

**The attitude of economics teachers
towards environmental sustainability**

**By
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**This thesis presented in partial fulfilment of the requirement for the degree
Masters in Education at the University of Stellenbosch**



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April 2019

Declaration

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Abstract

Study: The focus of this survey research study is to measure the economics teachers' attitude towards environmental sustainability. As researcher I want to measure the economics teachers' attitude towards environmental sustainability. The literature shows that the economics teachers' role should not be underestimated because teachers can play a major role in shaping the attitudes of learners' positively towards the environment. Teachers have the capacity to influence learners' attitudes towards environmental sustainability but that would only be possible if they themselves have positive attitudes towards the environment/environmental sustainability.

Participants: The participants in the study are Grade 10-12 economics teachers in the eight education districts who fall under the auspices of the Western Cape Education Department in the Western Cape Province. Four districts are classified as urban region while four districts are classified as rural region. The questionnaires were disseminated to the Grade 10-12 economics teachers at an annual mandatory subject meeting. The teachers were requested to voluntarily complete the questionnaires at the meeting venue and the completed questionnaires were collected by the economics subject advisors of the respective education districts.

Dimensions: In the literature the researcher focuses on five dimensions of environmental sustainability, namely biophysical, economic, political, social and education. Through the literature review, the researcher examines each dimension in detail, showing the impact each one has on environmental sustainability.

Data collection: This survey research study is guided by a hypothesis and six Null hypotheses. The quantitative method of collecting data was used. A 5-scale Likert scale questionnaire was developed to gather data from the participants. The questionnaire is divided into five sections with five questions each that test the economics teachers' attitude towards environmental sustainability.

Results: The study finds that economics teachers have a positive attitude towards environmental sustainability. The study finds that Null hypotheses 1, 4, 5 and 6 cannot be rejected for biophysical, economic, political, social and education dimensions. The study finds that Null hypothesis 2 cannot be rejected for the economic, political and education dimensions and Null hypothesis 3 cannot be rejected for the political dimension. Null hypothesis 2 is rejected for the biophysical and social dimensions and Null hypothesis 3 is rejected for the biophysical, economic, social and education dimensions.

Opsomming

Studie: Die fokus van hierdie ondersoeknavorsingsstudie is om die houding van die Ekonomie-onderwysers ten opsigte van omgewingsvolhoubaarheid te meet. As navorser wil ek die ekonomie-onderwysers se houding teenoor omgewingsvolhoubaarheid meet. Die literatuur toon dat die rol van die ekonomie-onderwysers nie onderskat moet word nie, aangesien onderwysers 'n belangrike rol kan speel in die positiewe vorming van die houdings van leerders teenoor die omgewing. Onderwysers het die vermoë om leerders se houdings teenoor omgewingsvolhoubaarheid te beïnvloed, maar dit sal slegs moontlik wees indien hulle self 'n positiewe houdings teenoor die omgewing/omgewingsvolhoubaarheid openbaar.

Deelnemers: Die deelnemers aan die studie is Graad 10-12 ekonomie-onderwysers in die agt onderwysdistrikte wat onder die vaandel van die Wes-Kaap Onderwysdepartement in die Wes-Kaapprovinsie val. Vier distrikte word as stedelike gebied geklassifiseer, terwyl vier distrikte as landelike gebied geklassifiseer word. Die vraelyste is op 'n jaarlikse verpligte vakvergadering aan die Graad 10-12 ekonomie-onderwysers versprei. Die onderwysers is versoek om die vraelyste vrywillig by die lokaal van die vergadering te voltooi en die voltooide vraelyste is deur die ekonomie vakadviseurs van die onderskeie onderwysdistrikte ingesamel.

Dimensies: In die literatuur fokus ek op vyf dimensies van omgewingsvolhoubaarheid, naamlik; biofisiese, ekonomiese, politieke, sosiale en opvoedingsdimensies. Deur die literatuuroorsig ondersoek ek elke dimensie volledig en toon die impak wat elkeen op die volhoubaarheid van die omgewing het.

Data-insameling: Hierdie ondersoeknavorsingsstudie word gelei deur 'n hipotese en ses nulhipoteses. Die kwantitatiewe metode van data insameling is gebruik. 'n 5-Skaal Likert skaal vraelys is ontwikkel om data van die deelnemers in te samel. Die vraelys word in vyf afdelings verdeel met vyf vrae wat elk die houding van die Ekonomie-onderwysers ten opsigte van omgewingsvolhoubaarheid toets.

Resultate: Die studie het bevind dat ekonomie-onderwysers 'n positiewe houding teenoor omgewingsvolhoubaarheid het. Die studie toon dat nulhipoteses 1, 4, 5 en 6 nie verwerp kan word vir biofisiese, ekonomiese, politieke, sosiale- en onderwysdimensies nie. Die studie toon dat nulhipotese 2 nie verwerp kan word vir die ekonomiese dimensie, politieke dimensie en onderwysdimensie nie en nulhipotese 3 kan nie verwerp word vir die politieke dimensie nie. Nulhipotese 2 word verwerp vir die biofisiese- en sosiale dimensie en

nulhipotese 3 word verwerp vir die biofisiese, ekonomiese, sosiale en opvoedingsdimensies.

Acknowledgments

I would like to express my sincere gratitude and appreciation to the following:

To our Heavenly Father for inner strength, courage, perseverance and wisdom to complete the research study.

To my supervisor, Prof. Lesley Le Grange for his excellent guidance, continuous support and constructive critique throughout the research study. It was a great honour to pursue this research under his supervision.

To my wife Blanche for her support, understanding and without whose support and encouragement I would not have completed this research study.

To my children Grant and Caleigh for your love, understanding and support throughout the study.

To the Western Cape Education Department for granting me permission to conduct the survey research study in the education fraternity of the Western Cape Education Department.

To the economics subject advisors of the eight districts for their assistance in administering the survey questionnaires and for their continuous encouragement to complete the research study.

To the teachers who were willing to participate in the pilot study of the research questionnaire.

To the economics teachers of the Western Cape Education Department who were willing to participate by completing the survey questionnaires.

To my colleagues at Metro North Education Department, for their interest, support and encouragement in the research study.

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Acronyms

ANOVA (Analysis of Variance)

CAPS = Curriculum and Assessment Policy Statements

DBE = Department of Basic Education

FET = Further Education and Training

NASA = National Aeronautics and Space Administration

NPA = National Protocol for Assessment

SARS = South African Revenue Service

Statssa = Statistics South Africa

UN = United Nations

Unesco = United Nations Educational, Scientific and Cultural Organization

Unicef = United Nations International Children's Emergency Fund

WCED = Western Cape Education Department

WHO= World Health Organisation

WWW= World Wide Fund

Chapter 1

Overview of the Study

This chapter gives an overview of the research study and covers the motivation, problem statement and aims of the research study. It also gives an overview of the research problem, the hypothesis and six Null hypotheses the research study sets out to measure and test. The chapter also informs about the research methodology, the method used to gather data and how the data was captured and analysed. The ethical considerations concerned with conducting research are also covered in the chapter.

1.1 Introduction

During my BEdHon studies, environmental education was one of the subjects that interested me. I realised that as economics teachers we can make a big difference in the attitude of learners towards the environment through our classroom engagements and classroom teaching. I believed that we as teachers can influence learners positively, but to make a positive impact, economics teachers themselves need to have a positive attitude towards the environment. It is therefore crucial to determine the attitudes of economics teachers towards environmental sustainability.

Through this research study I want to investigate and measure the attitudes of school economics teachers towards environmental sustainability. This study will focus on school teachers teaching economics in the Further Education and Training band (FET Grades 10-12). Economics is a social science and is one of the subjects taught in the FET band in South Africa. Environmental sustainability is not a stand-alone subject in the South African school curriculum, but should be integrated into all school subjects among which economics is one such subject.

Mohr and Fourie and Associates (2008:5) define economics as a study which concerns the use of scarce resources to satisfy unlimited needs. They quote Joseph Stigling who defines economics as a study of how individuals, firms, governments and other organisations in our society make choices and how those choices determine the way resources are used by society. They also quote Paul Samuelson who defines economics as “the study of how societies use scarce resources to produce valuable commodities and distribute them among different people”. Economics therefore is a study of scarcity because resources are limited and every society attempts to figure out how to allocate

these scarce resources efficiently for maximum satisfaction of needs. Throughout their engagements with learners in the economics classroom, it is critical that teachers emphasise the importance of environmental sustainability. It is crucial that learners are made aware of the Earth's natural resources and that we as human beings need to protect and preserve our natural resources by allocating them efficiently and effectively in all the phases of economic activities. If we fail, our natural resources will become exhausted, extinct and lost to future generations.

An understanding of the attitude of economics teachers towards the environment is significant because teachers are the people who engage on a daily basis with learners and who have the ability to influence learners' attitudes towards environmental sustainability. Swanepoel, Loubser and Chacko (2002: 282) argue that teachers more than any other professional group can promote environmental literacy, by virtue of their interaction with society (more specifically learners, parents and colleagues). During their engagement with learners it becomes requisite that teachers voice their concerns about the state of the environment. Teachers must continuously engage learners on the dangers and consequences of waste, pollution, the greenhouse effect, acid rain and so forth on the quality of life of people. This can transpire in a productive way through school economics as a subject when economics teachers themselves have a positive attitude towards environmental sustainability.

The question is what is attitude? Attitude can be defined as a mental and neutral state of readiness, organised through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related (Allport, 1966:20). Eilam and Tropic (2012) alluded to different authors and define attitude in the following way:

- An enduring combination of motivational, emotional, perceptual and cognitive processes with respect to some aspect of our environment (Krech, 1948);
- A learned predisposition to respond in a consistently favourable or unfavourable manner with respect to a given object (Fishbein and Ajzen, 1975);
- A person's overall evaluation of persons (including oneself), objects, and issues (Petty and Wegener, 1998).

Shaw and Wright (1967: 2) argue that attitude entails an existing predisposition to respond to social objects which, in interaction with situational and other dispositional variables,

guides and directs the overt behaviour of the individual. It is important to determine the attitudes of teachers towards environmental sustainability because their attitudes influence their classroom practices, e.g. the way they prepare classroom lessons, the teaching methods they use and the resources they bring into the class. The exposure they give to learners is influenced by their attitudes towards environmental sustainability in the school economics curriculum. The attitudes of teachers towards their educational practices are important to determine their classroom effectiveness (Tok, 2011:81).

Attitudes are construed as varying in quality and intensity on a continuum from positive through neutral to negative (Shaw and Wright, 1967:6). Shaw and Wright (1967:6) argue further that a negative attitude towards environmental sustainability may arouse a negative approach to the teaching thereof, or an avoidance of teaching the subject matter as required by the curriculum in the classroom.

Shaw and Wright (1967:6) point out attitudes are learned, rather than being innate or a result of constitutional development and maturation. They argue that a measurement in attitudes will allow us to understand why teachers have negative or positive attitudes towards environmental sustainability. They argue further that should teachers possess a negative attitude towards environmental sustainability as a result of a lack of training in environmental education (environmental sustainability), professional development programmes can be constructed and introduced to assist teachers.

Shaw and Wright (1967:2) agree with Krech et al., 1962; Secord and Backman 1964 who conceptualised attitude as consisting of three components: an affective component, a cognitive component and a behavioural component to change attitude. Tok (2011:81) said that the cognitive approach involves how individuals think about an object; the behavioural approach involves reinforcements and punishments; and the final approach is social (affective approach), which concerns the inclination of individuals to imitate the beliefs and behaviours of people who are admired.

1.2 Background of the study

Human beings have become more aware of the environmental problems that are facing humanity. We have become cognisant of the fact that we must change our thinking towards the environment, and if we want to protect and preserve the Earth with its diverse biodiversity for future generations we need to adapt and embrace environmental

sustainability as a way of life. We have become conscious that we need to change our mind set towards and start working more eagerly towards a green economy. Nel, Du Plessis and Al-Shamaa (2012:91) agree that peoples' awareness about sustainability and understanding of the complexity of issues presented by modern lifestyles has grown over time. This awareness allows people to respond positively towards ecological and environmental problems the world is currently experiencing.

The Earth with its natural resources and different ecosystems is sensitive and has a limited supply which must be preserved for future generations. However, the actions of human beings assume that the Earth has an abundance of natural resources which will last forever. Yousuf and Bhutta (2012:154) refer to Makki, Abd-El-Khalick & Boujaoude (2003) who agree that environmental degradation has emerged as a serious issue in the world today. According to them, the human factor is the largest contributing factor to environmental degradation. However, the existence and well-being of humanity is dependent on the Earth's resources, like good quality water, clean air and a sustainable food supply and so forth.

The global demand for goods has increased while the supply of natural resources has remained constant. Natural resources are needed and used in the production of goods to satisfy human needs. If human beings do not change their attitudes towards the use of natural resources and start using natural resources optimally, economically and efficiently, it will contribute towards our own obliteration and destruction. Human beings will struggle to satisfy their basic needs and to survive without natural resources. Natural resources form the primary inputs in the production process, producing final goods. This demands that human beings adapt how they see the environment and change their attitudes towards environmental sustainability. It has become crucial that human beings, and especially learners, develop a positive attitude towards environmental sustainability if we want a better quality life and our future generations to survive.

Economic growth and development, globalisation and international trade are perceived to be major contributors to environmental degradation and the destruction of natural resources. Nel, Du Plessis and Al-Shamaa (2012:92) pointed out that population growth increased industrialisation and improper utilisation of resources has negatively impacted the ecosystem. Modern views on environmental degradation and the loss of biodiversity have caused governments, businesses and ordinary people to change their thinking about

nature and its ecology. They have come to the realisation that economic activities and the intensity thereof should change, thus the movement towards a green economy.

Many governments have changed their attitudes towards environmental sustainability. They have engaged in the acceptance of international environmental treaties, agreements, and so forth regarding environmental sustainability. They have developed green papers, policies, enacted various laws and so forth with which they try to reduce environmental destruction and promote environmental sustainability through the creation of a green economy. These changes have filtered into the school curriculum.

Changes can be seen in the South African school economics curriculum. Environmental sustainability is one of the contemporary economic issues topics (DBE, 2011:37), but the Curriculum and Assessment Policy Statements (CAPS) have pointed out that teachers will have to integrate contemporary issues which include environmental sustainability across the economics curriculum as teaching progresses (DBE, 2011:22). The depth and extensiveness of the integration depends on the attitudes of the economics teacher. Economics teachers with a positive attitude will be predisposed to include environmental sustainability issues when dealing with other topics such as economic growth, natural resources, globalisation, international trade and so forth.

Economics teachers can play a fundamental role in changing the attitudes of learners towards the environmental sustainability. Yousuf and Bhutta (2012:154) argue that there is a dire need to pay serious attention to protecting life on Earth. It is the prime responsibility of economics teachers to take measures to overcome environmental problems by changing the attitudes of learners towards environmental sustainability. It is therefore important to determine the attitudes of economics teachers towards environmental sustainability. Understanding the attitudes of economics teachers will allow us to understand whether teachers have a positive or negative attitude towards environmental sustainability. This problem supports and leads to the hypothesis of this thesis.

1.3 Aim of the study

The aim of this research study is to measure the attitudes of school economics teachers towards environmental sustainability. When the attitudes of school economics teachers are known, the relevant role-players can construct intervention processes and programmes to assist teachers, both in formal teachers' training and in-service training programmes, in

altering their attitudes towards environmental sustainability. Through this research study, the researcher wants to measure whether age, gender, teaching experience, years of teacher training, in-service training and geographical location influence the attitudes of economics teachers towards environmental sustainability.

Can it be assumed that age, gender, teaching experience, years of training and in-service training influence a teacher's attitudes towards environmental sustainability? Can it be assumed that a teacher of a particular age and gender has a better attitude towards environmental sustainability than those in other age groups and opposite gender? Can it be assumed that a teacher with many years' teaching experience has a positive attitude towards environmental sustainability, or does a new teacher have a more positive attitude towards environmental sustainability? Do the qualifications of a teacher influence a teacher's attitude towards environmental sustainability? Can it be assumed that the years of teacher training a teacher has influences the teacher in such a way that he or she develops a positive attitude towards environmental sustainability? Can it be assumed that ongoing in-service training cultivates positive attitudes in teachers towards environmental sustainability? Can it be assumed that teachers in urban areas have better attitudes towards environmental sustainability than teachers in rural areas?

The answer to these questions are no. It cannot be accepted that these assumptions are truthful. For the researcher to prove the hypothesis, it must be tested because it cannot be assumed that economics teachers have a positive attitude towards environmental sustainability. Through this research study an instrument will be developed to measure the attitude of economics teachers towards environmental sustainability.

1.4 Research question

This research study is guided by a hypothesis, a research question and six Null hypotheses. No research study can be conducted without a hypothesis and the hypothesis that guides this research study is: **“Economics teachers have a positive attitude towards environmental sustainability”** and therefore the question that needs to be answered through the study is: **“What is the attitude of economics teachers towards environmental sustainability?”**

1.5 The Null hypotheses which will be tested

1. **The Null hypothesis = H_0 :** There is no significant difference between the attitudes of male and female teachers of school economics towards environmental sustainability.
2. **The Null hypothesis = H_0 :** There is no significant difference between how long teachers have been teaching school economics and their attitudes towards environmental sustainability.
3. **The Null hypothesis = H_0 :** There is no significant difference between the age of teachers of school economics and their attitudes towards environmental sustainability.
4. **The Null hypothesis = H_0 :** There is no significant difference between the years of training of teachers of school economics and their attitudes towards environmental sustainability.
5. **The Null hypothesis = H_0 :** There is no significant difference between the in-service education opportunities of teachers of school economics and their attitudes towards environmental sustainability.
6. **The Null hypothesis = H_0 :** There is no significant difference between geographical location of teachers and their attitudes towards environmental sustainability

1.6 Research methodology

The survey research approach was adopted in this research study because it is an appropriate measurement to study the attitudes of economics teachers. Neuman (2011:309) suggests that surveys can provide us with accurate, reliable and valid data. A survey asks many questions at once thereby measuring many variables (Neuman, 2011:309). Neuman (2011) also points out that a survey will allow a researcher to gather descriptive information and test multiple hypotheses in a single survey. The survey research method is used by social scientists to empirically and scientifically study and provide information about people and social phenomena and the survey is used to test hypotheses (Lavrakas, 2008). This study uses a survey research approach to test the

following hypothesis: “Economics teachers have a positive attitude towards environmental sustainability.”

Rea and Parker (1992:2) argue that the ultimate goal of survey research is to allow researchers to generalise its finding about a large population by studying a small portion of that population. The technique that was used in this research study is primary data collection, data collected on a first-hand basis, directly from the subjects under study (Rea and Parker, 1992:3). Survey research offers the advantage of replicability (Rea and Parker, 1992: 7) which will allow further research in the attitudes of economics teachers towards environmental sustainability by using the same questionnaire over a larger sample.

1.7 Method of data gathering

Lavrakas (2008) argues that a survey is scientific because there is an established process that can be followed, documented, and replicated. Burns (2000:555) argues that survey research is a method of obtaining research data through using the quantitative research approach. This research study did not include any observations, interviews or any consultations as techniques of gathering data.

A 5-scale rating Likert scale was developed and used as the measuring instrument for this research study. The measuring instrument was disseminated to economics teachers at their mandatory reflection and planning meetings in their respective districts. It was expected of the respondents to indicate whether they 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree. The higher the score obtained, the more positive the attitudes of economics teachers towards environmental sustainability. The completed measuring instrument was returned to the researcher for the capturing of the data on an Excel worksheet and thereafter statistically processed.

Likert (1967:90), who developed the Likert scale to measure attitudes, alludes to certain criteria being kept in mind when collecting and structuring statements for the survey questionnaire. According to Likert, the statements should be of such a nature that persons with different points of view will respond to it differently. The statement used should be of desired behaviour and not desired fact. Each statement should be constructed clear, concise and straightforward. He added that it would be desirable to have the questions so

worded that the modal reaction to some is more towards one end of the attitude continuum and to others more in the middle or towards the other end (Likert, 1967).

Shaw and Wright (1967:3) consider attitude to be an evaluative reaction based upon evaluative concepts which are closely related to other cognitions and overt behaviour. They add that evaluative reactions based upon cognitive processes have the advantage of relating the theoretical construct most closely with the operations which are conducted through attitude scales.

1.8 Pilot study

A pilot study was conducted to ensure the face validity of the questionnaire. The questionnaire was disseminated to a small group of selected economics teachers to be completed. This process was conducted before the questionnaire was disseminated to the greater sub-sample of economics teachers. The purpose of the pilot study was to determine the face validity of the measuring instrument and to ensure that the selected group of economics teachers and peers have the same understanding of the statements. If there were any unclear or ambiguous statements in the measuring instrument, then it could be amended before the final questionnaires were disseminated to the broader sub-sample of economics teachers.

1.9 Data collection

The questionnaires were not administered via mail or e-mail because this method of data collection could have had an effect on the return rate of completed questionnaires. The researcher requested the economics subject advisors of the various district offices in the Western Cape to disseminate the questionnaires to economics teachers at their respective mandatory reflection and planning meetings which are held at the beginning of the year. This ensured a greater return rate of completed questionnaires. The questionnaires were disseminated to economics teachers in the eight districts that fall under the auspices of the Western Cape Education Department. The economics teachers were asked to complete the questionnaire at the venue of the reflection and planning meeting and after completion submit the completed questionnaire to their subject advisors. The researcher arranged with the subject advisors how the completed questionnaires would be collected from the various education districts.

1.10 Data analysis

The data on the completed questionnaires was captured on an Excel worksheet and thereafter the data was statistically analysed. Stangor (2004:15) argues that quantitative research uses questionnaires which are designed to be subjected to statistical analysis. The information from individuals is aggregated to provide a statistical profile of the survey population (Lavrakas, 2008).

An Excel spreadsheet and box and whiskers plot (box plot) was used to measure the hypothesis whether economics teachers have a positive attitude towards environmental sustainability. The Excel spreadsheet and box and whiskers plot (box plot) were used to capture and show the distribution of the data. The box plot also shows the existence of outliers which might influence the data.

Three different tests were conducted to test the six Null hypotheses. A Mann-Whiney U test was used to test Null hypothesis 1: "There is no significant difference between the attitudes of male and female teachers of school economics towards environmental sustainability"; and Null hypothesis 5: "There is no significant difference between the in-service education opportunities of teachers of school economics and their attitude towards environmental sustainability."

A Spearman rho correlation was used to test Null hypothesis 2: "There is no significant difference between how long teachers have been teaching school economics and their attitudes towards environmental sustainability"; Null hypothesis 3: "There is no significant difference between the age of teachers of school economics and their attitude towards environmental sustainability"; and Null hypothesis 4: "There is no significant difference between the years of training teachers who teach school economics received and their attitude towards environmental sustainability".

An ANOVA (Analysis of Variance) was used to test Null hypothesis 6: "There is no significant difference between geographical location of teachers of school economics and their attitudes towards environmental sustainability."

1.11 Reliability

Attitude scales are useful only if they are reliable and the questions valid. Shaw and Wright (1967: 16) argue that reliability is the degree to which a scale yields consistent scores when the attitude is measured a number of times. A Cronbach Alpha Coefficient test was conducted to determine the internal reliability and consistency of the statements in the questionnaire. Burns (2000:563) argues that measures of internal consistency are possible with Likert scales by correlating item score to total score, the general principle being that item score should be congruent with total score.

1.12 Validity

The validity of the questionnaire was ensured by conducting face validity and content validity.

1.12.1 Face validity

The questionnaire was subjected to a pilot study to ensure face validity of the attitude measurement scale and to determine whether the instrument is clear and unambiguous. The questionnaire was issued to seven selected economics teachers to be completed. They were requested to answer all the statements on the questionnaire and if a statement caused confusion, uncertainty, ambiguity or misunderstanding they should highlight such statements and indicate the concern they have with it. After the questionnaire was finalised it was disseminated to the economics teachers in the Western Cape at their annual mandatory reflection and planning meetings. The economics teachers who were asked to assist with the pilot study were included in the sub-sample again.

1.12.2 Content validity

The researcher worked through the content of Chapter 2, the literature review, to set the statements to be included in the questionnaire. This process was carried out to ensure content validity.

1.13 Sample

The research study was conducted among the economics teachers at their mandatory reflection and planning meetings in the eight educational districts in the Western Cape. The economic teachers who were asked to be part of the research study differ in age, years of teaching experience and gender. The teachers were not pre-selected and the questionnaire was issued to all the economics teachers present at the reflection and

planning meetings. The economic teachers' participation was fully voluntary and participants had the right to complete the questionnaire or refuse to complete it without fear of sanction or discrimination. A letter of consent to participate in the research informed the participants that they had the right to withdraw from the study at any time. (See Appendix 4)

1.14 Ethical considerations

The research study was conducted with openness, transparency and trust. The participants were informed about the nature and scope of the research study and that they would have the full right to know about the research study and whether it would affect them negatively.

An electronic application was completed and submitted to the Departmental Ethics Screening Committee (DESC) of the University of Stellenbosch to obtain ethical clearance to progress with the research. This process was completed before the final questionnaire was disseminated to the economics teachers to be completed. (See Appendix 1). A cover letter accompanied the questionnaire and informed the participants of the purpose of the research study and their right to withdraw at any time. (See Appendix 4)

1.15 Outline of chapters

Chapter 2: Literature review

In this chapter a literature review is conducted to review literature to support the research study.

Chapter 3: Research methodology

In this chapter a detailed description is given of how the survey research study was conducted.

Chapter 4: Presentation and analysis of research data

In this chapter the results of the research study are interpreted and discussed. The results of the participants' responses to the five dimensions of environmental sustainability (biophysical, economic, political, social and education) are examined.

Chapter 5: Discussion and research findings

In this chapter the results of the research study are interpreted and discussed. The findings are presented in the same sequence as presented in Chapter 4. The results of the hypothesis are discussed first and thereafter the results of the six Null hypotheses.

Chapter 6: Conclusion

In this chapter an outline is given of the research study findings. The importance of the study for different role-players, the limitations of the study and recommendations are made.

Chapter 2

Literature review

2.1 Introduction

In this chapter literature will be reviewed to support the research study on “the attitudes of economics teachers towards environmental sustainability” and related topics.

Why did the researcher decide to approach this study through an economics lens? The answer lies in the fact that there is a close relationship between economic activities and environmental sustainability because economic activities and economic decisions made by people, communities, businesses and nations always have long-term environmental impacts. There might be the general view that environmental studies lie exclusively in the field of the sciences, however environmental issues are not solely problems that need to be solved by the sciences but also by the social sciences, of which economics education is part, and can thus make a contribution to solving environmental problems.

The role of economics teachers should not be underestimated because teachers can play a major role in shaping the attitudes of learners positively towards the environment. Teachers have the capacity to influence learners’ attitudes towards environmental sustainability, but that would only be possible if they themselves have positive attitudes towards the environment/environmental sustainability.

In the literature review, the researcher will explore and examine two concepts, namely sustainability and environmental sustainability, and the dimensions of environmental sustainability, namely the biophysical, economic, political, social and education dimensions, in ensuring environmental sustainability. In the last part of the chapter the researcher will review literature relating to the attitudes of economics teachers towards environmental sustainability. This literature review will give background to and support the research study.

2.2 Definitions of operational Concepts: Sustainability and Environmental sustainability

Through the researcher’s engagement with literature sources, several authors contributed to the clarification of the concepts of sustainability and environmental sustainability. It is

therefore important to examine and develop an understanding of the relationship between these two concepts.

2.2.1 Sustainability

Different authors variously define the word sustainability. Focht and Abramson (2009:127) define it as the “long-term improvement of human satisfaction, with quality of life through a balanced and adaptive stewardship of resources that lie at the human nature interface, which in turn requires that the systems that provide these resources be maintained in a healthy and resilient condition”. Goodland (1995:14) argues that sustainability means “maintaining environmental assets or at least not depleting them”; while Bridges and Wilhelm (2008:34) used the generally accepted definition of sustainability that was formulated by Brundtland commission report: “Development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987). These definitions support the notion that human beings need to strive towards a better quality of life, but by doing so; they need to constantly ensure that their actions towards the environment and natural resources are in balance. In other words, there needs to be dynamic balance between biophysical, economic, social and political factors if sustainability is to be achieved. Sustainability requires of human beings to understand the need to safeguard the natural environment because human beings are part of this environment (Marovah, 2013).

Sustainability requires of human beings to constantly review their actions towards the environment. Given the unsustainable course of human society, it might be argued that sustainability demands a change in the attitudes of human beings towards the environment. In order to live more sustainably, it would be necessary for human beings to check their current consumption patterns and to save natural resources for future generations (Nel, Du Plessis and Al-Shamaa, 2012). A change in habits, consumer and production practices and general attitudes towards the environment is needed. Human beings will be required to use natural resources sparingly because of their scarcity and non-renewable nature (Nwagbara, Abia, Uyang and Ejeje, 2012).

It is therefore understandable that if human beings want to live sustainably there is an urgent need for the reorientation of the production and consumption patterns of individuals, communities and businesses. This re-orientation is crucial for economic development because it will be economically effective and lead to ecological sensitivity (Larijani and

Yeshodhara, 2008). However, Le Grange (2002) focuses our attention on the fact that sustainability is not only linked to development, but also to a better quality of life. People have unlimited wants which they constantly want to satisfy in order to improve their quality of life. But it has become necessary that they adopt a carefully planned approach towards the environment in their quest to satisfy their needs in the interest of the needs of future generations (Kobiowu, Dibu-Ojerinde and Alao, 2005). Human beings need to review their daily practices and interaction with the environment and that is why it has become crucial that they change the way they think, live and work if they want to achieve sustainability (Larijani and Yeshodhara, 2008).

An understanding of the concept of sustainability is crucial because it is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are in harmony and enhance both current and future potential to meet human needs and aspirations (Idoko, Nkamnebe and Amobi, 2013). However, it is more than understanding that is required; understanding needs to lead to attitudes that are positively disposed to caring for the environment.

2.2.2 Environmental sustainability

The term environmental sustainability captures two words, namely the environment and sustainability. The word environment includes all the natural resources, the Earth, all living plants, animals and all the organisms that inhabit the Earth. However, Le Grange (2008:184) argues that “environment” is a complex concept that encapsulates interacting biophysical, social, political and economic dimensions”. According to Le Grange (2008), the word sustainability focuses on the creation of a good quality of life for all, and human beings need to engage with the environment in a way that future generations can have the pleasure of enjoying the Earth and its resources in a similar manner in which present generations do. It is therefore important to explore the meaning of the concept of environmental sustainability in more detail.

Various authors developed their own definitions which encapsulate and define the term environmental sustainability. Morelli (2011:6) defines environmental sustainability as “meeting the resource and services needs of current and future generations without compromising the health of the ecosystems that provide them, and more specifically, as a condition of balance, resilience, and interconnectedness that allows human society to satisfy its needs, while neither exceeding the capacity of its supporting ecosystems to

continue to regenerate the services necessary to meet those needs, nor by our actions diminishing biological diversity". Goodland (1995:10) defines environmental sustainability as "the maintenance of natural capital", while Hueting (2010:526) defines it as "the situation in which vital environmental functions are safeguarded for future generations". Masika and Joekes (1997:1) added that environmental sustainability refers to "the maintenance of the ecosystem and the natural resource base". From the views of the authors mentioned it is evident that if human beings fail to maintain the environment for the present and future generations then they are failing to meet the goal of environmental sustainability. It has become necessary that human beings limit their onslaught on the Earth and its resource base and maximise the reduction of environmental degradation.

The underlying issues which support environmental sustainability are that all the countries of the world need to secure enough natural resources, ecosystems, diversity of plant and animal species, including the human living environment in the short and long term (Vlek and Steg, 2007; Bridges and Wilhelm, 2008). Environmental sustainability requires a healthy environment free of pollution and toxic waste, and which should provide the basis that complement a stable economy (Bridges and Wilhelm, 2008).

Erzengin and Teke (2013) argue that environmental damage is one of the major problems faced by nations today. They argue further that humans continue to damage the environment with the help of governments and society. The human race is causing major damage to the environment through deforestation, unsustainable agricultural practices, over-fishing, industrialisation, large-scale production of goods and services, extraction of raw materials for industry, and human-made hazards such as pollution by consumers, destroying clean water resources, air pollution, biodiversity loss, and so forth (Ibimilua, 2011, Nwonwu, 2007 and Goodland, 1995). It is a matter of urgency for all nations to change and embrace environmental sustainability because the environmental life-support systems are deteriorating. The Earth is supplied with a limited resources base which is deteriorating at a rapid pace. Most of the Earth's natural resources are non-renewable and therefore cannot be substituted or replaced immediately because some of the Earth's resources will take time to be replenished due to their slow self-generating qualities. That is why it is said that environmental sustainability imposes a time limit (Goodland, 1995).

Human beings need to understand that the environmental resources are the property of all generations, present and past, and every person has a human right to enjoy a safe and

well-preserved environment. Just as the current generation claims the right/entitlement to the use of natural resources so do future generations have the same right.

Nwagbara, Abia, Uyang and Ejeje (2012:6) argue that “sustainable development implies the utilisation of environmental resources by the present generation of human beings in such a way and manner that the future generation of the human species will come and meet such resources in better qualities and quantities than their predecessors”. But it seems that future generations will be much poorer than the current generation if we observe the rate at which the current generation is using and abusing environmental resources (Goodland and Daly, 1996).

According to Nwagbara, Abia, Uyang and Ejeje (2012), the issue central to sustainable development is that of intergenerational equity. Goodland and Daly (1996) pointed out that sustainability has an element of not harming future generations (intergenerational equity), but if we only focus on addressing the future we divert the attention from today’s lack of sustainability (intra-generational equity). Goodland and Daly (1996:1005) warn that if “the world cannot move towards intra-generational sustainability for this generation it will be greatly more difficult to achieve intergenerational sustainability in the future”. This emerges from the belief that natural resources belong to all the generations, present and future. It is important to achieve intergenerational equity because the environment with its resources is controlled by one generation at a time and nature with its natural resources is always controlled by the present generation (Nwagbara, Abia, Uyang and Ejeje, 2012). But due to the annual increase in population growth in mainly poverty-stricken areas make achieving intergenerational equity more difficult (Goodland and Daly, 1996).

Nations need to review their environmental actions and how these actions influence the achieving of environmental sustainability. These actions include but are not limited to consumer behaviour, production processes, economic development, economic growth and the influence of foreign direct investments on the environment. Wright (2002:111) argues that the concept of environmental sustainability must be “clearly linked with poverty, population, food security, democracy, human rights, peace and health and a respect for traditional cultural and ecological knowledge”.

We need an answer to the following question: when is environmental sustainability achieved? Environmental sustainability will be achieved when biophysical awareness and

protection, social needs and welfare, the political will and economic opportunity are integrated and connected to environmental concerns (Nwagbara, Abia, Uyang and Ejeje, 2012). Goodland (1997) argues that environmental sustainability will be achieved if the world changes to the use of renewable energy sources and maintains a stable human population.

In conclusion, Hlalele (2013:566) argues that “sustainable development is commonly associated with environmental sustainability”, while Nel, Du Plessis and Al-Shamaa (2012:94) argue that according to literature the term “sustainability is developed from sustainable development of the natural resources available to humans”. Therefore, in this study the words sustainability and sustainable development will be used synonymously with the term environmental sustainability.

2.3 The dimensions of environmental sustainability

Human beings are confronted daily with issues regarding the deterioration of the environment. A major cause of environmental degradation and depletion of the Earth's resource base is the blamed on irrational human activities. Le Grange (2008) elucidates that the destruction of the Earth's biophysical base is a symptom of modernity and that the cracks in the pillars modernity are visible in all four areas of the environment, namely biophysical, economic, political and social. An inquiry into the biophysical, economic, political and social dimensions of environmental sustainability is therefore essential.

Tilbury (1995:197) alluded to the essential nature of these four dimensions. She refers to the Brundtland report and argues that there is “(a) the need for reconciliation between economic development and environmental conservation; (b) the need to place any understanding of environmental concerns within a socio-economic and political context; and (c) the need to combine environment and development concerns”. The importance of these dimensions is the interrelated relationship between the economic, biophysical, social and political dimensions and the fact that these dimensions do not operate in isolation.

Education is the fifth dimension on which this research study will focus. Education is crucial if we want to achieve environmental sustainability because if human beings want to achieve a sustainable environment it is important to integrate environmental education into the school curriculum. Edem and Monnapula-Mapesela (2013) claim that education and especially environmental education is a necessity and is one of the responses to the

environmental crisis, while Sauv  (1996) avers that education is closely associated to and is of prime importance for promoting sustainable development. Education can be used to inform learners about the global environmental predicament and education can assist learners in acquiring the skills and knowledge to act and advocate environmentally sustainable practices in their schools, homes and community organisations and in the businesses in which they will be employed one day (Bridges and Wilhelm, 2008).

These five dimensions (economic, biophysical, social, political and education) are mutually dependent and a change in one will bring about a change in the other four. In this study, the researcher will focus on these five dimensions of environmental sustainability.

A clarification of the five dimensions of environmental sustainability is necessary. The economic dimension is the capacity and the ability to use local/regional/global resources productively in order for communities to draw long-term benefits from them without damaging the natural resource base, or the breakdown thereof, and without increasing the ecological footprint in cities and towns. It also implies that the entire production cycle must be taken into account (Allen, 2009). The economic dimension, according to Masika and Joekes (1997), encompasses the economic needs such as adequate livelihoods, assets and systems that are used to realise production. It also includes the interaction between economic growth, industrialisation, foreign direct Investments, technology, poverty, population growth, urbanisation, unemployment and the environment.

Social sustainability refers to fairness, inclusiveness and cultural adequacy of an intervention to promote equal rights and social justice and which supports the livelihoods and lives of local communities, while cultural adequacy means the extent to which a practice respects cultural heritage and cultural diversity (Allen, 2009). Masika and Joekes (1997:3) argue that social and cultural dimensions encompass “social and cultural needs and systems, e.g. health, education, shelter, equity, cultural institutions and norms, and their relationship with the environment”.

Biophysical (ecological) sustainability refers to the impact of production and consumption on the integrity and health of the rural/urban environment and the global carrying capacity. It also refers to the “relationship between the state and the dynamics of environmental resources and services and the demands exerted on them” (Allen, 2009). Masika and

Joeke (1997:3) argue that the biophysical dimensions encompass the “maintenance of the ecosystem and the natural resource base”.

Political sustainability is concerned with quality of the governance systems which guide the relationship and actions between the different actors: economic, social, biophysical and educational. It also deals with the democratisation and participation of communities in decision-making processes and how their decisions affect their existence and the environment (Allen, 2009). Masika and Joeke (1997:3) argue that the political dimension encompasses the “political needs (ability to participate in decision-making processes) and systems, and how they influence the environment”.

Education, especially environmental education, is an “important social instrument that can act as a catalyst” (Larijani and Yeshodhara, 2008:195) to “promote sustainable development and improve the capacity of the people to address environmental and developmental issues” (Biasutti and Frate, 2017:7). Education “plays a pivotal role in the realisation of sustainability of the Earth’s resources, economic welfare and society’s well-being” (America, 2014:2) and “it is through education that people can achieve knowledge, awareness, skills, values and attitudes which will assist them to lead a desired quality of life” (Larijani and Yeshodhara, 2008:195) and become environmentally literate.

Following this brief introduction to the five dimensions of environmental sustainability, each will now be discussed in greater detail.

2.3.1 Biophysical dimension

When we observe the world around us, it is clear that the Earth and the environment are constantly under enormous pressure. In order to satisfy their unlimited wants, human beings are exploiting the natural resource base at an alarming rate. The actions of human beings are of such a nature that it seems that they believe that nature with its various resources will remain forever. It is therefore crucial to review unsustainable practices towards the environment and for human beings to become aware of the Earths’ limited resource capacity. Planet Earth is experiencing major environmental changes which are caused by excessive human intervention on the environment, but human beings need to realise that the boundaries of planet Earth are finite (Spiropoulou, Antonakaki, Kontaxaki and Bouras, 2007; Kosoy, Brown, Bosselmann, Duraiappah, Mackey, Martinez-Alier, Rogers and Thomson, 2012).

The Earth as an ecosystem has a threshold within which it can absorb and withstand environmental interruptions (Kalu, Uwatt and Asim, 2008). However, a healthy ecosystem is of economic importance because it is associated with the livelihoods of people, but the over-exploitation of natural resources puts the livelihoods of people in all the countries in the world at risk (Rao, Knight and Samarth, 2010). Over the last few centuries development-orientated activities, the higher rate of exploitation of natural resources and an increase in the generation of waste by human beings have restructured the environment and upset the delicate balance of nature (Kalu, Uwatt and Asim, 2008). The natural resources base of the Earth is finite and has a limited carrying capacity, but with continuous extraction, exploitation and collection of natural resources a point will be reached where every additional person born will have a negative impact on nature's resources (Zaman, Khan, Khan, Saleem and Nawaz, 2011).

