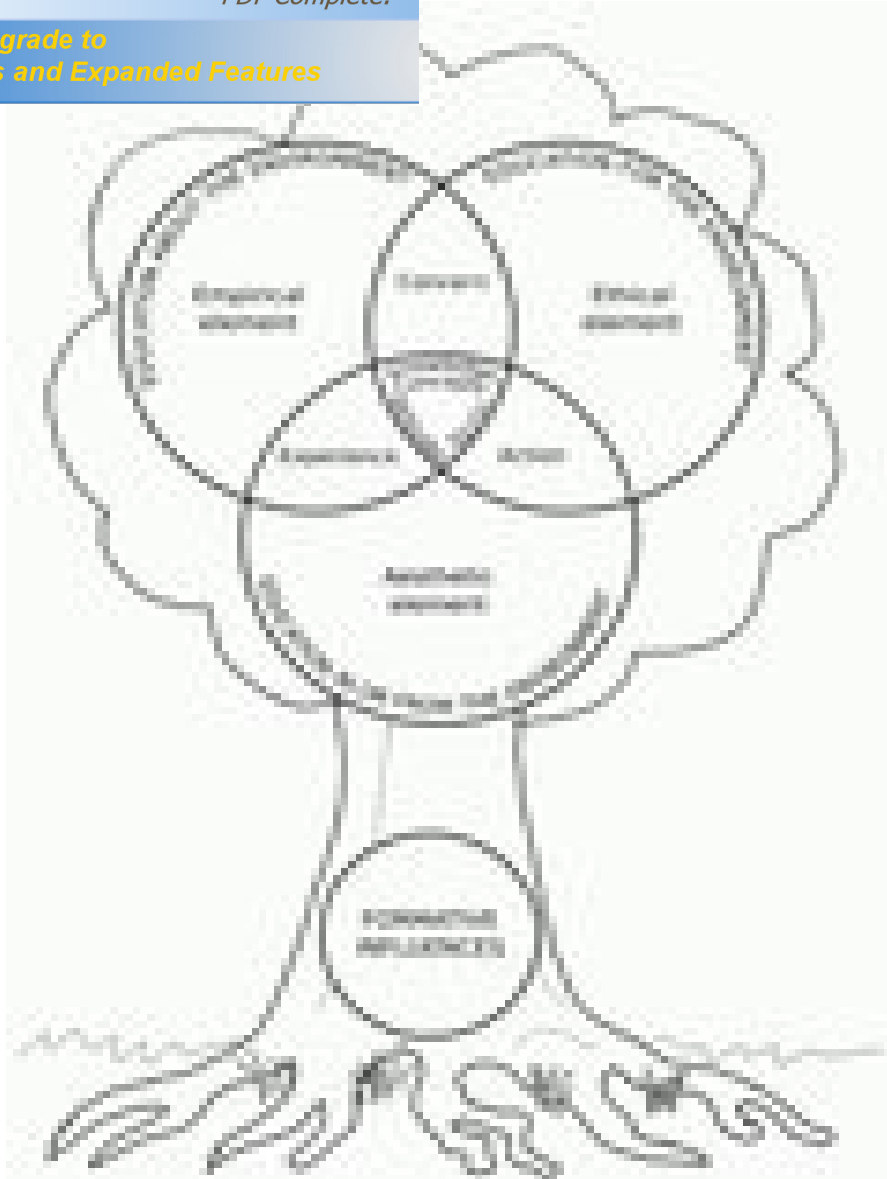


Figure 2.3: The tree model (Palmer: 1998)

The next model is “The House model” which is based on the idea that the development of senses and emotions is crucial in EE (Jeronen & Kaikkonen, 2002). The main aims of EE are to foster environmental sensitivity, to learn environmental awareness and knowledge and to acquire a readiness and responsibility to solve environmental problems. The aims are lifelong and hierarchic. This means that teachers should stress sensitivity education especially with younger learners, but also at the beginning of teaching and learning processes with older ones. Later on, they should gradually put more and more

knowledge, readiness and responsibility (Jeronen & illustration of *the House model*:



Figure 2.4: The house model (Jeronen & Kaikkonen, 2002).

The Model of education for sustainable development is based on the UNESCO declaration on ecological, economic and social development. In the model, biodiversity, environmental problems and the concept of SD form the core issues.

EE is a part of ESD and is based on the Tree model (Åhlberg, 2005). All the models presented above have the same purpose: education for the future. Their main aim is to develop skills and qualifications important for nature conservation, such as sensitivity for the environment, knowledge about nature and ecology, environmentally responsible emotions and values, understanding of environmental

, social action skills, ethical growth and responsible (Koskinen & Koskinen, 2004). They also share the idea that EE involves many different approaches.

Aims of NS in Finland

The main aim of NS was identified as to foster a relationship between children and their nature. Other secondary aims appeared to be that NS was developing senses, understanding of nature, active citizenship and reflection of lifestyle.

An EE teacher expressed this issue by saying: *We try to offer programmes which are linked to the national curriculum for basic education. The cross-curricular theme is Responsibility for the environment, well-being, and a sustainable future.* The National core curriculum (2004) was seen to be particularly important. 29 % of the NSs said that they rewrote their curricula depending on the needs of the visitors.

Educational methods and approaches in NS

Nature experiences and nature trips are popular and successful methods that Finnish teachers commend. Secondly, the teachers favoured games and playing used as inquiry based learning. Learners learnt about plant and animal species in forest and water and were happy to write research reports on landscapes and land use.

Another popular approach was story-telling, craft work, drawing, drama, nature exhibitions, earth walk and experiential learning. A teacher who wrote: *The holistic learning conception is important. Nature education is based on everyone's nature relationship and it tries to deepen this individual relationship. This is a way to foster nature love. Individual experiences create understanding on nature phenomena and the meaning of one's own action.*

This method takes the child outside the controlling school environment to the real world where the child actually belongs and spends more of his spare time. It is a memorable experience which every healthy young mind requires. It should serve as an example to other countries, developed or developing.

The researcher reviews the paper by Gopal and Anand (2014) entitled "Environmental Education in school Curriculum an overall perspective" on the state of EE in India. In their introduction they describe the National Curriculum Frame (NCF) as a document which answers the following questions:

- (a) What educational purposes should the schools seek to achieve?
- (b) What educational experiences in EE can be provided in order to help to achieve these goals?
- (c) How can these educational experiences be meaningfully organized to achieve the objectives?
- (d) How do we ensure that these educational purposes are indeed being accomplished?

Gopal and Anand (2014) contend that India started recognising the importance of EE as early as 1930. The Kothari commission (1964-1966) recognised EE in primary schools and recommended that "the aims of teaching science in the Primary schools should be to develop proper understanding of the main facts, concepts, principles and processes in physical biological environment." They saw Environmental education as an essential part of every pupil's learning by encouraging awareness of the environment, leading to informed concern for and active participation in resolving environmental problems. EE was introduced from class -1Evs, as a subject in an attempt to instil the correct environmental attitudes that right from their childhood minds.

EE should also be fun and a book entitled "Joy of learning" with lot of environmental activities, a handbook for Teachers was published. Similarly several work shops were conducted to introduce EE to school teachers and educational functionaries of the state boards on various aspects of environmental education. It was there that strategies for successful implementation of EE in Schools were discussed in detail.

The curriculum for environmental education stipulated that:

EE in the school curriculum.

er subjects of study.

- Mode and strategy of inclusion of chapters at different levels.
- EE in terms of time and allocation of marks.
- Development of syllabi and instructional material for dissemination at different levels of school.

The First Consultation on the academic aspects of Environmental Education (EE) in Schools was organised by NCERT on the 13th . 14th February 2004, in New Delhi. Academics and officials of government dealing with environment studies, environmental science, environmental ecology, botany, marine biology and geography of different universities, teacher educators, principals of teacher training colleges, prominent non-governmental organisations (NGOs) and NCERT faculty took part in deliberations. The Second Consultation on the implementation of EE in Schools was held on 13th March, 2004.