Human beings use environmental resources to satisfy their increasing wants. By doing so, their actions have led to the exploitation of natural resources and the rapid deterioration of the environment, causing caused untold imbalance to the ecosystem (Ibimilua, 2011; Nwagbara, Abia, Uyang and Ejeje, 2012). Human beings depend on the natural environment to satisfy their basic needs and wants for food, shelter and clothing, and their actions to satisfy such needs and wants have led to the degradation of the environment. In their quest to put bread on the table and to satisfy their daily wants human beings are inducing devastation on the environment (Ibimilua, 2011). Human beings are responsible for the exploitation of swamps, forest, grassland, rocks, the atmosphere, water and other resources of the natural environment to satisfy these basic needs and wants (Nwagbara, Abia, Uyang and Ejeje, 2012). In their quest to satisfy their unlimited needs and wants human beings are in the process of expanding their habitat for a better quality of life. This process has created serious disturbances to the equilibrium of the environment. The environment is heavily used and the rate of exploitation of natural resources is faster than the time that it would take to replenish nature. That is why natural capital has become the limiting factor for economic activities, e.g. timber is limited by the remaining forests and not by sawmills; petroleum is limited by the geological deposits, not refining capacity, and so forth (Goodland, 1995; Sudarmadi, Suzuki, Kawada, Netti, Soemantri and Tugawati, 2001; Nwagbara, Abia, Uyang and Ejeje, 2012).

It can also be argued that human beings are deliberately or/and ignorantly destroying environmental resources through activities such as deforestation, unsustainable agricultural practices, urbanisation, indiscriminate bush burning, over-fishing, industrialisation, poaching, housing, mining and the dereliction thereof, while man-made hazards include all kinds of waste, food poisoning and environmental degradation (Ibimilua, 2011). While human beings are in the process of destroying the Earth's clean water resources, air, soil and biodiversity, they are also reducing the capacity of the environment to contribute towards a better quality of life (Harte, 2007).

The prevailing modes of production in the global economy, the pressure placed on the environment to provide goods and services for domestic consumption, the supply of raw materials for industry and when waste is returned to the environment after social and economic activities, are causing the exhaustion of the Earth's natural capital such as topsoil, groundwater, tropical forest, fisheries and biodiversity (Nwonwu, 2007; Goodland, 1995 citing Daily, G, Ehrlich PR, Ehrlich A, 1994, 1992). Because of the increased population growth coupled with unlimited needs, it has become imperative that crop production yield increases. Dams and irrigation as well as soil additives, chemicals and other non-natural techniques are used to improve the production yield of countries and these are contributing towards environmental degradation (Nwagbara, Abia, Uyang and Ejeje, 2012). Nwonwu (2007:135) argues that the "environment is the substratum on which the supply and sustenance of the resources for development are built". Every society needs a sustainable productive environment to provide a resource foundation for a better quality of life, but without it we cannot have a sustainable society. A sustainable flow of material, energy and environmental resources are required for a sustainable economy and without it the economic system will fail. However a sustainable environment does not depend on the existence of an economy or the society because a sustainable environment can stand alone as a sustainable system (Morelli, 2011).

Human existence is dependent on the environment and that is the reason why humans should adopt a positive attitude towards it. This does not mean that humans are not allowed to reap the fruits of the natural environment, but it means that when they engage with nature their actions should be guided by ethical considerations and obligations because of their inter-relatedness with nature (Ibimilua, 2011). Environmental problems cannot be solved by technology, government and business policies or individual countries alone, but need a new way of thinking how humans and other species on earth can coexist

(Leemans and Solecki, 2013). It is the moral obligation of every human being to understand the environmental predicament that we are in and to seek ways to avoid such escalating damage now and in the future (Harte, 2007). This means that natural resources “must be harvested no faster than they can be regenerated and waste must be emitted no faster than it can be assimilated by the environment” (Basiago, 1999:149). If we are in agreement that environmental degradation is caused by human activities such as an increase in population growth, increased in material consumption and an expansion of technology then it becomes crucial that human beings need to take corrective action to remove the threats that degrade the environment and adopt a positive environmental sustainable attitude (Morelli, 2011; Vlek and Steg, 2007).

The ecosystem has evolved for millions of years and provides human beings with essential physical basic needs for their existence, like food, fresh water, clean air, medicine and recreation (WWF, 2016). However, over the past 100 years nature’s ability to provide human beings with the essential services is coming under increasing risk (WWF, 2016). Bio-diversity, the essential variety of life-forms on Earth, continues to decline in every region of the world, significantly reducing nature’s capacity to contribute to people’s well-being (Unesco, 2018).

Bio-diversity and nature’s capacity to contribute to people are being degraded, reduced and lost. This is alarming because it endangers economies, livelihoods, food security and the quality of life of people everywhere (Unesco, 2018). What is frightening is that humanity’s ecological footprint has exceeded the Earth’s capacity to supply and has risen to the point at which 1.6 planets would be needed to provide resources sustainably, and that the biodiversity index has fallen by more than 50% as the population of species continue to decline (Howes, 2017). Worsening land degradation caused by human activities is undermining the well-being of two fifths of humanity (Unesco, 2018).

Habitat stress, over-exploitation and unsustainable use of natural resources; air, land and water pollution; the increasing numbers and impact of invasive alien species; extinction of species and climate change are all contributing factors to bio-diversity loss and the current degrading state of the Earth (Unesco, 2018; WWF 2016). Human beings are behind the current rate of species extinction which is at least 100 – 1000 higher than nature intended (WWF, 2017). The living planet index shows that the population size of vertebrate species

(mammals, birds, reptiles, amphibians and fish) has dropped by an overall 58% between 1970 and 2012 and this happened in little as 40 years (WWF, 2016:18).

Worsening land degradation is a major contributor towards mass human migration and increased conflict in certain regions (Unesco, 2018). Land degradation through loss of biodiversity and ecosystem services cost the equivalent of 10% of the world's annual gross domestic product (GDP) in 2010 (Unesco, 2018).

The Living Planet Report states that there has been a limit to nature's capacity to absorb the impact of human development (WWF, 2016). However the Earth's capacity to meet the increasing needs of humans is declining. This can be observed through the Earth's Overshoot Day which marks the date when humanity has exhausted nature's budget for the specific year and therefore for the rest of the year we are maintaining our ecological deficit by drawing down local resource stocks and accumulating carbon dioxide in the atmosphere (Global Footprint Network, 2018). The Earth's capacity to provide natural resources are declining year on year and human consumption of natural resources are increasing year on year. The Earth Overshoot Day for 2016 fell on 8 August 2016 (WWF, 2016) and the Earth Overshoot Day for 2017 fell on 2 August 2017 (Global Footprint Network, 2018).

More than 3 billion people worldwide obtain about 20 percent of their protein from fish and the majority of the fish comes from the ocean (WWF, 2016). However it is argued in the United Nations Environment Programme report (2017) that there will be more plastic than fish in the oceans by 2050. Plastic in the ocean originates from single-use items such as plastic straws, bags, bottles, and so forth). It is argued in the same report that when the population stood at 2.5 billion people in 1950, 1.5 million tons of plastic were produced, but in 2016 when the population stood at more than 7 billion, 300 million tons of plastic were produced (UN, 2017). It is inspiring to observe how many fast-food outlets and restaurants are changing attitudes towards the issue of plastic straws. Many outlets no longer issue plastic straws when one buys beverages, and now issue paper straws.

Cirino (2017) argues that plastic can be detected in more than 50 percent of the world's sea turtles and scientists estimate that 90 % of sea birds have ingested plastic at some time in their lives. Scientists predict that current estimates put the oceans' total plastic load at 165 million tons. The increase in the production and use of plastic has severe

consequences on marine animal and plant life, but also on the lives of human beings. Given the amount of plastic in the oceans, much of the marine life now carries plastic that was either ingested directly or by eating smaller marine creatures. Plastics enter the marine life directly or through the smaller fish they eat and then end up on our dinner tables through the sea food we eat (UN, 2017).

Forests are crucial to the way the Earth is functioning because they use up the carbon and release oxygen which is crucial for human survival. Forests also influence rainfall, filter water and prevent flooding and soil erosion (WWF, 2016). Although forests are crucial to the survival of human beings they are still being chopped down in large numbers. The Global Assessment Report shows that 129 million hectares of forest (an area larger than South Africa) on a net basis has been lost since 1990. This total represents natural forests over planted forests (WWF, 2016). A total of 239 million hectares of natural forests were lost over the same period on a gross basis (WWF, 2016).

Howes (2017) argues that the world has lost more than 48% of its tropical and sub-tropical forests. Deforestation causes major environmental damage and results in the habitat loss of millions of species. Deforestation causes global warming because there are fewer trees and forests to absorb the greenhouses gasses that enter the atmosphere and are a major cause of climate change (National Geographic, 2018).

Climate change is the single greatest challenge faced by humanity and causes irreversible changes to the ecosystem (UNEP, 2018). Climate change poses a threat to the economies of countries, the health and safety of human beings, food production and security of nations (UNEP, 2018). Weather patterns are changing, threatening food production because of the unpredictable rainfall patterns (UNEP, 2018).

The Earth's global surface temperature is rising. Seventeen of the 18 warmest years in 136 years (1880 to 2016) have been recorded since 2001, with the exception of 1998 (NASA). 2016 was the warmest year and 2017 the second warmest year recorded since 1880 (NASA, 2018). The five-year global temperature average from 2013 to 2017 was the highest average recorded on record, the world's nine warmest years recorded have all occurred since 2005 and the five warmest years were all since 2010 (UN, 2018).

The global sea level rose by about 17 centimetres in the last century. The sea level has risen at twice the rate of the previous century. As a result of the warming climate sea levels are rising by more than 3 millimetres per year (NASA, 2018). Twenty-five years of NASA and European satellite data show that the sea-level rise is accelerating instead of increasing steadily. The acceleration is driven by the melting ice in Greenland and Antarctica. If the ocean rise continues at the current rate the sea level will rise by 26 inches (65 centimetres) by 2100 (Weeman and Lynch, 2018). The rise in the sea level will have serious consequences for human health and quality of life and coastal populations are facing the risk of dislocation due to flooding (NASA, 2018).

Climate change has become current and visible because human beings can observe climate change in the loss of sea ice, accelerated sea-level rise and longer and more intense heatwaves (NASA, 2018). Longer and more intense droughts are threatening crop cultivation, wildlife and freshwater supplies and endanger the Earth's biodiversity (WWF, 2018).

Desertification is a phenomenon that ranks among the greatest environmental challenges of our time (UN). Desertification occurs when the tree and plant cover that binds the soil is removed. It occurs when trees and bushes are stripped away for fuelwood and timber, or to clear land for cultivation. It is also when animals eat away the grass and erode the topsoil with their hooves and when intensive farming depletes the nutrients in the soil (UN).

Desertification is a silent and invisible crisis that is destabilising communities on a global scale (UNCCD, 2014). Desertification does not always lead to conflict but the effects of desertification are felt globally as victims are turned into refugees, displaced people within their own countries and forced migrants, or they turn into radicalisation, extremism or resource-driven wars for survival (UNCCD, 2014).

Over 1 billion people today have no access to water, and the demand for water will increase by 30% by 2030 (UNCCD 2014:4). The African continent has the highest proportion of countries experiencing water stress (41%) (WWF, 2016:54). Environmental degradation causes women and girls to walk ever longer distances and unfamiliar territories in search of clean water and firewood which exposes women and girls to violence and sexual abuse on their journeys to the water collection points (Kabeberi-Macharia, 2017). A study by the UNICEF/World Health Organisation (2012) shows that in

the 25 countries studied which represent 48 % of the region's population, women are primarily responsible for water collection. The study shows that women spend a combined total of 16 million hours each day collecting drinking water, men spend a combined 6 million hours and children spend a combined 4 million hours collecting drinking water.

A News24 (2018) report on the European Geosciences Union General Assembly 2018 says that Francesco Bregoli argued that pharmaceutical medicines are widely used by human beings as a cure from different illnesses and also to cure animals. Pharmaceutical effluence is now entering river systems around the world and ends up in oceans. Bregoli said that the rivers are contaminated with over-the-counter prescription medicines which are beneficial to human life but are threatening the freshwater ecosystem because some ingredients in the medications induce sex changes in fish and amphibians and also drive some species to extinction. He said the research study found large concentrations of analgesics, antibiotics, anti-platelet agents, hormones, psychiatric drug and anti-histamines in the environment that are harmful to wildlife.

2.3.2 Economic dimension

The Industrial Revolution of the 18th century changed humanity's relationship with nature forever. Before the Industrial Revolution, people made a living from the soil to survive because they were self-sustaining farmers. Production was aimed at consumption and there was an awareness of dependence on nature for daily survival. People understood their relationship with the Earth and its natural resources. With the advent of the Industrial Revolution in the 1700s in Britain the production-consumption relationship changed from production for immediate consumption to production aimed at selling products on the market. The Industrial Revolution was accompanied by the emergence of industries and factories, urbanisation, overcrowding of cities and towns, the construction and expansion of cities and towns, excessive pollution, noise, and so forth. It brought with it the emergence of markets, the use of money as a medium of exchange, the use of machinery in factories which led to mass production, etc. The economic activities during the Industrial Revolution contributed towards the depletion of natural resources and major environmental degradation (Ahuti, 2015; Huwart and Verdier, 2013; Komlos, 1989).

Things did not improve much in the modern economy because all economic activities are geared towards the satisfaction of peoples' needs and wants (Huetting, 2010). Modern economic activities are increasingly affecting the environment and society at large.

Increased poverty, increased inequality, economic marginalisation and environmental degradation are modern issues that hinder the development of nations and that is the reason why sustainability should be an integral consideration to all economic activities if we want to address these challenges (America, 2014). Birhanu (2013) added that modern economic activities such as globalisation, economic growth, industrialisation, foreign trade, trade openness, foreign direct investments, patterns of production of industries, patterns of consumption and consumer behaviour are all major causes of environmental degradation and contribute towards the destruction of the natural resource base.

Natural resources are needed and used as a primary input in the production process to manufacture final goods which are a requirement for the satisfaction of needs and wants of the people. But the Earth's capacity to supply more natural resources to satisfy increasing consumer demand is diminishing. To provide for increased consumer demand, factories and producers are forced to increase their production capacity (which leads to economic growth); this will cause an increase in the demand for raw materials (natural resources) which places additional pressure on the already struggling environment. This argument is supported by Papagiannis and Farrell (2002) and Birhanu (2013) who argue that environmental degradation and destruction are inevitable results of economic growth of countries and the consumption patterns of human beings.

Countries around the world have a tendency to promote economic growth and development, but to achieve economic growth and development requires the use of natural resources. Put differently, in the pursuit of economic growth and development, tampering with the Earth is inevitable (Aboagye and Kwakwa, 2014). Economic growth cannot be disentangled from the environment because as the economy grows so its impact on the environment grows (Kahuthu, 2006) and the natural environment will be increasingly put under pressure if the current trends of economic growth and consumption patterns prevail (Birhanu, 2013). This is the result of the interdependent relationship between economic growth and environmental quality and that is the reason why there is an "urgent need for the sound, efficient and sustainable utilisation of the environment" (Aboagye and Kwakwa, 2014:136).

Gross domestic product (GDP) is defined as the total value of all final goods and services produced within the boundaries of a country within a specific period of time, usually a year (Mohr and Fourie and Associates, 2008: 57). It translates to an increase in the capacity of

the economy to produce more final goods and services in a specific period of time. GDP is one of the most important barometers of the performance of the economy (Mohr and Fourie and Associates, 2008). Countries also use GDP figures to compare their economic strength and prosperity with each other. GDP is the most influential indicator used to indicate the strength of a country's economy (Zhang, 2012). GDP per capita is used to measure the level of economic development of a country (Kahuthu, 2006). Both approaches are seen as flawed from an environmental perspective. The method of measuring GDP according to the System of National Accounts, according to the United Nations, only takes human-made capital into consideration in the calculation of national accounts, but it ignores social and natural capital (Zhang, 2012). The method used to calculate GDP per capita ignores the damage caused by pollution and depletion of natural resources when the level of development of a nation improves (Kahuthu, 2006). Papagiannis and Farrell (2002) point out that humanity is faced with a dilemma because world leaders prefer economic growth as the preferred solution to resolve differences in the life-chances of citizens in developed versus developing countries.

York, Rosa and Dietz (2003:295) found in their study that increases in GDP per capita consistently lead to increases in environmental impacts, but the increases are not proportional. Zhang (2012) revealed in a study that China's economic growth over the past years was initiated by market-orientated reforms and policies but that it created a series of social and environmental problems. Rapid industrial development relied heavily on energy, natural resources and environmental services, which resulted in the depletion of natural resources and environmental degradation. Zhang (2012) argues that if China wants to avoid environmental disasters it will have to revisit its economic growth and environmental policies.

Neo-classical economic theory contributes towards environmental problems because the neo-classical theorists believe in unlimited economic growth through the operation of the free market system and an increase in the consumption of goods and services (Stubbs and Cocklin, 2008). Neo-classical theorists argue that individuals obtain utility from consumption of goods and services. They argue further that the economy maximises social welfare through the productive and efficient allocation of resources (Nahman, Wise and De Lange, 2009; Mohr and Fourie and Associates, 2008). Allocative efficiency, also called Pareto efficiency, is achieved when goods and services are allocated in the most efficient manner. Allocative efficiency is obtained when a distribution strategy exists where

one party's situation cannot be improved without making another party worse off. Productive efficiency, also called technical efficiency, is achieved when goods and services are produced without wasting scarce resources (Mohr and Fourie and Associates, 2008).

Stubbs and Cocklin (2008) argue further that neo-classical theorists believe that technology can solve any kind of problem related to environmental degradation by replacing natural capital with human-made capital. According to them, neo-classical theorists believe that humanity does not need to worry because pollution and waste can be dealt with through the development of new technology. That is why organisations shaped by neo-classical economic theory feel that they are above nature and that the "exploitation of natural resources is legitimate because resources are free and plentiful" (Stubbs and Cocklin, 2008:209). A major problem is that the neo-classical theorist never questions the negative impact on the environment of continuous production of new products to satisfy the unlimited consumer wants and they never question whether environmental degradation is linked to industrial production and unsustainable consumption patterns (Stubbs and Cocklin, 2008).

Globalisation has changed the way the world economy functions. Trade has changed because resources (factors of production such as natural resources, capital, labour and entrepreneurship) become mobile as a result of effective transportation, communication and improved technology. Economic globalisation assists in increasing economic growth (Agarwal, 2012), while the appearance of the global economy is the force behind the "movement and the integration of goods, services, capital, technology, labour and with eminent reliance on natural resources" (America, 2014:1). Globalisation has changed the boundaries and the requirements of governments and market institutions. Globalisation has promoted the role of the market through economic, social and environmental outcomes and it has constrained the role of governments (Farazmand and Moradi, 2015).

A valuation of the global economy shows that the economy has increased tenfold in value over the decades and that it will continue to expand because of the current trend of economic activities. This increased growth will not only occur in developed countries but also in emerging economies such as those in Asia, Africa and Latin America (Leemans and Solecki, 2013).

There are authors who do not agree that environmental degradation is a result of globalisation. In a study, Alam (2010) found that there exists a long-run relationship between economic growth, environmental degradation, globalisation, poverty and other socio-economic and demographic factors such as education, industrial and agricultural output, urbanisation and population. Alam (2010:110) also found that “increased globalisation has caused a decrease the rate of environmental degradation”. In their study, Farazmand and Moradi (2015:105) found that “globalisation diffuses world product standards to the extent that environmental standards are higher in the dominant consumer markets and it creates a trend toward rising standards globally”.

There exists an uneven economic relationship between the North (developed countries) and the South (developing countries) with regard to the consumption of resources.

Developing countries open up their markets and relax their environmental regulations to foreign companies to do business because the influx of foreign direct investment (mostly in the form of creating industries or businesses) is a major contributor to job creation and economic growth in developing countries. This leads to the “pollution haven hypothesis” which assumes that “developing countries may utilise lenient environmental regulations as a strategy to compete for the investment of polluting industry from developed countries” (Xing and Kolstad, 2002:20). But the influx of polluting industries from developed countries into developing countries cause major environmental degradation problems in the form of pollution, toxic and other waste and loss of biodiversity and a lack of structured sustainable agricultural and economic activities (Birhanu, 2013). Riti and Kamah (2015) found through their study that foreign direct investment inflows contributed to the worsening of the environment which is evident in pollution emissions in the long run. This view is shared by Agarwal, (2012) who found in a study that the import of foreign direct capital or foreign technology leads to increases in pollution.

In their study, Eskeland and Harrison (2003) explore the impact of multinationals which flock to developing countries to take advantage of lax environmental standards. Through their studies, they (Eskeland and Harrison, 2003; Xing and Kolstad, 2002) found weak evidence to support the pollution haven hypothesis. Eskeland and Harrison (2003) focused our attention on a related study conducted in Mexico, Venezuela, Morocco and Cote d'Ivoire where no evidence was found that the investment in developing countries is related to abatement costs in industrialised countries. They also found that foreign firms

pollute less than their peers in developing countries. It was found that foreign plants are significantly more energy efficient and use cleaner types of energy than domestically owned industries. The use of energy efficient equipment and cleaner energy sources can be attributed to the highly advanced technology used by the industries originating from developed countries, but the local industries in developing countries are not in a position to afford these advanced technologies (Eskeland and Harrison, 2003).

Trade liberation is the abolishment of trade barriers and the opening up of international markets which encourages free and unrestricted exports and imports (Lee, 2005). Lee (2005:1) defines trade liberalisation as “a move towards freer trade through the reduction of tariffs and other barriers and is generally perceived as the major driving force behind globalisation”. “It includes dismantling of tariffs such as duties, surcharges, and export subsidies, as well as non-tariff barriers such as licensing regulations, quotas, and arbitrary standards” (Business Dictionary.com, 2015). The easing or eradication of these trade restrictions or barriers is often referred to as promoting free trade (Investopedia.com, 2015). South Africa as a developing country promotes exports and import substitution to improve the state of the economy. Many countries prefer a policy of export promotion because it contributes to increased exports, job creation, tackling issues such as poverty, inequality and unemployment and economic growth, but increased export volumes can endanger the environment (Van Niekerk and Viviers, 2014).

There are commentators who are very critical of trade liberation. They argue that trade liberation is the reason for the increase in poverty, global inequality and environmental degradation (Lee, 2005). In their study, Aboagye and Kwakwa (2014) found signs that trade liberation is beneficial to rich countries and their sustainable development, but that it is harmful to poor countries. They argue further that trade openness has had an adverse effect on the environment of poor countries.

However, there are critics who argue that trade liberation does not cause environmental degradation and that it may be beneficial to the environment. Agarwal (2012) found that there is no evidence to show that trade liberalisation has led to a significant rise in environment pollution. Farazmand and Moradi (2015) argue that trade openness results in production efficiency to economies because of increased competition. According to them, inefficient companies who use outdated and inefficient machinery will be put out of business by businesses using new and environmental-friendly machinery. This will result

in a reduction in energy consumption and by this a reduction in the emissions generated by the higher cost of energy resources. In their study, Farazmand and Moradi, (2015:105) found that “trade openness reduces the production of pollution”, while Riti and Kamah, (2015:23) found in their study that “economic growth and trade openness aided environmental quality in the long run”. Aboagye and Kwakwa (2014:135) found in their study that “trade openness reduces pollution and degradation” of the environment “through a reduction of CO₂ emissions and energy consumption per capita”.

The underlying drivers of land degradation are the high consumption lifestyle in most of the developed countries and the rising consumption in developing and emerging countries (Unesco, 2018). High and rising per capita consumption which is amplified by an increasing population growth in many parts of the world are all drivers of unsustainable levels of agricultural expansion, natural resource and mineral extraction and urbanisation and this lead to greater levels of land degradation (Unesco, 2018).

The consumption patterns of human beings also contribute towards the degradation of the environment, for example through different types of pollution, excessive waste, over-utilisation of resources to feed the production processes and so forth. America (2014:3) argues that “consumption drives manufacturing and resource extraction around the world”, but consumption patterns are no longer influenced or dictated by local factors alone. Consumption patterns are influenced by remote economic, technological, social, political and environmental impacts that are caused by the impact of technology. New improved technology is the result of a rapid change in resources, transfer of energy and information (Sibbel, 2009). Increased consumer demand is the result of the variety of products offered on the market and the increased competitiveness between businesses, but all efforts to reduce the impact of increased consumption patterns on the environment are hampered because it is not always economical and financially viable (America, 2014). New technological developments have led to marketers being very close to their existing market, as well as potential markets. Marketers make use of mass advertisement media to bring new products, new inventions and existing products to the public's attention. Through this they try to establish and create brand loyalty among especially the youth because they see the youth as a future as well as a current market. This will ensure sales, but increased sales lead to increased consumption. Increased patterns of consumption will inevitably lead to more waste, pollution and increased emissions of greenhouse gases whether through manufacturing or the transportation of goods (Taylor, Doff, Jenkins and

Kennelly, 2007). If human beings continue their selfish onslaught on the environment through excessive consumption and production patterns, and if their consumption patterns of resources increase beyond regenerative rates, it can adversely affect the ecosystem and this can lead to the eventual collapse of the ecosystem (Marshall and Toffel, 2005).

If human beings want to contribute towards saving the environment for present as well as future generations it has become crucial to change their attitudes towards their consumption patterns. Households play a multi-functional role in the economy, but if they change their behaviour towards the environment it could potentially lead to the effective management of the Earth's resources. If we fail to recognise the role of households as a social decision-making unit in the economy we could lose the countless opportunities for a change in behaviour of people and to achieve environmental sustainable communities across the globe (Sibbel, 2009).

Environmental sustainability is a serious global issue and consumers are becoming more and more aware of the devastating environmental impact of small and medium-sized enterprises on the ecosystem and natural resources base (Idoko, Nkamnebe and Amobi, 2013). Idoko, Nkamnebe and Amobi, (2013:17) argue that small and medium-sized enterprises are “the largest business sector in the economy and that they contribute up to 60% of the global economic output”. It is therefore evident that small and medium-sized enterprises contribute towards the degradation of the environment. Idoko, Nkamnebe and Amobi, (2013:17) argue that the actions of small and medium-sized enterprises result in the “huge generation of solid waste, contamination of groundwater through discharge of waste water, carbon dioxide (CO₂) emissions among other dangerous gases into the atmosphere resulting in climate change with its devastating impact on human beings and the environment”.

2.3.3 Political dimension

The current state of the environment is characterised by pollution, excessive waste, ozone depletion, etc. Large-scale global environmental law and policy changes are needed to change the state of the environment. If people, businesses and governments want to reverse or minimise these negative impacts on the environment, a cultural and social transformation on their part is needed (Rao, Knight and Samarth, 2010). Changes to the environment are the result of systemic market failures and governments are forced to intervene in the market to rectify these market failures (Rao, Knight and Samarth, 2010).

Governments are forced to intervene in the market to protect the environment with its resource base for present and future generations. The South African government, for example, intervenes in the economy to enact laws and regulations which protect the environment against, for example, excessive fishing, excessive and destructive mining, poaching of marine resources, poaching of rhinos and elephants for their ivory, pollution, spilling of acid water in main water supply systems by mining activities, adhering to international CO₂ emissions quotas, etc.

But there must be a political will by governments to pass pro-environmental laws which will protect the natural resources of the earth, as well as protecting the environment from irrational exploitation by humans. Anderson (1991:238) suggested that “for the implementation of sound environmental management, the understanding of social values must be transformed into political will, so that governments do not give in to conflicting market interests”. If human beings are left alone and they have the freedom to do what they want, they will continue with their exploitation of the environment. Anderson (1991) pointed out that economic decision-makers will only take the impact of their actions on the environment into consideration if it is regulated by law, or when the people who are affected by their negative actions towards the environment take action against them. It is crucial for governments that make laws that deal with environmental protection to oversee the enforcement of environmental laws, rules and regulations in practice through their respective agencies and law enforcement agencies.

The role of politicians in government is crucial because they can influence the promulgation of laws, making of decisions and their implementation. Politicians who are part of households as consumers, part of government as policy makers and as promoters of natural resources need to stand up for the protection of the environment and environmental resources. However, politicians have a political agenda which is influenced by financial support from companies and the gaining of votes from members of the public. Therefore supporting or passing laws that might infringe on the profits of businesses and which could be unpopular with the broader population might shrink their support base (Zhang, 2012). In China, the government and its officials promoted pro-growth policies, because economic growth was seen as the main task of the government. The economic performance of the country was linked to career advancements, financial rewards and political futures of government officials. This resulted in massive economic growth, but created a number of social and environmental problems (Zhang, 2012).

It is crucial that governments know how economic growth policies and growth-related policies affect the environment. Knowledge thereof could assist in the design and implementation of proper environmental policies and promote greener environmental policies (Aboagye and Kwakwa, 2014). If countries decide that economic growth is good for the country and the environment, then the policies they are passing to stimulate economic growth (trade liberalisation, economic restructuring and price reform) must also be good for the environment (Farazmand and Moradi, 2015).

Politicians will undoubtedly want to achieve the goal of increasing throughput that is created by an increase in the consumption by all. Throughput is the constant flow of materials, energy, resources from the environment which is used by human beings and returned to the environmental sink as waste (Goodland 1995). Another reason why governments experience problems with achieving environmental sustainability is their failure to admit that the rate of population growth is responsible for more harm than good to the environment (Goodland, 1995). Politicians will not raise issues such as population growth, family planning and smaller families in their political or election campaigns because they do not want to be unpopular with the masses.

As Goodland (1995:13) wrote: "Controlling consumerism and waste, halting human population growth, and probably reducing population size, and relying on renewable energy is to be regarded as politically unacceptable". Sibbel (2009) argues the many government policies do not challenge the way producers' manufacture, the packaging they use and the manner in which products are distributed. The focus is placed on consumer behaviour and ways to change consumer behaviour to become more environmentally conscious, specifically consumption patterns and waste management. For example, in South Africa consumers are charged a fee by stores for plastic carrier bags. Through the levy of the fee, the government aims to reduce the use of plastic carrier bags by consumers. Instead, government could have taxed the manufacturers when they produce non-biodegradable carrier plastic bags for retail outlets.

Multinational corporations are predisposed to relocate their pollution intensive activities to developing countries as a result of higher management costs in their own countries, usually developed countries. Multinational enterprises prevent developing countries from applying environmental protection laws and policies because they have the financial

(economic) power to play governments against each other. Multinational companies use their economic power to blackmail governments of developing countries to accept pollution in return for investments, and the consequence of this is that pollution is transferred from developed countries to developing countries (Anderson, 1991). It is also argued by Idoko, Nkamnebe and Amobi, (2013) that many small and medium-sized enterprises operate within the informal sector which lies outside the control of the law. This results in heavy unsustainable behaviour from these enterprises. In their study, Idoko, Nkamnebe and Amobi (2013:11) strongly recommend the “enactment of environmental law, harmonisation of taxes, levies and fees targeted at small and medium-sized enterprises and public private partnership to encourage small and medium-sized enterprises to acquire environmentally-friendly technologies in order to advance the process towards achieving environmental sustainability”.

Various international intergovernmental environmental conferences have been held over the decades and it has become clear that governments must take charge of protecting the environment. The 1992 Rio Earth Summit, the 2002 Johannesburg World Summit on Sustainable Development and the Rio +20 conferences all pointed to the crucial role governments must play in the battle against environmental destruction and decay. The increase in global and local awareness of the risks and threats associated with environmental issues and the quest to adhere to the international protocols, has led to South Africa including environmental considerations in the laws and policies of the country. These environmental considerations are also expressed in the Constitution of South Africa (the supreme law of the country) and promote the right to an environment that is not harmful to the health and well-being of South Africans and all who live in our country (Department of Environmental Affairs, 2016; RSA, 1996).

Rao, Knight and Samarth (2010) point out that South Africa is one of the countries that have embraced pro-environmental policies to achieve sustainable development. South Africa also adopted the Millennium Development Goals (MDGs) which highlighted the importance of achieving environmental sustainability. However, although the country adopted these pro-environmental laws and policies, the environment remains continually threatened (Rao, Knight and Samarth, 2010). With all these laws and policies in place, the South African policy and decision-makers often prioritise economic development at the expense of environmental integrity (Nahman, Wise and de Lange, 2009). But if the countries can pass environmental policies that ensure environmental sustainability,

environmental degradation and climate change will be lessened (Rao, Knight and Samarth, 2010). It is therefore crucial that South Africa achieve goal 7 of the Millennium Development Goals to “harmonise economic growth with sustainability and to improve the health and well-being of all South Africans” (Rao, Knight and Samarth, 2010:111).

Environmental justice means the inclusion of women, children, disabled people, senior citizens or any other marginalised groups in environmental decision-making processes. Environmental justice demands that all the people have equal rights and opportunities from the poorest person to the wealthiest person (Hlalele, 2013). This requires that governmental laws and policies promote, protect and sustain the environmental rights of all the people in the country. Political systems around the world are faced with environmental justice issues and the absence thereof leads to problems because sustainable development is neglected and it restrains people’s equitable access to natural resources (Murombo, 2010).

Fairness, equity and inclusion in all interactions in society are a precondition for democracy (Mahlomaholo, Nkoane and Ambrosio, 2013). “Social justice” and environmental justice “encourages environmental sustainability because it argues for respect for the environment so that future generations can be able to derive optimum benefit from it” (Mahlomaholo, Nkoane and Ambrosio, 2013: viii). Countries must accept and embrace environmental justice because it will give dignity to the inhabitants (especially the marginalised groups) of a country. Cutter (1995:112) pointed out that the principle of environmental justice guarantees: “1) the protection from environmental degradation; 2) the prevention of adverse health impacts from deteriorating environmental conditions before the harm occurs, not afterwards; 3) mechanisms for assigning culpability and shifting the burden of proof of contamination to polluters not residents; and 4) redressing the impacts with targeted remedial action and resources”. But Murombo, (2010:176) argues that “there is an intricate nexus between bad governance, environmental injustice, and inequitable distribution of environmental goods and harms”. In countries where dictatorships, civil chaos, or lack of rule of law are the order of the day, environmental problems are found to be common and the inhabitants of these countries struggle with environmental justice issues because of the suppression of their human rights, as well as their environmental rights (Murombo, 2010).

2.3.4 Social dimension

In discussing the social dimension of environment/environmental sustainability, the following aspects that relate to it: poverty, population growth and urbanisation, will be reviewed.

2.3.4.1 Poverty

Poverty, population growth and urbanisation are the cause of major changes to the environment. This occurs at such a rapid pace that the environment struggles to recover timeously and this will have a great impact on the livelihoods of human beings who depend on the natural environment for their existence.

It is argued that poverty and environmental problems are interrelated and closely linked with environmental degradation (Zhang, 2012; Nwagbara, Abia, Uyang and Ejeje, 2012). According to Ibimilua (2011: 480), “poverty is the bane of environmental protection, especially in rural areas”. Many poor people in rural areas depend on the environment for food, medicine, building materials for shelter, etc. In their quest to satisfy their wants, they are systematically destroying the biomass (Ibimilua, 2011). In trying to survive, poor people are over-utilising and abusing their surrounding areas, causing further poverty and hunger and in some cases famine. The over-utilisation and cultivation of agricultural land is causing soil exhaustion, which results in a reduction of crop yields which have a spill-over effect in coming years. Large-scale deforestation to make way for more agricultural land results in flooding, causing the washing away of the topsoil. Zhang (2012:14) pointed out that “deforestation, over-grazing, and over-development of agricultural land lead to resource degradation and increasing natural disasters, which disproportionately occur in the poor regions and reduce their developmental capacities”. A large portion of the lower income groups do not own the economic and technological resources which their wealthier counterparts have and this forces them to overuse and misuse resources for their survival (Orimoogunje, Adegboyega, Banjo and Funmilayo, 2011).

One of the outcomes or conclusions of the Bruntland commission, which was accepted as the blueprint for environmental conservation, stated that poverty is a major cause of environmental problems (Duraiappah 1998).

The chief of the environment department of the Asian Development Bank links poverty to environmental degradation when he argues that “it is generally accepted that

environmental degradation, rapid population growth and stagnant production are closely linked with the fast spread of acute poverty in many countries of Asia” (Duraiappah, 1998:2169). In a World Bank development report it was stated that “poor families who have to meet their short-term needs mine the natural capital by excessive cutting down of trees for firewood and failure to replace soil nutrients” (Duraiappah, 1998:2169 citing the World Bank, 1992).

Unjust social conditions are also responsible for creating poverty. Poverty is not limited to environmental degradation and maldistribution of resources, but it is also about “social exclusion, cultural marginalisation and the process of being deprived of prospects and opportunities” (Jerneck, 2015:2). People who are poor and hungry are often forced to destroy their immediate environment because they try to survive. They are also responsible for the over-cultivation of agricultural land and the chopping down of trees. Many poor people live in slum conditions and because of a lack of essential services they throw their litter and garbage in canals and rivers. Poor people also experience a shortage of resources and materials needed to maintain a basic standard of living in order to survive (Nwagbara, Abia, Uyang and Ejeje, 2012). That is why poor people are seen as victims of environmental degradation because they are forced to live in ecologically vulnerable areas. They are also seen as agents of environmental sustainability because it is due to their circumstances that they are forced to deplete the environment in order to satisfy their basic needs and wants (Masika and Joekes, 1997).

Irrespective of whether countries are claiming phenomenal economic growth and rapid economic development, poverty and environmental degradation remain a critical social problem which affects both the rich and the poor (Nwagbara, Abia, Uyang and Ejeje, 2012). However, environmental degradation is not solely caused by the poor because damage to the environment is caused by both rich and poor people. According to Ibimilua (2011:475), it is only “the frequency and magnitude that differs”. But Goodland (1995) argues that it is the poor that are suffering most because they are unable to protect themselves against scarcities (e.g. clean water, clean air) and pollution. Both developed and developing countries struggle with poverty which is a great cause of environmental degradation. In order to reduce poverty it is argued that economic growth and development are needed but economic growth and development can cause more environmental stress on the ecology if they are not carried out in a more balanced manner (Goodland, 1995).

Alam (2010) found in a study that poverty increases environmental degradation and if poverty is not alleviated it will slow down economic development. In their study, Aggrey, Wambugu, Karugia and Wanga (2010:86) found that environmental degradation “show a spatial correlation with poverty”. They also found that poverty is positively linked to deforestation and wetland degradation. There should therefore be an urgency to eradicate poverty if we want to save the environment and its resource base. The eradication of poverty will require “economic, political and social initiatives and interventions” and surely a political will to accompany these initiatives and interventions (Jerneck, 2015:3).

There are authors that refute the argument that environmental degradation is solely a result of poverty. According to them, environmental degradation cannot be blamed solely on the poverty conditions of people. In a literature review by Duraiappah (1998) it was concluded that the poor are not responsible for the degradation of the environment, but that environmental degradation was a consequence of the activities executed by powerful and wealthy nations. Finco (2009) refutes the poverty-environmental trap theory and argues that not all environmental degradation is the result of poverty, neither is it created by poor people. Both Finco (2009) and Duraiappah (1998) argue that environmental degradation is the result of certain externalities which are the consequences of market failures. Finco (2009) points out that the activities of rich agricultural farmers who employ large and capital-intensive lumber and/or cattle operations can ravage the environment without the poor lifting a hand. The culpability of environmental degradation is placed on the consumption patterns of the rich and wealthy because the type, size and amount of waste generated by them does not compare with the waste of the poor (Nwagbara, Abia, Uyang and Ejeje, 2012).

2.3.4.2 Population growth

Another social issue blamed for environmental degradation is increasing population growth. Population growth has been identified since the Stockholm conference in the early 1970s as a problem contributing to environmental degradation. The North blamed the population explosion in the South as the major cause of environmental degradation, while the South blamed the consumption patterns of the North as the major contributor to environmental degradation (Nwagbara, Abia, Uyang and Ejeje, 2012). Increased population growth places extra pressure on the environment in the form of more food that is needed to feed more mouths, more water is needed; more shelter is needed, etc. This

places more strain on environmental resources and if it is not managed well through reducing the population numbers it will jeopardise the goal of achieving environmental sustainability (Osuafor and Samuel, 2015).

Various authors blame environmental degradation on population growth. Ibimilua (2011:480) says that “population pressure is responsible for many environmental problems”, while Zhang, (2012:15) argues that “population growth is regarded as a major cause, although not the sole one, for resource depletion and environmental deterioration”. Clark (2012:67) argues that “an increased population growth is the primary cause of deforestation in Africa and certainly in Madagascar”. Zaman, Khan, Khan, Saleem and Nawaz (2011) found in their study that a closely intertwined relationship exists between the population and the environment, and that population growth has a harmful impact on the environment. They also found that an increase in the population led to a greater demand for agricultural land to meet the growing population's needs. Re-use and overuse of agricultural land results in deterioration of the quality of the soil. Increased population growth puts more strain on the environment in the form of degradation, water pollution, hazardous waste, pests, diseases, food contamination and premature death, and most of these problems result from urbanisation and overcrowding (Ibimilua, 2011). Orimoogunje, Adegboyega, Banjo and Funmilayo, (2011) found in their study that the major problems of population growth are soil erosion, land degradation and habitat loss.