Seventy-two officials comprising Presidents/Chairpersons of Boards/Councils of School Education, Directors of State Councils of Educational Research and Training (SCERTs), Directors of Education in the states, eminent scientists, environmentalists and NCERT faculty participated. The initial draft prepared by NCERT faculty presented in the First Consultation was revised and presented in the Second Consultation and suggestions for further improvement were received. Various issues were deliberated upon in these Consultations through plenary presentation, open house discussion, interaction in groups and consolidation of recommendations and it came up with the following aims and objectives of EE:

The environment is a common heritage of mankind. The common duty of maintaining, protecting and improving the quality of environment, as a contribution to the protection of human health and safeguarding the ecological balance; the need for a prudent and rational utilization of resources; the way in which each individual can, by his own behaviour and action, contribute to the protection of environment; the long-term aims of environmental education are to improve management of environment and provide satisfactory solutions to environmental issues.

the following had to be done: Provide opportunities values, attitudes, commitment and skills needed to protect and improve the environment. Encourage pupils to examine and interpret the environment from variety of perspectives - physical, geographical, biological, sociological, economic, political, technological, historical, aesthetic and ethical. Arouse pupils awareness and curiosity about the environment and encourage active participation in resolving environmental problems.

Environmental education is closely linked to the other cross circular themes of other subject areas. Objectives were relating to knowledge, skills and attitudes and Environmental education was seen comprising the following:

Education about the environments (Knowledge).

Education for the environment (Values, Attitudes & Positive actions).

Education through the environment (A Resource).

Textbooks for EE were developed for the curricula of the primary stage, the secondary stage and the higher secondary stage. Since this study is based on the upper secondary school+the researcher will list the concepts of EE covered in the Indian curriculum as:

Environment and sustainable development:

Atmospheric pollution- global warming, greenhouse effect, acid rain, ozone layer depletion; Water pollution- international standards of drinking water, Importance of dissolved oxygen in water,

Bio-chemical oxygen demand, chemical oxygen demand, land pollution, pesticides and ecology.

In conclusion Gopal and Anand acknowledge the long history of EE component in Indian school curriculum treated secondary to sciences, social sciences, mathematics. They go on to mention that recently in curricular 2000 and 2005 (NCF 2000 & NCF 2005) emphasis has been laid on EE as it did in other school subjects.

Unfortunately India like South Africa is still engaged in a fierce debate about the status of EE in the curriculum as integrated or standing-alone. While a few

an infusion model others insist on transacting EE as
out again the question of how EE should be taught
is still significant in India as well. The NCF 2005 advocates the following
attainment targets as particularly relevant in class III to XII Science & Social
Science curriculum:

Exploration of Science

The variety of life, process of life, human influence on earth, types and uses of materials, explaining how materials behave, earth and atmosphere, energy, the natural resources & conservation.

Education for the EE is concerned with children: Children should study aspects of their local environment which have been affected by human activity. These may include, for example, farming, industry and sewage disposal, mining or quarrying.

2.13 Environmental Education in China

The researcher presents a paper entitled %Towards Sustainability: Environmental Education in China a German Strategy for Chinese Schools+ written by Wasner (2005). According to Wasner (2005) China has taken interest in EE and realised that it can help solve their economic problems despite the lack of funding. As a result China had to seek help from Germany and Wasner (2005) evaluates the impact it has made in the situation of Chinese schools.

Purpose and scope of the paper

The researcher aimed at soliciting some funding for China. The scope was basic background knowledge on EE development in China, needs of Chinese schools, adaptation of German intervention and alternative projects.

Methods

Wasner (2005) studied and used the Chinese and international publications in EE to obtain the information.

The researcher found that EE is very different from Germany in terms of educational system and teaching. Most teachers in China lacked the expertise. He also saw a lack of teaching materials especially in non-city areas as most of the city schools got help mainly from the German project.

Conclusions

According to Wasner (2005) the German project helps some of the city schools to standardize their EE to that of Germany. Funding is in demand in order to promote the knowledge and understanding of global environmental issues. Remote schools (from the city) require the promotion of basic EE education and resources to foster the German project. Projects in remote areas need time to be implemented.

There is also a need for teacher training and literature on EE, says Wasner (2005). He also thinks a Chinese partner with a good network will be required to guarantee effectiveness and long-term effects of EE.

Recommendations

The researcher highlighted the following actions (as quoted) in his recommendations:

- Draw up a project proposal in English and Chinese for the project.
- Choose a co-ordinator and main partner with a good reputation from among the suggested possible project partners.
- Work together with this partner helps to choose further project partners and the target schools.
- Get in personal contact with the partners.

Introduction

Wasner (2005) acknowledges the problems of China in EE as low living standard, land-drought, and environmental degradation, uncontrolled exploitation of

and economic development which causes serious
problems.

The researcher believes that since Chinese economy is continually growing its sustainability will only be ensured by the creation of awareness of environmental matters by special attention to the younger generation.

Goal-setting and approach

The researcher suggests how, why and where to implement a project on EE in Chinese schools. This is to be done by evaluating the feasibility of implementation; by analysing the general conditions of EE in China which are the project's contents, methods and its implementation.

Another factor that Wasner (2005) suggests is a needs analysis approach of content, method and implementation.

What are contents?

Project implementation should regard specific Chinese conditions as determined by the political and education, the mentality and geographical factors. Schools should be treated as they are, as city schools, city-near schools and remote/poor schools and their needs analysis should be determined.

The German EE project should be implemented throughout China.

China's educational system

Education in China is highly centralised where the political system is, and decentralised where the government intervention is minimal.

Economic development and Environmental Education

According to Wasner (2005) China's economy has been growing between 7 and 8 percent per year thus causing a tremendous impact on environment.

He says that the Brundtland Report published in 1987 first alluded to sustainability and the need to maintain resources for future generations. This has resulted in many people realising the importance of a sustainable China.



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In 1982 China introduced the phases of focusing on pollution treatment and protection of the environment, according to Wasner (2005). Laws and regulations to this regard were drawn up. The policy stated that the economy should develop in harmony with the environment.

Many businesses however, advocated an economic development first approach which according to Wasner (2005) states that the relationship between economic development and environmental impact could be represented by an inverted U starting from low levels of development environmental pressure would rise with income growth and the decrease and level off at high income levels.

The development of environmental awareness

The researcher is critical of the parental and societal support in secondary schools resulting in less environmental awareness and behaviour. However, the government has realised the need to invigorated education in EE, by coming up with the National Action Compendium on Environmental Propaganda and Education (1996 . 2010) to protect the environment.

The goals, according to Wasner (2005) were:

- To improve the quality of mentality and morality of the nation.
- To improve the quality of science and civilization
- To organize environmental protection, propaganda and education
- To adapt to the local needs of regions and their schools in order to make it valuable part of quality education.



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Environmental Education

The paper issued in 1981, according to Wasner, formed the basis for EE. It was known as The Decision Enhancing Environmental Protection Work at Present Time (1981).

The researcher claims at this time efforts were made to include EE in the curricular of primary and secondary schools.

Second phase: 1983 -1992

A broader approach to EE happened according to Wasner (2005). In 1988 the State Environmental Protection Agency (SEPA) was established. In 1990 the State Education Commission recommended the integration of EE as an optional subject in higher secondary schools.

Third phase: 1992 – today

In 1993 EE was integrated officially in social and economic contents curriculum guidelines, marking the beginning of the connection between environmental protection, educational reform and socio-economic reform.

Today according to Wasner (2005) many projects and initiatives have been brought up in schools on EE but again funding still is a stumbling block.

EE Curriculum in Secondary Schools

Wasner (2005) says Chinese in lower secondary grades learn about national and international environmental issues, the relationship between human/economic development and the environment and finally get to know the principle of sustainable education and become active.

At higher secondary schools, Wasner (2005) states that the complexity of environmental problems foster environmental awareness.

Primary schools

The researcher says they take part in workshops or small discussion classes, organise commemoration days, do propaganda work for environmental protection on the streets, write up wall papers and newspapers and go on summer camps where they get an opportunity to meet with students from other EE schools. He also says they are involved in recycling old batteries, paper and other goods.

Protagonists of EE in China

Wasner (2005) mentions the initiatives of the Chinese government and non-governmental institutions or foreign organisations as the protagonists of EE in China.

He refers to the Green Schools who implemented an eco-schools plan in 1994. In 2001 the plan had grown to over 21 countries with about 6 000 schools taking part. Students learn about the protection of the environment, says Wasner (2005).