Iwejingi (2011) examined the impact of population growth on the environment in Nigeria and found that the increased population growth rate contributes towards environmental pollution which eventually affects the health of the people. The study by Osuafor and Samuel (2015) supports this view and found that overpopulation is causing pollution that brings about major health problems that are brought about by the use of natural resources and the production of excessive waste. The growing population leads to environmental degradation in the form of the destruction of wetlands, forests, agricultural land and fisheries, etc., but a degraded environment will lead to health problems, food shortages, famine, etc. (Orimoogunje, Adegboyega, Banjo and Funmilayo, 2011). It is therefore plausible to say that a growing population is causing environmental degradation and that the latter affects the population negatively.

Hui (2015:157) argues that the human population currently stands at ± 7 billion people and it is projected that it will reach the 10-billion mark in the middle of this century. The 2017

Revision of the World Population Prospects report pointed out that the world's population nearly reached 7.6 billion during mid-2017. This figure implies that the world has added about 1 billion inhabitants over the last 12 years (United Nations 2017:2). However the report further shows that although the population continues to grow, it is growing at a slower rate. The global population was growing a 1.24% per year 10 years ago, but it is today it is growing at 1.10% per year (United Nations 2017:2).

2.3.4.3 Urbanisation

Urbanisation is a “major issue of the 21st century all over the world” (Maiti and Agrawal, 2005: 278) and it has “destroyed the symbiotic relationship between humanity and nature” (Hawkes, Yannas, Hinsley and Dunster, 1996:66). It is argued that urbanisation can be a gift to humanity if it is controlled and well planned, but if not it can be a curse to any country (Mohan, Pathan, Narendrareddy, Kandya and Pandey, 2011).

Urbanisation is the movement of people from rural areas to urban areas in their quest to break the cycle of poverty and in doing so securing a better quality of life. Urbanisation is attributed to rapid economic growth which is responsible for the establishment of more businesses and industries in and around cities and towns creating the prospects of abundant job opportunities for people in rural areas. People move from rural areas to urban areas and major towns in search of work. Cities are unable to absorb the influx of people because of the limited living space and an inability to provide sufficient housing and employment opportunities for incoming people. The result of rapid urbanisation is that towns are becoming larger and arable land is decreasing (Li and Ma, 2014).

Many cities especially in poor countries do not have sufficient resources to invest in basic human infrastructure such as water, sanitation, housing, etc. Poor countries lack the ability to provide urban residents with crucial economic opportunities which will allow them to live above the poverty line, and are therefore creating urban poverty. Urbanisation is creating an urban poor who are confronted with over-population, pollution, over-consumption, encountering solid-waste challenges, etc. The urban poor are also exposed to biological and physical threats and their access to protective and infrastructure services is restricted. The existence of urban poverty is not only the shifting of poverty from rural areas to urban areas, but it is exacerbated by the socio-economic, gender and ethnic inequalities experienced by people (Allen, 2009).

The influx of people from rural areas into city spaces creates massive overcrowding and housing problems which force people to erect informal structures and houses, and this gives rise to the existence of informal settlements in and around the cities, causing urban sprawl (Mohan, Pathan, Narendrareddy, Kandya and Pandey, 2011). They found that countries that experience rapid urbanisation are also experiencing urban sprawl which contributes to a change in land use. "Sprawl generally refers to some type of uncoordinated development with impacts such as loss of agricultural land, open space and ecologically sensitive habitats in and around urban areas due to lack of integrated and holistic approaches in regional planning" (Mohan, Pathan, Narendrareddy, Kandya and Pandey, 2011:1275). Agricultural land and fertile soil are sacrificed in urban cities and towns for use as residential land, mainly for housing, whether informal or formal.

Modern cities need plenty of resources to satisfy the growing demand of the urban population. The continuous demand and excessive consumption of natural resources results in the increasing demand for non-renewable resources. The continuous cultivation, extraction and collection of natural resources cause environmental destruction, both in the immediate surroundings of cities, as well as globally (Hawkes, Yannas, Hinsley and Dunster, 1996). As Donohoe (2003:573) writes: "Urbanisation causes major environmental degradation, which includes different kinds of pollution, increased poverty (urban poverty), over-crowding, famine, species loss, acute and chronic medical illnesses, human rights abuses, etc. and destruction of the natural environment". Aboagye and Kwakwa (2014) allude to this in their study and state that the process of urbanisation is responsible for creating slum conditions, land insecurity, worsening of water supply and quality, and excessive pollution. These conditions are the result of growing industrialisation and growth in motor vehicle use and the problems of solid-waste disposal (Aboagye and Kwakwa, 2014).

In a study conducted by Alam (2010:110), it was found that the "expansion in intensive industrial and agricultural activities and rapid urbanisation affect the environment". York, Rosa and Dietz (2003:295) found in their study that "urbanisation increases environmental impacts". Magigi (2013:1137) found in another study that "urbanisation is the key factor underpinning and catalysing changes in food systems, environmental quality, climate change and agriculture livelihoods in the overall urban ecosystem setting and its sustainability". The study suggests that where countries expect their population to increase they should put in place "clear, spatial land-use policies and management strategies to

overcome the challenges to reducing the negative externalities for enhanced food systems and urban environmental sustainability” (Magigi, 2013:1148).

Li and Ma (2014:5160) conclude in their study that “an extensive development pattern would have a significantly negative effect on the environment”. They found that the process of urbanisation causes major problems to the environment. The increase in businesses and industries in urban areas contributes towards higher pollution levels and CO₂ emissions and the consumption patterns of the increase urban population are causing solid waste problems (Li and Ma, 2014). In their study, Aboagye and Kwakwa (2014:135) found that industrialisation “unambiguously harms the environment, while rapid urbanisation is revealed to increase pollution/degradation through increased CO₂ emissions and energy consumption”. Maiti and Agrawal (2005) conducted a study in India and found that there is a clear link between urbanisation and the environment. They found that urbanisation is a threat to the quality of life of people, which has emerged as the major issue today. According to them, uncontrolled urbanisation in India is the cause of a housing shortage, deteriorating water quality, air and noise pollution and major problems with the disposal of solid and hazardous waste (Maiti and Agrawal, 2005).

Jahan (2008) focuses on the impact of environmental degradation on women in Bangladesh and how women suffer the most from environmental problems and diseases. Jahan (2008) concluded that women are the most vulnerable group in any society and that they suffer the most from any form of environmental degradation. Jahan, (2008:14) argues that “they are affected directly and adversely both through human-made and natural disasters”. The role of women in society and especially with regard to environmental issues should be recognised and women should be included in any engagement which deals with environmental issues (Jahan, 2008). Jahan (2008:14) argues that the “environment is not gender based”, but that the “process of environmental degradation should be viewed from a gender perspective” because “women are socially responsible for the management and conservation of natural resources” in and around their living areas.

Drastic steps need to be taken to reduce the impact of urbanisation on the environment. The voice of women should reflect in environmental management and planning processes and policies. If the contribution of women is not recognised and supported when dealing with environmental issues, reaching environmental sustainability will be an elusive goal (Jahan, 2008). York, Rosa and Dietz (2003:295) suggest that “societies cannot be

sanguine about achieving sustainability via a continuation of current trends in economic growth and institutional change”.

Adequate steps need to be taken to prevent and reduce urban pollution and to improve the quality of life of all people by providing urban residents better social amenities and improving basic services. Governments must control the urban population because people in urban areas compete for land to build their house and in most cases informal structures; people compete for clean water resources, clean air, solid-waste disposal, and so forth. If governments fail, the quality of life of people in cities will deteriorate and people will be exposed to more unhealthy conditions (Maiti and Agrawal, 2005). It is important that more efforts need to be made to increase and preserve a green cover and to increase the awareness of a green economy. The suggestion is that the expansion of urban areas should be diverted towards sandy areas and wastelands and that agricultural land be used for their purpose of cultivating agricultural produce (Mohan, Pathan, Narendrareddy, Kandya and Pandey, 2011).

2.3.5 Education dimension

2.3.5.1 International influences and the inclusion of environmental education in the South African educational system

The UN Conference on Environmental and Development (UNCED) in Rio de Janeiro in 1992 was influential in linking sustainability to education and learning (Jones, Selby and Sterling, 2010). Agenda 21 is crucial because it identified the role of education in teaching learners sustainability and stated that “school-age to adult education should promote sustainable development and improving the capacity of people to address environmental and development issues” (Jones, Selby and Sterling, 2010:1).

The UN Decade of Education for Sustainable Development (2005-2014), which followed the World Summit on Sustainable Development in 2002, sought to mobilise the educational resources of the world to help create a more sustainable future (Gough 2006; Unesco, 2016). Gough (2006) argues that Unesco’s view of education for sustainable development is that schools should implement approaches that integrate the objectives for maintaining social justice, appropriate development and democracy in a vision and mission that will lead to personal and social change. It is crucial that environmental integrity and economic viability be preserved if we want to ensure that current and future generations

will enjoy social justice (Unesco, 2017). However, Unesco argues that education alone cannot achieve a more sustainable future, but without education and learning for sustainable development we will not be able to reach a sustainable future.

By the time the first international conferences on environmental education were held there was no urgent state-driven attempt by the South African government to include environmental education in South Africa's formal school curriculum. It was only in 1989 that the South African government started to include environmental education in its policy processes (Le Grange, 2002). Several international conferences were held in Stockholm (1972), Belgrade (1975), Tbilisi (1977) and the United Nations Conference on Environment and development (Agenda 21) which influenced the inclusion of environmental education in the national public school curriculum in South Africa (Le Grange, 2002:84). Some of the principles that were adopted at these international conferences were incorporated into the White Paper on Education and Training, Notice 196 of 1995 of South Africa (Le Grange, 2002). One of the key principles of this first White Paper on Education and Training produced in post-apartheid South Africa is:

Environmental education, involving an inter-disciplinary, integrated and active approach to learning, must be a vital element of all levels and programmes of the education and training system, in order to create environmentally literate and active citizens and ensure that all South Africans, present and future, enjoy a decent quality of life through the sustainable use of resources (Principle No.20: 22, RSA, 1995).

Some of the principles that were adopted at these international conferences are also captured in the South African Constitution of 1992. The effect of this is that all the laws that are passed in the country must adhere to the principles of the Constitution. Through the Constitution, environmental principles are included in many of the laws relative to all sectors of the economy.

South Africa does not have a designated subject with the name environmental sustainability or environmental education, but an integrated approach is followed whereby environmental topics, issues and aspects are infused in all the mainstream school subjects, of which economics is one. The South African government has infused environmental sustainability topics into the national school curriculum, the National

Curriculum Statements (NCS). Topics dealing with the environment, natural resources, environmental sustainability, environmental degradation, etc., are included in South Africa's most recent version of the NCS, the Curriculum and Assessment Policy Statement Grade 10-12: Economics (DBE, 2011).

2.3.5.2 The importance of economics as a school subject in achieving environmental sustainability

Environmental education or environmental topics dealing with environmental sustainability do not lie exclusively within the subject content of the field of natural science.

Environmental topics should not only be owned by the study field of science and therefore taught and co-opted by science teachers alone (Palmer, 1997). Environmental topics should be integrated into all the subjects forming part of the school curriculum if progress is to be made towards a sustainable society (Bridges and Wilhelm, 2008; Ogunyemi and Ifegbesan, 2011). Environmental education integrates knowledge from different disciplines, ranging from natural science and social sciences, as well as the humanities, and therefore provides the knowledge which can be of interest to all the learners in all the subjects irrespective of their diverse backgrounds (Sorensen, 2005). Environmental sustainability is of interest to all the subject disciplines taught at school, and it appears in the economics, business studies, consumer studies, life sciences, natural science etc. curriculum because environmental issues and topics can be taught through the lens of environmental education which is integrated into all these subjects (Bridges and Wilhelm, 2008).

It is argued by Sudarmadi, Suzuki, Kawada, Netti, Soemantri and Tugaswati, (2001:170) that "global environmental problems cannot be understood without a substantial contribution by the social sciences (economics is a social science), because social approaches are indispensable to implementing environmental conservation policies in society". Ogunyemi and Ifegbesan (2011) found in their study that social science studies have a great responsibility educating learners about the environment because the solution to many of the environmental problems depends on complex economic, social and political considerations and teachers are in the position to cultivate a sense of civic responsibility in learners to change their attitude towards the environment. Economics as a social science, which is one of the business education subjects, can be used as a vehicle to create an awareness of environmental sustainability and learners can be taught how sustainability relates to society, the economy and the environment (America (2014).

The Constitution of South Africa is the supreme law of the country and it is crucial that the obligations imposed by it be fulfilled. When laws are formulated and promulgated they must adhere to the principles and stipulations set out by the Constitution. The Education Act of South Africa is no exception to the rule. Le Roux and Maila (2004:234) argue that the views of the role, status and purpose of education in general, and environmental education in particular, are contained in policy documents such as the Constitution of South Africa, the White Paper of 1995, the National Environmental Management Act of 1999, the National Curriculum Statements Grades R-12, and the Curriculum and Assessment Policy Statements, generally referred to as CAPS.

The Constitution in its Bill of Rights gives recognition to the environment. The Constitution of the Republic of South Africa (Act of 108 of 1996), article 24 on the environment, the Bill of Rights, states that everyone has the right:

- a. to an environment that is not harmful to their health or wellbeing; and
- b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:
 - i. prevent pollution and ecological degradation
 - ii. promote conservation and
 - iii. secure ecological sustainable development and use of natural resources while promoting justifiable economic and social development (RSA 1996).

These rights on the environment are expressed in the principles of the National Curriculum Statements, the school curriculum of South Africa and more specifically in the economics school curriculum. Environmental education processes are integral to all the subjects in the formal curriculum. One of the principles of the National Curriculum Statement Grades R-12 is based on:

Human rights, inclusivity, environmental and social justice: infusing the principles and practices of social and environmental justice and human rights as defined in the Constitution of the Republic of South Africa. The National Curriculum Statement Grades R-12 is sensitive to issues of diversity such as poverty, inequality, race, gender, language, age, disability and other factors (DBE:2011:5).

It is mandatory that all South African public schools follow the National Curriculum Statements Grade R-12 (NCS – Grades R-12) as the formal curriculum. The Curriculum and Assessment policy statements (CAPS) are an amendment to the National Curriculum

Statements Grade R-12. The NCS – Grades R-12 stipulates policy on curriculum and assessment in the schooling sector (DBE, 2011:3).

Economics is one of the subjects offered in the Further Education and Training (FET) band (Grades 10-12). Each school and subject teacher must have a CAPS document. The CAPS document serves as a curriculum policy, providing teachers with clear guidelines on what should be taught and when it should be taught on a day-to-day, term-to-term basis. CAPS are prescriptive and performative in nature. Teachers are bound by the CAPS document when they execute their teaching task. Economics is one of the subjects selected from Group B and the prescribed time to be spent on economics in the FET band is a minimum of four hours per week (DBE, 2011:7).

The CAPS document as an assessment policy indicates the Programme of Assessment (POA) that should be followed in each school subject. The POA stipulates the number of formal assessment tasks, tests and examinations that should be administered within a term and within the academic year. It is mandatory for every teacher to meet the POA requirements in the year.

2.3.5.3 Environmental sustainability in the school economics curriculum – FET Grades 10-12

The school subject economics is taught from Grades 10-12. Economics is defined in the CAPS document as the study of how individuals, businesses, governments and other organisations within our society choose to use scarce resources to satisfy their numerous needs and wants in a manner that is efficient, equitable and sustainable (DBE, 2011:8). Bridges and Wilhelm (2008:34) argue that the curriculum should espouse a sustainability worldview and it should teach learners how to make effective and sound environmental decisions which are simultaneously in the best long-run interest of their quality of life, the community they live in and society as whole. According to them, a healthy environment, free of pollution and toxic waste, and simultaneously providing the basis for a stable economy that will endure for an extended period is viewed as complementary rather than conflicting endeavours.

South Africa does not have a designated subject with the name environmental sustainability nor environmental education. An integrated approach is followed whereby environmental topics, issues and aspects are infused into mainstream school subjects of

which economics is one. Palmer (1997:6) argues that environmental education/ environmental sustainability do not lie exclusively in the field of science education. It is not and should not be an adopted child of this field, something to be co-opted by science educators alone. Bridges and Wilhelm (2008:38) agree that environmental sustainability is of interest to many disciplines (e.g. economics, life sciences, physical science, geography, business studies, etc.) and it is time to foster greater cooperation among them if progress is to be made towards a sustainable society. Sorensen (2005:2) argues that environmental education/environmental sustainability provide interdisciplinary knowledge and can be focused on topics that capture the interests of children from diverse backgrounds. According to her, mathematics, economics, biology, technology, chemistry and political science can all be taught through the lens of environmental education, which integrates knowledge from disciplines that span the natural and social sciences, as well as the humanities.

The discussion will now focus on the CAPS document for economics and indicate topics that must be covered in the different grades and where environmental sustainability topics/issues can be infused during classroom teaching.

2.3.5.3.1 Grade 10

The CAPS document of 2011 prescribes that teachers must cover the following economics content topics but teachers can use the opportunity to infuse environmental sustainability topics into their teaching. The CAPS document prescribes the topic and content that must be covered in Grade 10.

Topic: Basic economic problem
Content: Problems that all economies try to solve regarding the basic processes of production, consumption and exchange, <u>highlighting</u> the promotion or violation of human rights and the environment.
The scarcity problem: <ul style="list-style-type: none"> - absolute and relative scarcity - economic and free goods - alternatives and choices - opportunity cost <ul style="list-style-type: none"> • The basic processes:

<ul style="list-style-type: none"> - production - exchange - consumption • Promotion or violation of human rights and the environment: <ul style="list-style-type: none"> - human rights - the environment
The Topic: Economic redress
Content: The reconstruction of the South African economy after 1994 as an effort to redress the inequalities of the past.
Natural resources: <ul style="list-style-type: none"> - Land - Minerals and energy - Fishing - Forestry

(DBE 2011: 14)

The role of the teacher should not merely be to explain this content in isolation but to elucidate on how these processes impact on the environment and how they contribute towards the promotion and violation of the environment.

Although these are the topics where reference is made to the environment in the CAPS document, the inclusion of environmental topics and issues should still be integrated with other topics as the teachers cover the curriculum content.

When the topic “Growth, development and globalisation” is taught, it is expected that the teachers cover the early economic development, the emergence of markets, the evolution of markets, industrial development and the evolution of economic institutions (DBE: 2011). The CAPS document does not make any reference to the impact these developments have had on environmental degradation, the Earth and its resources. Yet the development of economies has had a major influence on the relationship between human beings and nature. It is imperative that when the teachers are dealing with these curriculum topics that they infuse the impact of these developments have had on the Earth and its resources.

According to the CAPS document, teachers should cover the historical economic development of the South Africa. It is expected of teachers to cover the impact of

colonialism and imperialism on the South African economy. According to CAPS, teachers should expose learners to the following content: the animal husbandry and agriculture stage, the agriculture and mining stage, the mining and industry stage, and the manufacturing and services stage. The effect and impact of these activities on the environment is not dealt with explicitly in the CAPS document, although these activities have had a direct impact on the state of South Africa's current environmental state and its natural resources base.

Another content topic that must be covered is population size and labour force. The CAPS document specifies that teachers should explain the factors and the impact of HIV/AIDS on population size and labour force. It is important that teachers should expound on excessive population growth and how it impacts negatively on the Earth and its environmental resources. Teachers should link these content topics to income inequality and poverty and how poverty impacts on environmental degradation in areas where communities reside.

2.3.5.3.2 Grade 11

The CAPS document prescribes the topic and content that must be covered in Grade 11.

Environmental deterioration is covered explicitly in the Grade 11 curriculum. The content that must be covered is illustrated below.

Topic: Economic Redress: Environmental deterioration
Content: The environment: <ul style="list-style-type: none"> • The problem • Protecting the environment • Approaches to sustainability • The global and local impact on South Africa

(DBE, 2011:31)

There are topics that must be covered in Grade 11, but no reference is made to the impact it has on the environment. However, a teacher with a positive attitude towards environmental sustainability will infuse such topics where appropriate into the curriculum as he/she progresses with the content coverage.

Topics where environmental issues and topics can be infused are when teachers cover the basic economic problem, when they deal with the factors of production: natural resources and entrepreneurship; the analysis and calculation of national aggregates (GDP); and when an analysis of the economic structure of the South African economy is required. Teachers can infuse environmental issues, topics and concepts when they have to cover the composition and importance of the primary, secondary and tertiary sectors and infrastructure. The CAPS document further indicates that the exclusion and discrimination in service provisioning and access to economic opportunity should be infused in the analysis, but does not make reference that teachers should infuse environmental issues into the topics.

The topic “growth and development” also deals with standards of living, characteristics of developed and developing countries and indigenous knowledge systems. Even though the CAPS document does not make any mention of environmental issues that should be incorporated in this topic, it is crucial that teachers should make learners aware of the impact of economic development and growth on the indigenous systems of countries.

When dealing with the topic of globalisation, the CAPS document specifies that teachers must examine and debate globalisation, its relevance to the North/ South divide and its effects (negative and positive) on South Africa. Teachers need to focus on the following:

- Meaning
- Causes
- Consequences
- Absolute and comparative advantages and disadvantages
- North/South divide

When dealing with this content teachers should cover the impact the actions of globalisation has on the Earth and its resources. Economic development, economic growth and poverty are all topics in which environmental issues and topics should be integrated because all these economic actions contribute to the current state of the economy.

2.3.5.3.3 Grade 12

Environmental sustainability is covered explicitly as a topic in the Grade 12 curriculum. Environmental sustainability is covered explicitly in Grade 12 and the content below must be covered:

Topic: Basic economic problem: Environmental sustainability
Content: Analysis of environmental sustainability, investigating recent international agreements in this regard, for example, the Rio de Janeiro and Johannesburg summits.
<ul style="list-style-type: none"> • The state of the environment • Measures to ensure sustainability • Major international agreements (Rio de Janeiro and Johannesburg summits)

(DBE, 2011:37)

This content is further clarified in the examination guidelines of 2017. The examination guideline of 2017 is an important and useful document because it guides teachers in their classroom preparation and teachings. The purpose of the examination guidelines is to provide clarity on the depth and scope of the content to be assessed in the Grade 12 National Senior Certificate (NSC) examination in economics and to assist teachers to adequately prepare learners for the examinations (DBE 2017: 3). At present there is only an examination guideline for Grade 12.

The economics examination guideline 2017 (DBE 2017:28) indicates that teachers must cover the following content with regard to environmental sustainability:

Topic: Contemporary economic Issues: environmental sustainability	
Analyse environmental sustainability and investigate recent international agreements in this regard, for example the Rio de Janeiro and Johannesburg summits	
	Content
14.1 The state of the environment	<ul style="list-style-type: none"> • Broadly describe the relevant concepts • Briefly discuss the state of the environment under the following headings: <ul style="list-style-type: none"> - Pollution (Definition and types) - Erosion - Deforestation - Climate change - Conservation - Preservation

<p>14.2 Measures to ensure sustainability</p>	<ul style="list-style-type: none"> • Brief discussion of how the markets can be used to ensure sustainability under the following headings: <ul style="list-style-type: none"> - The market does not take care of social costs and benefits - The market fails because of specific reasons - The mechanism of the market and social costs and benefits • Discuss in detail how the government can ensure sustainable development under the following headings: <ul style="list-style-type: none"> - Grant property rights - Pay for environmental use - Levy environmental tax - Pay environmental subsidies - Issue marketable permits - Command and control - Voluntary agreements - Education
<p>14.3 International measures</p>	<ul style="list-style-type: none"> • Discuss in detail the following problems and the international measures taken to ensure sustainable development under the following headings: <ul style="list-style-type: none"> - Biodiversity - Chemical waste - Hazardous waste - Climate change policy – adaptation and mitigation - Indigenous knowledge • Give a broad outline of the major international protocols and agreements on sustainable development: <ul style="list-style-type: none"> - Rio de Janeiro summit (UNCED) - Johannesburg summit (WSSD) - Rio + 20 summit - Kyoto Protocol - Millennium Development Goals - United Nations Framework Convention on Climate Change

- Conference of the Parties (COP17)

(Extract from examination Guidelines, DBE, 2017:28)

However there are topics that must be covered and environmental issues and sustainability can be infused when teaching them. Both the CAPS document and the examination guidelines mention that teachers must infuse environmental topics and refer to environmental issues in other topics as they progress with their curriculum content coverage. The level of engagement with environmental topics and issues will entirely depend on the teachers' attitudes towards environmental education and environmental sustainability.

Both these documents indicate that when teachers cover the “public sector, he/she must infuse where appropriate: national macro-economic policy and service delivery with regard to socio-economic rights, education, health, and the environment, and social security, convention of the rights of the child, taxation, and compensation for human rights abuses”. (DBE 2011:10).

When covering the content on the reasons for international trade, teachers can highlight the impact mass production and globalisation have on the environment. With protectionism and free trade (globalisation) teachers cover the arguments in favour of protectionism and one of the sub-headings is the protection of natural resources.

The CAPS document which is exemplified by the examination guidelines indicates that teachers must cover the consequences of market failures. Teachers must focus on negative externalities (pollution, waste, etc.) and it also expected that they address the social cost of negative externalities (e.g. pollution, waste, etc.) on people and communities.

The CAPS document specifies that teachers must cover the North /South divide and the examination guideline-2017 gives clarity on the content and explains that teachers should engage learners with the following:

- Compare the standard of living between North-South countries
- Explain the positive/negative impact of globalisation on developing countries
- Explain the negative environmental effects as a result of the economic activities in both North and South

Tourism is also a topic that is covered but when dealing with this topic teachers must refer to the externalities caused by tourism and the impact of tourism on the environment. Teachers also need to address policy suggestions by the Department of Tourism with regard to environmental management.

There are sections in the CAPS document where no reference is made to the inclusion of environmental issues and topics into the curriculum. The CAPS document (DBE 2011:31) instructs teachers that economic issues of the day must be incorporated across all the topics. It also instructs teachers to engage in citizenship and life-skills essentials and learners should be exposed to subject-related competitions and other practical activities.

It is therefore essential to have teachers with positive attitudes towards environmental sustainability and environmental education. Teachers with positive attitudes towards environmental sustainability will bring current contemporary environmental issues into the classroom on a regular basis. They will encourage learners to think about environmental issues globally and environmental issues in their communities. They will also be predisposed to instil critical thinking and problem-solving skills in learners.

Teachers with a negative attitude towards environmental sustainability and environmental education will be predisposed to address environmental issues and topics in superficial and elementary ways. They might have an academic approach to environmental sustainability because they want to complete the curriculum content with no reference to current environmental world events. Their purpose is to teach for learners to be in position to answer examination paper questions.

Tilbury (1995) argues that a clear position needs to be adopted in our modern society because an educational approach to sustainability should not only focus on the immediate change and/or improvement of current environmental issues, but an educational approach is needed which addresses environmental sustainability in the long run. It requires a holistic educational approach by which environmental topics and issues are integrated in

the different curriculum subjects and by which environmental conservation and economic development are reconciled. It is therefore important that the role of teachers should never be overlooked. It is ultimately the responsibility of teachers to integrate environmental topics, issues and problems in their lessons when they engage with learners in the classroom. That is why teachers with positive attitudes towards the environment are needed so that they can instil pro-environment attitudes in their learners.

2.3.5.4 The role of education and environmental education in ensuring environmental sustainability

2.3.5.4.1 Environmental education

Environmental education is an important strategy for achieving environmental sustainability (Taylor, Doff, Jenkins and Kennelly, 2007). Environmental education is not only about teaching about the environment, but it is also about the interactions between human life, the environment and how environmental degradation and destruction can be overcome and prevented now and in the future (Palmer 1997). Palmer (1997:5) argues further that if people know about their relationship to the environment, “then taking action to avoid or fix environmental issues would be logical and feasible”.

It is important that human beings need to be informed about the impact of their excessive consumption patterns and their dependence on environmental resources because it does not appear as if they know the consequences of their actions (Ibimilua, 2011). All people should be aware of negative environmental impacts and the increasing depletion of natural resources (Edem and Monnapula-Mapesela, 2013). It is a commonly accepted norm today that education can be used to teach individuals to change their attitudes, values and behaviours to reverse their harmful environmental practices and to adopt a more environmentally sustainable lifestyle (Edem and Monnapula-Mapesela, 2013).

Chapter 36 of Agenda 21 points out the strategic and important role of environmental education. The role of environmental education is to prepare people to solve global environmental problems (Sudarmadi, Suzuki, Kawada, Netti, Soemantri and Tugaswati, 2001) and to sensitise people about environmental problems, its impact on the quality of life, to lay the foundations for people to participate actively in protecting the environment and to use natural resources efficiently (Spiropoulou, Antonakaki, Kontaxaki and Bouras, 2007). The aim of environmental education is to provide people with the knowledge and

skills to understand the interrelatedness between economic, social, political dimensions and the limitations thereof and if we want to achieve environmental sustainability we need to provide people with the capacity to highlight and address the problems affecting the environment (Liarakou, Gavrilakis and Flouri, 2009; Nahman, Wise and De Lange, 2009).

It is crucial that environmental education should be intensified from junior secondary school if we want to sustain and protect the environment (Osuafor and Samuel, 2015). This view is supported by Sauv  (1996), who argues that environmental education should be conducted from pre-school age through the university years and life afterwards, and this should be instigated to the current and all future generations. In their study Sudarmadi, Suzuki, Kawada, Netti, Soemantri and Tugaswati, (2001) found that environmental education should be taught intensively and comprehensively through all the avenues of education, formal, informal and non-formal. They also found that environmental education is one of the most important aspects to be considered with regard to environmental conservation in order to deal with environmental problems. They argue further that environmental education is found to be one of the fundamental socialising forces and it plays a central role in the formative processes of children and adults. Environmental education is “one of the most effective strategies for increasing public environmental perception, knowledge, awareness, and attitude” (Sudarmadi, Suzuki, Kawada, Netti, Soemantri and Tugaswati, 2001:180).

2.3.5.4.2 Education

Children are future adults, parents, leaders, policy-makers, politicians, business owners, entrepreneurs etc., and it is crucial that they should be equipped with the skills, knowledge, attitude and values to address any current as well as future environmental challenges that might arise. It is crucial to prepare learners to deal with environmental issues and challenges that are currently experienced by communities, cities, countries and the world as a whole (Liarakou, Gavrilakis and Flouri, 2009). Schooling can play a significant role in the formation of environmental attitudes and that is why the role of teachers is instrumental in the formation of these environmental attitudes (Vlaardingerbroek and Taylor, 2007).

In their study, Larijani and Yeshodhara (2008:199) found that “there is a paramount need to create a consciousness of the environment”. They argue that this consciousness must “permeate all ages and sections of society” and that it should start with children. It is

crucial that environmental consciousness should be informed through teaching in schools because it will be difficult to achieve a sustainable way of life with an educational system which does not deal with principles of sustainability. The youth should be taught environmental consciousness in such a way that they will be able to apply the principles of sustainability in their daily family life, community life, work life, etc. (Larijani and Yeshodhara, 2008).

Alam (2010), who conducted a study in Pakistan, argues that education is an indicator of human development and found that it generates awareness in people to protect the environment and that education also contributes to the improvement in the economic development of countries. Alam (2010) argues further that education can have a significant effect on the reduction of environmental degradation, alleviation of poverty, increase in awareness of environmental protection, generation of an understanding towards globalisation of resources and contribute positively towards the attainment of sustainable development in Pakistan. Rao, Knight and Samarth (2010) argue that in order to address climate change we need to recognise that it could exert an effect on livelihoods, economic productivity, social stability and health. But education is a key strategy that can be used to improve people's living environment, which will result in secure livelihoods, reduced vulnerability and better health (Rao, Knight and Samarth, 2010).

2.3.6 The role of education in creating a positive attitude towards the environment

The Industrial Revolution brought with it one of the biggest environmental problems. One of the major harms to the environment is the desire of human beings to control nature with the help of technology. Human beings believe that technology can be used to reverse the damage done to the environment, but this is based on selfish ideas and negative attitudes towards the environment are the result of irresponsibility and lack of knowledge (Saka and Sahinturk, 2013). Education can be used as a vehicle to inculcate learners' knowledge and skills which will assist them to overcome the issues related to their environment, economy and social well-being, and as a catalyst to change people's attitude positively towards the environment (Azmahani, Sharipah, Khairiyah, Amirmudin, Jamaludin, Fatimah, 2012; Liarakou, Gavrilakis and Flouri, 2009).

Education can be used to inculcate awareness of environmental sustainability and to maintain and improve the quality of life of present as well as future generations. When learners are equipped with knowledge and skills it will assist them to find solutions to

environmental issues. It is only when learners understand environmental sustainability as an aspect of their social and ethical responsibility that they will become citizens who see the interconnectedness between human beings and nature. They will be in position to make environmentally-friendly decisions which will not degrade the environment but which will sustain and protect the environment for present as well as future generations (Azmahani, Sharipah, Khairiyah, Amirmudin, Jamaludin, Fatimah, 2012).

Biasutti and Frate (2017) found in their study that education is a fundamental discipline to disseminate the principles of sustainability and for advancing the ability to address environmental sustainable issues. Biasutti and Frate (2017:4) also found that “education is crucial for developing environmental and ethical awareness, values and attitudes in human beings that will promote effective public participation in decision-making and policy life”. Societies and countries will encounter developmental problems if people lack the necessary knowledge of the environment and if they possess low levels of positive attitudes towards the environment (Saka and Sahinturk (2013). It is essential that communities and countries accept sustainability as an integral part of their lives and education is needed to provide learners with insights into how to respond to environmental issues and by so doing will equip them with the much needed knowledge, skills, attitudes and values to deal efficiently with environmental sustainability.

The five dimensions of environmental sustainability (biophysical, economic, political, social and education) that were discussed will serve as the framework for development of the instrument that will be used to measure the attitudes of economics teachers towards environmental sustainability.

2.3.7 The attitude of economics teachers to environmental sustainability

An “attitude is a point of view that someone holds on an idea or object in his/her everyday life” and it “plays a key role in achieving successful social interaction among teachers and students” and “to win their attention in favour of the required educational modality” and in this case environmental sustainability (Beyene and Tizazu, 2010: 91). People have the ability to develop a positive or negative attitude towards an idea or an object, but for any person to perform a task effectively and efficiently they need to have a positive attitude towards it (Beyene and Tizazu, 2010). Azmahani, Sharipah, Khairiyah, Amirmudin, Jamaludin and Fatimah, (2012:514) argue that, according to the Theory of Planned Behaviour which was developed by Ajzen and Fishbein (1988), “attitude is a function of

belief, where beliefs refer to knowledge. This finding has been supported in social learning theories, saying that attitude and behaviours are learnt through our interactions with the social world in which we live (Albert Bandura)".

Azmahani, Sharipah, Khairiyah, Amirmudin, Jamaludin and Fatimah, (2012:514) argue that it is important to instil the "knowledge and understanding towards the awareness of sustainable development from the early year of study that will be built and strongly embedded in their cognitive and affective outcomes (attitude) to be present and future environmental sustainable advocates". In their study, Azmahani, Sharipah, Khairiyah, Amirmudin, Jamaludin and Fatimah, (2012:521) found that "basic knowledge on sustainable development has a strong correlation to the students' attitudes". Teaching environmental sustainability or environmental topics across the curriculum does not only depend on the content of the curriculum but on the attitude, knowledge, awareness and skills of the teachers (Metin, 2010). Individuals who demonstrate a negative attitude towards the environment will continue to disclose inappropriate attitudes towards environmental problems (Ugulu, Sahin and Baslar, 2013). The role of teachers should therefore never be underestimated because their role is undoubtedly essential. Teachers who have positive attitudes towards the environment will be in a position to turn the attitudes of learners into positive actions (Saka and Sahinturk, 2013).

Teachers are in position to educate learners who are future leaders, professionals, labourers, parents and global citizens and that is the reason why it is important that learners should be educated positively regarding the environment. It is only when people understand the importance of nature for their own existence that they will start to express pro-environmental attitudes and behaviour towards environmental sustainability (Lahiri, 2011). Lukman, Lozano, Vamberger, Krajnc, (2013); Larijani and Yeshodhara, (2008) and Lahiri, (2011) agree that teachers play an important role in creating a positive attitude and awareness in learners towards environmental sustainability. It is important that teachers should demonstrate pro-environmental attitudes because it is their responsibility to engage learners effectively in their teachings (Birhanu, 2013). If teachers want to engage their learners effectively in dealing with environmental issues, then teachers themselves should have a positive attitude towards the environment (Taylor, Doff, Jenkins and Kennelly, 2007).

The attitude of teachers towards the environment will influence the teacher/learner relationship because teachers with positive attitudes towards the environment will be in a position to model their attitudes for students (Beyene and Tizazu, 2010). In their study Lukman, Lozano, Vamberger and Krajnc, (2013:99) found that “teachers have the potential to form, shape, re-shape and encourage pro-environmental knowledge and behaviours” in learners. This can be achieved when teachers model pro-environmental attitudes and when they are willing to integrate environmental issues in the curriculum. However, teaching content relating to the environment and awareness of environmental issues does not lie exclusively in the curriculum or school facilities and resources, but it also depends on the quality of the teachers with regard to their knowledge and their attitudes towards the environment (Larijani and Yeshodhara, 2008).

Teachers with positive attitudes will be predisposed to continuously upskill themselves to stay abreast of major economic developments, consumption patterns and production developments that influence the environment because it is important that teachers should use their teachings and classroom practices to create an awareness in the young consumers (America, 2014). Teachers with positive attitudes towards environmental sustainability will be predisposed to teach environmental topics and infuse these topics effectively across the economics school curriculum (Beyene and Tizazu, 2010). They are also in position to acknowledge and understand the value of inclusion of environmental sustainability topics and issues in the economics curriculum and how the teaching thereof can have a major influence on the attitudes of the learners they are teaching (Beyene and Tizazu, 2010).

It is crucial that teachers incorporate concepts of environment, environmental sustainability and environmental degradation etc. into their lesson pedagogy and continuously make learners aware of the creation of a green economy and the positive effect of a green economy on the quality of our personal lives, the community, the country and the world. Classroom teachings should inform learners how to make effective and sound environmental decisions and how their decisions will impact their quality of life, the quality of life of the community and the quality of life of society as a whole (Bridges and Wilhelm, 2008).

Teachers with positive attitudes will understand the necessity to incorporate environmental topics across the economics Grade 10-12 curriculum. This is important because there are

environmental topics that are explicitly covered in the curriculum, but then there is the need to infuse environmental topics and issues when economics topics are covered because of the implicit nature of the environmental topics. The environmental topics that are directly (explicitly) covered in the Grade10-12 economics school curriculum are: environmental deterioration, sustainability and externalities. However, there are economic topics that must be covered in the Grade10-12 economics school curriculum in which teachers need to integrate environmental content to address the impact of economic activities on the environment. Teachers should address the impacts on the environment when they cover or address the following content: the basic economic problem, public sector, Industrial development, tourism, globalisation, economic growth and development, poverty, unemployment, economic goods and services, factors of production, etc. (DBE: 2011).

The attitudes of teachers will determine how efficiently they will execute the infusion of environmental topics and issues in the classroom setting (Tok, 2011) because if teachers show a concern for the environment and have positive attitudes towards the environment it is only then that they will be in a position to produce environmentally literate learners (Esa, 2010).

Swanepoel, Loubser and Chacko (2002:282) developed a definition of environmental literacy in their research and stated that: “Environmental literacy is the ability to be aware of one’s environment. It enriches one with the knowledge to realise the imbalances and threats the environment faces and enables one to form positive attitudes towards it with the aim of developing skills to resolve and prevent environmental problems and to protect and improve the environment for the present and future generations by active participation”. Environmentally literate people will have the capacity to understand that sustainability is a way out of environmental problems (Saka and Sahinturk, 2013). That is why “all the teachers have a responsibility to prepare learners to become environmentally literate citizens both as consumers and producers of goods and services” (Herremans and Reid, 2002:16), but to achieve this environmental literacy it must be planted in the soil of the education system, as well as in every classroom (Sorensen, 2005).

Teachers more than any profession are in position to assist learners to become environmental literate, but they will not be successful in their efforts if they themselves are not environmentally literate. Environmental literacy is important because it is through

environmental literacy that learners will come to understand their relationship with nature for their survival (Swanepoel, Loubser and Chacko 2002). But as Lahiri (2011) points out, if we do not allow children to develop a sense of respect and caring for the environment from their childhood years it will be difficult for them to develop pro-environmental attitudes later in life.