Wasner (2005) also alludes to the *Hand in Hand, Building an Earth Village* project which aimed at providing the Chinese children with EE and opportunities for interaction with the environment. School would establish their own little environmental villages like village environmental experts with an advisory committee and supporting group of teachers and parents and write environmental bulletin where they report on the environmental activities happening in their schools.

Wasner reports on international programmes such as the Global Learning and Observations to the Benefit of the Environment (GLOBE). The project was instituted by the former Vice President of US, Al Gore and it focused on building international networks of schools to observe and protect the environment.

Wasner (2005) also refers to the Global Village of Beijing (GVB) which aims to advance China's sustainable development through a public environmental movement. Through it the China Central Television (CCTV) has produced a nation-wide channel on EE.

In summing up, the researcher in this study shows that there is no doubt that China like many countries is in the process of increasing awareness and

This study proclaims for South Africa. Following many
ing South African EE can solve the environmental
crisis which is obviously a diabolical monster to developing and developed
communities.

2.14 Conclusion

In this chapter the researcher reviewed extensive literature in relation to the
theoretical framework of Bronfenbrenner's work, in addition with the contribution of
local, national and international literature to shape this study. Chapter 3 with data
collection techniques will follow.

3.1 Introduction

The researcher used the qualitative method because of its many features that apply in this study in terms of, for example, the qualitative methods characteristics, theoretical underpinnings, research designs, simple data collection and data analysis techniques. The study will reveal how this method was followed right from the beginning to the end.

3.2 Characteristics of qualitative research

Naturalistic: Bogdan and Biklen (2003) claim that qualitative research has actual settings as the direct source of data and the researcher is the key instrument. Researchers enter and spend considerable time in schools, families, neighbourhoods, and other locale learning about educational concerns. In this study the researcher is himself a teacher at the school studied. The researcher is interested in the role which environmental education plays as a subject and how it can contribute to the betterment of the children's neighbourhood which the researcher knows and feels it is not given enough attention.

Descriptive data: The data collected take the form of words or pictures rather than numbers according to Bogdan (2003). In this study the researcher interviewed learners and teachers respectively and tape-recorded their responses.

Concern with process: Bogdan (2003) says that qualitative researchers are concerned with process rather than simply with outcomes or products. Hence the researcher in this study did not interfere with the participants' responses to questions posed by the researcher. The researcher did not wish to direct or influence the perspectives of the participants in his favour or otherwise. Data was collected in a raw fashion and analysed as such.

Inductive: Bogdan (2003) states that the researchers should not seek to search for any evidence that will prove or disprove their theories they hold before embarking on the collection of data. Although the researcher in this study is a proponent for environmental education to be taught as a subject on its own, he,

...ncing the participantsq notions throughout the

Meaning: Researchers who use the qualitative method are interested in how different people make sense of their lives called participant perspectives (Erickson, 1986). The researcher in this study placed his focus squarely on how the participants understood and adopted environmental education broadly.

3.3 Theoretical underpinnings of the study

Theoretical orientation or theoretical perspective is talking about a way of looking at the world; the assumption people have about what is important and what makes the world work (Bogdan, 2003). In this study the researcher, informed by data, used the theoretical assumption of a phenomenological nature which attempts to understand the meaning of events and interactions to ordinary people (teachers and learners) in particular situations (ideas on environmental education as a stand-alone subject (Bogdan, 2003).

3.4 Case study in qualitative research

The researcher preferred a case study approach in his study for various reasons, namely, because he observed the characteristics of an individual unit (Cohen, 1989) in this case the school community, the approach is interpretive and seeks to bring to life a case (Anderson, 2002). The researcher's case in this study is that environmental education must be a stand-alone subject. As Anderson (2002) points out the interview is a prime source of case study data, as is the case in this study. In fact semi-structured interviews are the only techniques the researcher used in this study.

Furthermore, this study looks at how the learners and teachers view the place and role of environmental education as a stand-alone subject, which is a participant observation type inquiry that is also a feature of case study research. The researcher considered the following ideas proposed by Staker for a case study report (Schreiber & Kimberly, 2011):

1. **Issue identification:** The main issue and purpose of the study has been identified in the study that is, arguing for environmental education

ject in the FET band of secondary schools in South Africa is shared by many international institutions of learning and governance, yet it has not yet received the prominence it deserves in the South African education system.

2. **Description:** The researcher provided enough descriptive meaning to the study in the literature review. References to environmental education articles, journals, reports and other documentation were cited. Books ranging from content to methodology were also consulted, acknowledged and communicated. The study also explained clearly how the collection and analysis of data was conducted.
3. **Developments of issues:** The study draws issues from learners and teachers and complements that with literature related to environment education. The study delved into each issue sufficiently enough for the reader to agree or disagree with the ideas. The researcher would from time to time keep abreast with the issues on environmental education, be it from the media or internet.
4. **Assertions:** Towards the end of this study a conclusion will provide a summary of the case study focusing on environmental education, recommendations and evaluation of the case in point.
5. **Closing Vigette:** The researcher closes with a vignette and highlights to the reader that the report is only one perspective of the case. (Schreiber, 2011). This is precisely what the conclusion in this study tries to do.

3.5 Research design of this study

The research design in this study informs the researcher about the methodology that he/she can use in the collection of data techniques and the analysis thereafter. In this study the researcher used the qualitative method and case study design.

Document analysis was used to show the integration of EE in secondary schools (FET level).



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The study was conducted at a secondary school in Mdantsane, a township school, a pilot school for the WESSA environmental project subsidised by the Department of Education. The school provides tuition to mainly learners from Grade 8 (GET level) to Grade 12 (FET level). There are 300 learners in the school. Since the launch of WESSA programme about three years ago the school has been participating fully in the environmental initiatives such as annual German volunteer student programmes (students would visit and stay in the township for 12 months and steer the WESSA projects in the school, arbour day, gardening, school clean-up campaigns fortnightly, coastal clean-up, fishing, excursions such as the Hogsback one where learners were skilled in recycling, agriculture and other things.

The researcher conducted the interviews of both learners and teachers in the school library, an initiative of German volunteer students who solicited funding for the establishment and equipping of the school library. The library is appropriate as it is detached from the school buildings and unpopulated during school hours. It also has comfortable chairs and a cosy atmosphere to stimulate the interviewees' interest.

The researcher as a teacher and teacher-librarian requested permission from the Principal of the school to interview learners and teachers during periods where teachers and learners were available.

3.6.2 Population and sampling

The researcher sampled selected teachers and learners of the studied school and interviewed them. The researcher ensured that the interviews take place in a calm neat library with comfortable chairs. Interviewees were assured of their rights of confidentiality, anonymity, volunteering and no incentive nature of the study and asked for the permission to be interviewed.

Three teachers teaching Mathematics in Grades 10-12, Life Sciences in Grades 10-12 and Physical Sciences in Grade 10-12 were interviewed. The researcher asked them the following questions:

- (a) Do you think teachers of any subject pay enough attention to environmental education? Why?
- (b) Do you think environmental education should be a stand-alone subject? Why?
- (c) Do you think a specialised teacher for environmental education is required? Why?

The Life Sciences teacher was also an Eco-club mentor who also underwent WESSA training in 2013.

Learners

Three learners in Grades 10, 11 and 12 not in the WESSA programme. These learners were selected randomly and on a no merit basis. The interview was tape-recorded.

The researcher did the same with the other three learners who are members of the WESSA programme. These learners are also representing Grade 10, 11 and 12.

3.6.3 Interviews

According to Anderson (2002, p.190) an interview is defined as a specialized form of communication between people for a specific purpose associated with some agreed subject matter. The researcher used the key-informant interview. Cohen defined it as a two - person conversation initiated by the interviewer for the specific purpose of obtaining research-relevant information, and focussed by him on content specified by research objectives of systematic description, prediction or explanation (Cohen and Marion, 1989, p.307).

The researcher used a semi-structured interview in this study. Semi-structured

determined set of questions, but allow some latitude in (Cohen & Ledford 2003, p.133). The following three questions were asked from all respondents.