Teachers can have all the knowledge and skills regarding environmental sustainability but if they themselves do not have positive attitudes towards the environment, their classroom teachings will not have a major impact on changing learners' attitudes towards the environment. Teachers with positive attitudes will model their behaviour and attitudes for learners. Because of the fact that South Africa does not have a dedicated subject called environmental education, teachers who will infuse and deal with environmental topics across the curriculum are required. Environmental topics are included across the economics curriculum and that is why economics teachers with positive attitudes towards environmental sustainability are needed to achieve the aims of the curriculum. It is therefore important to have committed teachers with positive attitudes to inculcate awareness in learners to protect and preserve the environment because it is through teaching that learners are exposed to sustainability issues.

The researcher consulted various sources of literature on the topic "the attitudes of economics teachers towards environmental sustainability". The nearest research studies to the topic that could be found were the following: "Nigerian teachers' attitudes towards environmental sustainability issues in the curriculum", "Environmental knowledge and attitudes of some Nigerian secondary school teachers" and "Teachers' attitudes towards environmental education and sustainable development: A case study of secondary school teachers of Kupwara district of Jammu and Kashmir State, India".

However, there are no known studies that specifically focus on "the attitudes of economics teachers towards environmental sustainability". This research study is meant to fill this gap.

2.4 The 4th Industrial Revolution

We are entering the Fourth Industrial revolution which promise efficient technologies. The Fourth Industrial Revolution is characterized by what are seeing around us. Artificial Intelligence, robotics, drones, driver less cars. We read in new papers of new revolutionary medical equipment whereby operations can be performed much better with the machine than the human-beings.

Schwab (2015) argues that humanity stands on the brink of a technological revolution that will change the humans live, work and their relation to one another. He pointed out that the First revolution used water and steam power to mechanise production, the Second revolution used electric power to create mass production, the Third revolution used electronics and information to automate production. The Fourth revolution is building on the Third revolution. The Fourth revolution is characterized by fusion technologies that is blurring the lines between physical, digital and biological spheres. World Economic Forum (2019) argues that the Fourth revolution holds great potential for delivering systems changes required to create clean, resource-secure and inclusive economies. Harvey (2017) pointed out that during the Fourth Industrial revolution it becomes possible to transition to a circular economy and according to him nothing that is made in this economy becomes waste. Harvey (2017) argue that the way energy is generated and distributed will change the radically. The realization on fossils fuels will become less.

World Economic forum (2017) argues that the new technologies of the Fourth Industrial revolution enable societal shifts which will have an effect on economics, values, identities and possibilities for future generations. Prisecaru (2016) argues that the progress in technology enables the reduction of industrial waste. Technology also allows for the redesigning of production and consumption systems to be more efficient in terms of resource use. Technology also endangers jobs because of robotics and other innovations. The question which arise is; “how will the Fourth Industrial Revolution affect poverty, job creation, inequality, waste generation, etc.”. The answer to this question will not be seen immediately. What will influence the answer to this question is the manner in which the Fourth Industrial revolution will be manage.

2.5 Conclusion

This chapter has tried to give a detailed understanding of the topic “The attitude of economics teachers towards environmental sustainability”. The concepts sustainability and

environmental sustainability were studied and it is concluded that in this thesis the words sustainability and sustainable development will be used synonymously with environmental sustainability. The following five dimensions of environmental sustainability were elucidated in this chapter namely, biophysical, economic, political, social and education. The chapter gives an understanding that there exists interrelatedness between these dimensions and a change in one dimension affects the other dimensions.

The role of education in the fostering of a positive attitude towards environmental sustainability is explained. The chapter sketches a broad overview of the importance of teachers in fostering a positive attitude towards environmental sustainability but if teachers want to be successful they need to have a positive attitude. The research design and methodology will be discussed in the following chapter.

Chapter 3

Research design and Methodology

3.1 Introduction

In this chapter a detailed description of how the survey research study was conducted will be given. The chapter states the purpose of the research and outlines the hypotheses, the research question which guides this research study and the six Null hypotheses. The quantitative method of collecting data and the questionnaire as data collection method and how the questionnaire was a pilot study among a few respondents will be discussed. The sampling method and how data was collected and analysed will be highlighted. The study also deals with reliability and validity issues, ethical considerations and confidentiality. The end result was to generalise the results over a population. The survey research study was conducted in such a way to ensure the validity of the results and the reliability of the measuring instrument. This was done in such a way that it does not compromise the ethical standards.

3.2 The purpose of the survey research study

The researcher's experience as an economics teacher led him to choose this research topic. Whilst teaching economics, the researcher came to realise that it could be used as a vehicle to promote learning awareness of issues related to environmental sustainable. Economics is a subject through which children can be exposed to pressing environmental issues that are threatening our existence. The CAPS for economics allows teachers to infuse contemporary economics issues throughout their classroom teaching. The CAPS for economics also indicates that economic issues of the day should be incorporated across all the topics (DBE, 2011).

The CAPS for economics allows teachers to infuse environmental issues into classroom discussions and can give learners' opportunities to state their opinions about the current state of the environment, as well as question learners on the impact environmental degradation and destruction will have on the lives of individuals, communities and the country (DBE, 2011). To ensure that this happens, teachers with positive attitudes towards environmental sustainability are needed.

When the content of the NCS-CAPS curriculum is studied it becomes clear that environmental sustainability can enjoy regular attention. Economics is an ideal subject for

studying how the following impact on the environment: production of goods and services, consumption of goods and services, exchange of goods and services, globalisation, poverty, different sectors of the economy (primary, secondary and tertiary sectors), the nature and importance of natural resources, population growth, economic growth and development, environmental sustainability, tourism, etc. A special type of teacher is needed who holds a strong attitude towards environmental sustainability to infuse environmental concerns when teaching the above topics in the curriculum.

Therefore in this study the researcher measures the attitudes of teachers towards environmental sustainability. Teachers with positive attitudes towards environmental sustainability are more likely to infuse environmental sustainable issues and topics into their classroom lessons when they teach content matter pertinent to economics.

The literature review in Chapter 2 showed that no study was found that measured the attitudes of economic teachers towards environmental sustainability in the FET band (Grades 10-12) in South Africa. Conducting a research study to measure the attitudes of economic teachers towards environmental sustainability could therefore provide important insights to policy-makers.

3.3 Research

“Research plays an important role in shaping the world around us and it is through research that we gain a better understanding of today’s most pressing and complex social and scientific issues” (Council of Canadian Academies, 2010:1). Leedy and Ormrod (2010:2) define research as “a systematic process of collecting, analysing, and interpreting information (data) in order to increase our understanding of a phenomenon about which we are interested or concerned”. Bassey (1999:38) defines research as “a systematic, critical and self-critical enquiry which aims to contribute to the advancement of knowledge and wisdom”. It is necessary for a researcher to plan the research process systematically, analyse and interpret data thoroughly if the researcher wants to add value to the understanding of a certain phenomenon (Bassey, 1999). Ellis (2010:4) argues that “the term research is used to describe the structure and conscious application of scientific methods to the exploration of an issue of interest in order either to better understand the issue or the established new truth”. The systematic planning of the study begins with defining the hypotheses, the research question and six Null hypotheses.

3.3.1 The Hypothesis

This research is a survey research study which is guided by the following hypothesis:

“Economics teachers have a positive attitude towards environmental sustainability”

Ellis (2010) avers that it is a good practice to start the research with a hypothesis. He argues that the hypothesis is the idea that has to be tested because it cannot be assumed that economic teachers have a positive attitude towards environmental sustainability.

3.3.2 Research question

The research question that informs this research study is:

“What is the attitude of economics teachers towards environmental sustainability”?

Punch (2005) argues that it is the research question that guides the survey research study. He argues that it is clear in advance what question the research question wants to answer. Kelley, Clark, Brown and Sitzia (2003:262) argue that “a good research question has the characteristic that its purpose is to address a single clear and explicit research question.

3.3.3 Null Hypotheses

Six Null hypotheses will be tested to measure the influence of different independent variables on teachers' attitudes towards environmental sustainability. The following Null hypotheses will be tested.

1. **The Null hypothesis = H_0 :** There is no significant difference between the attitudes of male and female teachers of school economics towards environmental sustainability.
2. **The Null hypothesis = H_0 :** There is no significant difference between how long teachers have been teaching school economics and their attitudes towards environmental sustainability.
3. **The Null hypothesis = H_0 :** There is no significant difference between the age of teachers of school economics and their attitude towards environmental sustainability.

4. **The Null hypothesis = H_0 :** There is no significant difference between the years of training of teachers of school economics and their attitude towards environmental sustainability.
5. **The Null hypothesis = H_0 :** There is no significant difference between the in-service education opportunities of teachers of school economics and their attitude towards environmental sustainability.
6. **The Null hypothesis = H_0 :** There is no significant difference between the geographical location of teachers and their attitude towards environmental sustainability

3.4 Survey research

This study will be conducted as a survey research study. The term survey refers to the selection of a sample of people from a pre-determined population. The researcher usually uses the information from the sample to make some inferences about the wider population (Kelley, Clark, Brown and Sitzia, 2003). Research surveys are the most used research method in social science research (Kelley, Clark, Brown and Sitzia, 2003). Lavrakas (2008:860) argues that “a survey is a research method that is used by social scientists (e.g. economists, political scientists, etc.) to empirically and scientifically study and provide information about people and a social phenomenon”.

Frank (2007:243) argues that “the survey method of research is probably the most common approach employed in social sciences to empirically study the characteristics and interrelations of psychological and sociological variables”. Muijs (2004) argues that one reason why survey research is the most common research method used in social sciences and educational research is because it is an efficient way to collect large amounts of data. Furthermore, Muijs (2004) suggests that survey research is suitable where researchers wish to inquire into the relationship between variables and what occurs in a real-life context. Therefore this study aims to measure a pressing real-life situation: “Economic teachers’ attitude towards environmental sustainability”. A survey research study is therefore appropriate because survey research is suitable for studying attitudes, opinions, feelings and so forth (Muijs, 2004).

Drawing on the work of Frank (2007) and (Fowler, 1984), the following distinctive features of survey research may be identified:

- The purpose of survey research is to produce quantitative or numerical descriptions of some aspects of a population under study.
- The research survey asks people structured and predefined questions as the main approach to data collection.
- Researchers collect data about a fraction of the study population, a sample, in such a manner that it enables the researcher to generalise the findings to the population as a whole.

Survey research like any other research methods has its advantages and challenges. Based on the research of Kelley, Clark, Brown and Sitzia (2003); Muijs (2004); Gable (1994); Glasow (2005) and Ellis (2010) the following advantages and challenges of survey research may be identified.

Advantages of survey research

- It is highly flexible and quick and easy to complete
- Survey questionnaires are commonplace in society and are easily understood by the respondents who complete it – it is generally user friendly
- It is possible to study a wide range of research questions
- It allows the researcher to describe a situation and study the relationship between variables
- The research produces data based on real-world observations (empirical data)
- The breadth of the coverage of many people or events means that it is more likely than some other approaches to obtain data based on a representative sample and can therefore be generalised to a population and it is also easier to generalise findings to real-world situations
- Surveys can accurately document the norm, identify outcomes and delineate associations between variables and samples
- Surveys can produce a large amount of data in a short time at fairly low cost.
- Researchers can set a finite time-span for a project which can assist in planning and delivering end results.
- Surveys can elicit information about attitudes that are otherwise difficult to measure using observational techniques

- Survey research guarantee the anonymity of the participants in the research study

Challenges of survey research

- The significance of data can be neglected if the researchers focus too much on the range of coverage to the exclusion of an adequate account of the implications of those data for relevant issues, problems and theories.
- The data that are produced are likely to lack details or depth on the topic being investigated.
- Securing a high response rate to a survey can be hard to control, particularly when it is carried out through the post, but it can also be difficult when it is carried out face to face or over the telephone.
- The quality of the data collected is limited to the willingness and ability of the participants to answer the survey.
- The willingness of participants' response to a survey questionnaire is related to the research topic, the questions or statements that are posed and how the questions/statements are posed.

When survey research is conducted, certain errors might creep in and that is why it is necessary for the researcher to be cautious and guard against these errors. So what are the errors a researcher needs to guard against? Moy and Murphy (2016:18) point out the error dimensions that might occur in the survey research process. They argue that:

- The specification error can result when the wrong survey questions are used to measure the concept of interest.
- The frame error can occur if a biased or incomplete set of individuals is used to draw the survey sample.
- The non-response error occurs when selected individuals do not respond to the survey or to certain items in the survey, biasing the estimates.
- The measuring error is introduced when the survey interviewer or respondent does not interpret, administer or react to the question in the survey as intended in the design.
- The processing error results when there are problems with the editing, entry or coding of data; the calculation and application of survey weights; or the process of data tabulation.

Moy and Murphy (2016) argue further that a researcher must be very cautious when conducting survey research because he/she might experience errors through the design of the questionnaire, data-collection process and the data analysis stage. If the researcher does not take precautions or ignores the possible errors that might creep in, it can undermine the reliability and viability of the data collection and therefore the end result of the research study (Moy and Murphy, 2016).

Survey research is not innately flawed, but the poor result that is sometimes achieved is the result of the poor execution of the survey research study by the researcher (Frank, 2007). According to Frank (2007), many researchers fail to apply rigorous survey design techniques and therefore fail to elicit meaningful data, and some researchers undermine themselves with poor analysis of the results.

This researcher found very early in the research process that setting the statements to be answered by teachers is no easy task. The structuring of the statements in a specific way can influence the respondents' responses in answering in a specific way, which will make the research study biased and this will influence the quality of the final result of the study. The researcher worked through the contents of the literature review in Chapter 2 to set the statements of the questionnaire.

Before the final questionnaire was disseminated to economics teachers it was tested by a few practising economics teachers in a pilot study. Teachers in the pilot study were asked to comment on each statement and to point out where they did not clearly understand a statement.

3.5 Pilot study

In this survey research study the entire questionnaire was exposed to a pilot study. The questionnaire was sent to seven practicing teachers. The seven teachers are currently engaged with and are teaching economics at different schools. These teachers were selected according to their life experience, teaching experience (teaching economics Grades 10-12) and involvement in and knowledge of economics. The respondents in the pilot study and those in the main study had similar characteristics.

Muijs (2004) argues that the most effective strategy to minimise problems is to pilot the measuring instrument. A pilot study can prevent a situation where the questionnaire with mistakes is disseminated to participants. The distribution of a flawed questionnaire will have dire consequences on the research study, the data collected and the findings made from the results drawn. Therefore to minimise or eliminate mistakes it is good practice to pilot the questionnaire.

Muijs (2004) argues further that it is good practice is to ask colleagues to read through the items on the questionnaire and provide feedback on the instrument. This researcher contacted seven teachers electronically, via e-mail, asking them whether they were willing to be part of the pilot study. It was explained to them what the pilot study entailed and that they should complete the questionnaire as if they were doing a real-time survey. They would have to read each statement carefully to see whether they understood the statements; did each statement enable them to give an answer? Were the statements biased, open-ended or vague? When they experienced any challenges they were told to indicate the statement in red and return the questionnaire electronically to the researcher.

Krosnick (1999) argues that the pre-testing of the survey questionnaire informs the researcher with regard to the respondents' understanding of the items in the survey questionnaire. Krosnick (1999) further argues that a pre-test identifies items in the questionnaire that the respondents have difficulty understanding or which items the respondents find difficult to interpret. He said that the pre-test also gives the researcher an idea where the respondents interpret questions differently than what the researcher intended.

The aim of the pilot study is to identify if there are any flaws in the items on the questionnaire and if there are, it will give the researcher the opportunity to correct the items before the main survey is conducted (Gable, 1994). Gable also pointed out that there is very little the researcher can do when he/she realises that some crucial questions/statements were omitted, or that some questions/statements are ambiguous or misunderstood by respondents. That is why there is need to pilot-test some survey items or the entire questionnaire before it is disseminated to the actual or larger group of respondents in the main survey research (Moy and Murphy, 2016).

3.6 Description of the research instrument: Questionnaire

Krosnick and Presser (2010) argue that at the heart of survey research is its questionnaire. Survey research is flexible and can appear in a variety of forms but all of them are characterised by the collection of data using a standard questionnaire (Muijs, 2004). Muijs further argues that the way questionnaires are designed and worded will have an effect on the answers given by participants. The quality of the data will depend on the quality of the measuring instrument (Muijs, 2004). Krosnick and Presser (2010) argue that the results of a questionnaire depend on the questions or statements. Muijs (2004) points out that it is crucial that the researcher knows what information needs to be collected through the survey because this will assist him/her to choose what questions to ask, or what statements will be set, or which scales to use, or how many questions/statements should be set, etc.

3.6.1 Design of the measuring instrument: Questionnaire

Moy and Murphy (2016) argue that the development of a questionnaire can be deceptively simple because the developing of questions for a questionnaire is the same as asking and answering questions in daily life. The difference between asking questions in daily life and survey research questions is that the questions asked in a survey research questionnaire must be standardised questions which produce reliable and valid data or results.

This survey research study uses the questionnaire as method of data collection and considerable time was spent on the development of the measuring instrument, the questionnaire. Tait and Voepel-Lewis (2015) argue that the generation of the questions or items is a difficult process, but it is also the most important aspect of good survey research and for this reason deserves thoughtful consideration. It was therefore crucial that this researcher spent time designing a quality research measuring instrument because once the data are collected he would “not be able to rectify any problems or omissions to the measuring instrument” (Muijs, 2004).

Considerable time and effort was spent on the development of the items of the questionnaire. The items in this survey research questionnaire are statements which measure the attitudes of economics teachers towards environmental sustainability. The Literature Review in Chapter 2 guided the researcher in formulating the statements of the survey research instrument. Tait and Voepel-Lewis (2015) argue that it is important to review the literature to see if there are existing validated items and constructs that can be

incorporated for use in the survey research questionnaire. This researcher viewed different sources in existing literature, but decided to develop his own survey research instrument.

The researcher was very careful when designing the questionnaire because it was clear that the items on the questionnaire would determine the success, reliability and validity of the research study. A poorly designed questionnaire with poorly constructed items will influence the results of the study. If the questions do not measure the construct that it should measure then the researched study will be flawed. The statements were set at a language level understandable by all the participants and open-ended statements were eliminated. Four drafts were done before the pilot study questionnaire was handed to a few experienced teachers to be completed and provide the researcher with feedback on the statements in the questionnaire. Thereafter the questionnaire was finalised and disseminated to economics teachers in the Western Cape.

A five-rating Likert scale questionnaire was designed to gain information from the participants in this research study. Tait and Voepel (2015) argue that it is better to use a five-rating scale to the statement option because it garners significantly greater detail. Muijs (2004) avers that if you include seven categories or nine categories on the rating scale it becomes harder for the respondents to make such fine distinctions.

Stangor (2004) argues that the Likert scale is the most popular fixed format scale and it consists of a series of items that indicate agreement or disagreement with the issue that is to be measured. The rating scale allows the participants to choose from one of several options indicating their level of agreement (Muijs, 2004). Krosnick (1999:544) argues that reliability and validity can be significantly improved if all the points on the scale are labelled with words because they clarify the meanings of the scale points. This researcher therefore ensured that each point on the scale was labelled with words to limit or eradicate misinterpretation and/or confusion when the questionnaire was completed. Each respondent had to indicate on the questionnaire whether they 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree. The respondents were asked to indicate their options by making a cross in the preferred block on the questionnaire.

The questionnaire consisted of two parts. The first part captured the geographical information of the respondents; the second was divided into five dimensions of

environmental sustainability and each dimension consisted of five statements each on the five-scale Likert scale ranging from strongly disagree to strongly agree.

The questionnaire consisted in total of 25 statements that measure the attitudes of economics teachers towards environmental sustainability. The statements were kept brief, clear, simple and unambiguous so that every respondent who completed the questionnaire had the same understanding of the statements. The 25 statements were further subdivided into five dimensions of environmental sustainability, namely economic, political, social, biophysical and education. The five dimensions in the questionnaire address the five dimensions that were discussed in the literature review in Chapter 2. Each of the dimensions consists of five positive statements which bring the total of the statements in the questionnaire to 25. (See Appendix 5 for the full instrument).

3.7 Data collection

This research survey study employed a questionnaire to collect the data from economics teachers. Quantitative data collection commonly makes use of questionnaires (Ellis, 2010). Data collection within the quantitative research method allows the researcher to be removed from the data-collection process, allowing for the process to be objective and consistent. This detachment can contribute and ensure that the data collected is of a high quality and it also ensures that less bias creeps into the data-collection process (Ellis, 2010).

The questionnaires were administered to Grades 10-12 economics teachers at annual mandatory subject meetings. Every education district has a mandatory reflection and planning meeting (also known as the standard setting meeting) at the start of the school year. All the teachers teaching Grades 10-12 economics are invited to this meeting and the researcher saw it fit to use this opportunity to disseminate the questionnaires amongst the teachers at this specific meeting. This form of data collection constitutes a convenient sample.

Dudovskiy (2012) argues that convenient sampling is also known as available sampling. This specific type of non-probability sampling method relies on data collection from population members who are conveniently available to participate in the study. This sampling method involves getting participants wherever you can find them and typically wherever is convenient. Etikan, Musa and Alkassim (2016:2) argue that convenience is a

type of non-probability or non-random sampling where members of the target population that meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate, are included for the purpose of the study. Kelley, Clark, Brown and Sitzia (2003:264) pointed it out that a convenient sample is made up of the individuals who are the easiest to recruit.

The convenient sample in this study constituted the same group of economics teachers that would be used in a normal sample. No pre-selection of participants was made on the basis of the economics teachers' age, gender, location and so forth. The entire group of teachers who attended the reflection and planning meeting was handed questionnaires and included in the research study. Everybody who attended the reflection and planning meeting was handed a questionnaire to complete and everybody had the right to take part or not in the research study.

Stangor (2004) identified some challenges that might occur with regard to questionnaires:

- The return rate of completed questionnaires might be low.
- A low return rate can lead to incorrect conclusions because those who did not respond might have differed from those who responded.

This researcher approached the economics subject advisors of the various districts in the Western Cape, and asked them if they would be willing to disseminate and collect the questionnaires at their annual subject reflection and planning meetings. All the economics subject advisors indicated their willingness to disseminate and collect the questionnaires and after completion return them to this researcher. This was the most ideal opportunity to disseminate the survey research questionnaire among economics teachers and under these circumstances the researcher would be able to achieve a high return rate of completed questionnaires.

The Western Cape Education Department is divided into eight education districts of which four are located in rural areas and four in urban areas.

The education districts in the urban areas consist of the following districts:

- Metro North Education district
- Metro Central Education district
- Metro South Education District
- Metro East Education District

The education districts in rural areas consist of the following districts:

- Eden Karoo Education District
- Overberg Education District
- West Coast Education District
- Cape Winelands Education District

Due to the distance between districts and schools in the Western Cape it would have been a costly, uneconomical and time-consuming process to deliver the questionnaires to the respective schools and request the teachers to complete them. The second alternative would have been to ask teachers to complete an on-line questionnaire, but this could have had a huge influence on the return rate of the final completed questionnaires. There is always the possibility that only a small number of teachers would respond to the request to complete and return the questionnaires.

The questionnaires were prepared and each economics subject advisor was provided with a set of questionnaires to be disseminated to the economics teachers. The researcher pointed out to each subject advisor that the completion of the questionnaire was totally voluntary and should be done anonymously. The survey questionnaires were handed to the respondents and collected after completion at the venue of the meeting.

3.8 Data Analysis

After the questionnaires were completed and returned to the researcher, the data were captured on an Excel spreadsheet before being sent to the statistical service of the University of Stellenbosch to be statistically analysed.

The Cronbach Alpha coefficient test was used to determine the reliability of the questionnaire. Box and whisker plot graphs were used to determine the respondents' attitudes towards the different dimensions of environmental sustainability.

The Mann-Whitney U test is used to test the two independent groups on a continuous measure (Pallant, 2011:210). In this research study, the Mann Whitney U test was used to test Null hypothesis 1: “There is no significant difference between the attitude of male and female teachers of school economics towards environmental sustainability”; and hypothesis 5: “There is no significant difference between the in-service education opportunities of teachers of school economics and their attitudes towards environmental sustainability”.

The Spearman rank correlation (Spearman’s rho) was used to test Null hypothesis 2: “There is no significant difference between how long teachers have been teaching school economics and their attitudes towards environmental sustainability”; Null hypothesis 3: “There is no significant difference between the age of teachers of school economics and their attitude towards environmental sustainability”; and Null hypothesis 4: “There is no significant difference between the years of training teachers received who teach school economics and their attitude towards environmental sustainability. The reason for using a Spearman ranks correlation, or a Spearman’s rho, is because the correlation between two ordinal variables is measured.

The ANOVA (Analysis of variance) was used to test Null hypothesis 6: “There is no significant difference between geographical location of teachers of school economics and their attitudes towards environmental sustainability”. The ANOVA (Analysis of variance) is used to test and measure the significant differences between the individual variables and the construct.

3.9 Population and sample (target group)

Burns (2000:83) argues that “a population is an entire group of people or objects or events which all have at least one characteristic in common and must be defined specifically and unambiguously”. The population in this study is the teachers who teach economics as school subject, but according to Kelley, Clark, Brown and Sitzia (2003) it is impractical, impossible and uneconomical to reach every single person in this given population. The researcher therefore had to draw a sample. Sampling to get a representative group of people to survey that is approximately the same as the population is very important aspect (Sapsford, 2007 and Stangor, 2004). Sapsford (2007) and Muijs (2004) argue that the sample group should be enough like the population under investigation so that valid

generalisations can be made about the population on the basis of the sample. It is therefore crucial that the population of interest be defined precisely (Stangor, 2004).

A convenient sample was used in this research study. The convenient sample includes the economics teachers who are performing their teaching duties under the auspices of the Western Cape Education Department. The questionnaire was disseminated to economics teachers at their annual compulsory reflection and planning meetings which are held at the beginning of each year in their respective provincial education districts. This was to ensure a greater successful response rate. The completed questionnaires were collected at the meetings by the economics subject advisors and returned to the researcher.

3.10 Validity and Reliability

3.10.1 Validity

Muijs (2004) argues that to validate the survey research instrument is one of the most important aspects in educational research. Muijs (2004) points out further that even though the statistical analysis can be very sophisticated, and the best updated computer software is used, the results of the research will be meaningless if the measuring instrument does not measure what it is supposed to measure. Validity measures whether the test measures what it is supposed to measure (Le Grange and Beets, 2005). In this survey research, the items of the questionnaire were designed to measure the “attitudes of economics teachers towards environmental sustainability”.

Moy and Murphy (2016) point out that when the researcher constructs the items in the survey it must be done in such way that all the respondents will be able to interpret the questions in the same manner and are willing and able to answer it correctly. Therefore the items in the measuring instruments should be valid.

3.10.1.1 Face validity

Tait and Voepel-Lewis (2015:659) argue that “face validity refers to how good items or group of items in the questionnaire appear to lay individuals with no specific training in the subject matter, while content validity relies on input from individuals with expertise in the subject matter, namely economics, at hand. The face validity of the survey research questionnaire was validated when it was sent to seven economics teachers for the pilot study and six teachers responded and returned their questionnaires with their inputs. The

teachers were asked to study the 25 items in the survey questionnaire to see whether each item was valid to measure the economics teachers' attitudes towards environmental sustainability. The teachers involved in the pilot study were teachers with a strong academic economics background.

The pilot study provides the researcher with the opportunity to evaluate how the respondents navigate through the survey questionnaire (Tait and Voepel-Lewis, 2015). The inputs given by the six economics teachers were dealt with before the questionnaires were disseminated to the broader group of teachers. The researcher was assured that the items covered in the questionnaire were valid to measure the attitude of economics teachers towards environmental sustainability.

3.10.1.2 Content validity

Tait and Voepel-Lewis (2015) argue that it is helpful to discuss the potential items with knowledgeable colleagues to validate the items in the questionnaire. The content validity of this research study was ensured by aligning the statements in the questionnaire with the literature review in Chapter 2.

3.10.2 Reliability

Reliability refers to whether a method of data collection or a measurement will repeatedly give the same results if used by the same person more than once or by two or more people when measuring the same phenomenon (Ellis, 2010). Reliability refers to the dependability, stability, consistency, trustworthiness and accuracy of the response of the respondents to the items in the measuring instrument (Burns, 2000). Bush (2002) argues that a test or process is reliable when it produces similar results under constant conditions every time. Bush (2002) argues further that when a test or process produces one answer on one occasion and a different result on another occasion then the test is said to be unreliable. A reliable measurement instrument will be able to give more or less the same results each time it is used with the same person or group. Muijs (2004:71) argues that "reliability determines the quality of a measurement instrument". It refers to the extent to which tests are free from measurement error (Muijs, 2004; Stangor, 2004).

A Cronbach alpha coefficient test is used in this study to measure the internal consistency or reliability of the measurement scale. Gliem and Gliem (2003) argue that when a Likert scale is used it is imperative to calculate and report on the Cronbach alpha coefficient of

internal consistency or reliability of the measurement scale one is using. Gliem and Gliem (2003) argue that the Cronbach alpha coefficient of internal consistency or reliability is the most frequently used measure to measure internal consistency in quantitative research.

3.11 Ethical considerations

Stangor (2004:43) quotes the American Psychological Association guidelines on research with human participants which states that “the participants must be informed about the purpose of the research, expected duration and procedures, their right to decline to participate and to withdraw from the research once participation has begun, reasonably foreseeable factors that may be expected to influence their willingness to participate, any prospective research benefits and whom to contact for questions about the research and research participants rights. The researcher must respect and protect civil and human rights and the central importance of freedom of inquiry and expression in research, teaching and publication”.

This researcher completed and submitted an application form for ethical approval to conduct the research to the University of Stellenbosch: Departmental Ethics Screening Committee (DESC) (Curriculum Studies) online. It was mandatory that the researcher applied for ethical approval before starting the data-collection process because the research study involves human participants. According to the university’s code on the rules and guidelines to conduct research, all research which includes humans, institutions or communities/ groups must be screened by the department. Approval to proceed with this research study was granted by the Departmental Ethics Screening Committee (DESC) (Curriculum studies). (See Appendix 2)

The researcher applied to the Western Cape Education Department for approval to conduct research within the education sector of the Western Cape Province. Approval was granted by the Western Cape Education Department to proceed with the research study. (See Appendix 3)

Each questionnaire was accompanied by a cover letter which informed the participants about their consent to participate in the research study. Participants were informed that the questionnaire was divided into five sections each with five statements representing the dimensions of environmental sustainability, namely biophysical, economic, social, political and education. (See Appendix 4)

The cover letter informed participants that the completion of the questionnaire was completely voluntary and anonymous and that they could withdraw from the research study at any time they wished to do so. Participants were informed who they could contact when they had any questions or queries with regard to the research study, and that confidentiality of participants would at all times be protected and any information and collected data would remain confidential.

Punch (2005) pointed out that experience has shown that when participants are informed about the context, purpose, confidentiality and anonymity about what the data will be used for, and if this is done professionally, people will cooperate and the quality of the data will be improved. Participants were informed in the letter that the collected data would be stored on the researcher's computer and on a memory stick and would be used for the sole purpose of this study. (See Appendix 6 and 7)

3.12 Conclusion

In this chapter the planning and the design of the research was discussed. The design of the survey research measuring instrument (questionnaire) was described in detailed. The data collection method, data analysis, population and sample were highlighted. In the following chapter the presentation and analysis of research data will be discussed.

Chapter 4

Presentation and analysis of research data

4.1 Introduction

In this chapter, the results of the research study are presented, interpreted and discussed. The results of the economics teachers' responses to the five dimensions of environmental sustainability (biophysical, economic, political, social and education) were examined. Quantitative data were produced by the survey instrument administered to teachers and analysed using the Statistica 13 software package.

The responses of the economics teachers were captured on an Excel worksheet using the Microsoft Excel 2010 package. The respondents' responses were converted from a non-statistical format into a statistical format. The participating economics teachers were requested to indicate their responses to the statement by indicating whether they 1= strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree with each of the items on the survey instrument. The responses of each respondent to the items were captured on an Excel spreadsheet and computed so the total responses of the respondents to each item was represented as raw scores. (See Appendix 6 and 7)

With respect to the structure of the questionnaire, it was divided into five dimensions of environmental sustainability, namely, biophysical, economic, political, social, and education.

The data were collected from the eight education districts in the Western Cape. The questionnaires were issued to economics teachers at their respective reflection and planning meetings of the education districts by the subject advisors. After the economics teachers completed the questionnaires, they were collected by the economics subject advisors and returned to the researcher.

The responses to the questionnaire were divided and grouped into urban and rural areas in order to test the Null hypothesis "there is no significant difference between geographical location of teachers and their attitudes towards environmental sustainability". It is assumed that rural areas are less populated, less industrially developed, the environment is preserved and eco-tourism is usually promoted because of the unspoiled natural habitats.

Therefore one would assume that people residing in rural areas are inclined to be more positive towards the environment than their urban counterparts.

The Western Cape urban areas consist of Metro North Education District, Metro East Education District, Metro South Education District and Metro Central Education District. The rural areas consist of Overberg Education District, West Coast Education District, Eden and Central Karoo Education District and Cape Winelands Education District.

The first part of the questionnaire dealt with biographic/demographic information where the teachers were expected to indicate their gender, years of teaching experience, age, years of teacher training, exposure to environmental sustainability in-service training and the education district they are teaching in.

4.2 Presentation of the demographic data

In this section the demographic data of the participants is discussed. The researcher will explain the demographic data to show the characteristics of the sub-sample and the number of participants that participated in the study. The demographic data show that the research sub-sample constitutes a representative sample.

The demographic data which was captured as part of the questionnaire will now be discussed. The researcher will focus on the gender of the economics teachers, their age, their teaching experience, the years of pre-service training, in-service training and whether the teachers are teaching in urban or rural areas.

4.2.1 Participation rate of the economics teachers in the study

Table 4.1: Urban areas

Educational Districts	Number of questionnaires issued	Number of questionnaires returned	Number of questionnaires returned but spoiled	Sample used	Number of questionnaires that were not returned
North (N)	44	39	1	38	5
East (EA)	34	34	1	33	0
South (S)	36	25	1	24	11
Central (C)	36	32	1	31	4
Total Urban	150	130	4	126	20

As represented in Table 4.1, one hundred and fifty (150) questionnaires were administered to economics teachers in the urban districts and one hundred and thirty (130) completed questionnaires were returned by the teachers, ensuring a return rate of eighty-seven percent (87%). Twenty questionnaires (20) were not returned which represented a thirteen percent (13%) non-return rate. Four (4) questionnaires, three percent (3%) of total questionnaires administered could not be used because they were spoiled.

Table 4.2: Rural areas

Education Districts	Number of questionnaires issued	Number of Completed questionnaires returned	Number of questionnaires returned but spoiled	Sample used	Questionnaires that were not returned
Overberg (O)	7	7	0	7	0
West Coast (W)	15	13	2	11	2
Eden Karoo (E)	39	26	0	26	13
Wynland (WY)	30	24	0	24	6
Total Rural	91	70	2	68	21

Ninety-one (91) questionnaires were administered to economics teachers in rural districts and seventy (70) completed questionnaires were returned by the teachers, resulting in a return rate of seventy seven percent (77%). Twenty one questionnaires (21) were not returned, which represented a twenty-three percent (23%) non-return rate. Two (2) questionnaires that were returned could not be used, which represented three percent (3%) of the total number of questionnaires that were distributed.

4.2.2 Sub-sample size of the research respondents

The sampling was discussed in Chapter 3 of this study. Here more detail is provided as to the number of respondents per education district of the Western Cape Province.

Table 4.3 represents the number of respondents who participated from urban education districts and the number of respondents who participated from rural districts.

Table 4.3: The sub-sample size of the research study

Urban area	Number of teachers	Percentage (%)
Metro North Education District	38	20%
Metro East Education District	33	17%
Metro South Education District	24	12%
Metro Central Education District	31	16%
	126	65%
Rural area	Frequency	Percentage (%)
Overberg Education District	7	4%
West Coast Education District	11	6%
Eden and Central Karoo Education District	26	13%
Cape Winelands Education District	24	12%
	68	35%
TOTAL	194	100%

The total sub-sample (both urban and rural) of the research study was $n = 194$ participants. The urban area sub-sample of the research study was $n = 126$ with a research participation rate of sixty-five percent (65%) and the rural area sub-sample of the research study was $n = 68$ with a research participation rate of thirty five percent (35%).

4.2.3 Gender and age categories of respondents

The gender composition of the sub-sample is represented in Table 4.4 below.

Table 4.4: Gender of sub-sample

	Frequency = 194	Percentage (%)
Male	86	44%
Female	108	56%
Total	194	100%

There were $n = 86$ males, forty-four percent (44%) and $n = 108$ females, fifty-six percent (56%) who participated in the research study.

The age distribution of the sub-sample is represented in Table 4.5 below.

Table 4.5: Age distribution of the sample

	Number of participants = 194	Percentage (%)
20 – 29 years	18	9%
30 – 39 years	31	16%
40 – 49 years	75	39%
50 – 59 years	64	33%
60 – 64 years	6	3%
Total	194	100%

The data show a normal age distribution. Most of the respondents, thirty-nine percent (39%), are between the ages of 40-49 years. Twenty-five percent (25%) of the respondents are between 20–39 years and thirty-six percent (36%) of the respondents are between 50-64 years. Nine percent (9%) of the respondents are between 20-29 years and sixteen percent (16%) of the respondents are between 30-39 years. Thirty three percent (33%) of the respondents 50-59 years and three percent (3%) are between 60-64 years.

4.2.4 Teaching experience, years of pre-service teacher training and in-service education programmes attended

The teaching experience of the respondents is represented in Table 4.6 below.

Table 4.6: Teaching experience of respondents

	Number of participants =194	Percentage (%)
Less than 5 years	29	15%
6-10 years	32	17%
11- 15 years	26	13%
16-20 years	27	14%
21 years or more	80	41%
Total	194	100

Forty-one percent (41%) of the participants in the research study have more than 21 years of teaching experience and fifty-nine percent (59%) of the participants have less than 20 years of teaching experience, while thirty-one percent (31%) of the participants have less

than 10 years of teaching experience. Fifteen percent (15%) of the participants have less than 5 years of teaching experience and seventeen percent (17%) have between 6-10 years of teaching experience. Thirteen percent (13%) of the participants have between 11-15 years of teaching experience, while fourteen percent (14%) have between 16-20 years of teaching experience.

The number of years of pre-service teacher training in education received by respondents is represented in Table 4.7 below

Table 4.7: The years of pre-service teacher training in education received

	Number of participants = 194	Percentage (%)
0	1	0.5%
1 year	17	8.8%
2 years	9	4.6%
3 years	13	6.7%
4 years	104	53.6%
More than 4 years	50	25.8%
Total	194	100%

The qualification profile of teachers is quite diverse. Economics teachers who are currently employed as teachers by the Western Cape Education Department completed different study paths to become qualified teachers. The department distinguishes between an academic qualification and a professional qualification which is regarded as a teacher's qualification.

The manner in which economics teachers' professional qualifications are constructed is represented in Table 4.8 below:

Table 4.8: Example of various ways in which economics teachers' professional qualifications are compiled

Year	Professional Qualification (Teaching qualification)
0 year	<ul style="list-style-type: none"> The teacher is only in possession of a degree and no professional qualification.
1 year	<ul style="list-style-type: none"> Teacher is in possession of a degree plus a professional qualification. For example: the degree plus a Post-Graduate Certificate in Education or a Higher Diploma in Education or a Secondary Teacher certificate or a Secondary Teachers Diploma
2 years	<ul style="list-style-type: none"> Teacher is in possession of a degree, a professional qualification and post-graduate qualification. For example: the degree plus a Higher Diploma in Education or a Secondary Teacher certificate or a Secondary Teachers Diploma plus a previous qualification called the Bed degree.
3 years	<ul style="list-style-type: none"> Teacher is in possession of a three-year Higher Diploma in Education. Teacher is in possession of a degree plus a Higher Diploma in Education or a Secondary Teacher certificate or a Secondary Teachers Diploma plus a Bed degree plus a Bedhons degree Some teachers have a degree plus Higher Diploma in Education or a Secondary Teacher certificate or a Secondary Teachers Diploma plus a Bed degree plus Advance Certificate in Education (ACE).
4 years	<ul style="list-style-type: none"> Teacher is in possession of a four-year Higher Diploma in Education. Teacher is in possession of a four-year Bed degree.
More than 4 years	<ul style="list-style-type: none"> Teacher in possession of a four-year Bed degree plus a Bedhons degree Teacher in possession of a Higher Diploma in Education (commerce) four-year commerce diploma plus Advance Certificate in education or a BTech degree Teacher in possession of a four-year Bed degree plus a BedHons degree and a Master's degree in education.

The above table is an example and indication of how economics teachers' qualifications are structured. Teachers followed different study paths (which constitute different years of

study) to achieve and to better their educational qualifications. It is therefore important to measure whether the years of training have influenced the economics teachers' attitude towards environmental sustainability.

The data shows that fifty-three point six percent (53.6%) of the respondents have 4 years teacher training and twenty-five point eight percent (25.8%) of the respondents have more than more than 4 years teacher training. Zero point five percent (0.5%) of the respondents have zero (0) years teacher training and eight point eight percent (8.8%) have 1-year teacher training, while six point seven percent (6.7%) have 3 years teacher training. This data is also crucial for proving the Null hypothesis.

The number of respondents who received in-service education and who did not receive in-service education linked to environmental sustainability is represented in Table 4.9 below.

Table 4.9 In-service education focused on environmental sustainability

	Number of participants n=194	Percentage (%)
Yes; receive any in-service education	27	14%
No: Did not receive any in-service education	167	86%
Total	194	100%

The data show that n = 167 which constitute eighty-six percent (86%) of the respondents did not received any in-service education (upskilling) towards environmental sustainability, while n = 27 which constitute fourteen percent (14%) did receive in-service education (upskilling) linked to environmental sustainability.

4.3 Statistical Interpretation of the questionnaires

The second part of the questionnaire captured the teachers' responses to the individual statements comprising the survey instrument. The questionnaire was divided into five sections with each section having five statements linked to the particular dimension of environmental sustainability. The five dimensions were biophysical, economic, political, social and education.

4.3.1 Reliability of the instrument

A Cronbach alpha coefficient was calculated to measure the reliability of the five dimensions of the measuring scale. Tengku, Yadollah, Mariani, Asnarulkhadi, Nurizan, Siti (2013:284) argue that a Cronbach alpha coefficient is a useful way to measure the reliability of a measurement scale. According to Hee (2014:773), Cronbach's alpha is used as the reliability coefficient to show how well the items in the instrument are positively correlated to each other.

Different authors and researchers have different views on how reliable the Cronbach alpha coefficient is. Gliem and Gliem (2003:87) argue that a Cronbach alpha coefficient of 0.7 or more is acceptable. Bland and Altman (1997:572) argue that a Cronbach alpha coefficient of 0.7 or 0.8 is satisfactory. Tengku, Yadollah, Mariani, Asnarulkhadi, Nurizan, Siti (2013:284) argue that a Cronbach alpha coefficient above 0.6 obtained is considered to be acceptable. Tengku, Yadollah, Mariani, Asnarulkhadi, Nurizan, Siti (2013:284) refer to Chakrapani who argued that a Cronbach alpha coefficient of greater than 0.5 is considered to be acceptable and that a value below 0.5 is considered to be poor.

Schmitt (1996:353) concludes in his study that there is no sacred level of acceptable or unacceptable level of alpha. In some cases, measures of (by conventional standards) low levels of alpha may still be quite useful. Manerikar and Manerikar (2015:117) argue that some professionals and researchers require the level of Cronbach alpha to be 0.7 or higher, but that a Cronbach alpha level of 0.6 and higher is acceptable. For this research study the researcher accepted a Cronbach alpha level of 0.6 or higher as an acceptable level of reliability because it is the level accepted by most researchers.

The tables below represent the Cronbach alpha coefficient of the different dimensions of environmental sustainability.

Table 4.10: The Cronbach alpha coefficient of the biophysical dimension

Cronbach alpha: R = 0.44 Mean = 18.68 Average inter-item correlation = 0.15 N = 194			
Variable	Mean if deleted	Itm-Totl Correl.	Alpha if deleted
Biophysical (Q1)	15.16	0.23	0.39
Biophysical (Q2)	14.41	0.30	0.37
Biophysical (Q3)	15.05	0.20	0.41
Biophysical (Q4)	15.26	0.20	0.43
Biophysical (Q5)	14.84	0.29	0.34

Table 4.11: The Cronbach alpha coefficient of the economic dimension

Cronbach alpha: R=0.73 Mean = 21.03 Average inter-item correlation = 0.36 n = 194			
Variable	Mean if deleted	Itm-Totl Correl.	Alpha if deleted
Economic (Q1)	17.01	0.34	0.73
Economic (Q2)	16.87	0.42	0.71
Economic (Q3)	16.73	0.46	0.70
Economic (Q4)	16.76	0.63	0.63
Economic (Q5)	16.75	0.62	0.63

Table 4.12: The Cronbach alpha coefficient of the political dimension

Cronbach alpha: R = 0.71 Mean = 18.73 Average inter-item correlation = 0.33 n = 194			
Variable	Mean if deleted	Itm-Totl Correl.	Alpha if deleted
Political (Q1)	14.38	0.44	0.67
Political (Q2)	14.70	0.47	0.65
Political (Q3)	14.90	0.44	0.67
Political (Q4)	15.43	0.56	0.62
Political (Q5)	15.50	0.43	0.68

Table 4.13: The Cronbach alpha coefficient of the social dimension

Cronbach alpha: R = 0.61 Mean = 19.59 Average inter-item correlation = 0.26 n = 194			
Variable	Mean if deleted	Itm-Totl Correl.	Alpha if deleted
Social (Q1)	16.39	0.23	0.64
Social (Q2)	15.20	0.36	0.55
Social (Q3)	15.70	0.42	0.52
Social (Q4)	15.78	0.37	0.55
Social (Q5)	15.30	0.51	0.50

Table 4.14: The Cronbach alpha coefficient of the education dimension

Cronbach alpha: R = 0.86			
Mean = 20.75			
Average inter-item correlation = 0.58			
n = 194			
Variable	Mean if deleted	Itm-Totl Correl.	Alpha if deleted
Education (Q1)	16.36	0.64	0.84
Education (Q2)	16.45	0.74	0.81
Education (Q3)	16.66	0.76	0.80
Education (Q4)	16.63	0.79	0.80
Education (Q5)	16.89	0.48	0.88

The outcome of the Cronbach alpha in this research study varies from low to high between 0.44 and 0.86. The questionnaire was divided into five subsections and each subsection consisted of five items.

The subsection that measured a Cronbach alpha coefficient below the benchmark of 0.6 is the biophysical dimension which measured a Cronbach alpha of 0.44. The other subsections measured a Cronbach alpha higher than 0.6. The economic dimension measured a Cronbach alpha of 0.73 and the political dimension measured a Cronbach alpha of 0.71. The social dimension measured a Cronbach alpha of 0.61 and the education as a dimension of environmental sustainability measured a Cronbach alpha of 0.86.

Four dimensions towards environmental sustainability measured a Cronbach alpha above 0.6 and one dimension measure a Cronbach alpha below 0.6. On the whole, the instrument is reliable.

An item-total correlation was also performed to see whether deleting any items would improve the reliability of the instrument:

Biophysical

The item-total correlation varies between 0.23 and 0.30. It does not make statistical sense to delete any item because by deleting any item it will not increase the reliability significantly.

Economic

The item-total correlation varies between 0.34 and 0.63. It does not make statistical sense to delete item 1 with a total-item correlation of 0.34 from the scale because if deleted it will not increase the reliability significantly.

Political

The item-total correlation varies between 0.43 and 0.56. It does not make statistical sense to delete any of the items from scale because it will have no effect on the level of the reliability. If anyone of the items is deleted from the measuring scale the reliability of the measuring scale will decrease.

Social

The item-total correlation varies between 0.23 and 0.51. Item 1 has an item total correlation of 0.23. If item 1 is deleted from the measuring scale it will increase the level of the Cronbach Alpha from 0.61 to 0.64. By deleting item 1 the reliability of the measuring scale will increase. It therefore makes statistical sense to remove item 1 from the measurement instrument.

Education

The item-total correlation varies between 0.48 and 0.79. Item 5 has an item total correlation of 0.48. If item 5 is deleted from the scale it will increase the Cronbach alpha from 0.86 to 0.88. By deleting item 5 the reliability of the measuring instrument will increase.

After discussing the reliability of the research instrument the discussion now turns to the testing of several hypotheses.

4.3.2 Hypothesis testing

Hypothesis 1: Economics teachers have a positive attitude towards environmental sustainability.

Table 4.15: Results of respondents' choices on the biophysical dimension

Likert Scale number	1		2		3		4		5	
	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
Statement	No	%	No	%	No	%	No	%	No	%
Other species and the biophysical world should be valued equally to humans.	10	5	21	11	41	21	98	51	23	12
I am willing to change my current lifestyle if it will prevent the extinction of species.	1	1	1	1	12	6	106	55	73	38
More land should be made available for conservation than for development.	1	1	27	14	42	22	93	48	30	16
The number of children that people can have should be limited to 2 children per household.	15	8	38	20	45	23	39	20	56	29
People should not have the right to exploit the natural environment to satisfy their unlimited needs and wants.	11	6	26	13	19	10	61	32	76	39
	38	3.9	113	11.7	159	16.5	397	41.1	258	26.7

The biophysical dimension consists of five statements that measured the respondents' attitudes towards environmental sustainability. 3.9% of the respondents strongly disagree with the statements on the measuring scale, while 11.7% of the respondents disagree with the statements. 16.5% of the respondents gave a neutral response to the statements on

the measuring scale. 41.1% of the respondents agree with statements on the measuring scale while 26.7% of the respondents strongly agree with the statements. This means that 67.8% of the respondents show positive attitudes towards the statements on the biophysical dimension of environmental sustainability on the measuring scale.

Figure 4.1 represents teachers' responses to the statements on the biophysical dimension of environmental sustainability on the measuring scale.

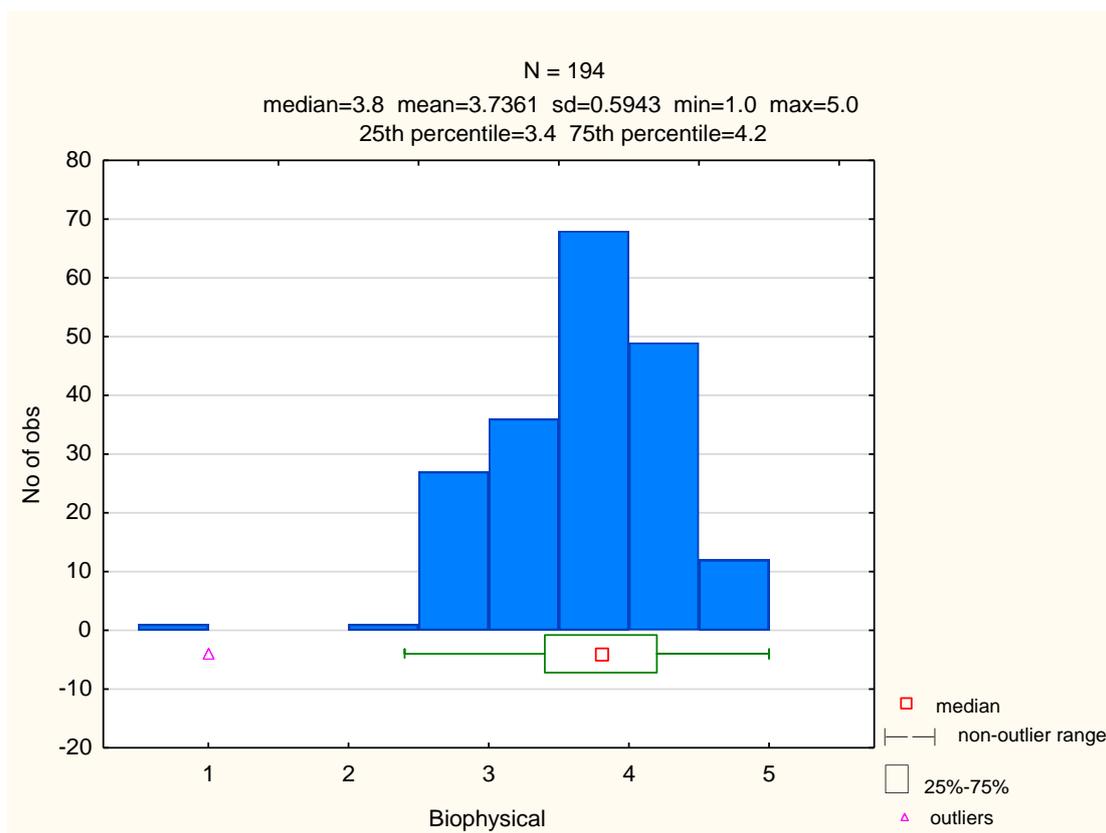


Figure 4.1: Teachers' responses to biophysical dimension of the scale

From the above figure it can be seen that the median of the data set is 3.8 and the mean of the data set is 3.7361. In the above box and whisker plot the range of the data set is between a minimum of 1 to a maximum of 5. The data set is divided into 4 quartiles and the median of the 1st quartile is 3.4 and the median of the 3rd quartile is 4.2.

The box in the box and whiskers plot represents 50% of the data. The interquartile range is between the 1st quartile and the 3rd quartile. The interquartile range is the range of the middle 50% of the data set. The interquartile range of the data set is the difference between the 3rd quartile = 4.2 and the 1st quartile = 3.4. The interquartile range therefore

is 4.2 minus $3.4 = 0.8$. The interquartile range is 0.8 which indicates that the data are clustered in the middle 50% of the data set.

In quartile 4, 25% of the respondents' responses are between 4.2 and 5 . In quartile 3, 25% of respondents' responses are between 3.8 and 4.2 and in quartile 2, 25% of respondents' responses are between 3.4 and 3.8 .

There are outliers that were disregarded because outliers are responses that are extremely different from the majority of the responses and which will influence the statistics negatively. Outliers are cases with values well above or well below the majority of the other cases and which can have a significant effect on the results of the research study (Pallant, 2011).

The researcher concludes that more than 50% of the respondents agree and strongly agree with the statements in the questionnaire. This is an indication that most of the respondents have a positive attitude towards the biophysical environmental sustainability.

Table 4.16: Results of respondents' choices on the economic dimension

Likert Scale number	1		2		3		4		5	
	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
Statement	No	%	No	%	No	%	No	%	No	%
Companies that are environmentally sustainable are more likely to be profitable in the long run.	0	0	5	3	30	16	111	58	47	24
Consumers should receive rewards from retailers if they purchase environmentally friendly goods.	0	0	11	6	21	11	88	46	73	38
Managers and executives of companies must be criminally charged when their companies are found to be polluting.	3	2	6	3	16	8	73	38	95	49
I am willing to promote the principles of a green economy even if people tell me that it is an unachievable dream.	2	1	0	0	11	6	108	56	72	37
Multinational corporations should be forced by law to adhere to the environmental laws by governments even if there is a threat that lucrative business contracts might be terminated.	1	1	3	2	18	9	87	45	84	44
	6	0.62	25	2.6	96	9.9	467	48.4	371	38.4

The economic dimension consists of five statements that measured the respondents' attitudes towards environmental sustainability. 0.62% of the respondents strongly disagreed with the statements on the measuring scale, while 2.6% of the respondents disagreed with the statements on the measuring scale. 9.9% of the respondents gave a neutral response to the statements in the measuring scale. 48.4% of the respondents agreed with the statements on the measuring scale, while 38.4% of the respondents strongly agreed with the statements in the measuring scale. This means that 86.8% of the respondents show a positive attitude towards the statements on the economic dimension of environmental sustainability of the measuring scale.

Figure 4.2 represents teachers' responses to the statements on the economic dimension of environmental sustainability on the measuring scale.

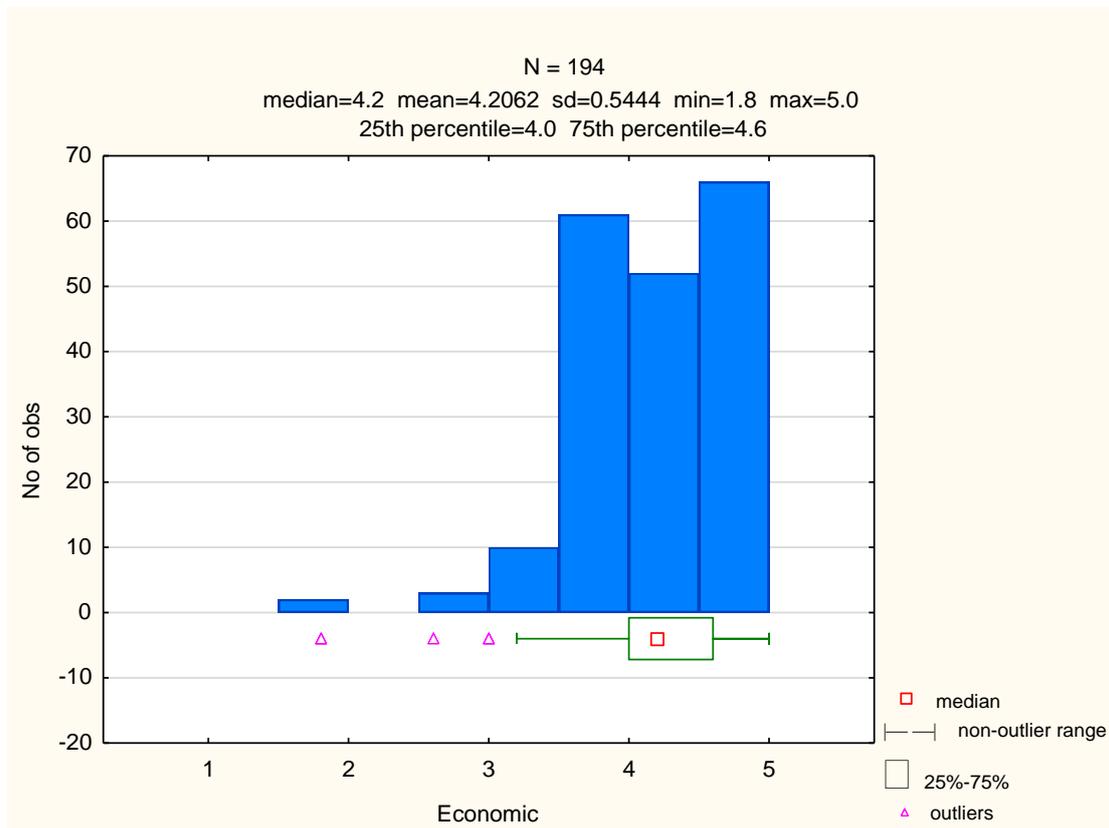


Figure 4.2: Teachers' responses to the economic dimension

From the above figure it can be seen that the median of the data set is 4.2 and the mean of the data set is 4.2062. In the above box and whisker plot the range of the data set is between a minimum of 1.8 to a maximum of 5. The data set is divided into 4 quartiles and the median of the 1st quartile is 4.0 and the median of the 3rd quartile is 4.6.

The box in the box and whiskers plot represents 50% of the data. The interquartile range is the difference between the 1st quartile and the 3rd quartile. The interquartile range of the data set is the difference between the 3rd quartile = 4.6 and the 1st quartile = 4.0. The interquartile range is: $4.6 - 4.0 = 0.6$. The interquartile range is 0.6 which indicates that the data are clustered in the middle 50% of the data set.

In quartile 4, 25% of the respondents' responses are between 4.6 and 5. In quartile 3, 25% of respondents' responses are between 4.2 and 4.6 and in quartile 2, 25% of respondents' responses are between 4.0 and 4.2.

There are outliers that were disregarded because outliers are responses that are extremely different from the majority of the responses and which will influence the statistics negatively. The exclusion of the outliers shortened the range of the data set.

The researcher concludes that more than 75% of the respondents agree and strongly agree with the statements in the questionnaire. This is an indication that most of the respondents have a positive attitude towards the economic dimension of environmental sustainability.

Table 4.17: Results of respondents' choices on the political dimension

Likert Scale number	1		2		3		4		5	
	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
Statement	No	%	No	%	No	%	No	%	No	%
Governments should provide tax incentives to companies who produce environmental friendly products, e.g. build electric cars.	1	1	3	2	11	6	88	46	90	47
The government is right in to make consumers pay for the use of environmentally damaging products such as non-degradable plastic bags.	4	2	8	4	22	11	101	52	58	30
Changing peoples' lifestyles to be more environmental sustainable should be enforced and regulated by governments.	3	2	19	10	31	16	92	48	48	25
Citizens should vote for political parties whose manifestos focus mainly on environmental sustainability.	3	2	37	19	68	35	67	35	18	9
Governments should spent more money on the conservation and preservation of the environment even if it means that less money is available for other government services.	10	5	46	24	49	25	64	33	24	12
	21	2.2	113	11.7	181	18.7	412	42.7	238	24.7

The political dimension consists of five statements that measured the respondents' attitudes towards environmental sustainability. 2.2% of the respondents strongly disagree with the statements on the measuring scale, while 11.7% disagree with the statements on the measuring scale. 18.7% of the respondents gave a neutral response to the statements

on the measuring scale. 42.7% agree with the statements in the measuring scale, while 24.7% strongly agree with the statements on the measuring scale. This means that 67.4% of the respondents show a positive attitude towards the statements on the political dimension of environmental sustainability on the measuring scale.

Figure 4.3 represents teachers' responses to the statements on the political dimension of the measuring scale.

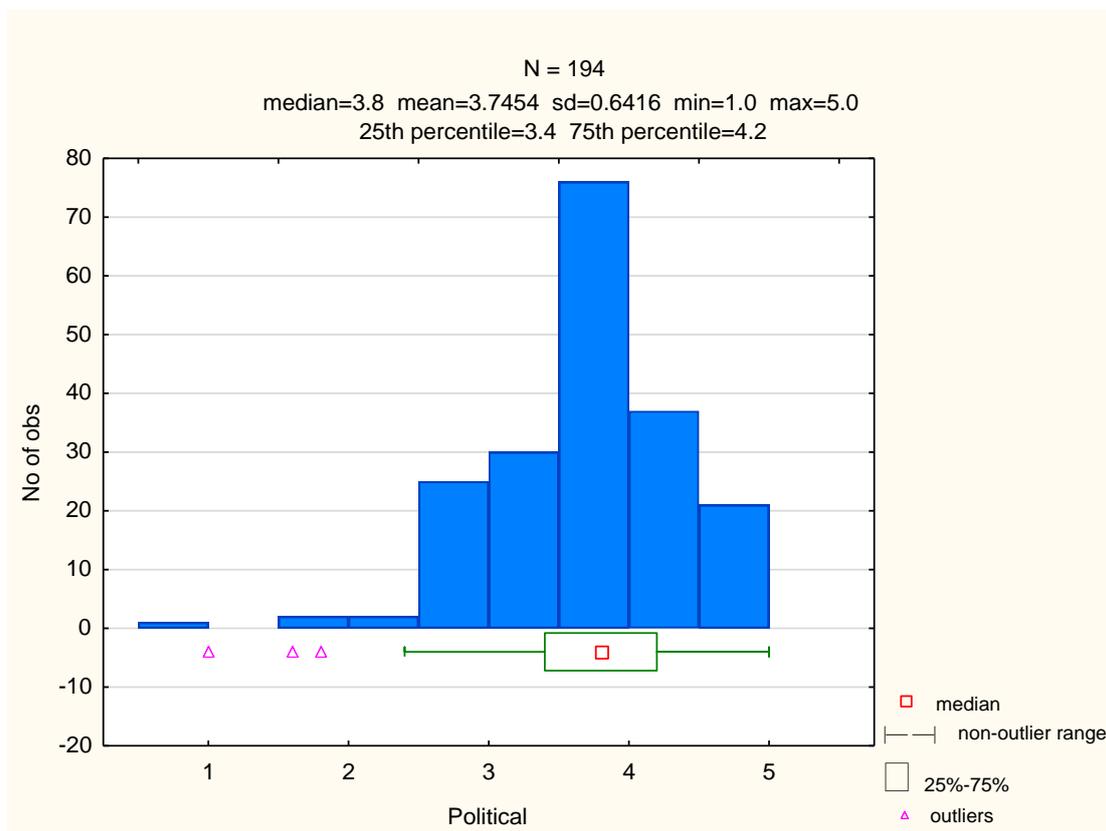


Figure 4.3: Teachers' responses to the political dimension

From the above figure it can be seen that the median of the data set is 3.8 and the mean of the data set is 3.7454. In the above box and whisker plot the range of the data set is between a minimum of 1 to a maximum of 5. The data set is divided into 4 quartiles and the median of the 1st quartile is 3.4 and the median of the 3rd quartile is 4.2.

The box in the box and whiskers plot represents 50% of the data. The interquartile range is between the 1st quartile and the 3rd quartile. The interquartile range of the data set is the difference between 3rd quartile = 4.2 and the 1st quartile = 3.4. The interquartile range

therefore is: $4.2 \text{ minus } 3.4 = 0.8$. The interquartile range is 0.8 which indicates that the data are clustered in the middle 50% of the data set.

In quartile 4, 25% of the respondents' responses are between 4.2 and 5. In quartile 3, 25% of respondents' responses are between 3.8 and 4.2 and in quartile 2, 25% of respondents' responses are between 3.4 and 3.8.

There are outliers that were disregarded because outliers are responses that are extremely different from the majority of the responses and which will influence the statistics negatively. The exclusion of the outliers shortened the range of the data set.

The researcher concludes that more than 60% of the respondents show a positive response to the statements in the questionnaire. This is an indication that most of the respondents have a positive attitude towards the political dimension of environmental sustainability.

Table 4.18: Results of respondents' choices on the social dimension

Likert Scale number	1		2		3		4		5	
	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
Statement	No	%	No	%	No	%	No	%	No	%
Controlling the growth of the world population should take precedence over peoples' personal, religious and cultural beliefs.	8	4	49	25	51	26	63	33	22	11
Overuse of natural resources is a serious threat to the health and welfare of future generations.	2	1	0	0	14	7	78	40	99	51
I have more confidence in social movements that promote environmental sustainability than governments.	2	1	4	2	50	26	91	47	46	24
Environmental sustainability cannot be achieved without eliminating poverty.	3	2	22	11	31	16	86	45	51	26
Environmental sustainability can be achieved if communities work together to solve local environmental problems.	1	1	1	1	10	5	107	55	74	38
	16	1.7	76	7.9	156	16.2	425	44	292	30.2

The social dimension consists of five statements that measure the responses of the respondents' attitude towards environmental sustainability. 1.7% of the respondents strongly disagree with the statements on the measuring scale, while 7.9% of the respondents disagree with the statements on the measuring scale. 16.2% of the respondents gave a neutral response to the statements on the measuring scale. 44% of the respondents agree with the statements on the measuring scale, while 30.2% strongly agree with the statements on the measuring scale. This means that 74.2% of the

respondents show a positive attitude towards the items on the social dimension of environmental sustainability on the measuring scale.

Figure 4.4 represents teachers' responses to the statements on the social dimension of environmental sustainability on the measuring scale.

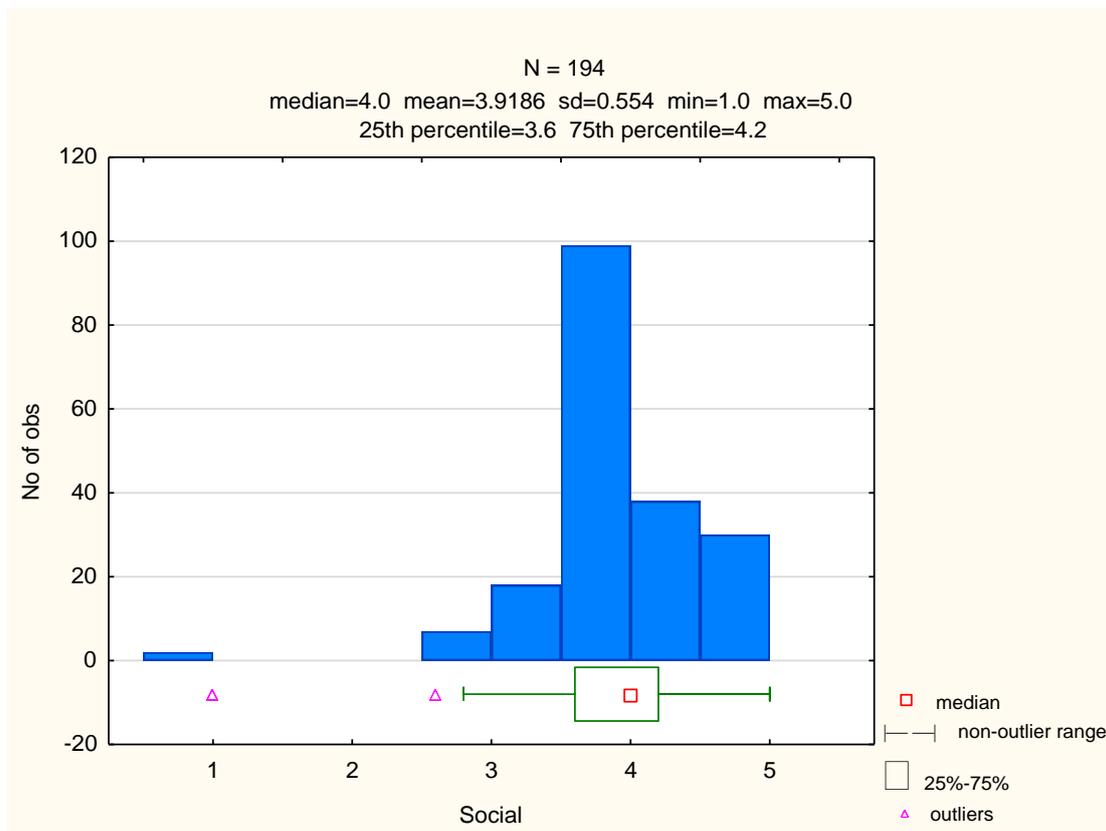


Figure 4.4: Teachers' responses to the social dimension

From the above figure it can be seen that the median of the data set is 4.0 and the mean of the data set is 3.9186. In the above box and whisker plot the range of the data set is between a minimum of 1 to a maximum of 5. The data set is divided into 4 quartiles and the median of the 1st quartile is 3.6 and the median of the 3rd quartile is 4.2.

The box in the box and whiskers plot represents 50% of the data. The interquartile range is between the 1st quartile and the 3rd quartile. The interquartile range of the data set is the 3rd quartile is 4.2 minus the 1st quartile is 3.6. The interquartile range of the data set is: $4.2 - 3.6 = 0.6$. The interquartile range is 0.6 which indicates that the data are clustered in the middle 50% of the data set.

In quartile 4, 25% of the respondents' responses are between 4.2 and 5, in quartile 3, 25% of respondents' responses are between 4.0 and 4.2 and in quartile 2, 25% of respondents' responses are between 3.6 and 4.0.

There are outliers that were disregarded because outliers are responses that are extremely different from the majority of the responses and which will influence the statistics negatively. The exclusion of the outliers shortened the range of the data set.

The researcher concludes that more than 70% of the respondents agree and strongly agree with the statements in the questionnaire. This is an indication that most of the respondents have a positive attitude towards the social dimension of environmental sustainability.

Table 4.19: Results of respondents' choices on the education dimension

Likert Scale number	1		2		3		4		5	
	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
Statement	No	%	No	%	No	%	No	%	No	%
Environmental sustainability should be taught in all school subjects and in all the grades.	3	2	3	2	12	6	69	36	106	55
Economics teachers should find every available opportunity in the curriculum to address environmental sustainability issues.	1	1	1	1	18	9	89	46	84	44
There should be compulsory professional development programmes for all economics teachers on environmental sustainability issues.	3	2	5	3	29	15	88	46	68	35
Environmental sustainability education must be a compulsory module in all student teacher training programmes.	2	1	4	2	28	15	92	48	67	35
Economics teachers should teach environmental sustainability topics even if it not prescribed in the curriculum.	4	2	17	9	29	15	93	48	50	26
	13	1.3	30	3.1	116	12	431	44.7	375	38.9

The education dimension consists of five statements that measure the response of the respondents' attitude towards environmental sustainability. 1.3% of the respondents strongly disagree with the statements on the measuring scale, while 3.1% disagree with the statements on the measuring scale. 12% of the respondents gave a neutral response to the statements on the measuring scale. 44.7% of the respondents agree with the statements on the measuring scale, while 38.9% of the respondents strongly agree with

the statements on the measuring scale. This means that 83.6% of the respondents show a positive attitude towards the statements of the education dimension of environmental sustainability on the measuring scale.

Figure 4.5 represents teachers' responses to the statements on the education dimension of the measuring scale.

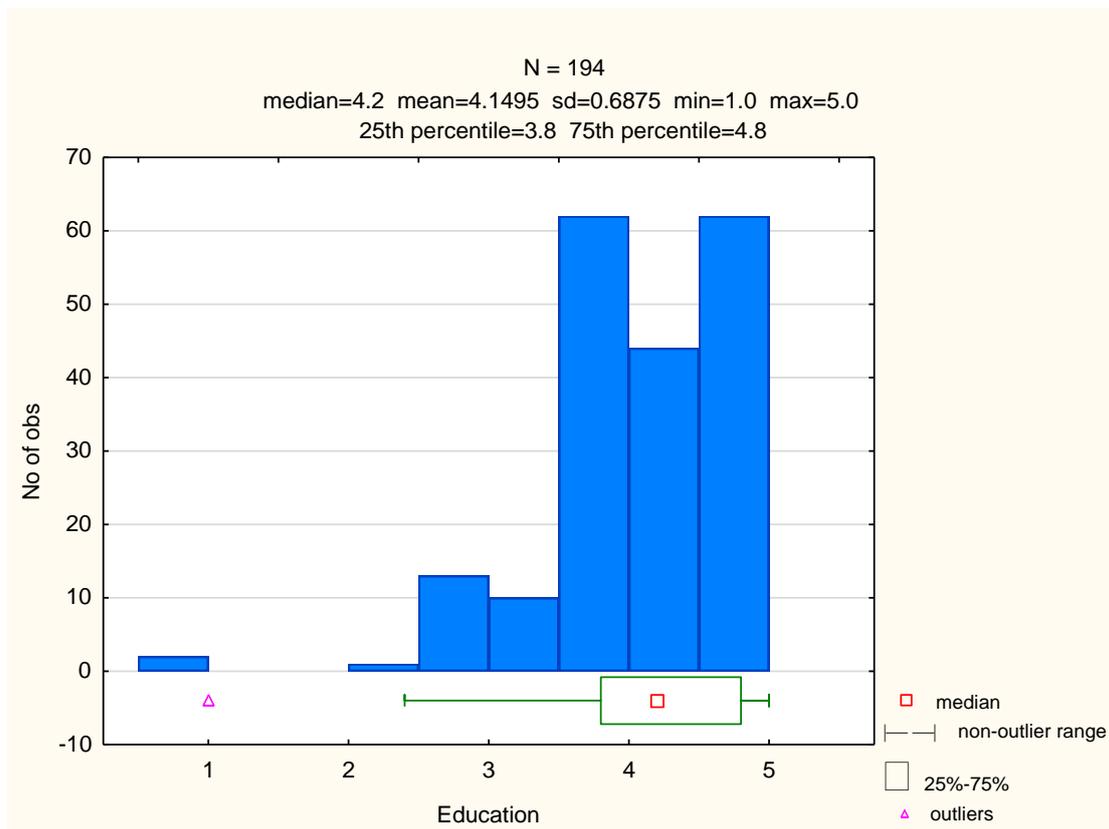


Figure 4.5: Teachers' responses to the education dimension

From the above figure it can be seen that the median of the data set is 4.2 and the mean of the data set is 4.1495. In the above box and whisker plot the range of the data set is between a minimum of 1 to a maximum of 5. The data set is divided into 4 quartiles and the median of the 1st quartile is 3.8 and the median of the 3rd quartile is 4.8.

The box in the box and whiskers plot represents 50% of the data. The interquartile range is between the 1st quartile and the 3rd quartile. The interquartile range of the data set is the difference between the 3rd quartile = 4.8 and 1st quartile = 3.8. The interquartile range therefore is: $4.8 - 3.8 = 1$. The interquartile range is 1 which indicates that the data are clustered in the middle 50% of the data set.

In quartile 4, 25% of the respondents' responses are 4.8 and 5. In quartile 3, 25% of respondents' responses are 4.2 and 4.8 and in quartile 2, 25% of respondents' responses are 3.8 and 4.2.

There are outliers that were disregarded because outliers are responses that are extremely different from the majority of the responses and which will influence the statistics negatively. The exclusion of the outliers shortened the range of the data set.

The researcher concludes that more than 80% of the respondents agree and strongly agree with the statements in the questionnaire. This is an indication that most of the respondents have a positive attitude towards the education dimension of environmental sustainability.

The results of the data represented for the five dimensions of environmental education indicate that economics teachers have a positive attitude towards environmental sustainability when measured on the scale as a whole.

4.3.3 Null hypothesis testing

Six Null hypotheses were tested to measure the influence of different independent variables on teachers' attitudes towards environmental sustainability. Three different tests were conducted.

A Mann Whitney U tests was conducted to tests the following two hypotheses, Hypothesis 1: "There is no significant difference between the years of training teachers received who teach school economics and their attitude towards environmental sustainability" and Hypothesis 5: "There is no significant difference between the in-service education opportunities of teachers of school economics and their attitude towards environmental sustainability".

The Mann-Whitney U test is a statistical test used in statistics to examine differences between two independent groups on a continuous scale and where the dependent variable is either ordinal or continuous (Milenovic, 2011; Lund and Lund, 2018). The Mann-Whitney U compares the median of the two independent variables and it is also used to test the Null hypothesis (Milenovic, 2011; Lund and Lund, 2018). In research of the professional

development of teachers of primary schools, the most commonly used criterion variables were gender (male, female), education (college, university), occupation (class teacher/ subject teacher) and school environment (urban, rural) (Milenovic, 2011:73).

A Spearman rho correlation is used to test the following hypotheses, Hypothesis 2:

“There is no significant difference between how long teachers have been teaching school economics and their attitude towards environmental sustainability”; Hypothesis 3:

“There is no significant difference between the age of teachers of school economics and their attitude towards environmental sustainability”; and Hypothesis 4: “There is no

significant difference between the years of training teachers received who teach school economics and their attitude towards environmental sustainability”.

A Spearman rank correlation (Spearman’s rho) is used to determine the correlation between the years of teaching experience, age, the years of teacher training and the five different dimensions of environmental sustainability. The reason for using a Spearman ranks correlation is because the correlation between two ordinal variables is measured. The sub-sample consists of $n = 194$ respondents but one outlier (respondent 86) was excluded from the data set.

Mukaka (2012) pointed out that the strength of a relationship is measured by a Spearman correlation and can be anywhere between -1 and +1. The stronger the correlation between the two variables, the closer the correlation coefficient comes to +1 and the weaker the correlation between two variables the closer it comes to -1. Mukaka (2012) states further that a zero correlation indicates that there exist no linear relationship between two variables but if the coefficient is a positive number it indicates the variables are directly related and if the coefficients is a negative number it indicates that the variables inversely related. Therefore the strength of the value can be anywhere between -1 and +1.

An Analysis of Variance (ANOVA) is used to test hypothesis 6: “There is no significant difference between geographical location of teachers of school economics and their attitude towards environmental sustainability”. The Mann-Whitney Test can also be used, but the ANOVA with the F test is used to test the hypothesis. The ANOVA with the F test makes the assumption that the data is normally distributed (Statistical Solutions, 2013) and the data in this research study was close enough for it being a valid method. If the p-value is $p > 0.05$ the Null hypothesis cannot be rejected. If the Null hypothesis cannot be rejected

then there is no significant difference between geographical location of teachers of school economics and their attitudes towards environmental sustainability.

If the p-value is $p < 0.05$ then the Null hypothesis is rejected. If the Null hypothesis is rejected then there is a significant difference between geographical location of teachers of school economics and their attitudes towards environmental sustainability, then we conclude that there is a difference between the mean of the groups. Therefore we can conclude that the means of the groups is not equal.

The total sub-sample consisted of $n = 194$ respondents but for the data analysis only $n = 193$ respondents was used. The data set used for the ANOVA consists of $n = 193$ respondents. One respondent (respondent 86) was considered an outlier and was removed from the data set to get a more meaningful result. This respondent responded with a code 1 to all the statement items.

As is generally accepted in the social sciences, $p > 0.05$ is regarded as the statistically significant level. For example, if the p-value is $p > 0.05$ the Null hypothesis cannot be rejected. This indicates that there is an independent variable that has no influence on teachers' attitudes towards environmental sustainability. If the p-value is $p < 0.05$ the Null hypothesis is rejected. This indicates that there is an independent variable that does influence teachers' attitudes towards environmental sustainability.

4.3.3.1 The Null hypothesis = H_0 : There is no significant difference between the attitude of male and female teachers of school economics towards environmental sustainability.

The results of male and female teachers' attitudes towards the biophysical dimension of environmental sustainability are represented in Table 4.20 and graphically illustrated in Figure 4.6 below.