- (a) Do you think teachers of any subject pay enough attention to environmental education? Why?
- (b) Do you think environmental education should be a stand-alone subject? Why?
- (c) Do you think a specialised teacher for environmental education is required? Why?

During the interview questions focused on the subject of environmental education forms Cohen (2000) alluded to conceptions of the interview, namely:

1. **Free information transfer**+ which refers to the friendliness the researcher asks questions. In the study the participants were the researcher's students, friends and colleagues who were always releasing information voluntarily.
2. **A transaction** which inevitably has bias, which is to be recognised and controlled.+ During the interview the researcher stressed that participants should respond in whatever manner, but all the participants were aware of the positive changes that have been brought to the school by WESSA driven environmental education.

3.6.4 Tape- recorded transcripts of responses

Learners (WESSA MEMBERS) Response

Note: Interview questions are listed in Addendum 2 (Research instrument) of this document.

Grade 10 Learner

Question 1 Response: No. They don't talk about it often.

because we need to learn more about environment

Question 3 Response: Yes because a specialised teacher will be skilled to deal with environmental education.

Grade 11 Learner 2

Question 1 Response: No teachers don't teach us anything about EE when they should because the world we live in at risk of so many things we learnt from WESSA such as ozone depletion, recycling, etc.

Question 2 Response: Yes. Teachers need to teach us about the good practices of the environment.

Question 3 Response: Yes if it is going to stand alone surely a trained teacher who knows about the environment is needed.

Grade 12 Learner 3

Question 1 Response: No because like in life orientation we concentrate on life skills and nothing about the environment as opposed to the activities that we were doing in the youth club.

Question 2 Response: Yes because like now our school is filthy and full of rubbish which we could use for art purposes as we did in the youth club.

Question 3 Response: Yes a specialised teacher will be equipped and trained to teach us about safe standards like washing our hands, recycling and the like.

Learners (NON-WESSA MEMBERS) Response

Grade 10 Learner 1

Question 1 Response: Sometimes yes they do like they tell us about pollution and its effects on to our environment.

Question 2 Response: Yes because that can help us learn to keep our communities clean as we can apply what we are taught at school.

Question 3 Response: No because we learn about these things everyday on the media like on TV they tell us how to look after our environment.

Question 1 Response: No because some of the teachers do allude to the environment but they are not explaining it clearly to us.

Question 2 Response: Yes because I think this may encourage learners to be creative and economical. Some of us have talents in art and if they can be taught how to use them to their benefit then they can benefit.

Question 3 Response: Yes because a trained qualified teacher will be able to guide learners accordingly with regard to what learners can or cannot do. She/he can provide that information that learners require.

Grade 12 Learner 3

Question 1 Response: No because most of our teachers just assume that the environment is known to us all and there is no need for it to be taught to us.

Question 2 Response: Yes because I think environmental studies need a lot of time. We were taught it in lower forms only and nothing so much is said in a high school.

Question 3 Response: Yes we need an experienced and qualified teacher who would also have passion and love for teaching EE to us.

Teachers Response

Teacher 1 Physical Science

Question 1 Response: No because Physical Sciences have not integrated EE.

Question 2 Response: Yes because this could make learners focus more on EE.

Question 3 Response: Yes because environment is science and someone needs to be trained to be pedagogically capable of teaching it.

Teacher 2 Life Sciences and EE mentor for WESSA

Question 1 Response: No as a life sciences teacher I think it is not enough because although it is integrated perhaps a chapter is not enough to address the problems that the environment places on to our learners. Teaching EE within another subject limits time and focus on it.

Question 2 Response: Yes I think in that way it will receive the attention it deserves in schools. I watched a TV programme recently about Cape Town and

or rubbish. People must be taught about recycling
to be brought to the attention of our learners.

Question 3 Response: Yes like with any other subject we need a qualified person to handle it. Our government in fact has experts who should be coming to schools from time to time and revive it, but they don't. Fortunately, however, organisations like WESSA need to be encouraged. However we need to have EE as a standalone subject with its own teacher can alleviate the problem.

Teacher 3 Tourism

Question 1 Response: Yes because in tourism learners are taught about people and their daily interactions. So studying in their natural environments all spheres of the environment are cared for. In tourism there is a section on responsible and sustainable tourism whereby tourists are expected to act environmentally responsible. Furthermore community involvement (ecotourism) teaches learners about their culture and the dangers of environmental extinction like rhino poaching.

Question 2 Response: Yes because the present curriculum treats it as a section rather than an entirety. If it were to stand alone as a subject I think outreach programmes like community involvement and business enterprises would be afforded an opportunity to liaise with schools directly.

Question 3 Response: Yes a specialised teacher would be able to devote more time in the subject and even get an opportunity of fostering these relations with all the stakeholders.

3.6.5 Curriculum Assessment and Policy Statement (CAPS)

An acronym CAPS+ is an abbreviation for Curriculum Assessment and Policy Statement, the system of education which replaced Curriculum 2005 known as National Curriculum statements (NCS) in South Africa. According to Motshekga (2011), the Minister of Basic Education CAPS replaced the Revised National Curriculum Statements (RNCS) and the National Curriculum statements (NCS). The RNCS was implemented for Grades R-9. It was a review of the 1997 outcomes-based-education (OBE) and its main aim was to redress the previous



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the NCS address the Grades 10-12 curriculum and it
05.

The CAPS document replaced RNCS and NCS in 2012 with an aim of providing clearer specification of what is to be taught and learnt on a term to term basis. CAPS outline the content material, assessment guidelines and promotion requirements for all the subjects offered in schools from Grade R to 12. The researcher required this document to support the theory that environment education is integrated in some of the subjects in schools. The researcher looked at the three CAPS documents for Life Sciences, Tourism and Physical Sciences reflecting the three teachers the researcher managed to interview.

3.6 Conclusion

This chapter referred to interviews and document collection as the main techniques of collecting data in this study. The analysis of this data will be shown in the next chapter, chapter four.

4.1 Introduction

This chapter deals with the process which Boeije (2010) says contains the cutting of data up in order to put it together again in the manner that seems relevant and meaningful.

In this study the analyses of the semi-structured interviews of the teachers and learners who participated in the study are discussed. Hardings (2010) suggestions of summarising the interviews before using the constant comparative method will be applied.

The main aim was to identify the themes that developed from the interviews so that conclusive findings could be made. An identified list of categories of data is presented. Categories themselves were then reduced to sub-divisions which appeared (a) similar, (b) related or (c) different to create the themes which informed this study.

The data analysis is compared to the CAPS (2011) document analysis. This aims to consolidate the findings made from the interview analysis for coherence.

4.2 Interview data

Hardings stage theory (2013) will be to analyse the interview data in this study. Harding proposed two first stages namely (1) summarising of interviews and (2) the use of a constant comparative method. Summarising helps the researcher to achieve three aims: examining commonality or similarities, examining differences and examining relationships (Gibson and Brown, 2009). The comparison is made by the learners, teachers and through document reviews.

4.2.1 Summarising interviews

The researcher re-read the interviews of learners and teachers in order to identify the relevant research objective of the study which is arguing that environmental

alone subject in the FET (Grade 10, 11 and 12) participant 2 of the interview directly talked to the main objective of the study, hence the researcher summarised the responses of learners and teachers to the questions and made the following finding:

- (a) All learners (the eco-club and non WESSA eco-club members) gave a Yes response to the question that environmental education should be separated from other subjects and stand alone as a subject of its own. They gave different but positive reasons, such as they will learn more about the environment and save the ecosystem; good practices of the environment; rubbish could be reused and skills and talents of learners be developed; learners communities can be attended to and more time and attention will be given to EE.
- (b) All three teachers the researcher interviewed also supported the idea of EE as a stand-alone subject. They cited the following reasons: it could make learners focus more on EE; it will receive the attention it deserves and it would encourage community and business involvement at school.
- (c) Teachers and learners who were interviewed all agreed that EE should cease to be integrated to other subjects at FET level and be made a stand-alone subject with its own specialist teacher and teaching time. This is likely to influence the learners and eventually the society to positive practises in environmental behaviour and management.

The researcher noted the repetition of patterned information in some of the responses like learner 1 in the eco-club agreeing with the life sciences teacher that EE will receive more attention if taught as a separate subject.

4.2.2 The constant comparative method

Charmaz (2006) describes the constant comparative method in the following words %at first you compare data to find similarities and differences. For example, you compare interview statements and incidents with the same interview and compare statements and incidents in differed interviews+ (Charmaz 2006, p.54). Charmaz further provides %a helpful approach+which, he says, is:

similarities and differences between the cases to be

- (2) Amending the list as further cases are added.
- (3) Identifying research findings once all the cases have been included in the analysis (Harding 2013: 66).

Similarities among the cases

The researcher found the following similarity in the study:

All the respondents, learners and teachers favoured EE as a stand-alone subject in the South African curriculum citing various reasons that can benefit learners and the community at large.

Differences among the cases

The researcher concluded that while there was agreement among the interviewees on the main objective of the study, there were differences of opinion on other secondary issues such as the need for an EE practitioner as asked in question 3 of the interview. While many of the respondents supported that an EE specialist can teach EE effectively learner 1 in the NON-WESSA group felt there is no need as the media is able to communicate EE effectively to many people.

Amendment of the list of cases

The researcher resolved that the first interview question was relevant and significant in determining the effectiveness of the integration of EE in the curriculum as currently exists. Two interviewees, a learner and a teacher, felt that there was not enough attention given to EE in the current curriculum where it is integrated into other subjects.

Research findings of the cases using the constant comparative method

The researcher used the following steps:

- (a) Examined commonality: By counting of cases of commonality (Miles and Huberman, 1994, p.253). Barbour argues that this method is the key element of using the constant comparative method. (Barbour, 2008,

er in this study counted 9 cases of commonality in question, which was %Do you think that EE must be a standalone subject? Why?+ In other words, all 9 respondents, three teachers and three eco club and three non eco club learners, answered %yes+.

(b) Examined differences: In the study 1 out of 9 (that is a learner) respondents answered %no+ to question 3 which read, %Do you think a specialised teacher is required for teaching EE? Why?+ Another difference was in question 1 reading, %Do you think teachers pay enough attention to EE when they teach it in an integrated way? Why?+ 2 respondents out of 9 (a learner and a teacher) answered %yes+.

(c) Examined relationships: Bryman (2008) argues that %the qualitative researcher is in a better position to view the linkages between events and activities and to explore people's interpretation of the factors which produce such connection+ (Bryman 2008, p.101-102). Richards (2009) argues that the process involves examining the characteristics of cases that co-occur in order to explain the manner in which they are connected.

The commonalities and relationships will be discussed now. The researcher found that generally the learners' and teachers' interpretations of EE as a stand-alone subject in the curriculum were common. They mentioned positive reasons which all promoted good teaching and learning of EE in secondary schools.

Even when the researcher followed Rosenthal's (2004) argument that %types can be developed by examining contrasting cases+ (Rosenthal 2004, p.161), he came to the same conclusion that the types of cases that were interviewed showed enormous linkages and relationship in their interpretations of issues of EE.

Minor contrasts on the specialised practitioner teaching EE not being required can be explained by the fact that the interviewed teacher might be having his own idea for the subject and maybe teaching the section on EE passionately. With regard to a learner who stated that some teachers do teach EE, the researcher felt that

possible that all the teachers whose subjects have the section convincingly. In fact all the interviewed learners acknowledged the understanding of EE but some complained about the limited time given to it. In the section analysing the CAPS document the researcher will reveal that very little time is allocated to EE in integrated subjects. In conclusion, Harding (2008) says that making summaries is essentially a means to an end; a method of reducing the large amounts of data present in an interview to an at-a-glance view of the points that are likely to be most useful in analysis (Harding 2008, p.79).

4.2.3 Using categories to analyse data

Introduction

Gibson and Brown (2009) note that a category draws attention to a commonality within a dataset. (Gibson and Brown 2009, p.130). Categories are notes made in the margin of an interview transcript as abbreviation (Miles and Huberman 1994, p. 59) or both abbreviations and numbers (Matthews and Ross 2010, p.332) or even using full words and short phrases (Charmaz 2006, p.52). This study will use words and short phrases. This research used the empirical categories by following the following four steps:

Step 1 Identifying initial categories based on reading the transcripts

The researcher read and re-read the interview transcripts in order to identify the categories needed to save time for the analysis and to comply with Charmaz (2006) suggestion that the identification of categories requires collecting, separating and sorting data (Charmaz 2006, p.45).

In the exercise the researcher produced the following three categories making his judgement by identifying broad subject cases under which the data could be grouped (Harding 2013, p.83). These initial categories are based on the three questions which the researcher asked the interviewees during the semi-structured interview.

Data in the study

- stand alone in the curriculum
- specialist teacher

Step 2 Writing categories alongside the transcripts

This process involves three elements, namely: **Summarising** or data reduction, **selecting** and **interpreting** for the purposes of clarity. In this study the researcher identified the following categories in the interview transcripts.

Table 4.1: Interview transcripts in categories

Interview transcripts	Categories
<p>Learners (WESSA members)</p> <p><i>Grade 10: Learner 1</i></p> <p>Question 1: Response No They don't talk about it often.</p> <p>Question 2: Response: Yes because we need to learn more about environment and save our ecosystem.</p> <p>Question 3: Response: Yes because a specialised teacher will be skilled to deal with environmental education.</p> <p><i>Grade 11 Learner 2</i></p> <p>Question 1 Response:</p> <p>No teachers don't teach us anything about EE when they should because the world we live in at risk of so many things we learnt from WESSA such as ozone depletion, recycling, etc.</p>	<p>No integration</p> <p>Stand-alone</p> <p>Specialist teacher</p> <p>No integration</p>

<p>us about the good practices of the environment.</p> <p>Question 3 Response: Yes if it is going to stand alone surely A trained teacher who knows about the environment is needed.</p> <p>Grade 12 Learner 3</p> <p>Question 1 Response: No because like in life orientation we concentrate on life skills and nothing about the environment as opposed to activities that we were doing in the youth club.</p> <p>Question 2 Response: Yes because like now our school is filthy and full of rubbish which we could use for art purposes as we did in the youth club.</p> <p>Question 3 Response: Yes a specialised teacher will be equipped and trained to teach us about safe standards like washing our hands, recycling and the like.</p> <p>Learners (non-WESSA members)</p> <p>Grade 10 Learner 1</p> <p>Question 1 Response: Sometimes yes they do like they tell</p>	<p>Favours stand-alone Specialised teacher</p> <p>No integration</p> <p>Stand-alone</p> <p>Specialist teacher</p>
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<p>Question 2 Response: Yes because that can help us learn to keep our communities clean as we can apply what we are taught at school.</p> <p>Question 3 Response: No because we learn about these things everyday on the media like on TV they tell us how to look after our environment.</p> <p>Grade 11 Learner 2</p> <p>Question 1 Response: No because some of the teachers do allude to the environment but they are not explaining it clearly to us.</p> <p>Question 2 Response Yes because I think this may encourage learners to be creative and economical. Some of us have talents in art and if they can be taught how to use them to their benefit then they can benefit.</p> <p>Question 3 Response Yes because a trained qualified teacher will be able to guide learners accordingly with regard to what learners can or cannot do. She/he can provide that information that learners require.</p>	<p>ects on to</p> <p>No attention to EE</p> <p>Stand-alone</p> <p>Specialist teacher</p> <p>No Integrated teaching</p> <p>Stand-alone</p> <p>Specialist teacher</p>
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<p>Question 1 Response: No because most of our teachers just assume that the environment is known to us all and there is no need for it to be taught to us.</p> <p>Question 2 Response: Yes because I think environmental studies need a lot of time. We were taught it in lower forms only and nothing so much is said in a high school.</p> <p>Question 3 Response: Yes we need an experienced and qualified teacher.</p>	<p>No integration</p> <p>Favours stand-alone</p> <p>Specialist teacher</p>
<p>Teacher 1 Physical Science</p> <p>Question 1 Response: No because Physical Sciences has not Integrated EE</p> <p>Question 2 Response: Yes because this could make learners focus more on EE.</p> <p>Question 3 Response: Yes because environment is science and someone needs to be trained to be pedagogically capable of teaching it.</p>	<p>Integration unnecessary</p> <p>Stand - alone</p> <p>Specialised teacher</p>
<p>Teacher 2 Life Sciences and EE mentor</p>	