Table 4.20: Male and female teachers’ attitudes towards the biophysical dimension of environmental sustainability

Effect	Level of Factor	N	Biophysical mean
Total		193	3.75
Gender	Male	86	3.70
Gender	Female	107	3.79

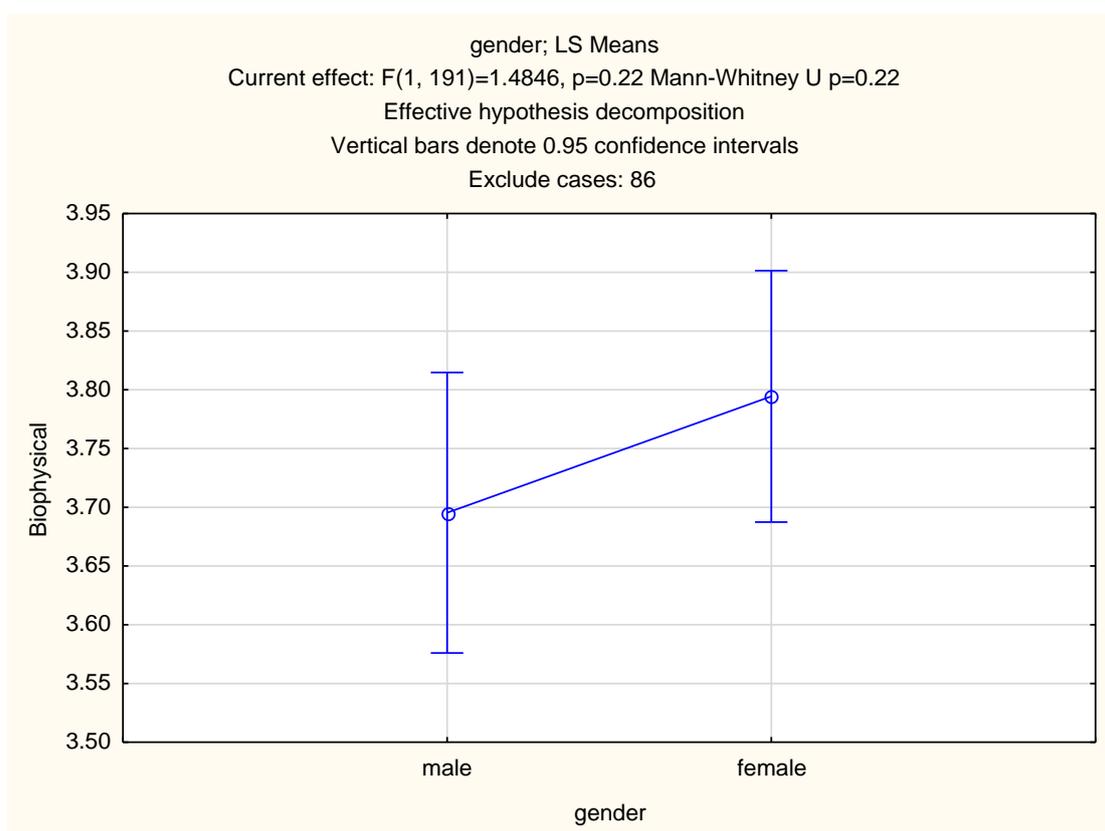


Figure 4.6: Gender and biophysical dimension

A Mann-Whitney U test is used to determine the relationship between the attitudes of male and female teachers of school economics towards environmental sustainability. The sub-sample consists of n = 194 respondents but one outlier (respondent 86) was excluded from the data set. Therefore the data set consist of n = 193 respondents.

Eighty Six (86) of the participants in the research study were male and one hundred and seven (107) were female. In this instance, gender is the factor and the two levels are male and female teachers. The male respondents show a mean of 3.70 and the female respondents show a mean of 3.79. These levels act independently from each other.

The above figure depicts the difference between the attitude of male and female teachers of school economics towards the biophysical dimension of environmental sustainability. As can be seen, the p-value is $p=0.22$, which is greater than the significant level of 0.05, and therefore the Null hypothesis for this dimension cannot be rejected. This shows that there is no significant difference between the attitudes of male and female teachers of school economics towards environmental sustainability for the biophysical dimension.

The results of male and female teachers' attitudes towards the economic dimension of environmental sustainability are represented in Table 4.21 and graphically illustrated in Figure 4.7 below.

Table 4.21: Male and female teachers' attitudes towards the economic dimension of environmental sustainability

Effect	Level of Factor	N	Economic Mean
Total		193	4.21
Gender	Male	86	4.21
Gender	Female	107	4.22

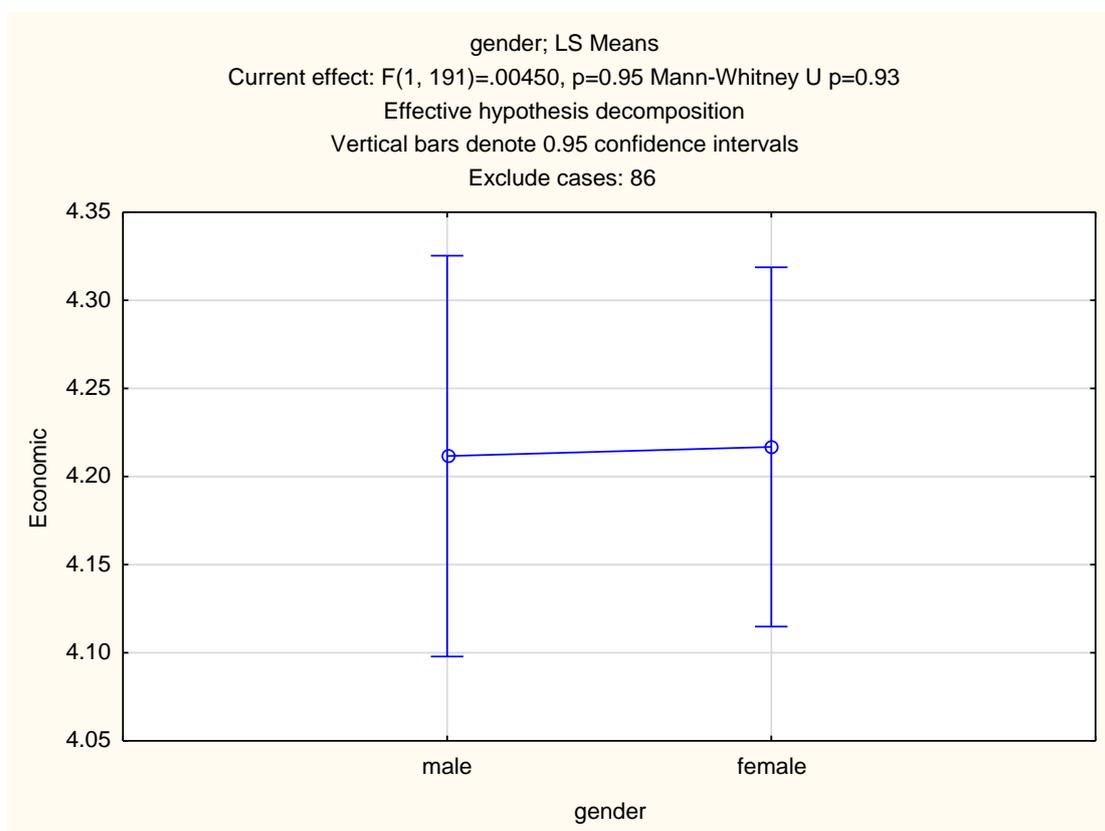


Figure 4.7: Gender and the economic dimension

A Mann-Whitney U test is used to determine the relationship between the attitudes of male and female teachers of school economics towards environmental sustainability. The sub-sample consists of $n = 194$ respondents, but one outlier (respondent 86) was excluded from the data set. Therefore the data set consist of $n = 193$ respondents.

Eighty-six (86) of the participants who participated in the research study were male and one hundred and seven (107) were female. In this instance, gender is the factor and the two levels are male and female teachers. The male respondents show a mean of 4.21 and the female respondents show a mean of 4.22.

The above figure depicts the difference between the attitudes of male and female teachers of school economics towards environmental sustainability. As can be seen that the p-value is $p=0.93$ which is greater than the significant level of 0.05 and therefore the Null hypothesis for this dimension cannot be rejected. This shows that there is no significant difference between the attitudes of male and female teachers of school economics towards environmental sustainability for the economic dimension.

The results of male and female teachers' attitudes towards the political dimension of environmental sustainability are represented in Table 4.22 and graphically illustrated in Figure 4.8 below.

Table 4.22: Male and female teachers' attitudes towards the political dimension of environmental sustainability

Effect	Level of Factor	N	Political Mean
Total		193	3.76
Gender	Male	86	3.67
Gender	Female	107	3.83

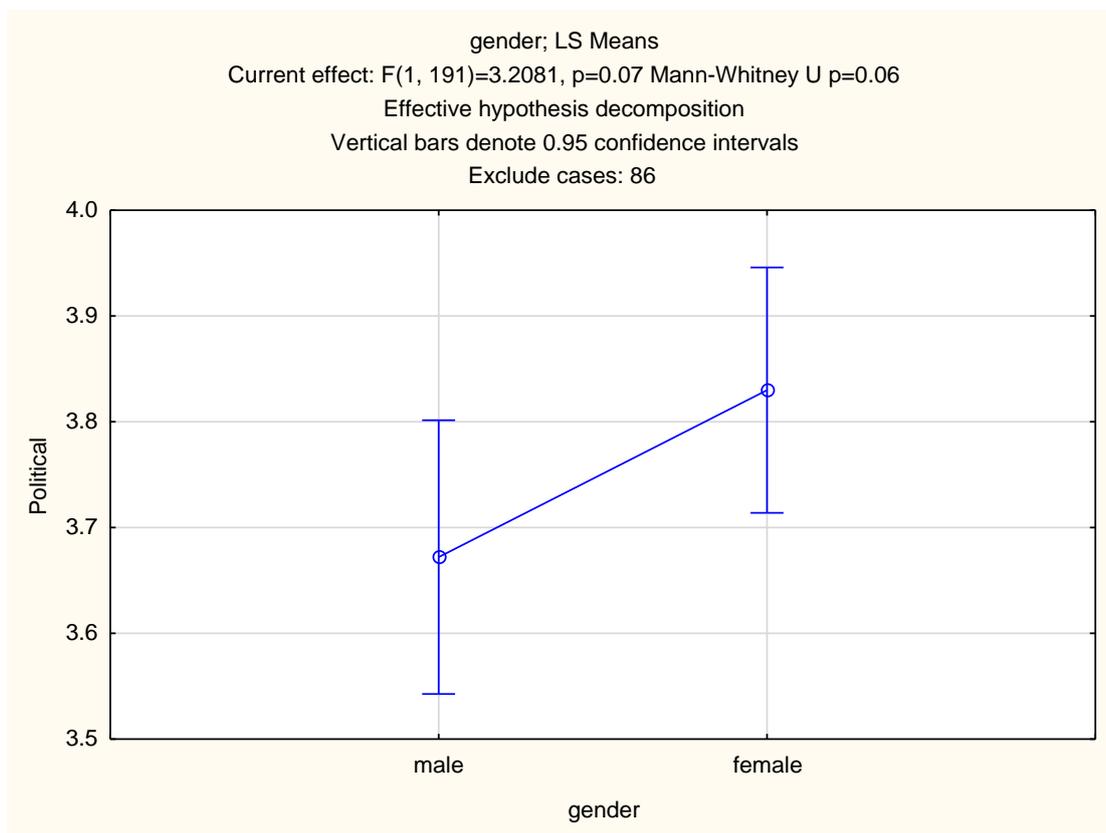


Figure 4.8: Gender and the political dimension

A Mann-Whitney U test is used to determine the relationship between the attitudes of male and female teachers of school economics towards environmental sustainability. The sub-sample consists of $n = 194$ respondents but one outlier (respondent 86) was excluded from the data set. Therefore the data set consist of $n = 193$ respondents.

Eighty-six (86) of the participants who participated in the research study were male and one hundred and seven (107) participants were female. In this instance, gender is the factor and the two levels are male and female teachers. The male respondents show a mean of 3.67 and the female respondents show a mean of 3.83.

The above figure depicts the difference between the attitudes of male and female teachers of school economics towards the political dimension of environmental sustainability. As can be seen that the p -value is $p=0.06$ which is greater than the significant level of 0.05 and therefore the Null hypothesis for this dimension cannot be rejected. This shows that there is no significant difference between the attitudes of male and female teachers of school economics towards environmental sustainability for the political dimension.

The results of male and female teachers' attitudes towards the social dimension of environmental sustainability are represented in Table 4.23 and graphically illustrated in Figure 4.9 below.

Table 4.23: Male and female teachers' attitudes towards the social dimension of environmental sustainability

Effect	Level of Factor	N	Social Mean
Total		193	3.93
Gender	Male	86	3.98
Gender	Female	107	3.90

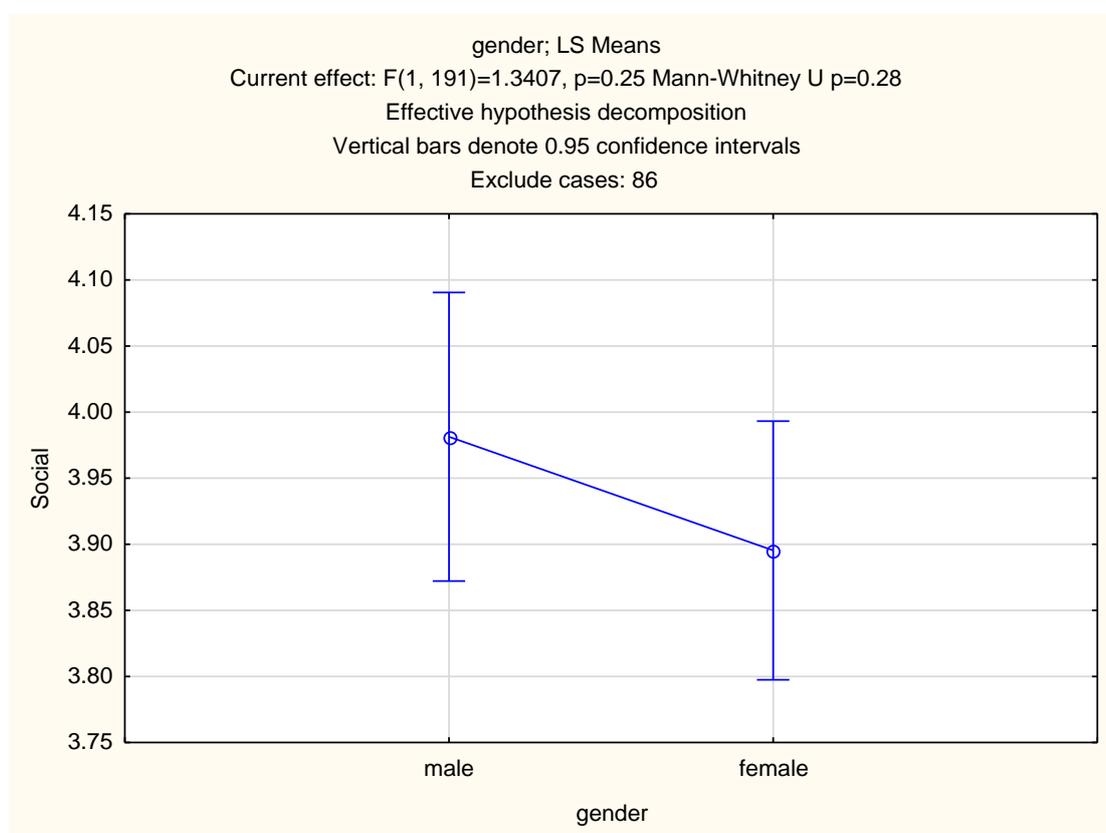


Figure 4.9: Gender and the social dimension

A Mann-Whitney U test is used to determine the relationship between the attitudes of male and female teachers of school economics towards environmental sustainability. The sub-sample consists of $n = 194$ respondents but one outlier (respondent 86) was excluded from the data set. Therefore the data set consist of $n = 193$ respondents.

Eighty-six (86) of the participants who participated in the research study were male and one hundred and seven (107) participants were female. In this instance, gender is the factor and the two levels are male and female teachers. The male respondents show a mean of 3.98 and the female respondents show a mean of 3.90.

The above figure depicts the difference between the attitudes of male and female teachers of school economics towards the social dimension of environmental sustainability. As can be seen that the p-value is $p=0.28$ which is greater than the significant level of 0.05 and therefore the Null hypothesis for this dimension cannot be rejected. This shows that there is no significant difference between the attitudes of male and female teachers of school economics towards environmental sustainability for the social dimension.

The results of male and female teachers' attitudes towards the education dimension of environmental sustainability are represented in Table 4.24 and graphically illustrated in Figure 4.10 below.

Table 4.24: Male and female teachers' attitudes towards the education dimension of environmental sustainability

Effect	Level of Factor	N	Education Mean
Total		193	4.17
Gender	Male	86	4.14
Gender	Female	107	4.19

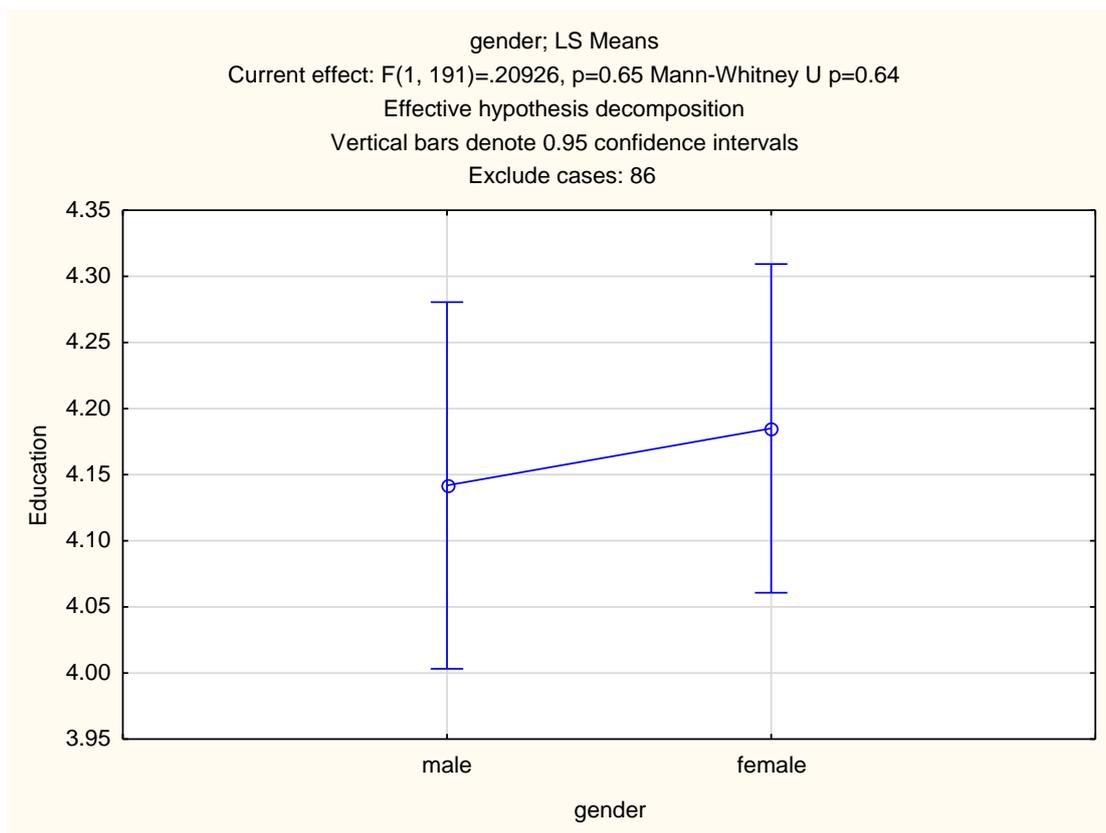


Figure 4.10: Gender and education as a dimension

A Mann-Whitney U test is used to determine the relationship between the attitudes of male and female teachers of school economics towards environmental sustainability. The sub-sample consists of $n = 194$ respondents, but one outlier (respondent 86) was excluded from the data set. Therefore the data set consist of $n = 193$ respondents.

Eighty-six (86) of the participants who participated in the research study were male and one hundred and seven (107) were female. In this instance, gender is the factor and the two levels are male and female teachers. The male respondents show a mean of 4.14 and the female respondents show a mean of 4.19.

The above figure depicts the difference between the attitude of male and female teachers of school economics towards education as dimension of environmental sustainability. As can be seen that the p -value is $p = 0.64$ which is greater than the significant level of 0.05 and therefore the Null hypothesis for this dimension cannot be rejected. This shows that there is no significant difference between the attitudes of male and female teachers of school economics towards environmental sustainability for the social dimension.

In summary, the Null hypothesis states that there is no significant difference between the attitudes of male and female teachers of school economics towards environmental sustainability. The biophysical dimension shows a p-value of $p=0.22$, the economic dimension shows a p-value of $p=0.93$, the political dimension shows a p-value of $p=0.06$, the social dimension shows a p-value of $p=0.28$ and education as a dimension shows a p-value of $p=0.64$. All the dimensions show a p-value greater than significant level of $p=0.05$ and therefore the Null hypothesis cannot be rejected.

4.3.3.2 The Null hypothesis = H_0 : There is no significant difference between how long teachers have been teaching school economics and their attitude towards environmental sustainability.

Table 4.25 below represents the relationship between years of teaching experience and teachers' attitudes towards environmental sustainability.

Table 4.25: Teaching experience and attitudes towards environmental sustainability

1 Variable 1	2 Variable 2	3 Spearman Correlation	4 Spearman p-value	5 # Cases
Years teaching	Biophysical	0.18	0.01	193
Years teaching	Economic	0.13	0.07	193
Years teaching	Political	0.05	0.50	193
Years teaching	Social	0.19	<0.01	193
Years teaching	Education	0.14	0.05	193

A Spearman rank correlation (Spearman's rho) is used to determine the correlations between the teaching experience and attitudes towards environmental sustainability are reported in column 3 in table 4.25 above. The correlations do not apply to one specific group which indicate the teaching experience but it is calculated over all the groups. There is a positive but weak correlation between teaching experience and the biophysical dimension (Spearman rho = 0.18), economic dimension (Spearman rho = 0.13), political dimension (Spearman rho = 0.05), social dimension (Spearman rho = 0.19) and education dimension (Spearman rho = 0.14). The five dimensions (biophysical, economic, political,

social and education) all show positive but weak correlations between teaching experience and teachers' attitudes towards environmental sustainability.

The data show that teachers with more experience have a more positive attitude towards biophysical, economic, political, social and education dimensions of environmental sustainability. Fifty five percent (55%) of the participants have more than twenty years teaching experience. Fifteen percent of the participants have less than 5 years teaching experience. The majority of teachers show a positive attitude towards environmental sustainability across all the dimensions. Experience teachers can engage, assist and mentor teachers with less than five years' experience in such a way that the less experience teachers can also develop a positive attitude towards environmental sustainability.

The table shows that there is a statistically significant p-value for the biophysical dimension is $p=0.01$ and the social dimension is $p< 0.01$. Both of these dimensions show a significant level below $p=0.05$ and therefore the Null hypothesis is rejected for these two dimensions. However, the economic dimension shows a significant level of a p-value of $p=0.07$, the political dimension shows a significant level of a p-value of $p=0.50$ and education as dimension shows a significant level of a p-value of $p=0.05$ which means that the Null hypothesis cannot be rejected for these three dimensions.

4.3.3.3 The Null hypothesis = H_0 : There is no significant difference between the age of teachers of school economics and their attitude towards environmental sustainability.

Table 4.26 below represents the relationship between age and teachers' attitude towards environmental sustainability.

Table 4.26: Age and the attitude towards environmental sustainability

1 Variable	2 Variable	3 Spearman Correlation	4 Spearman p-value	5 # Cases
Age	Biophysical	0.18	0.01	193
Age	Economic	0.18	0.01	193
Age	Political	0.05	0.51	193
Age	Social	0.15	0.04	193
Age	Education	0.20	<0.01	193

A Spearman rank correlation (Spearman's rho) is used to determine the correlations between the age of economics teachers and their attitudes towards environmental sustainability are reported in column 3 in table 4.26 above. The correlations made do not apply to one specific group which indicate the age of teachers but it is calculated over all the age groups.

There is a positive but weak correlation between the age of teachers and the biophysical dimension (Spearman rho = 0.18), economic dimensions (Spearman rho = 0.18), political dimension (Spearman rho = 0.05), social dimension (Spearman rho = 0.15) and education dimension (Spearman rho = 0.20).

Five dimensions (biophysical, economic, social and education) all show positive but weak correlations between the age and teachers' attitudes towards environmental sustainability. The data show that the higher the age of economics teachers the more positive their attitudes towards the biophysical, economic, political, social and education dimension of environmental sustainability. Ninety one percent (91%) of the participants are older than 30 years and nine percent (9%) of the participants are younger than 30 years old. The majority of teachers show a positive attitude towards environmental sustainability across all the dimensions. Older teachers can engaged, assist and mentor teachers who are younger than 30 years old in such a way that the younger teachers can also develop a positive attitude towards environmental sustainability.

The p-value for the biophysical dimension is $p=0.01$, the economic dimension is $p=0.01$, the social dimension is $p=0.04$ and education dimension is $p<0.01$. These dimensions show a p-value below $p=0.05$ and this shows that the Null hypothesis is rejected. The

p -value for the political dimension is $p=0.51$. This dimensions show a p -value of $p>0.05$ and therefore for his dimension the Null hypothesis cannot be rejected.

4.3.3.4 The Null hypothesis = H_0 : There is no significant difference between the years of training teachers received who teach school economics and their attitude towards environmental sustainability.

Table 4.27 below represents the relationship between years of teacher training and teachers' attitudes towards environmental sustainability.

Table 4.27: Years training and teachers' attitudes toward environmental Sustainability

1 Variable 1	2 Variable 2	3 Spearman correlation	4 Spearman P-value	5 # cases
Year training	Biophysical	0.06	0.41	193
Year training	Economic	0.12	0.11	193
Year training	Political	0.01	0.90	193
Year training	Social	-0.06	0.42	193
Year training	Education	0.04	0.56	193

A Spearman rank correlation (Spearman's rho) is used to determine the correlations between years of teacher training of economic teachers and attitudes towards environmental sustainability are reported in column 3 in table 4.27 above. The correlations do not apply to one specific group which indicate the years of training but it is calculated over the different groups.

The data show that there is a positive but weak correlation between years of teacher training of economics teachers and the biophysical dimension (Spearman rho = 0.06), economic dimension (Spearman rho = 0.12), political dimension (Spearman rho = 0.01) and education dimension (Spearman rho = 0.04). There is a negative correlation between years of teacher training of economic teachers and the social dimension (Spearman rho = -0.06).

Four of the five dimensions (biophysical, economic, political and education) show a positive but weak correlation between years of teacher training of economics teachers and their attitudes towards environmental sustainability. One dimension (social) shows a negative correlation between years of teacher training of economics teachers and the attitudes towards environmental sustainability. The data show that the higher the number of years of teacher training of economics teachers the more positive the attitude towards the biophysical, economic, political and education dimension of environmental sustainability. The information shows that the lower the number of years of teacher training of economics teachers the lower their attitude towards the social dimension of environmental sustainability.

The p-value for the biophysical dimension is $p=0.41$, the economic dimension is $p=0.11$, the political dimension is $p=0.90$, the social dimension is $p=0.42$ and the education dimension is $p=0.56$. All five dimensions show a p-value of $p>0.05$ and therefore the Null hypothesis cannot be rejected.

4.3.3.5 The Null hypothesis = H_0 : There is no significant difference between the in-service education opportunities of teachers of school economics and their attitude towards environmental sustainability.

The relationship between in-service education opportunities and biophysical dimension of environmental sustainability is represented Table 4.28, graphically illustrated in Figure 4.11 and discussed below.

Table 4.28: In-service education opportunities and the biophysical dimension

Effect	Level of Factor	n	Biophysical mean
Total		193	3.75
In-Service training	Yes	26	3.75
In- Service training	No	167	3.75

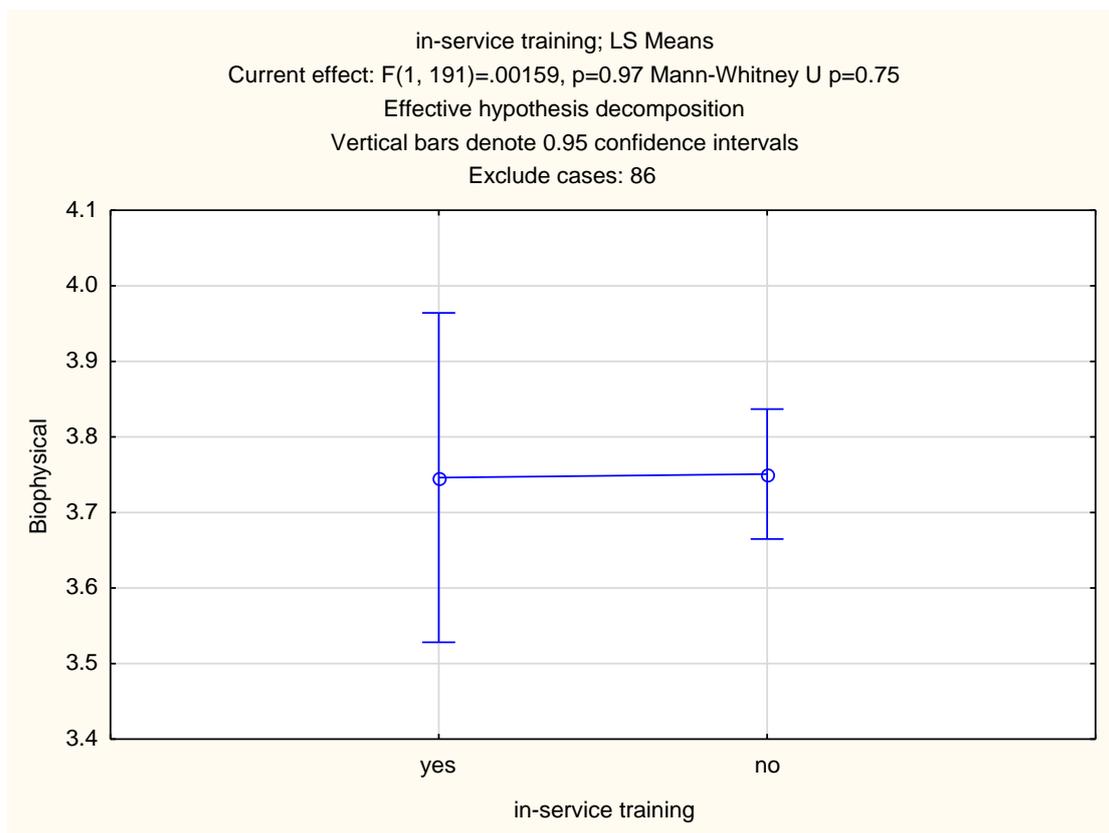


Figure 4.11: In-service education opportunities and the biophysical dimension

A Mann-Whitney U was used to determine the relationship between the in-service education opportunities of teachers and the economic dimension towards environmental sustainability. The sample consists of $n = 194$ respondents but one outlier (respondent 86) was excluded from the data set. Therefore the data set consists of $n = 193$ respondents.

Twenty-six (26) teachers received in-service education towards environmental sustainability while one hundred and sixty-seven (167) received no in-service education towards environmental sustainability. Both groups of respondents show a mean of 3.75.

The relationship between the biophysical dimension and in-service education shows a p -value of $p=0.75$. The significant level of the p -value is greater than 0.05 therefore the Null hypothesis cannot be rejected for the biophysical dimension of environmental sustainability. This shows that there is no significant difference between the in-service education opportunities of teachers of school economics and their attitudes towards the biophysical dimension of environmental sustainability.

The relationship between the in-service education opportunities and economic dimension of environmental sustainability is represented Table 4.29, graphically illustrated in Figure 4.12 and discussed below.

Table 4.29: In-service education opportunities and the economic dimension

Effect	Level of Factor	n	Economic mean
Total		193	4.21
In-service training	Yes	26	4.34
In-Service training	No	167	4.20

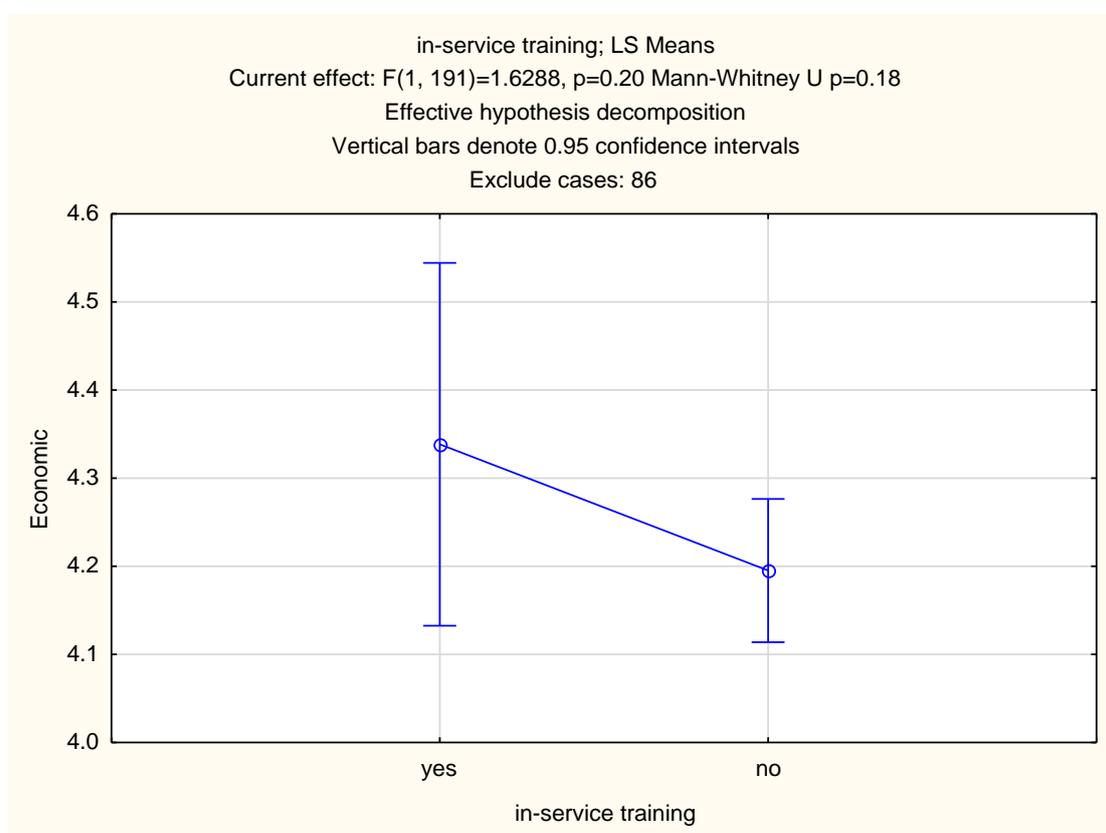


Figure 4.12: In-service education opportunities and the economic dimension

A Mann-Whitney U was used to determine the relationship between the in-service education opportunities of teachers and the economic dimension towards environmental sustainability. The sample consists of $n = 194$ respondents but one outlier (respondent 86) was excluded from the data set. Therefore the data set consist of $n = 193$ respondents.

Twenty-six (26) teachers received in-service education towards environmental sustainability while one hundred and sixty-seven (167) teachers received no in-service education towards environmental sustainability. The respondents who received in-service education show a mean of 4.34 and the group of respondents who received no in-service education shows a mean of 4.20.

The relationship between the economic dimension and in-service education show a p-value of $p=0.18$. The significant level of the p-value is greater than 0.05 and therefore the Null hypothesis cannot be rejected. This shows that there is no significant difference between the in-service education opportunities of teachers and their attitudes towards the economic dimension of environmental sustainability.

The relationship between the in-service education opportunities and political dimension of environmental sustainability is represented in Table 4.30, graphically illustrated in Figure 4.13 and discussed below.

Table 4.30: In-service education opportunities and the political dimension

Effect	Level of Factor	n	Political Mean
Total		193	3.76
In-service training	Yes	26	3.89
In-service training	No	167	3.74

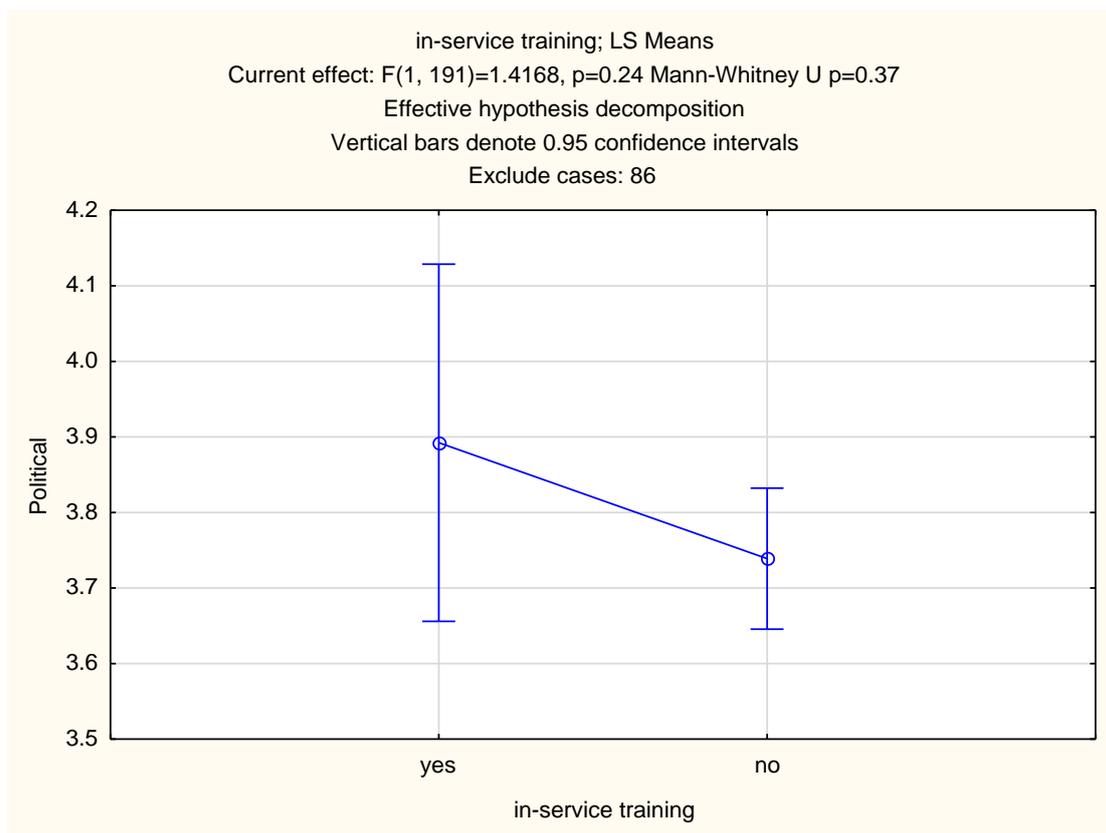


Figure 4.13: In-service education opportunities and the political dimension

A Mann-Whitney U was used to determine the relationship between the in-service education opportunities of teachers and political dimension towards environmental sustainability. The sample consists of $n = 194$ respondents but one outlier (respondent 86) was excluded from the data set. Therefore the data set consist of $n = 193$ respondents.

Twenty-six (26) teachers received in-service education towards environmental sustainability while one hundred and sixty-seven (167) teachers received no training towards environmental sustainability. The respondents who received in-service education show a mean of 3.89 and the group of respondents who received no in-service education shows a mean of 3.74.

The relationship between the in-service education opportunities and the political dimension show a p-value of $p=0.37$. The significant level of the p-value is greater than 0.05, therefore the Null hypothesis cannot be rejected. This shows that there is no significant difference between the in-service education opportunities of teachers and their attitudes towards the political dimension of environmental sustainability.

The relationship between the in-service education opportunities and social dimension of environmental sustainability is represented Table 4.31, graphically illustrated in Figure 4.14 and discussed below.