<p>I think it is not enough because although it is integrated perhaps a chapter it is not enough to address the problems that the environment places on to our learners. Teaching EE within another subject limits time and focus on it.</p> <p>Question 2 Response: Yes I think in that way it will receive the attention it deserves in schools. I watched a TV programme recently about Cape Town and about it running out of space for rubbish. People must be taught about recycling as an example. So EE needs to be brought to the attention of our learners.</p> <p>Question 3 Response: Yes like with any other subject we need a qualified person to handle it. Our government in fact has experts who should be coming to schools from time and time and revive it, but they don't. Fortunately however organisations like WESSA need to be encouraged. However have EE as a standalone subject with its own teacher can alleviate the problem.</p>	<p>No integration</p> <p>Stand -alone</p> <p>Specialist teacher</p>
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<p>Question 1 Response:</p> <p>Yes because in tourism learners are taught about people and their daily interactions. So studying in their natural environments all spheres of the environment are cared for. In tourism there is a section on responsible and sustainable tourism whereby tourists are expected to act environmentally responsible. Furthermore community involvement (ecotourism) teaches learners about their culture and the dangers of environmental extinction like rhino poaching.</p> <p>Question 2 Response</p> <p>Yes because the present curriculum treats it as a section rather than an entirety. If it were to stand alone as a subject I think outreach programmes like community involvement and business enterprises would be afforded an opportunity to liaise with schools directly.</p> <p>Question 3 Response</p> <p>Yes a specialised teacher would be able to devote more time in the subject and even get an opportunity of fostering these relations with all the stakeholders.</p>	<p>No teaching integration</p> <p>stand-alone (student focus)</p> <p>Specialist teacher</p>
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Step 3: Identifying categories to be placed in subcategories

The researcher proceeded to place the above categories, as sub-categories in the three broad categories (mentioned above) to which they belong as follows:

Category 1 Attention given to EE when integrated in other subjects

No attention given to EE (grade 10 WESSA member)

No attention to EE (grade 11 WESSA member)

EE Integration leads to non-concentration (Grade 12 WESSA member)

Shallow attention in integrated EE given (Grade 11 non WESSA member)

No attention in integration because of teacher's wrong assumptions (Grade 12

Non-WESSA member)

Teachers

No enough attention in integration (shortcoming) (life sciences teacher)

Not enough time for EE in integration (shortcomings) (life sciences teacher)

Attention enough in tourism (tourism teacher)

Category 2 Need for EE to stand alone in the curriculum

Learners

WESSA teachings- recycling (Grade 11 WESSA member)

Filthy schools (Grade 12 WESSA member)

Art- academic benefit (Grade 12 WESSA member)

Cleanliness-social benefit (Grade 12 WESSA member)

Pollution (grade 10 non-WESSA member)

Clean communities (Grade 10 non-WESSA member)

Teachers

Learners focus (Physical Science teacher)

Recycling important (Life Sciences teacher)

Outreach programmes (Tourism teacher)

Category 3 Need for EE specialist in schools

Learners

Practitioner is skilled (Grade 10 WESSA member)

Practitioner required (Grade 11 WESSA member)

Qualified EE practitioner can give necessary guidance (Grade 11 non-WESSA member).

Qualified practitioner from government is not effective . necessary (life sciences teacher).

Outreach programmes to community and business . specialised teacher - (tourism teacher).

Specialised teacher-more time for EE projects (tourism teacher).

STEP 4 Themes and findings in each category.

- In this study the researcher concluded that learners and teachers agreed that there is little or no attention at all to EE teaching in schools as it is integrated in other subjects.
- A single respondent, however, specifically pointed to Tourism as indirectly attending to EE through teaching sustainable tourism and eco-tourism in an integrated manner.
- All the respondents felt that EE should stand alone and be taught as such citing several benefits of an academic, social and economic nature.
- All respondents favoured the appointment of an EE qualified specialist teacher whom, they believe, will be equipped enough to deal with all the necessary challenges an EE subject may face.

4.3 Curriculum and Assessment Policy Statement Document Analysis

Wharton (2009) defines documentary analysis as "the detailed examination of documents produced across a wide range of social practices, taking a variety of forms from the written word to the visual image." This means the researcher will explain what the document is and how it came into being.

The Curriculum and Assessment Policy Statement (CAPS) is the current South African document which determines which and how the content must be taught and assessed in all school subjects. This document guides the teacher on the topics to be covered term by term in the subject.

ment Policy Statement is the culmination of 17 years of democratic government to redress the education imbalances created by the previous apartheid administration. It replaces the outcomes-based-education (OBE) which was also known as Curriculum 2005. In her foreword of CAPS the Minister of Education Motshekga (2011) stated that the South African curriculum was built on the values that inspired the Constitution (ACT 108 of 1996) which aims to redress the past, improve the quality of life of all citizens and lay the foundation for the will of the people.

In this section the review within the CAPS document where EE is integrated will be analysed. The table below shows the EE content (topic) material covered and the time span per year given to cover it.

Table 4.2: Grade 10, 11 and 12 Environmental Education integrated content

Subject /Grade	EE content	Time span per year
Life Sciences		
Grade 10	Biosphere, environment, ecosystems, abiotic and biotic factors	6 weeks (24 hours)
Grade 11	Climate change, water, food security, loss of diversity, and solid waste disposal	7 weeks (28 hours)
Grade 12	Human evolution	2 weeks (8 hours)
Tourism		
Grade 10	Sustainable tourism concepts, three pillars of sustainable tourism, responsible tourism, good environmental practices, global warming and	3 weeks (12 hours)

	ism	
	none	none
Grade 12	Three pillars of sustainable tourism, responsible tourism, code of conduct for tourist behaviour, role players in responsible and sustainable tourism	2 weeks (8 hours)
Physical Sciences	None (all FET grades)	None (all FET grades)

In analysing the data in the CAPS document it is clear that EE is absorbed into the curriculum in contrast to the recommendations of both learners and teachers who in their interview responses recommended it to be a stand-alone subject.

4.4 Conclusion

This chapter of data analysis outlines why the researcher believes that the data collected during the research process is, to a large extent, reliable and valid (as the researcher stated in chapter 1). Reliability is underlined by the fact that data was collected from learners and teachers who were directly and/or indirectly involved with the teaching of EE. There was unanimous agreement in response to the questions posed.

Validity or trustworthiness or the truth of the information given by the interviewees therefore can be concluded from its reliability. Moreover the interviewees seemed to be overly in agreement with one another in their responses to the questions posed to them.

The few differences reflected only indicated human nature and objectivity as against subjectivity which destroys many qualitative researches.



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conclusions and findings without any controversy and
could as this section clearly indicated that EE did
not receive priority at FET level.

What was revealed by the data analysed is that EE is clearly not receiving the necessary attention at FET level as it is expected when one reviews the global literature evident in Chapter 2.

5.1 Introduction

This chapter summarises the findings that the researcher made from the interview transcripts and the CAPS document analysis. While the researcher conducted the interviews of learners and teachers, he ensured that they were willing to participate by:

- Providing them with comfortable chairs and tables in the library which is the tidiest and quietest venue in the school.
- Explaining to them their rights of confidentiality, voluntary participation and that there were no monetary incentives during or after the interview.
- Asking the interviewees for an appropriate time of less than 20 minutes during breaks or after school hours.
- Maintaining a friendly attitude towards the interviewees before, during and after the interviews.
- Explaining to them that the purpose of the interview was based on EE as it presents itself in the current curriculum.

The researcher will also report on the findings in respect of the CAPS (2011)

document analysis for FET level in the respective subjects, life sciences, tourism and physical science. The interview setting was of utmost importance as it created the atmosphere to carry out this research.

The researcher has made recommendations and suggestions resulting from the interviewees in respect of the objectives of the study and argument, namely, EE as a stand-alone subject with its own qualified teacher.

The researcher has discussed the limitations and challenges that the study faced and how certain challenges could have been avoided if possible. Lastly, the researcher will present the possibilities of future studies in EE that could support

5.2 Findings

5.2.1 Interview transcripts

During the thematic data analysis the researcher made the following findings:

(i) There is little or no attention at all to EE teaching in schools as it is integrated to other subjects. The researcher feels that this point is valid and true to many educators who have no expert training in EE. They may assume, as one interviewee said, that learners know a lot on EE and need to be taught more in other subjects.

(ii) A single respondent, however, specifically pointed to Tourism as indirectly attending to EE through teaching sustainable tourism and eco-tourism.

The tourism teacher interviewed seemed to be passionate about EE as other teachers may be but the problem seems to be the insufficient time available for tourism as a subject and more specifically for EE to take priority.

(iii) All the respondents felt that EE should stand alone and be taught as such citing several benefits of academic, social and economic nature. The thinking of the respondents is in line with the scholarly international literature alluded to in the literature review chapter, as well as organisations and governments. There is a general belief that EE can alleviate poverty in many communities if it is effectively taught. Global initiatives have been spelled out in Chapter 2

(iv) All respondents favoured the appointment of an EE qualified specialist teacher whom they believe will be equipped to deal with the pedagogy of teaching and learning. If EE can be recognised as a stand-alone subject, like other subjects, it obviously requires the personnel as the main resource in terms of curriculum implementation.

In the analysis of the data document the researcher noticed that a lot of significant aspects of EE could not be accommodated in the subjects. It is true that the integration is necessary because EE covers a wide spectrum of topics; science or social and learners need to be aware of this. However the integration on its own seems to shift the focus from EE itself and place it on that particular subject as a form of blended teaching and learning. The researcher found it inappropriate that some of the academic subjects such as physical sciences do not have a component of EE in the curriculum. It is the researcher's belief that academic subjects ought to blend and cross-reference subject and content knowledge of EE into its subject area. The environment is life itself.

5.3 Recommendations

5.3.1 Attention to Environmental Education as an integrated subject

Integration of EE topics in certain subjects is necessary and significant but the curriculum developers need to consider that all subjects ought to cover EE topics in one way or the other. EE has become a broad subject of interest with many people and communities seeing it as a solution to their problems. People today grapple with life threatening sicknesses like cancer and HIV/AIDS which scientists associate with environmental despoliation in many respects. The researcher, supported by the respondents, argues through this study that EE is not taken seriously at FET level.

5.3.2 Environmental Education as a stand-alone subject

The researcher argues that, as a stand-alone subject, EE will receive the necessary attention and seriousness it deserves as all the interview respondents alluded to. The school where this interview took place had seen the intervention of an NGO organisation called WESSA as an improvement to EE. The school produced an excellent vegetable garden by learners which generated funds for the Youth Club learners of WESSA. The school received a donation of water tank, a R5 000 Pick and Pay voucher on winning a speech competition, overseas friends in education, free fishing lessons, free-of-charge excursions to Hogsback to learn about EE, self-development projects, involvement in EE projects such as the

g (about 10 days), environment expos in Daimler-
the projects happened after school and during school
holidays. Learners were actively engaged in the knowledge, skills and attitudes
toward the environment.

The researcher, just like the interviewees, feels this can only be extended if EE
stands alone as a subject with a specialist and it is allocated its own specific slot.

5.3.3 An Environmental Education specialist is needed in schools

A qualified specialised teacher, as alluded by the respondents, will be able to drive
EE teaching, learning and activities appropriately. Activities such as enough
training and time to organise fieldwork, sponsorship for schools, liaise with local
communities and encourage participation in EE school projects should be catered
for. NGOs like WESSA have staff that is fully committed to the EE course activities
co-ordinating their activities with youth clubs. These NGOs align current EE issues
and assist EE educators to strengthen and deepen environmental sustainability in
the school, school community and society.

5.3.4 Environmental Education training in Universities and Colleges

If a consensus is reached at government level that EE becomes a stand-alone
subject, it will require specialised educators to be trained and produced by
Universities and Colleges of Education. Studies like these would direct 21st
century curriculum, therefore it would be advised for these institutions of education
to present modules for specialities. What is on record is that Rhodes University
and Stellenbosch University in particular have enthusiastic academics in EE that
participate in the environmental activities on their campus and produce
publications. However, there is no evidence that these institutions train educators
in the EE field. More research is needed in institutions of learning to address
through Higher Education Institutions (HEI) the need and seriousness of EE as an
elective module or specialization.

5.3.5 Government intervention in Environmental Education teaching and learning

The national government is the main provider of education in schools. It was the
South African National government's decision to make EE an integrated subject

government's conviction to implement it as a stand-
it with funds and teachers. In its planning a
responsible government would be willing to initiate discussions with intellectuals
and academics about the feasibility and viability of adjusting the present
curriculum to accommodate EE as an autonomous subject.

5.3.6 Community involvement in Environmental Education

EE should help most of the poor communities learn how to be productive and
sustain their own livelihoods in the country with such high levels of unemployment.
Community leaders who struggle daily for service delivery can learn to do things
on their own. If community leaders can be educated about how EE can solve
poverty problems and be conscientised to work towards the ideals themselves, EE
can receive its attention.

5.4 Limitations to the study

Limited number of teachers interviewed. Only three teachers representing
Physical Sciences, Life Sciences and Tourism were interviewed because the
researcher felt that the sample represented almost all subjects, that is, those that
have integrated EE into their teaching as prescribed by CAPS. The researcher
initially selected the Life Orientation and the Geography teachers but they
declined the invitation.

Only one school in which the researcher is also a teacher was selected. This was
done because it would eliminate travelling and costs to go to another school
although critics may feel it compromised the interviewees' freedom of expression.

The interviewees were Xhosa home language speakers while the interview was
conducted in English. To eliminate misunderstanding especially with some
learners the researcher had to explain the question for purposes of clarity.



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The researcher recommends that further research in the EE field is done, especially on curriculum development, content at a national level. In this study the researcher depended on the journal articles as EE books on South Africa were not convincing. Books focussing on EE are unavailable in South Africa and this need to be strongly considered for further and future study purposes.

It would also be wise for EE departmental educators to look at how EE as a subject could be taught. Current literature concentrates more on the international scenario as countries like Britain, America and Germany seem to have made bigger advances in the field of EE.


5.6 Conclusion

In conclusion, the researcher wishes to make the reader aware that this study, to all its intent and purposes, achieved its main objective of highlighting the need for environmental education to be made a stand-alone subject in FET schools as proposed in Chapter 1. The researcher also got the attention of learners in talking about EE successfully.

The literature reviewed by the researcher in Chapter 2 talked directly to the theory and content of EE. The researcher spoke about the Bronfenbrenner's ecological model and showed clearly how it could be put into great use in studying EE. By the way, this system is receiving great respect and use internationally. The literature also looked at national and international perceptions and actions in respect of EE instruction.

In Chapter 3 the researcher explained how to use the qualitative method of choice in this study. Information collection through interviews of teachers and learners and documentation were explained.

In Chapter 4 the analysis of data was adequately done, touching on all four points of summarising, comparative method, coding and thematic analysis. This is what made the researcher in his concluding Chapter 5 decide that his findings are reliable and valid enough for the readers to appreciate.



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itionally as highly acclaimed, seriously dealt with in
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ADDENDUM 7.1

ACRONYMS

CCTV	China Central Television
GVB	Global Village of Beijing
GLOBE	Global Learning and Observations to the Benefit of the Environment
NCF	National Curriculum Frame
SDE	Sustainable Development Education
NS	Nature Schools
SCERT	State Councils of Educational Research and Training
CAPS	Curriculum and Assessment Policy Statement
CIE	Cambridge International Examinations
DOE	Department of Education
EE	Environmental Education
ESD	Education for Sustainable Development
FET	Further Education and Training
NAAEE	North American Association for Environmental
NCDC	National Curriculum Development Centre
NCS	National Curriculum Statement
POPBL	Problem Oriented Project Based Learning



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ational Curriculum Statement

Environmental Protection Agency

UFH	University of Fort Hare
UNDESD	United Nations Decade on Education for Sustainable Development
UNESCO	United Nations Education, Science and Cultural
WESSA	Wildlife Society of Southern Africa
WHO	World Health Organisation



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RESEARCH INSTRUMENT

Learners interview questions

- (a) Do you think teachers of any subject pay enough attention to environmental education? Why?
- (b) Do you think environmental education should be a stand-alone subject? Why?
- (c) Do you think a specialised teacher for environmental education is required? Why?