Table 4.31: In-service education opportunities and the social dimension

Effect	Level of Factor	n	Social Mean
Total		193	3.93
In-service training	Yes	26	4.07
In-service training	No	167	3.91

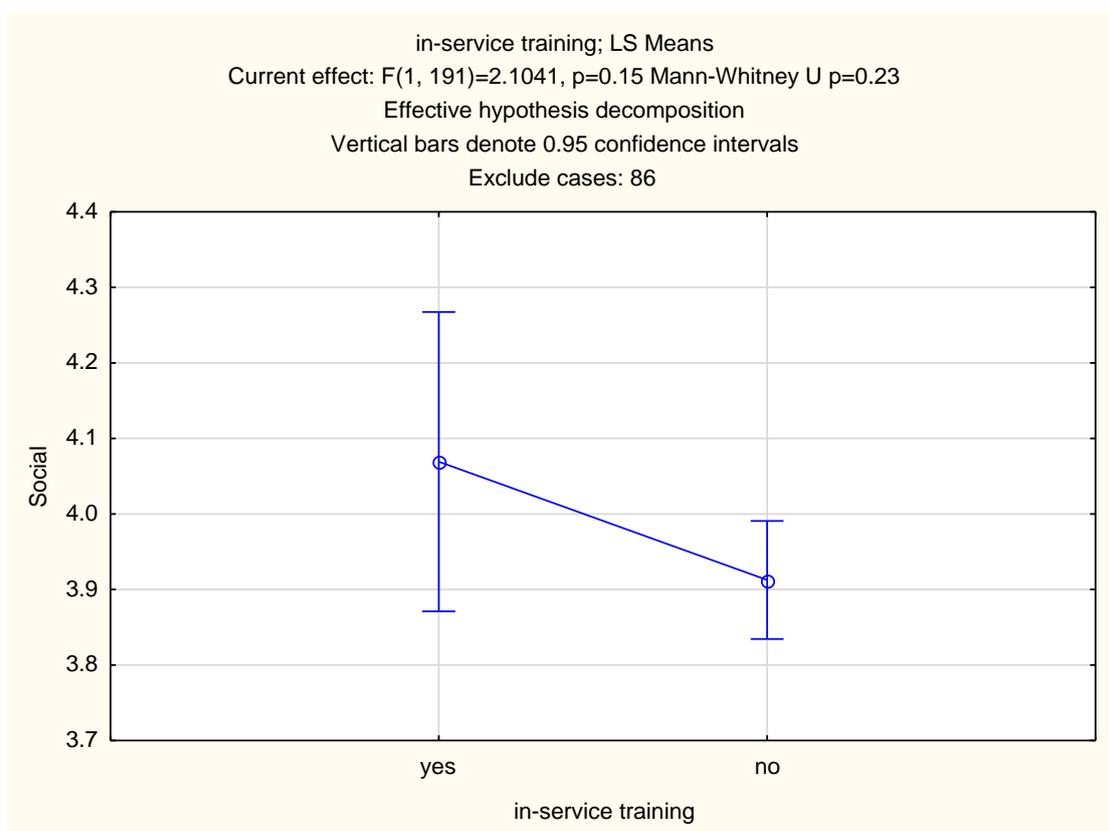


Figure 4.14: In-service education opportunities and the social dimension

A Mann-Whitney U was used to determine the relationship between the in-service education opportunities of teachers and the social dimension towards environmental sustainability. The sample consists of $n = 194$ respondents but one outlier (respondent 86) was excluded from the data set. Therefore the data set consist of $n = 193$ respondents.

Twenty-six (26) teachers received in service education towards environmental sustainability, while one hundred and sixty-seven (167) teachers received no in-service education towards environmental sustainability. The respondents who received in-service education show a mean of 4.07 and the group of respondents who received no in-service education shows a mean of 3.91.

The relationship between the in-service education opportunities and the social dimension show a p-value of $p=0.23$. The significant level of the p-value is greater than 0.05 and therefore the Null hypothesis cannot be rejected. This shows that there is no significant difference between the in-service education opportunities of teachers and their attitudes towards the social dimension towards environmental sustainability.

The relationship between the in-service education opportunities and education dimension of environmental sustainability is represented Table 4.32, graphically illustrated in Figure 4.15 and discussed below.

Table 4.32: In-service education opportunities and the education dimension

Effect	Level of Factor	n	Education Mean
Total		193	4.17
In-service training	Yes	26	4.24
In-service training	No	167	4.15

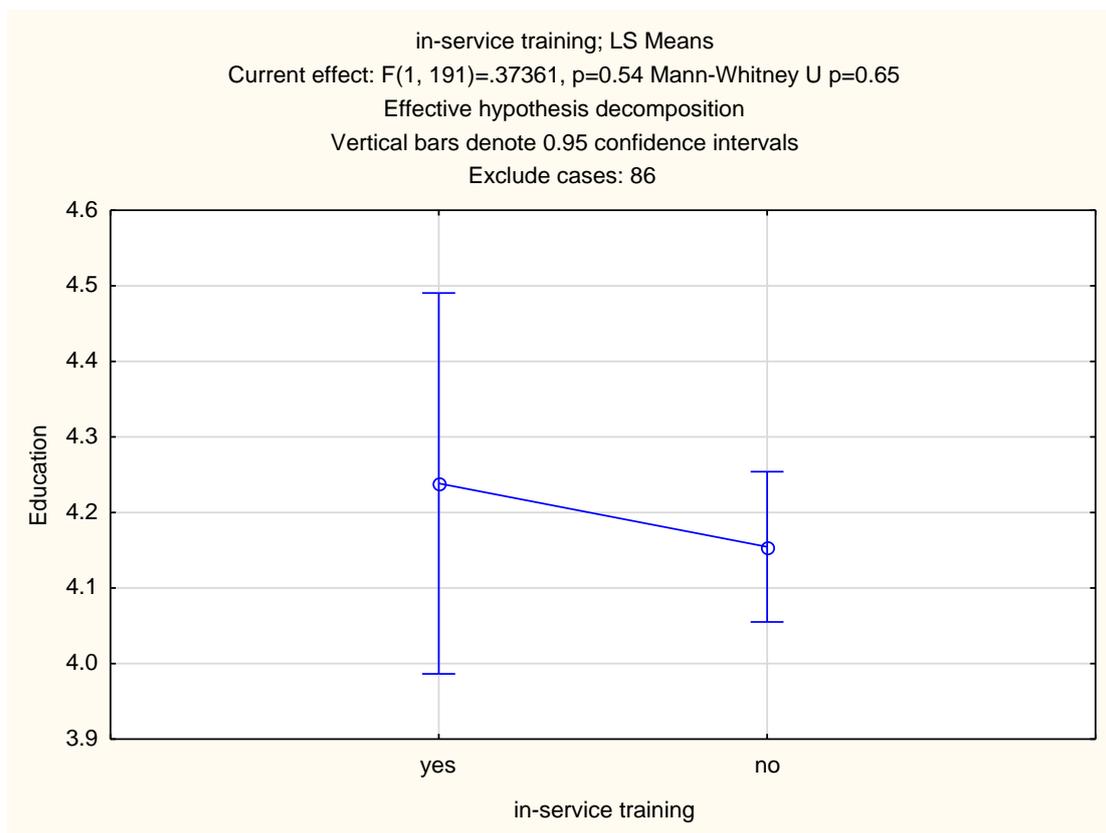


Figure 4.15: In-service education opportunities and the education dimension

A Mann-Whitney U was used to determine the relationship between the in-service education opportunities of teachers and education as dimension towards environmental sustainability. The sample consists of $n = 194$ respondents but one outlier (respondent 86) was excluded from the data set. Therefore the data set consist of $n = 193$ respondents.

Twenty-six (26) teachers received in-service education opportunities towards environmental sustainability, while one hundred and sixty-seven (167) teachers received no training towards environmental sustainability. The respondents who received in-service training towards environmental sustainability show a mean of 4.24 and the group of respondents who received no in-service training towards environmental sustainability shows a mean of 4.15.

The relationship between the in-service education opportunities on environmental sustainability and education as dimension shows a p-value of $p=0.65$. The significant level of the p-value is greater than 0.05 and therefore the Null hypothesis cannot be rejected. This shows that there is no significant difference between the in-service training

opportunities of teachers and education as a dimension towards environmental sustainability.

4.3.3.6 The Null hypothesis = H_0 : There is no significant difference between geographical location of teachers of school economics and their attitudes towards environmental sustainability

The relationship between geographical location and the biophysical dimension of environmental sustainability is represented in Table 33, graphically illustrated in Figure 4.16 and discussed below.

Table 4:33: Urban - Rural and biophysical dimension

Effect	Level of Factor	n	Biophysical Mean
Total		193	3.75
Urban/Rural	Urban	125	3.75
Urban/Rural	Rural	68	3.75

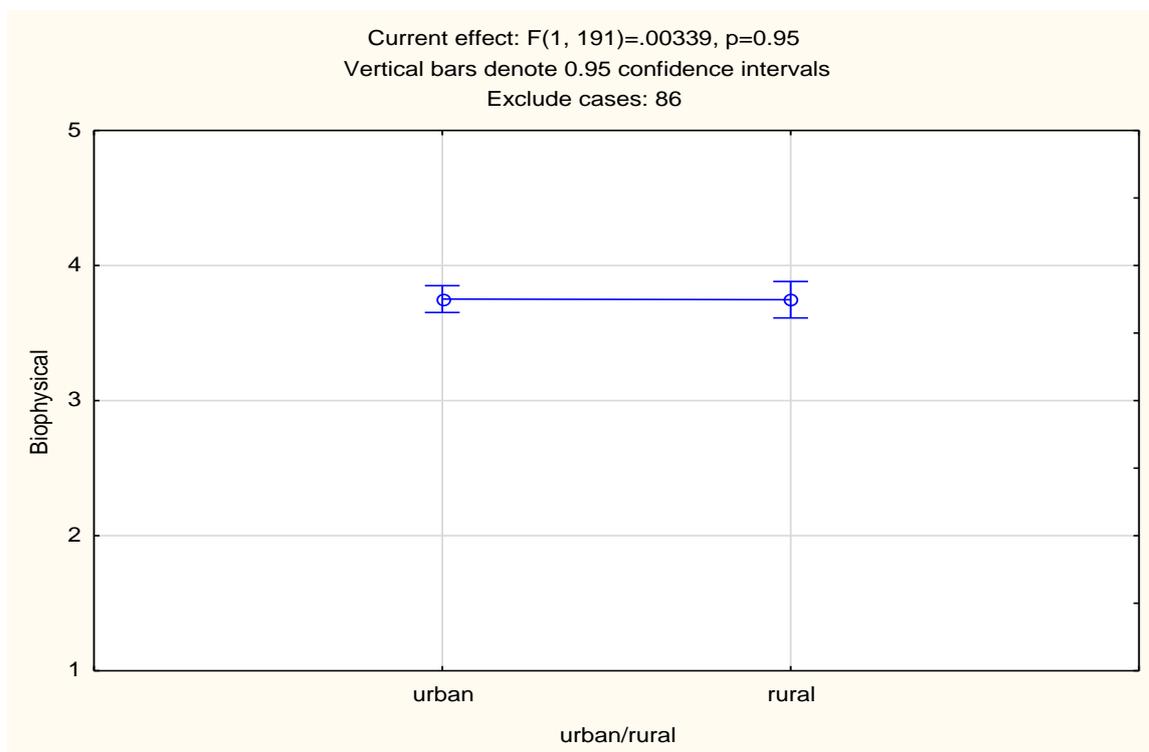


Figure 4.16: Urban - Rural and biophysical dimension

An ANOVA was used to measure the relationship between teachers' geographical location and their attitudes towards the biophysical dimension of environmental sustainability. The

sample consists of $n = 194$ respondents but one outlier (respondent 86) was excluded from the data set. Therefore the data set consist of $n = 193$ respondents.

The sub-sample consisted of hundred and twenty-five (125) urban respondents and sixty-eight (68) rural respondents. The biophysical dimension data set shows that the urban respondents show a mean of 3.75 and the rural respondents show a mean of 3.75.

The relationship between the biophysical dimension and the geographical location of respondents show a p-value of $p=0.95$. The significant level of the p-value is greater than 0.05 and therefore the Null hypothesis cannot be rejected. This shows that there is no significant difference between teachers' geographical location and their attitudes towards the biophysical dimension of environmental sustainability.

The relationship between geographical location and the economic dimension of environmental sustainability is represented in Table 34, graphically illustrated in Figure 4.17 and discussed below.

Table 4:34: Urban - Rural and economic dimension

Effect	Level of Factor	n	Economic Mean
Total		193	4.21
Urban/Rural	Urban	125	4.22
Urban/Rural	Rural	68	4.20

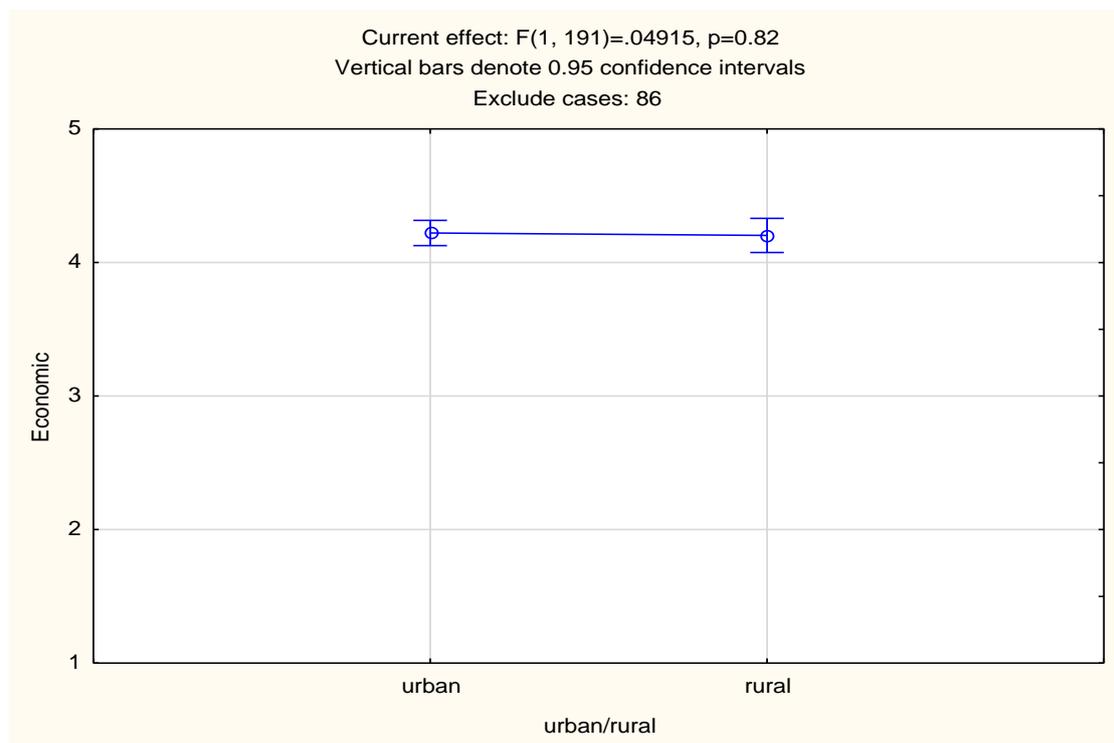


Figure 4.17: Urban - Rural and economic dimension

An ANOVA was used to measure the relationship between teachers' geographical locale and their attitudes towards the economic dimension of environmental sustainability. The sample consists of $n = 194$ respondents but one outlier (respondent 86) was excluded from the data set. Therefore the data set consist of $n = 193$ respondents.

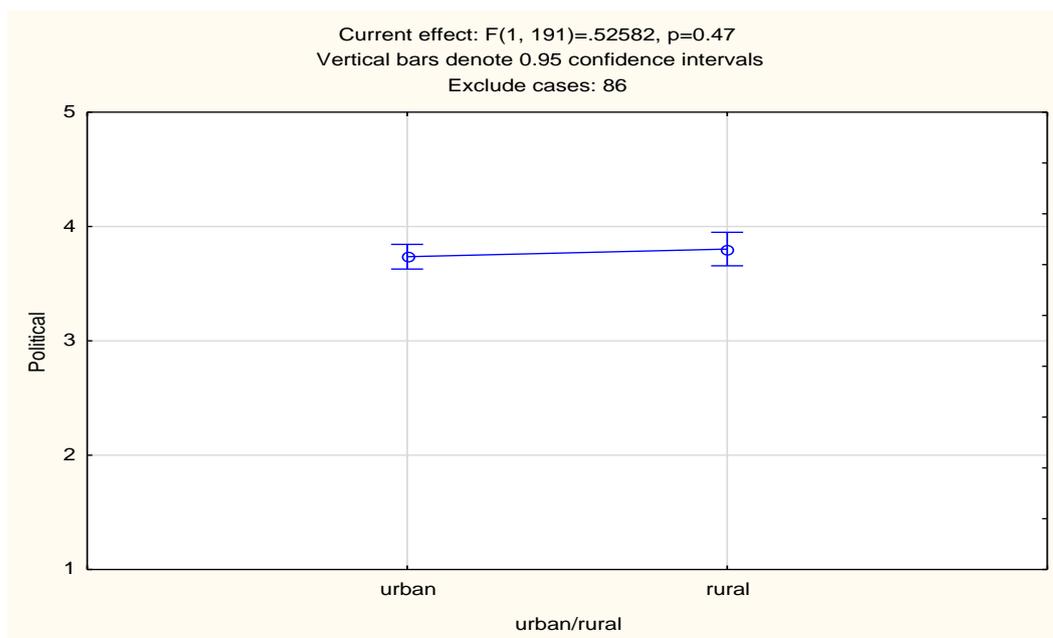
The sub-sample consists of hundred and twenty-five (125) urban respondents and sixty eight (68) rural respondents. The economic dimension data set shows that the urban respondents show a mean of 4.22 and the rural respondents show a mean of 4.20.

The relationship between teachers' geographical location and their attitudes towards the economic dimension of environmental sustainability shows a p-value of $p = 0.82$. The significant level of the p-value is greater than 0.05 and therefore the Null hypothesis cannot be rejected. This shows that there is no significant difference between the geographical location of teachers and their attitudes toward the economic dimension of environmental sustainability.

The relationship between geographical location and the political dimension of environmental sustainability is represented in Table 35, graphically illustrated in Figure 4.18 and discussed below.

Table 4:35: Urban – rural and political dimension

Effect	Level of Factor	n	Political Mean
Total		193	3.76
Urban/Rural	Urban	125	3.74
Urban/Rural	Rural	68	3.80

**Figure 4.18: Urban – rural and political dimension**

An ANOVA was used to measure the relationship between teachers' geographical location and their attitudes towards the political dimension of environmental sustainability. The sample consists of $n = 194$ respondents but one outlier (respondent 86) was excluded from the data set. Therefore the data set consist of $n = 193$ respondents.

The sub-sample consists of hundred and twenty-five (125) urban respondents and sixty-eight (68) rural respondents. The political dimension data set shows that the urban respondents show a mean of 3.74 and the rural respondents show a mean of 3.80

The relationship between teachers' geographical location and their attitudes toward the political dimension of environmental sustainability shows a p-value of $p=0.47$. The significant level of the p-value is greater than 0.05 and therefore the Null hypothesis cannot be rejected. This shows that there is no significant difference between teachers'

geographical location and their attitudes towards the political dimension of environmental sustainability.

The relationship between geographical location and the social dimension of environmental sustainability is represented in Table 36, graphically illustrated in Figure 4.19 and discussed below.

Table 4:36: Urban – rural and social dimension

Effect	Level of Factor	n	Social Mean
Total		193	3.93
Urban/Rural	Urban	125	3.96
Urban/Rural	Rural	68	3.89

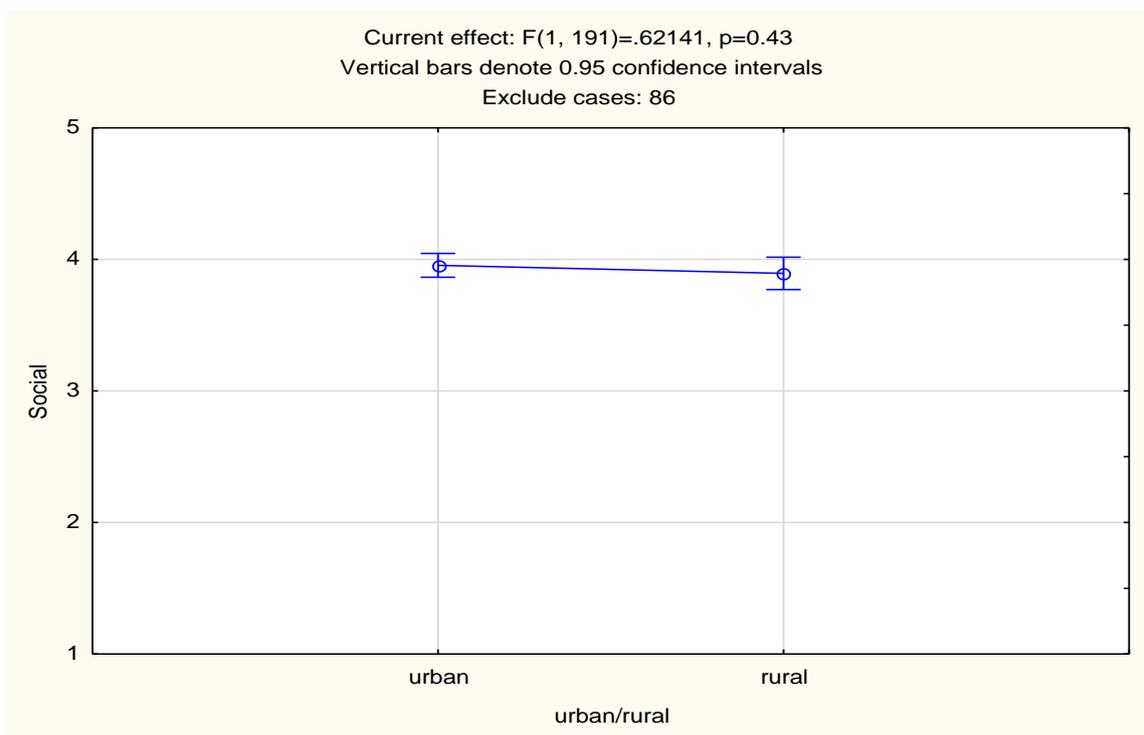


Figure 4.19: Urban – rural and social dimension

An ANOVA was used to measure the relationship between the teachers’ geographical location and their attitudes towards the social dimension of environmental sustainability. The sample consists of $n = 194$ respondents but one outlier (respondent 86) was excluded from the data set. Therefore the data set consist of $n = 193$ respondents.

The sub-sample consists of hundred and twenty-five (125) urban respondents and sixty-eight (68) rural respondents. The social dimension data set shows that the urban respondents show a mean of 3.96 and the rural respondents show a mean of 3.89.

The relationship between the teachers' geographical location and their attitudes towards the social dimension of environmental shows a p-value of $p=0.43$. The significant level of the p-value is greater than 0.05 and therefore the Null hypothesis cannot be rejected. This shows that there is no significant difference between teachers' geographical location and their attitudes towards the social dimension of environmental sustainability.

The relationship between geographical location and the education dimension of environmental sustainability is represented in Table 37, graphically illustrated in Figure 4.20 and discussed below.

Table 4:37: Urban – rural and Education as dimension

Effect	Level of Factor	n	Education Mean
Total		193	4.17
Urban/Rural	Urban	125	4.19
Urban/Rural	Rural	68	4.12

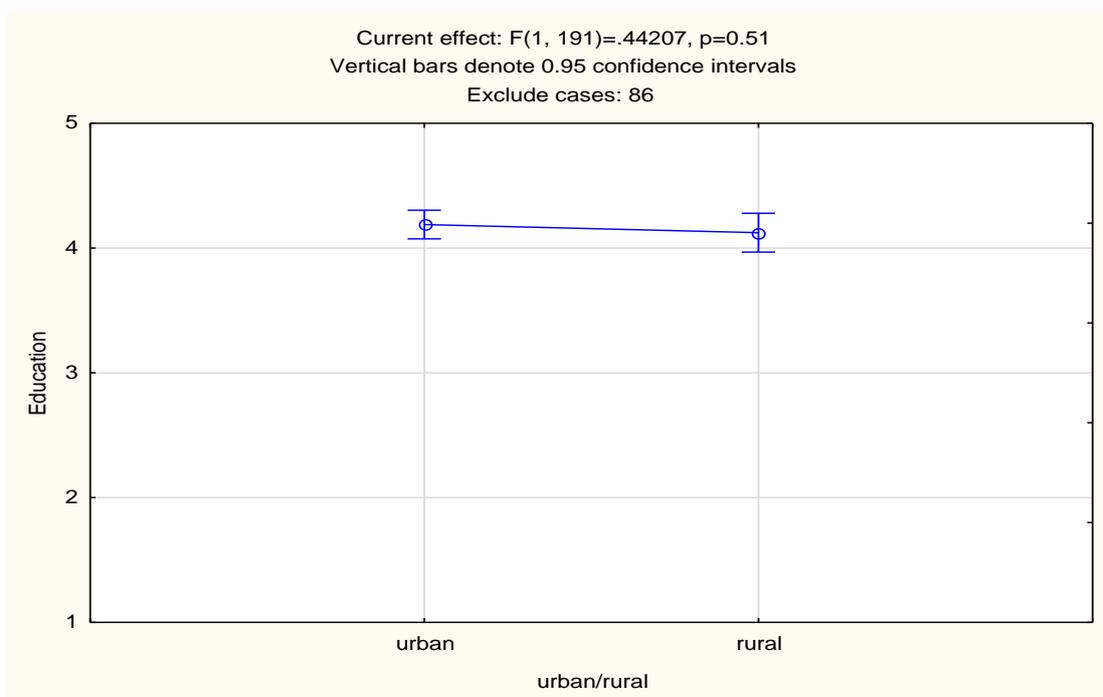


Figure 4.20: Urban–rural and education as dimension

An ANOVA was used to measure the relationship between the teachers' geographical location and their attitudes towards education as dimension of environmental sustainability. The sample consists of $n = 194$ respondents but one outlier (respondent 86) was excluded from the data set. Therefore the data set consist of $n = 193$ respondents.

The sub-sample consists of hundred and twenty-five (125) urban respondents and sixty-eight (68) rural respondents. The education dimension data set of shows that the urban respondents show a mean of 4.19 and the rural respondents show a mean of 4.12.

The relationship between teachers' geographical location and their attitudes toward education as dimension of environmental sustainability shows a p-value of $p=0.51$. The significant level of the p-value is greater than 0.05 and therefore the Null hypothesis cannot be rejected. This shows that there is no significant difference between teachers' geographical location and their attitudes toward the education as dimension of environmental sustainability.

4.4 Conclusion

The results of the research study were presented, interpreted and discussed. The results of the questionnaires were captured, plotted on an Excel worksheet and statistically analysed. The study found that economics teachers have a positive attitude towards environmental sustainability. The hypothesis and six null hypotheses were tested.

In the following chapter the research findings will be interpret and discussed.

CHAPTER 5

Discussion and research findings

In this chapter, the researcher interprets and discusses the results of the research study. The findings will be presented in the sequence that was followed in Chapter 4. First, the results of the testing of the one hypothesis will be discussed and thereafter the results of the testing of the six Null hypotheses.

5.1 Discussion of the findings of Hypothesis 1

5.1.1 Hypothesis 1: Economics teachers have a positive attitude towards environmental sustainability.

The findings of the survey show that economics teachers have a positive attitude towards each dimension of environmental sustainability. As shown in Chapter 4, 67.8% of the respondents show a positive attitude towards the biophysical dimension, 86.8% of the respondents show a positive attitude towards the economic dimension, 67.4% of the respondents show a positive attitude towards the political dimension, 74.2% of the respondents show a positive attitude towards the social dimension and 83.6% of the respondents show a positive attitude towards the education dimension of environmental sustainability.

With reference to the individual items of the survey instrument, respondents show positive attitudes to all or most of the items on each of the dimensions of the instrument. The findings show that economic teachers show a positive attitude towards four of the items of the biophysical dimension (statements 1, 2, 3, 5), all of the items of the economic dimension, three of the items of the political dimension (statements 1, 2, 3), four of the items of the social dimension (statements 2, 3, 4, 5) and all of the statements on the education dimension.

The respondents in the study show a less positive attitude to four of the 25 statements in the questionnaire. The overall positive attitude towards environmental sustainability is encouraging. Although not a sufficient condition, a positive attitude is a necessary condition for addressing environmental problems through education. As captured in the Tbilisi definition of environmental education:

Environmental education is “a process aimed at developing a world population that is aware of, and concerned about, the total environment and its associated problems, and which has the knowledge, attitudes, skills, motivation and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones (Unesco, 1977).

The respondents show a less positive attitude to statement 4 in the biophysical dimension. Statement 4 reads as follows: **“The number of children that people can have should be limited to 2 children per household”**.

Twenty-eight percent (28%) of the respondents indicate that they disagree with the statement, while forty-nine percent (49%) of the respondents indicate that they agree with the statement. Twenty-three percent (23%) of the respondents indicate a neutral response to the biophysical dimension of environmental sustainability.

Even though the largest percentage of teachers agreed with the statement, a significant number of teachers disagreed with the statement and almost a quarter of the respondents gave a neutral response. There could be several reasons for the spread of responses. The idea of regulating the number of children parents should have could be in conflict with peoples' beliefs, values, cultures, etc. The relatively high number of respondents, twenty-three percent (23%), who gave neutral as response could indicate that a meaningful number of people are conflicted about whether to regulate the number of children parents may have and their belief systems. The relatively high number of respondents who disagreed with the statement could be due to their belief systems or because they are aware of declining birth rates in South Africa and elsewhere.

The 2011 the census of South Africa shows that the fertility rate of South Africa has dropped. Anetos (2016) reported in Business Live that the statistician-general of Statistics South African pointed out that the birth rate of South Africa is declining. The number of registered births in 2015 declined with 6.8%, from 1.16 million in 2014 to 1.08 million in 2015. Anetos reported further that the average number of children born to each woman in South African is currently at 2.4, but the statistician-general pointed it out that it is expected that the number will drop further to 2.1 children per woman. The decline in the

birth rate is without government policy intervention that legally binds parents to reduce the number of children they have.

Rossouw, Burger and Burger (2012) argue that South Africa has witnessed a decline in fertility rate since 1960. South Africa witnessed a decline in the fertility levels between the 1960s and 1996 (Moultrie and Timaeus, 2003; Rossouw, Burger and Burger, 2012). Moultrie and Timaeus (2003) estimated that the fertility levels declined from six children per woman in 1960 to three to four children per woman in 1996. Awareness of these statistics could have influenced the teachers' response to the statement because as a country we are already moving towards an average of two children per women. However, to firmly establish why research subjects responded in the way they did, further qualitative studies would be needed using individual or focus-group interviews. The respondents also showed a less positive attitude towards statements 4 and 5 of the political dimension.

Statement 4 read: **“Citizens should vote for political parties whose manifestos focus mainly on environmental sustainability”**.

Twenty-one percent (21%) of the respondents indicated that they disagreed with statement 4, while forty-four percent (44%) of the respondents agreed with the statement. Thirty-five percent (35%) the respondents indicated a neutral response to the political dimension of environmental sustainability.

The response to these two statements is not entirely unexpected. Even though the largest percentage of teachers agreed with the statement, a significant number of teachers disagreed with the statement and almost one third of the respondents gave a neutral response. There could be several reasons for the spread of responses. The idea that citizens should vote for political parties whose manifestos focus mainly on environmental sustainability might be disillusioning to teachers because they might reason that there are much more pressing issues in the political domain that need immediate attention. The relatively high number of respondents (35%) who gave a neutral response could indicate that a meaningful number of people are conflicted about whether political parties should focus on environmental sustainability in a time when the news media continuously report on alleged corruption, alleged irregular and wasteful expenditure by parastatals, alleged involvement of government officials in corruption, and so forth. The relative high number of

respondents who disagreed with the statement could be due to their strong belief that political parties should solve current political ills before they focus on the environment.

The respondents might feel that manifestos of political parties should focus on more immediate and pressing challenges facing South African society, addressing matters such as unemployment, poverty, inequality between rich and poor, allegations of corruption and state capture, service delivery protests and so forth. The country is facing major social and political issues which need immediate attention from both local and national government. There might be a perception that national and local government are not doing enough to solve these pressing issues.

The South African unemployment rate is 26.7%, which is a major problem because without work people are stuck in poverty (Statistics South Africa, 2018). This culminates in one in four people in South Africa being unemployed. A great concern in South Africa is unemployment among the youth. The unemployment rate of youth between the ages of 15-35 years is 38.2% (Statistics South Africa, 2018). It can be safely said that one in three youth who are eligible to enter the labour market are unemployed. Unemployment among graduates is also a concern. The unemployment rate of graduates between the ages of 15-24 is 33.5% and for graduates between the ages of 24-34 it is 10.2%. The unemployment rate for adult graduates between the ages of 35-64 is 4.7%. Therefore, the South African government needs to address the youth unemployment rate in the country in particular. Unemployment and poverty is prevalent in communities and many teachers experience the suffering of families on a daily basis.

Poverty is on the rise in South Africa (Statistics South Africa, 2017:14). The poverty levels in South Africa increased from 53.2% in 2011 to 55.5% in 2015. This means 30.4 million people in South Africa live in poverty. In other words, they earn less than R992 per person per month (Statistics South Africa, 2017:14).

The number of people living in absolute poverty has increased from 11% in 2011 to 13.8% in 2015. These people earn less than R441 per person per month (Statistics South Africa, 2017:14). Children (aged 17 years and younger), black Africans, females, people from rural areas and those with little or no education are the main victims in the ongoing struggle against poverty (Statistics South Africa, 2017). Growing up in poverty is one of the greatest threats to a healthy childhood development (Statistics South Africa, 2017).

Omarjee (2017), a Fin24 reporter, quoted Dr Pali Lehohla, the statistician-general, who said that “if children are poor, they are less likely to go to school and even if in school, they will perform badly”.

South Africa is one of the countries with highest income inequality in the world with a Gini coefficient of 0.63 in 2011 (Trading Economics, 2018). The Gini coefficient is a statistical measure to gauge economic inequality and measures the income distribution or wealth distribution among the population of a country. The coefficient ranges from 0 -1 where 0 represents perfect equality and 1 perfect inequality. Therefore, moving more towards 1 indicates more inequality (Investopedia.com, 2018). In South Africa, the lowest 20% of the population earn 2.5% of the national income and the lowest 40% of the population earn 7.2% of the national income. The highest 20% of the population earn 68.9% of the national income and the highest 40% of the population earn 84.8% of the national income. Sixty percent (60%) of the population earn 15.2% of the national income (Trading Economics, 2018).

Msimang (2017), the chairperson of Corruption Watch, said that South Africans have experienced a determined onslaught on key institutions in South Africa. He pointed to institutions such as the South African Revenue Service (SARS), the National Treasury, the National Prosecuting Authority (NPA), the South African Police Service (SAPS) and Directorate for Crime Investigation (the Hawks). He said that these institutions are there to uphold the pillars of our democracy. He pointed out that instability at SARS resulted in a drop in tax revenue and to such extent that it registered a shortfall of R50 billion, which SARS is trying to recover through an increase in Value Added Tax (VAT) from 14% to 15%. He said this is an action which hits the poor hardest.

Madonsela (2016) through her state capture report linked many prominent business people, chief executive officers and executives of private and state-owned businesses, top business managers and government cabinet ministers to state capture.

Leoka (2017) said that the National Prosecuting Authority is trying to recover R50 billion worth of assets and cash that was believed to be illegally gained through state capture. She pointed out that R50 billion is a significant amount which could have been used to address the socio-economic challenges faced by South Africans.

Eskom posted a net loss of R2.3 billion for the financial year ended 31 March 2018. Irregular expenditure at Eskom has increased from R3 billion to R19.6 billion since 2012. Eskom received a qualified audit report for the year under review as the external auditors could not rely on the processes in place to ensure the completeness of irregular expenditure reported, fruitless and wasteful expenditure and losses due to criminal misconduct (Eskom, 2018). Leoka (2017) argues that Eskom has been riddled with corruption and posted a debt burden of R367 billion.

De Villiers (2018) argues that the total debt burden at Eskom went from R367 billion to R600 billion over a four-year period. The money lost through irregular spending, corruption and state capture at state enterprises such as Eskom is money that could have been employed to improve public healthcare, education, social services and security services, and relieve the plight for decent housing (Leoka, 2017; De Villiers, 2018).

The respondents might be looking for political parties who can ensure political and economic stability and they would like to see how political parties are going to address the current challenges in their manifestos. The perceptions of unhappiness and disillusionment of people towards the ruling party can be observed in the voting patterns of the population. The percentage of registered voters who voted in the elections declined from 1994 to 2014 (News24, 2018). In the 1994 elections 19 533 498 registered voters voted. Therefore 1994 will be used as a baseline of 100% and the following years will be measured against 1994. In the 1999 elections 87.9% of registered voters voted. This resulted in a decline in voters of 12.1% from 1994 to 1999. In the 2004 elections 76.7% of registered voters voted. This resulted in a decline of 11.2% from 1999 to 2004. In the 2009 elections 77.3% of registered voters voted. This resulted in a decline of 0.6% from 2004 to 2009. In the 2014 elections 73.5% of the registered voters voted (News24, 2018). This resulted in a decline of 3.8% from 2009 to 2014. It is safe to say that there is a cumulative voting decline of 26.5% in national elections from 1994 to 2014 (News24, 2018). Makunga (2018) wrote in her HeraldLIVE opinion column that unlike 1994, the electoral choices of the average black voter are increasingly influenced by what each party can do and what it represents, more than just its historic credentials. She added that all people want is a party that will use the power given to it to run an efficient government that delivers services and creates opportunities for all South Africans to maximise their potential. She argues that this is where policies of each party matter, be it on education, jobs, health services or social security.

In summary, the respondents might feel that the manifestos of political parties should deal with more pressing current issues. Respondents might argue that they need answers from political parties on how they are going to deal with more pressing issues in communities, such as poverty, crime, poor service delivery and so forth. People want to know more about what the political parties envisage to do to improve their standard of living. However, the result of the study is not that negative and it can be supposed that if the South African government, municipalities and parastatals are functioning effectively and people's standard of living improves, then the respondents might be in favour of hearing more about what the views of political parties and governmental organisations are to promote a sustainable environment.

Statement 5 read: **“Governments should spend more money on the conservation and preservation of the environment even if it means that less money is available for other government services”**.

Even though the largest percentage of teachers agreed with the statement, a significant number of teachers disagreed with the statement and quarter of the respondents gave a neutral response. There could be several reasons for the spread of responses.

The idea that governments should spend more money on the conservation and preservation of the environment even if it means that less money is available for other government services could be in conflict with what people experience daily in their respective communities. The relative high number of respondents (25%) who gave neutral as response could indicate that a meaningful number of people are conflicted about whether governments should spend more money on the conservation and preservation of the environment even if it means that less money is available for other government services because they regularly experience poor service delivery by local governments. The relatively high number of respondents who disagree with the statements could be due to their frustration with the levels of services delivery, poverty, homeless people and so forth and therefore feel that the bread-and-butter issues need to be attended to before addressing conservation and preservation of the environment.

The country experiences regular service delivery protests because perceptions are that municipalities are not delivering basic services efficiently and effectively to their

communities. These perceptions have been confirmed in reports by Statistics South Africa and municipal data and intelligence reports. Some of the economics teachers who participated in the study are part of the communities where service delivery protests occur, whether as residents or teachers teaching in the community. Some economics teachers might hold the view that there are more pressing issues at the moment and that the government should spend more money on eradicating poverty, improving and increasing access to health facilities, building more affordable housing for people, promoting the creation of job opportunities especially for the youth, etc., rather than spending money on the protection and preservation of the natural environment.

Service delivery protests have become a regular and widespread phenomenon in recent years. Residents in communities take to the streets to express their anger and frustration over the poor service delivery they receive in their respective communities. They engage in protest action, which in many cases becomes violent, because they hope that the government, whether local or national, will hear their voices and fix their problems. Communities raise their voices about issues such as access to electricity, housing, water and sanitation, health and social security (Statistics South Africa, 2018).

Service delivery protests are on the increase in South Africa. Thirty-four (34) major service delivery protests were recorded in 2005. From the beginning of 2018 to the end of April 2018, seventy-one (71) major service delivery protests were recorded. Ninety-four percent (94%) of these service delivery protests recorded since the start of 2018 have been violent in comparison to 76% service delivery protests for the whole year in 2004 (Municipal IQ: May 2018). The incidences of service delivery protests are increasing rapidly. From the beginning of May 2018 to the end of June 2018, seventy-three (73) major service delivery protests were recorded (Municipal IQ: July 2018).

Kevin Allan, MD of Municipal IQ (2018), argues that service delivery protests in South Africa are becoming a daily phenomenon and that communities are resorting to increasingly violent measures to engage the leadership structures. He pointed out that violent confrontations between the protesters and the police are also on the increase (Municipal IQ, May 2018 and (Municipal IQ, July 2018).

Therefore, in view of these more immediate and pressing issues facing local communities, some economics teachers might argue that more money is needed now to implement

intervention programmes to address these challenges and to improve the standard of living.

The overall response to the political dimension indicates that economics teachers have positive attitudes towards the statements, which indicates that they are pro-environment. However, the fact that teachers are less positive towards this dimension might suggest that some economics teachers hold the view basic needs of people need to be addressed first by the government and the standard of living of all the people improved first and that thereafter money should be allocated for the protection and preservation of the environment.