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- (a) Do you pay enough attention to environment education when teaching your subject? Explain.
- (b) Do you think environmental education should be a stand-alone subject? Why?
- (c) Do you think a specialised teacher for environmental education is required? Why?



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Research Budget
Presenter: Peter Khumalo
Student number: 201208455
Course: Master of Education

ITEM	COST
LANGUAGE EDITOR	R1 800
FLASH DISC	R 200
PHOTOCOPYING & PRINTING	R 500
TRANSPORT EXPENSES	R1 000
BINDING	R 300
TABLET(CELLPHONE)	R4 000
TELEPHONE EXPENSES	R 350
TOTAL	R 8 150

ETHICAL CLEARANCE



University of Fort Hare
Together in Excellence

ETHICAL CLEARANCE CERTIFICATE REC-270710-028-RA Level 01

Certificate Reference Number: GAL021504U01

Project title: Environmental education as a stand-alone subject in grade 10, 11 and 12: A case study in one school in the East London District

Nature of Project: Masters

Principal Researcher: Muzi Peter Khumalo

Supervisor: Prof G Galloway

Co-supervisor:

On behalf of the University of Fort Hare's Research Ethics Committee (UREC) I hereby give ethical approval in respect of the undertakings contained in the above-mentioned project and research instrument(s). Should any other instruments be used, these require separate authorization. The Researcher may therefore commence with the research as from the date of this certificate, using the reference number indicated above.

Please note that the UREC must be informed immediately of

- Any material change in the conditions or undertakings mentioned in the document
- Any material breaches of ethical undertakings or events that impact upon the ethical conduct of the research

The Principal Researcher must report to the UREC in the prescribed format, where applicable, annually, and at the end of the project, in respect of ethical compliance.

IFICATE

Special conditions: Research that includes children as per the official regulations of the act must take the following into account:

Note: The UREC is aware of the provisions of s71 of the National Health Act 61 of 2003 and that matters pertaining to obtaining the Minister's consent are under discussion and remain unresolved. Nonetheless, as was decided at a meeting between the National Health Research Ethics Committee and stakeholders on 6 June 2013, university ethics committees may continue to grant ethical clearance for research involving children without the Minister's consent, provided that the prescripts of the previous rules have been met. This certificate is granted in terms of this agreement.

The UREC retains the right to

- Withdraw or amend this Ethical Clearance Certificate if
 - o Any unethical principal or practices are revealed or suspected
 - o Relevant information has been withheld or misrepresented
 - o Regulatory changes of whatsoever nature so require
 - o The conditions contained in the Certificate have not been adhered to
- Request access to any information or data at any time during the course or after completion of the project.
- In addition to the need to comply with the highest level of ethical conduct principle investigators must report back annually as an evaluation and monitoring mechanism on the progress being made by the research. Such a report must be sent to the Dean of Research's office

The Ethics Committee wished you well in your research.

Yours sincerely



Professor Gideon de Wet
Dean of Research

23 June 2014

SSION FROM DoE

15 St Peters Road
Flat no 12A Joyoom Court
SOUTHERNWOOD
5201

10 August 2013

The EDO
Department of Education- Eastern Cape
East London District Office
Rubezana
MDANTSANE
6217

Dear Sir

RE: PERMISSION TO CONDUCT AN MED STUDY.

Kindly allow me to conduct a study on an MED dissertation entitled "Environmental Education as a stand-alone subject at FET level of Education in the Eastern Cape."

I plan to conduct this study in Inkwenkwezi High School which is also a pilot school for the WESSA environmental education project. As a researcher, I am also a teacher and the WESSA patron teacher in the school.

Your assistance in this regard will be highly appreciated.

Yours faithfully

Peter Khumalo



GRANTING PERMISSION

Department of Education- Eastern Cape
East London District Office
Rutbusana
MDANTSANE
5217

15 August 2013

Mr P. Khumalo
15 St Peters Road
Southernwood
5201

Dear Sir

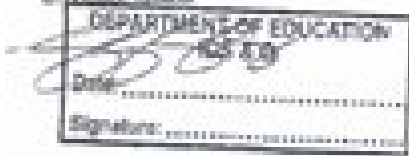
RE: PERMISSION TO CONDUCT RESEARCH STUDY

I hereby grant you permission to conduct A RESEARCH STUDY on environmental education at Inkwenkwezi High School.

Thank you.

Yours faithfully

L. Malengca


DEPARTMENT OF EDUCATION
Date:
Signature:

NG PERMISSION TO INTERVIEW

15 St Peters Road
Flat 12A Joycorn Street
SOUTHERNWOOD
5201

16 October 2013

The Principal
INKWENKWEZI HIGH SCHOOL
P.O. Box 1331
MDANTSANE

Dear Sir

RE: PERMISSION FOR INTERVIEWING TEACHERS AND LEARNERS

Kindly allow me to interview three FET teachers for Life Sciences, Physical Sciences and Tourism subjects at your school, Inkwenkwezi High School.

I also request permission to interview six learners , three being WESSA eco-club members and three others I will select randomly in Grades 10, 11 and 12 for the purpose of my research study. As a Fort Hare part-time student I am doing a dissertation for the MED degree on the topic entitled "Environmental Education as a stand-alone subject at FET level of education in the Eastern Cape. I intend to interview these teachers and learners during their free periods

Your co-operation will be highly appreciated.

Yours faithfully

Peter Khumalo



ASKING FOR VENUE

15 St Peters Road
Flat no 12A Joycom Court
SOUTHERNWOOD
5201

20 October 2013

The Principal
Inkwenkwezi High School
P.O. Box 1331
MDANTSANE
5217

Dear Sir

RE: REQUEST FOR LIBRARY AS VENUE FOR CONDUCTING INTERVIEWS.

I hereby ask for your permission to allow me to interview teachers and learners in the school library, for my Master of Education study entitled "Environmental Education should be a stand-alone subject at FET level in schools in the Eastern Cape".

I promise to treat the library with respect during and after the interviews.

Your assistance will be greatly appreciated.

Thank you.

Yours faithfully

Peter Khumalo



LETTER FROM PRINCIPAL GRANTING PERMISSION FOR INTERVIEWEES AND VENUE

Inkwenkwezi High School
P.O. Box 1331
MDANTSANE
6217

18 October 2013

18 St Peters Road
Flat 12A Joycom Street
SOUTHERNWOOD
5201

Dear Mr Khumalo

RE: PERMISSION FOR INTERVIEWS AND LIBRARY AS VENUE.

You are granted permission to interview teachers and learners during their free periods and to use the library as a venue for these interviews as per your request.

I hope your initiative will benefit the school and its community at large.

Thank you.

Yours truly

JKA Amoah
(Principal)



(9836908347)







INFORMED CONSENT FROM INTERVIEWEES

Dated 5th February 2014

INFORMED CONSENT FROM INTERVIEWEES

This memorandum serves to confirm that the undersigned interview participants agreed to be interviewed by the researcher for the purpose of a Master of Education study on environmental education. The participants were informed of their exclusive rights of anonymity, confidentiality, safety, and non-compensation during the interview process.

PARTICIPANTS/INTERVIEWEES	SIGNATURE
Tourism teacher	
Physical Science teacher	
Life Sciences teacher	
Grade 10 WESSA learner	
Grade 11 WESSA learner	Amanda Magesa
Grade 12 WESSA learner	S. Mqhayi
Grade 10 non WESSA learner	P. Mafokada
Grade 11 non WESSA learner	P. Zweni
Grade 12 non WESSA learner	Z. Nangwenwa

Researcher

 Peter Khumalo

LETTER FROM LANGUAGE EDITOR

University of Fort Hare

English Department

East London Campus

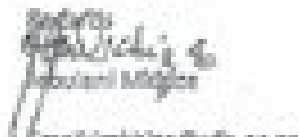
Tam Londen

RE: EDITING/PROOF READING

Dear Supervisor

This serves to confirm that I did the proof reading of Mr P. Khumalo's Masters Dissertation.

If there are any questions please contact me via my email address provided below.


4/6/14



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