Here, Maslow's hierarchy of needs come to mind. Maslow's emphasises that there are certain basic needs which must be met before other needs can be considered in various communities (Aruma and Hanachor, 2017:19). In their study, Aruma and Hanachor (2017:27) conclude that the realisation of human needs at the community level demands appropriate application of Maslow's hierarchy of needs with specific focus on certain basic needs which must be achieved before any consideration is given to other human needs in the society.

The respondents showed a less positive attitude to statement 1 of the social dimension.

Statement 1 reads: "**Controlling the growth of the world population should take precedence over peoples' personal, religious and cultural beliefs**".

The respondents represented a diverse group of people with different cultural, religious and personal beliefs. Cultural, religious and personal beliefs are strongly imbedded in many people. Some groups exercise their beliefs more strongly than others. The researcher ascribes the result to the fact that some economics teachers might argue that their religion, culture, beliefs, etc., are more important and therefore controlling the world population should not take precedence over them.

The relationship between religion and environment is an important one. In his seminal work, White (1967) argues that the roots of the global environmental crisis are to be found in the Judeo-Christian tradition. He argues that it is through the Judeo-Christian tradition that technology and science advanced and had a negative influence on the environment. White (1967:1207) concludes that "since the roots of our trouble are so largely religious,

the remedy must also be essentially religious". The advancement of science has also made it possible to reduce population growth through artificial forms of birth control. The important point is that there is a close relationship between religion and environmental concerns.

Leaders of various cultures, faiths and religious organisations acknowledge the role and importance of the environment and environmental sustainability in the existence of the human race and believe that it is the role of humanity to be the caretaker of the environment. These men and women are spreading the eco-gospel in their church communities, interfaith communities and on any platform available to preach the eco-gospel (Grist, 2007). Therefore, it could be that some economics teachers were less positive towards the statement because the addressing of environmental concerns is imbricated in religious beliefs so that it is not a matter of choosing between the two – caring for environment is tied to their religious beliefs. For example,

Ecumenical Patriarch Bartholomew who is the leader of more than 300 million Christians worldwide is also known as the Green Patriarch. He argues that crime against the natural world is a sin and supports various international environmental causes and he has urged leaders of other faiths to raise environmental awareness among their believers (Grist, 2007).

Similarly, the Dalai Lama has been talking up environmental protection since he won the Nobel Peace Prize in 1989. Environmental issues according to him are the key challenges facing humanity today. He stresses the importance of kindness to the planet. He has been outspoken about protecting forests and wildlife and controlling the spread of nuclear power. He calls a clean environment a basic human right, and declares that, "it is therefore part of our responsibility towards others to ensure that the world we pass on is as healthy, if not healthier, than we found it" (Grist, 2007).

The Interfaith Power and Light campaign, which is headed by the Rev. Sally Bingham, encourages religious groups to purchase green power and conserve energy by, among other things, replacing old-style light bulbs with compact fluorescents. The Regeneration Project, which she heads, recently united leaders from Christian, Muslim and Jewish faith groups to ask the US Congress and the White House to act on global warming (Grist, 2007).

Pope Benedict XVI of the Catholic faith is also vocal about climate change and the natural environment. He has been increasingly vocal about the suffering that climate change will cause for the world's poor. "The world is not something indifferent, raw material to be utilised simply as we see fit," he has said. "Rather, it is part of God's good plan." He has said that humans must listen to "the voice of the Earth" (Grist, 2007).

Fazlun Khalid is the founder and director of the Islamic Foundation for Ecology and Environmental Sciences in Birmingham, United Kingdom. Khalid is recognised as the foremost expert on ecology from the Islamic perspective. He believes that protecting the environment is a form of worship and that humans have a basic right to the benefits of a healthy planet. "As the guardians of Allah's creation we have a responsibility to protect the environment," he says (Grist, 2007).

In his address marking World Environment Day, South African Anglican cleric Archbishop Emeritus Desmond Tutu asserted that world leaders who continued to ignore climate change were violating the rights of future generations. He said that "we must act now and wake up to our moral obligations. Ignoring global warming is a sin, and the future of our beautiful planet is in our hands" (Grist, 2007).

References to different religious leaders and their concerns about caring for the environment demonstrate powerfully how environmental concern is tied up with faith. This might explain why some economics teachers might have difficulty in agreeing with the statement and it would be an error to interpret this as having a less positive attitude towards environmental sustainability. The argument around religion would also hold true for culture.

In summary, generally the results of this study show that economics teachers have a positive attitude towards environmental sustainability and this could suggest that they are positive towards teaching environmental topics in the classroom. This can of course only be determined by observing what teachers actually do. However, a positive attitude towards environmental sustainability is a prerequisite for positive action on the part of teaching in the interests of the environment.

The findings of this research study show that economics teachers have a positive attitude towards environmental sustainability and this result is similar to findings in studies conducted by Kalu, Uwatt and Asim (2008) and Naikoo (2017). Naikoo (2017) found in his study, which was conducted in Kupwara district of Jammu and Kashmir State in India, that the majority of teachers have a positive attitude towards environmental education and sustainable development. Kalu, Uwatt and Asim (2008) found in their study, which was conducted in Nigeria, that teachers have a significantly positive attitude towards environmental sustainability issues.

Therefore, it could be argued that the economics teachers who participated in this study are likely to be pre-disposed to teaching the curriculum content thoroughly and will stay abreast of current issues, environmental issues and bring newly found information into the classroom, and they will motivate learners to adopt a more positive attitude towards the environment because they themselves are positive towards environment sustainability issues. Moreover, they will teach the content with enthusiasm and might also be predisposed to integrate environmental issues into other content topics where applicable and necessary. Economics teachers with a positive attitude will in all likelihood be able to open learners' eyes to their surrounding environment and make them more conscious towards environmental dangers that might occur. Teaching economics with a positive attitude could assist in changing learners' attitudes towards environmental sustainability issues.

Ulug, Ozden and Eryilmaz (2011) found in their study that positive attitudes held by teachers have positive effects on students' performance and personality and that negative attitudes have negative effects on the performance levels and personality developments of students. The positive attitude of teachers is not limited to the classroom, it surpasses the boundaries of the classroom and the individuals' educational lives and the effect thereof can influence learners throughout their whole life (Ulug, Ozden and Eryilmaz, 2011).

Omolara and Adebukola (2015) found in their research that social studies teachers had a bad attitude towards teaching the subject. The bad attitudes were expressed through irregular class attendance, poor mastery of the subject, monotony in the method of instructional delivery, and lack of enthusiasm. The researchers recommended a change in the attitude of teachers, learners and the society towards teaching and learning of social studies in secondary schools.

Abudu and Gbadamosi (2014) found in their study that the attitude of teachers teaching chemistry in senior secondary schools has a significant effect on the achievement of students in chemistry. Abudu and Gbadamosi (2014:42) said that it must be realised that if teachers show a positive attitude towards the teaching of chemistry, the achievement of students will be better than what we have now in our secondary schools.

The discussion now will focus on the results of the six Null hypotheses. Each hypothesis will be discussed by referring respectively to the five dimensions of sustainability.

5.2 Discussion of the finding of the Null hypotheses

5.2.1 The Null hypothesis = H_0 : There is no significant difference between the attitudes of male and female teachers of school economics towards environmental sustainability.

The Mann Whitney U test is used to test Null hypothesis 1. The sub-sample consists of $n = 194$ respondents but one outlier (respondent 86) was excluded from the data set. Therefore, the data set consist of $n = 193$ respondents. Eighty-six (86) of the respondents who participated in the research study were male and one hundred and seven (107) of the respondents were female.

The biophysical dimension shows a p-value of $p=0.22$, the economic dimension shows a p-value of $p=0.93$, the political dimension shows a p-value of $p=0.06$, the social dimension shows a p-value of $p=0.28$ and the education dimension a p-value of $p=0.64$. All five dimensions show p-values greater than a statistical significant level of $p=0.05$ and therefore the Null hypothesis cannot be rejected for the each of the five dimensions. The data show that a statistically insignificant result exists between the attitudes of male and female teachers of school economics towards environmental sustainability. The result shows that there is no significant difference between the attitudes of male and female teachers of school economics towards environmental sustainability. This means that the attitudes of economics teachers towards environmental sustainability do not depend on the gender of the teachers. This corroborates the finding of a study by Kalu, Uwatt and Asim (2008), which reports that gender is not a significant variable with regard to attitudes towards environmental sustainable issues.

However, when the mean of each dimension is studied closer, it shows that female teachers have slightly more positive attitudes than male teachers of school economics towards environmental sustainability. The mean for the attitudes of male teachers of school economics towards environmental sustainability are as follows: for the biophysical dimension the mean = 3.70, for the economic dimension the mean = 4.21, for the political dimension the mean = 3.67, for the social dimension the mean = 3.98 and for the education dimension the mean = 4.14. The means of the attitudes of female teachers of school economics towards environmental sustainability are the following: for the biophysical dimension the mean = 3.79, for the economic dimension the mean = 4.22, for the political dimension the mean = 3.83, for the social dimension the mean = 3.90 and for the education dimension the mean = 4.19. The social dimension is the only dimension where male teachers of school economics show a slightly more positive attitude towards environmental sustainability. The biophysical, economic, political and education dimensions are where female teachers of school economics show a slightly more positive attitude towards environmental sustainability.

The slightly more sensitive attitudes of women towards the environment are supported in the literature. In their study, Zelezny, Chua and Aldrich (2000) found that women reported stronger environmental attitudes than men. In another study by Félonneau and Becker (2008) it was found that women endorsed higher altruistic values than men, especially when it comes to the environment.

Generally, the voice of women should be heard more in environmental discussions, planning and training sessions. Jahan (2008) concludes in her study in Bangladesh that although the environment is not gender based, the whole process of environmental degradation should be viewed from a gender perspective because the major victims of environmental degradation are women. She adds that the voices of women should be heard in environmental management processes, otherwise the goal of environmental sustainability will be an elusive one. Because females might have more positive attitudes towards environmental sustainability it is crucial that the voices of women should be more recognised and included in any engagement which deals with environmental issues (Jahan 2008). Larger studies may show that there are statistically significant differences between male and female attitudes towards environmental sustainability.

5.2.2 The Null hypothesis = H_0 : There is no significant difference between how long teachers have been teaching school economics and their attitude towards environmental sustainability.

The Spearman rho correlation is used to test Null hypothesis 2. The data shows that forty-one percent (41%) of the economics teachers in this study have more than 21 years teaching experience and fifty-five percent (55%) of the economics teachers have more than 16 years teaching experience. According to this data, one can confidently say that the economics teachers in this study are very experienced.

The research study finds that the five dimensions, the biophysical dimension with a Spearman rho = 0.18, the economic dimension with a Spearman rho = 0.13, the political dimension with a Spearman rho = 0.05, the social dimension with a Spearman rho = 0.19 and the education dimension with a Spearman rho = 0.14 show positive but weak correlations between how long teachers have been teaching school economics and their attitudes towards environmental sustainability. The data show a statistical insignificant correlation exists between how long teachers have been teaching school economics and their attitudes towards environmental sustainability for all five dimensions. The data also show that there is a direct relationship between how long teachers have been teaching school economics and their attitudes towards environmental sustainability for the biophysical, economic, political, social and education dimensions. This means that if the value of one variable goes up the other variables also go up.

The research study finds that the Null hypothesis is rejected for the biophysical dimension $p=0.01$ and for the social dimension $p<0.01$ because the dimensions have a p-value of $p<0.05$. The data show that there is a statistical significant result between how long teachers have been teaching school economics and their attitudes towards environmental sustainability and therefore the Null hypothesis is rejected for these two dimensions. The data show that there is a difference between how long teachers have been teaching school economics and their attitudes towards environmental sustainability for the biophysical and social dimensions.

The research study finds that the Null hypothesis cannot be rejected for the economic dimension $p=0.07$, for the political dimension $p=0.50$ and for the education dimension $p=0.05$ because the dimensions have a p-value of $p>0.05$. The data show that a

statistically insignificant result exists between how long teachers have been teaching school economics and their attitudes towards environmental sustainability for these three dimensions. The data show that there is no difference between how long teachers have been teaching school economics and their attitudes towards environmental sustainability for the economic, political and education dimensions.

These findings are similar to findings in a study by Kalu, Uwatt and Asim, (2008) and Naikoo (2018), who found that teachers have significantly positive attitudes towards environmental sustainability issues and the teaching of environmental sustainability topics in the school curriculum. The main effects of gender, teaching experience, educational qualification and school type and their interactions are not significant ($p < 0.05$) for attitudes towards environmental sustainability. However, the findings of Kalu, Uwatt and Asim (2008) are not in synch for teachers' years of experience and their attitudes towards the biophysical and social dimensions of environmental sustainability shown in this study. There is nothing in the literature that helps to understand these, therefore more and larger studies would have to be conducted to obtain further corroborative evidence. What would also be needed is to augment quantitative surveys of this kind with in-depth qualitative studies that might give greater insights into why there were statistically significant differences between experienced and inexperienced teachers' attitudes towards the biophysical and social dimensions of environmental sustainability.

5.2.3 The Null hypothesis = H_0 : There is no significant difference between the age of teachers of school economics and their attitude towards environmental sustainability.

The Spearman rho correlation is used to test Null hypothesis 3. The data show that eighty-eight percent (88%) of the respondents were between the ages of 30 and 39 years, while 72% of the respondents were between the ages of 40 and 59 years. Nine percent (9%) of the respondents were between the ages of 20 and 29 years. According to this data, one can confidently say that there is a good spread of ages among the economics teachers in this study.

The research study found that the five dimensions - the biophysical with a Spearman rho = 0.18, the economic with a Spearman rho = 0.18, the political with a Spearman rho = 0.05, the social with a Spearman rho = 0.15 and the education with a Spearman

$\rho = 0.20$ - show positive but weak correlations between the age of teachers of school economics and their attitudes towards environmental sustainability.

The data show a statistical insignificant correlation exists between the age of teachers of school economics and their attitudes towards environmental sustainability for all five dimensions. The data also show there is a direct relationship between the age of teachers of school economics and their attitudes towards environmental sustainability, meaning that if the value of one variable goes up the other variable also goes up.

The research study finds that the Null hypothesis is rejected for the biophysical dimension $p=0.01$, the economic dimension $p=0.01$, the social dimension $p=0.04$ and education dimension $p=<0.01$ because all the dimensions have a p-value of $p<0.05$. The data show a statistical significant result between the age of teachers of school economics and their attitude towards environmental sustainability and therefore the Null hypothesis is rejected for these four dimensions. The data show that there is a difference between the age of teachers of school economics and their attitudes towards environmental sustainability for the biophysical, economic, social and education dimensions. This means that the attitudes of economics teachers towards environmental sustainability are dependent on their age for the biophysical, economic, social and education dimensions.

The research study found that the Null hypothesis cannot be rejected for the political dimension $p=0.51$, which is higher than the p-value of $p>0.05$. The data show that the political dimension shows a statistical insignificant result between the age of teachers of school economics and their attitudes towards environmental sustainability and therefore the Null hypothesis cannot be rejected for the political dimension. The data show that there is no difference between the age of teachers of school economics and their attitudes towards environmental sustainability for the political dimension. This means that the attitudes of economics teachers towards environmental sustainability do not depend on their age for the political dimension.

The study found that there is a statistical significant difference between the age of teachers of school economics and their attitudes towards environmental sustainability for the biophysical, economic, social, and education dimensions because these dimensions have a p-value of $p<0.05$. The research study also found that there exists a positive but weak correlation between the age of teachers of school economics and their attitudes

towards environmental sustainability for the biophysical, economic, political, social and education dimensions. This positive correlation is an indication that the higher the age of economics teachers the more positive they are towards environmental sustainability.

Aminrad, Zakaria and Hadi (2011) studied the environmental awareness and attitude of 2 200 students in 14 private and government universities. They found that older students have a more positive attitude towards the environment than the younger group of students. They argue that older people's attitude and awareness is influenced by their exposure to the media. In their study Ogunbode and Arnold (2012) found that older respondents have a higher level of concern for the environment. They argue that as individuals grow older they find more time to contemplate environmental issues and the implications for their children, grandchildren and family.

The positive attitude of the responses of older teachers in the study can be attributed to the fact that older teachers have become more knowledgeable about environmental issues through teaching the economics curriculum content. Therefore the role of senior teachers should become more prominent in the school setup. Older teachers should use their skills and knowledge about environmental sustainability which they have gained through the years and pass it on to younger teachers. This will require older teachers to become coaches and mentors to younger teachers. This means regular meetings between young or novice teacher and older teachers to engage over issues regarding environmental issues at school, in the community, province, country and world. Through these engagements younger teachers can adopt a positive attitude towards the environment.

Where the data show a statistical significant result we can be assured that the result is not due to chance. However, the p-value is influenced by the sample size and therefore if the data show statistical insignificant results then the sample can be increased. The sample of this research study only included the economics teachers in the Western Cape who fall under the Western Cape Education Department. If the same study should include all the economics teachers in South Africa, the result may be more favourable and a statistically significant result could be reached.

5.2.4 The Null hypothesis = H_0 : There is no significant difference between the years of training teachers received who teach school economics and their attitude towards environmental sustainability.

The Spearman rho correlation is used to test the Null hypothesis. The data show that twenty-six percent (26%) of the economics teachers have four and more years' pre-service teacher training, fifty-four percent (54%) have four years' teacher training and seven percent (7%) have three years of teacher training. According to the data, one can confidently say that the economics teachers are suitably qualified to perform their task as teachers.

The research study found that four dimensions, the biophysical with a Spearman rho = 0.06, the economic with a Spearman rho = 0.12, the political with a Spearman rho = 0.01 and the education with a Spearman rho = 0.04 show a show positive but weak correlation between the years of training received by teachers who teach school economics and their attitudes towards environmental sustainability. The data show that a statistical insignificant correlation exists between the years of training received by teachers who teach school economics and their attitudes towards environmental sustainability for the biophysical and economic dimensions. The data also show that there is direct relationship between the years of training received by teachers who teach school economics and their attitude towards environmental sustainability for the biophysical, economic, political and education dimensions. This means that if the value of the one variable goes up the value of the other variables also go up.

The research study found that the social dimension with a Spearman rho = -0.06 shows a negative but weak correlation between the years of training received by teachers who teach school economics and their attitudes towards environmental sustainability. The data show a statistical significant correlation exists between the years of training received by teachers who teach school economics and their attitudes towards environmental sustainability. The data show that there is an inverse relationship between the years of training received by teachers who teach school economics and their attitudes towards environmental sustainability for the social dimension. This means that if the value of one variable goes up the other variable will go down.

The research study finds that the Null hypothesis cannot be rejected for the biophysical dimension $p=0.41$, the economic dimension $p=0.11$, the political dimension $p=0.90$, the social dimension $p=0.42$ and for the education dimension $p=0.56$ because all the dimensions have a p -value of $p>0.05$.

The data show that a statistical insignificant result exists between the years of training received by teachers who teach school economics and their attitudes towards environmental sustainability for all five dimensions. The data show there is no difference between the years of training received by teachers who teach school economics and their attitudes towards environmental sustainability for all five dimensions.

However, the data show a positive but weak correlation exists between the years of training received by teachers who teach school economics and their attitudes towards environmental sustainability for the biophysical, economic, political and education dimensions. This means that the higher the educational level of teachers the more positive they become. This is in line with other studies.

Koc and Kuvac (2016) found that senior pre-service science teachers have a more positive towards the environment. They argue that this result is due to the fact that senior pre-service teachers were longer exposed to environmental education experiences. Özden (2008) also found that senior pre-service teachers have more positive attitudes toward environmental issues than freshman pre-service teachers. Keleş (2010) found that the attitudes of pre-service teachers become more positive as they progressed to higher grade levels. Keleş (2010) found that the fourth-year students have a more positive attitude towards the environment. This result shows that teachers, both novice and experienced, should be constantly encouraged to further their studies.

5.2.5 The Null hypothesis = H_0 : There is no significant difference between the in-service education opportunities of teachers of school economics and their attitudes towards environmental sustainability.

The Mann Whitney U test is used to test Null hypothesis 5. The sub-sample consists of $n = 194$ respondents but one outlier (respondent 86) was excluded from the data set. Therefore, the data set consist of $n = 193$ respondents. Twenty-six (26) of the respondents who participated in the study received in-service training and one hundred and sixty-seven

(167) of the respondents did not receive any in-service training towards environmental sustainability.

The biophysical dimension shows a p-value of $p=0.75$, the economic dimension shows a p-value of $p=0.18$, the political dimension shows a p-value of $p=0.37$, the social dimension shows a p-value of $p=0.23$ and the education dimension shows a p-value of $p=0.65$. All five dimensions show a p-value greater than a statistical significant level of $p=0.05$ and therefore the Null hypothesis cannot be rejected for each of the five dimensions. The data show a statistical insignificant result exists between the in-service education opportunities of teachers of school economics and their attitudes towards environmental sustainability for all the dimensions. The result shows that there is no significant difference between the in-service education opportunities of teachers of school economics and their attitudes towards environmental sustainability for all five dimensions. This result means that the attitudes of economics teachers towards environmental sustainability for all five dimensions does not depend on the in-service education opportunities of teachers of school economics and their attitudes towards environmental sustainability.

However, when the mean of each dimension is studied closer, it shows that a difference exists between the in-service education opportunities of teachers of school economics and their attitudes towards environmental sustainability.

The mean of the attitudes of teachers of school economics who received in-service training towards environmental sustainability is as follows: for the biophysical dimension the mean = 3.75, for the economic dimension the mean = 4.34, for the political dimension the mean = 3.89, for the social dimension the mean = 4.07 and for the education dimension the mean = 4.24. The mean of the attitude of teachers of school economics who did not received in-service training towards environmental sustainability is as follows: for the biophysical dimension the mean = 3.75, for the economic dimension the mean = 4.20, for the political dimension the mean = 3.74, for the social dimension the mean = 3.91, and for the education dimension the mean = 4.15.

The data show that the biophysical dimension of environmental sustainability shows teachers of school economics who received in-service training opportunities and teachers of school economics who did not received in-service training opportunities with a mean

= 3.75. The economic, political, social and education dimensions are where teachers of school economics who received in-service training opportunities show a slightly more positive attitude towards environmental sustainability.

The result shows that if we want to change the attitude of economics teachers towards environmental sustainability they should be exposed to more upskilling and training sessions with regard to environmental sustainability. This result is similar to the results of Junejo, Sarwar, Ahmed (2017) who found a positive impact of in-service training programmes for teachers. Junejo, Sarwar, Ahmed (2017) argue further that the performance of teachers regarding professional skills, knowledge and experience can be significantly improved if they are exposed to different in-service training programmes. Biasutti and Frate (2017:4) found in their study that “education is crucial for developing environmental and ethical awareness, values and attitudes in human beings that will promote effective public participation in decision-making and policy life”. Biasutti and Frate (2017) also found in their study that education is a fundamental discipline to disseminate the principles of sustainability and for advancing people’s ability to address environmental sustainability issues. America (2014:6) concludes in her study that teachers should stay abreast of economic developments, consumption and production and the challenges presented to the sustainability debate. Staying abreast of current environmental developments will assist economics teachers and empower them to talk freely about current events in class and they will be able to infuse environmental topics into the curriculum content where necessary.

The study of Shaukat (2016) found that respondents who were exposed to courses in environmental sustainability developed a more positive attitude towards environmental sustainability. Zachariou, Tsami, Chalkias, Bersimis (2017) are in agreement with the findings that knowledge and understanding of environmental issues are linked to the development of positive attitudes towards environmental education. In-service upskilling or education opportunities can be taken up at seminars, workshops, lectures, formal and informal courses, practical fieldwork and so forth.

5.2.6 The Null hypothesis = H_0 : There is no significant difference between geographical location of teachers of school economics and their attitude towards environmental sustainability

An ANOVA (Analysis of Variance) is used to test hypothesis 6. The sub-sample consists of $n = 194$ respondents but one outlier (respondent 86) was excluded from the data set. Therefore, the data set consist of $n = 193$ respondents. One hundred and twenty-five (125) of the respondents were from urban districts and sixty-eight (68) of the respondents were from rural districts.

The biophysical dimension shows a p-value of $p=0.95$, the economic dimension shows a p-value of $p=0.82$, the political dimension shows a p-value of $p=0.47$, the social dimension shows a p-value of $p=0.43$ and the education dimension shows a p-value of $p=0.51$. All five dimensions show p-values greater than a statistical significant level of $p=0.05$ and therefore the Null hypothesis cannot be rejected for each of the five dimensions. The data show that a statistical insignificant result exists between the geographical location of teachers of school economics and their attitudes towards environmental sustainability for all the dimensions. The result shows that there is no significant difference between geographical location of teachers of school economics and their attitudes towards environmental sustainability for all the dimensions. This means that the attitudes of economic teachers towards environmental sustainability for all five dimensions do not depend on their geographical location.

However, when the mean of each dimension is studied closer, it shows that teachers from rural areas have slightly more positive attitudes than urban teachers of school economics towards environmental sustainability.

The mean of the attitudes of urban area teachers of school economics teachers towards environmental sustainability are as follows: for the biophysical dimension the mean = 3.75, for the economic dimension the mean = 4.22, for the political dimension the mean = 3.74, for the social dimension the mean = 3.96 and for the education dimension the mean = 4.19. The mean of the attitudes of rural area teachers of school economics teachers towards environmental sustainability are as follows: for the biophysical dimension the mean = 3.75, for the economic dimension the mean = 4.20, for the political dimension the

mean = 3.80, for the social dimension the mean = 3.89 and for the education dimension the mean = 4.12.

Urban area and rural area teachers of school economics show the same attitude towards environmental sustainability for the biophysical dimension with a mean = 3.75. The political dimension is the only dimension where rural area teachers of school economics show a slightly more positive attitude towards environmental sustainability. The economic, social and education dimensions are where urban teachers of school economics show a slightly more positive attitude towards environmental sustainability.

Overall, we can say that urban teachers of school economics show a more positive attitude than rural teachers of school economics towards environmental sustainability. In a study Özden (2008) found that student teachers living in urban areas had a more positive attitude towards environmental problems than teachers living in rural areas. A study by Safford, Cutler, Henly, Norman and Levin (2012) found that environmental concern is higher among urban than rural residents. The finding that urban teachers of school economics have slightly more positive attitudes towards environmental sustainability is counter-intuitive and not supported in the literature.

However, these differences are not statistically significant and larger studies would have to be conducted to establish whether location does influence the attitudes of school economics teachers towards environmental sustainability. The slightly more positive attitudes of urban teachers in this study might be due to the nature of this particular sample that could be affected by the other variables considered in this study. For each of the Null hypotheses in this study the relationship between two variables (one independent and one dependent) was considered and not the relationship between multiple independent variables and one dependent variable, which more sophisticated statistical methodologies can show.

In conclusion, the result of the research study show that economics teachers show positive attitudes towards environmental sustainability, but a positive attitude alone will not ensure environmental sustainability. Studying the Tbilisi definition of environmental sustainability, we can see that environmental education is an important role player in creating positive attitudes towards environmental sustainability. Secondly, the definition points out that people, learners and teachers should have or obtain more knowledge, skills, motivation

and commitment towards environmental issues, environmental problems and environmental sustainability. The role of education therefore should not be underestimated to address the gap between teachers and environmental sustainability. The research study tested six Null hypotheses and the findings differ from statistically significant to statistically insignificant, and studies with larger samples would have to be conducted to get corroborative evidence.

In Chapter 6, a summary of the findings, the limitations of the study and recommendations that flow out of the study will be given.

5.3 Conclusion

In this chapter the research findings of the research study were interpreted and discussed. The study found that economics teachers have a positive attitude towards environmental sustainability. However, the respondents in the study show a less positive attitude to four of the 25 statements in the questionnaire. The overall positive attitude towards environmental sustainability is encouraging. Three differed tests were conducted to measure the six null hypotheses. Null hypothesis 1 and Null hypothesis 5 were tested with a Mann Whitney U test. Null hypotheses 2, 3 and 4 were tested with a Spearman rho test and Null hypothesis 6 was tested with an ANOVA (Analysis of Variance) test.

CHAPTER 6

Conclusion

6.1 Introduction

This research study measured the attitudes of school economics teachers towards environmental sustainability. The study was guided by a hypothesis “Economics teachers have a positive attitude towards environmental sustainability” and the research question, “What is the attitude of economics teachers towards environmental sustainability?” that needed to be answered. The research study also aimed to measure whether age, gender, teaching experience, years of teacher training, in-service training and their geographical location had an influence on the attitudes of economics teachers towards environmental sustainability, which was tested using six Null hypotheses.

6.2 Summary of findings

6.2.1 Hypotheses

The findings of research study show that school economics teachers have a positive attitude towards environmental sustainability.

6.2.2 Six Null hypotheses were tested and found that:

Null hypothesis 1: The research finds that the Null hypothesis cannot be rejected for the biophysical, economic, political, social and education dimensions. The research finds that the data show a statistical insignificant result towards all the dimensions of environmental sustainability. There is no significant difference between the attitudes of male and female teachers of school economics towards environmental sustainability. However, an analysis of the means found that the data show that female teachers of school economics show a slightly more positive attitude towards environmental sustainability for the biophysical, economic, political and education dimensions. It is only the social dimension which shows that male teachers of school economics show a slightly more positive attitude towards environmental sustainability.

Null Hypothesis 2: The research finds that the Null hypothesis is rejected for the biophysical and social dimensions. The biophysical dimension ($p=0.01$) and social dimension ($p<0.01$) show a statistical significant result because both dimensions show a significant level below $p=0.05$. The Null hypothesis is rejected for these two dimensions. The research finds that a statistical significant result exists between how long teachers have been teaching school economics and their attitudes towards environmental sustainability for the biophysical and social dimensions.

The research finds that the Null hypothesis cannot be rejected for the economic, political and education dimensions. The economic dimension ($p=0.07$), political dimension ($p=0.50$) and education dimensions ($p=0.05$) show a statistical insignificant result because these dimensions show a significant level above $p=0.05$. The Null hypothesis cannot be rejected for these three dimensions. The research finds that a statistical insignificant result exists between how long teachers have been teaching school economics and their attitudes towards environmental sustainability for the economic, political and education dimensions.

Null hypothesis 3: The research study finds that the Null hypothesis is rejected for the biophysical, economic, social and education dimensions. The biophysical dimension ($p=0.001$), economic dimension ($p=0.01$), social dimension ($p=0.04$) and education dimensions ($p<0.01$) show a statistical significant result because these dimensions show a significant level below $p=0.05$. The data show a statistical significant result between the age of teachers of school economics and their attitude towards environmental sustainability and therefore the Null hypothesis is rejected for these four dimensions.

The research study finds that the Null hypothesis cannot be rejected for the political dimension ($p=0.51$) which is higher than the p-value of $p=0.05$. The data show that the political dimension shows a statistical insignificant result between the age of teachers of school economics and their attitudes towards environmental sustainability and therefore the Null hypothesis cannot be rejected for the political dimension.

Null hypothesis 4: The research study finds that the Null hypothesis cannot be rejected for the biophysical dimension $p=0.41$, the economic dimension $p=0.11$, the political dimension $p=0.90$, the social dimension $p=0.42$ and for the education dimension $p=0.56$ because all the dimensions have a p-value of $p>0.05$. The research study finds that the data shows a statistical insignificant result between the years of training received by

teachers who teach school economics and their attitudes towards environmental sustainability for the biophysical, economic, political, social and education dimensions.

Null hypothesis 5: The research finds that the Null hypothesis cannot be rejected for the biophysical, economic, political, social and education dimensions. The research study finds that the data show statistical insignificant result between the in-service education opportunities of teachers of school economics and their attitudes towards environmental sustainability for the biophysical, economic, political, social and education dimensions.

Null hypothesis 6: The research finds that the Null hypothesis cannot be rejected for the biophysical, economic, political, social and education dimensions. The research finds that the data show a statistical insignificant result between the geographical location of teachers of school economics and their attitudes towards environmental sustainability for the biophysical, economic, political, social and education dimensions.

The research study finds a statistical significant result for the biophysical and social dimensions of Null hypothesis 2 and a statistical significant result for biophysical, economic, social and education dimensions of Null hypothesis 3. The research study finds a statistical insignificant result for Null hypothesis 1, Null hypothesis 4, Null hypothesis 5 and Null hypothesis 6. The research study finds a statistical insignificant result for the economic, political and education dimensions for Null hypothesis 2 and a statistical insignificant result for the political dimension for Null hypothesis 3.

6.3 Significance of the study

The research study finds economics teachers have a positive attitude towards environmental sustainability.

This result is important because it can be used by the Western Cape Education Department to develop and design study programmes that could build on teachers' current attitudes and enhance environmental sustainability studies in the economics classroom.

This result should be encouraging to the Western Cape Education Department which should therefore take advantage from it. This should encourage the Western Cape Education Department to set up various upskilling initiatives to advance the environmental literacy levels of economics teachers. The Western Cape Education Department can use

the result as an indicator to initiate more in-service training opportunities to upskill teachers regarding environmental sustainability. Upskilling is crucial because it will advance teachers' literacy towards environmental sustainability issues. This is supported by a study by Sorensen (2005:4) who found that for environmental literacy to take root in society it must be planted in the soil of our educational system, at the national and provincial levels, as well as in every classroom. Sorensen (2005) said this can be done by targeting environmental education efforts to current and future teachers who will have great responsibility for educating future citizens and leaders.

The result should also encourage the Western Cape Education Department and economics subject advisors to create more upskilling opportunities for economics teachers where economics teachers can have discussions on contemporary environmental issues which are threatening communities, the country and the world. Teachers should not only be encouraged to take contemporary environmental issues into the classroom but also be shown how to mediate these topics with learners.

What should be encouraged is that the teaching of environmental topics should not be restricted to an academic approach but that it should entail various approaches to learning, e.g. classroom discussions, fieldwork, classroom debates, classroom presentations and worksheets. Swanepoel, Loubser and Chacko (2002) found in their study that teachers who received training in environmental education demonstrate a significantly higher level of awareness, attitude and participation intention than those teachers who did not receive such training.

Schools within a geographical area should work closely together and form professional learning communities where teachers can engage in discourses regarding environmental sustainability issues with regard to the community, broader geographical area, country and world issues. The professional learning community should be a platform where teachers share new ways of teaching, how to engage learners in learning and not make teaching environmental topics an academic exercise. Methods need to be developed to engage learners in the learning process so they have the capacity to identify environmental concerns and are able to address the issues to the right authorities. Stevenson (2007) argues that professional communities are powerful and that contribute to teacher learning. Stevenson (2007) makes a call for constructing discourse of professional learning that

reflexively builds, sustains and develops the space and opportunity to achieve meaningful environmental education in schools.

6.4 Limitations of the study

The limitations of the research study are that it was conducted only among economics teachers who teach under the auspices of the Western Cape Education Department. The participants completed the questionnaire at the annual mandatory reflection and planning meetings of the different districts. Further studies are needed to measure whether economics teachers over a wider sample base have a positive attitude towards environmental sustainability. Such studies should include all the economics teachers of all the provinces in the country. A larger sample might have an impact on the results of the current research study because the p-value of a data set is influenced by the sample size. A larger sample might result in data showing a more statistically significant result. Further studies are also needed to determine the scope, type and nature of environmental in-service training opportunities that need to be instituted by the Western Cape Education Department to promote and enhance effective classroom practices.

The study finds that economics teachers have a positive attitude towards environmental sustainability. Although the hypothesis is proven to be true, attitude is a necessary but not sufficient condition to ensure that positive actions are taken in the interest of environmental sustainability. The Tbilisi (Unesco, 1977) definition expresses the importance of environmental education as an important contributor to positive attitudes towards environmental sustainability. The definition points out that environmental education is “a process aimed at developing a world population that is **aware** of, and **concerned about**, the total environment and its associated problems, and which has the **knowledge**, **attitudes**, **skills**, **motivation** and **commitment** to work individually and collectively toward solutions of current problems and the prevention of new ones” (Unesco, 1977).

The definition points out that people, learners and teachers should have or obtain more knowledge, skills, motivation and commitment towards environmental issues, environmental problems and environmental sustainability. The role of education therefore should not be underestimated to address knowledge gap between teachers and environmental sustainability.

Education is an important factor that influences the levels of knowledge of people (Barthwal and Mathur, 2012). The study of Padmanabhan (2008) found that teachers who have a high level of awareness have a positive attitude towards the environment. An increase in the awareness of environmental issues and problems cause the development of a positive attitude towards the environment (Padmanabhan, 2008). The study of Shaukat (2016) found that greater knowledge of and experience relative to the environment will greatly influence the development of positive attitudes towards environmental sustainability in individuals.

6.5 Recommendations

1. This research study was conducted in the Western Cape Education Department and conducted over a relative small sample. It is recommended that this study be conducted over a larger sample base, for example in all the provinces in South Africa. This is to get corroborative evidence which supports this research study.
2. It is recommended that further quantitative studies be supported by qualitative studies. This is to understand why the respondents react the way they do to certain statements. Qualitative supporting studies will give an in-depth insight to why exist differences exist in the dimensions.
3. The positive findings of the economics teachers in the Western Cape Education Department can be of insight to the department, subject advisors, NGOs, teacher training institutions and so forth to develop environmental sustainability upskilling and training programmes to address environmental sustainability issues in the classroom.
4. It is recommended that further studies be undertaken over a larger sample to look at the relationship between the age of teachers of school economics and their attitudes towards environmental sustainability.
5. The research study found that in-service education opportunities contribute to the positive attitudes of economics teachers towards the environment. Little difference is found between the in-service education opportunities of teachers of school economics and their attitudes towards environmental sustainability. Further studies over a larger sample are recommended to corroborate the findings of this study.

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Appendix 1

Application for ethical clearance: University of Stellenbosch

Updated By: Andrew AC Green @ 15-Nov-2016 08:06:50 PM
Application Form for Ethics Approval
Page 1
 UNIVERSITEIT•STELLENBOSCH•UNIVERSITY jou kennisvenoot • your knowledge partner
1. Application Guidelines
<ol style="list-style-type: none">1. All sections must be completed and all information must be included in the form.2. Please note that all fields marked with a red asterisk (*) are mandatory.3. The application must be written simply and briefly, providing adequate information for expert review but also at the same time being understandable to lay persons.4. Please keep the REC deadline dates as published on the website of the Division for Research Development (DRD) in mind for timely submission of your REC application. DESC deadlines are available from your academic department.5. Please familiarised yourself with the Standard Operating Procedures and Guidelines so that you understand your obligations in terms thereof.6. Before you begin completing this form please consult the list of documents to be included.7. In fields that are not mandatory and are not applicable type in "not applicable" and provide motivation for your answer.9. Sentences in red, highlight things you need to know or consider when completing a question.10. Sentences in blue, provide instructions on how to use the form.11. You must consult the InfoEd Manual for Researchers when completing this form.
<input checked="" type="checkbox"/> I have read the above guidelines
<i>Enquiries on any REC: Humanities related matters may be directed to the Secretary, Ms Clarissa Graham at +27 21 808-9183 or cgraham@sun.ac.za</i>
Click here to view the submission closing dates and meeting dates for REC: Humanities

Page 2

2. Does my research qualify for exemption?

Yes No *1. My research involves direct interaction with, or data gathering from human participants as individuals, members of a group, organisation or institution (this includes completion of surveys and observation.)

Yes No *2. My research involves and requires access to institutional/organisational information or archival data/ archives that are not in the public domain?

Yes No *3. My research involves accessing information from a database that contains information linked to personal identifiers (Names, ID numbers, student numbers etc.) OR the database contains coded information but I have access to the code that links the information to identifiers OR the database that I am using is not in the public domain.

Yes No *4. My research involves information that is in the public domain but that could be regarded as sensitive, or potentially sensitive?

One or more YES answers? Complete the rest of this form and submit it.

Only NO answers? The project probably does not require ethics approval (unless it involves animals, environmental or biosafety issues); you need only complete all the compulsory questions and submit the form. Check with your supervisor.

Please note that should the nature of your data collection method change during your project i.e. one of the answers above becomes YES, you are required to complete the entire e-form and to notify the DESC of this change.

NB! Please ensure that all required 'permissions' are obtained, if applicable, before starting the study even if ethics approval is not required.

*5. Please upload your research proposal.

Page 3

3. General - proposal details

*1. Title of research project:
The attitude of Economics teachers towards environmental sustainability

*2. Please provide a short summary of the proposed research (500 words), that should contain the following:

- A short introduction and motivation
- Research questions or hypotheses
- Study aims and objectives
- Concise summary of the methodology

• A short introduction and motivation
Environmental sustainability is a significant problem faced by modern human-beings. It is frequently argued that humans because of their attitude towards the environment are held responsible for the degradation of the environment. Human-made hazards include wastes, food poisoning, bush burning and environmental degradation. They are increasingly damaging the environment. They induce some calamities to the environment in the quest to satisfy their daily needs and wants (Ibimilua, 2011).

Teachers can play a significant role in influencing and changing the attitudes of people. However it is important that teachers themselves need to have a positive attitude before they can influence and change the attitude of others. This view is supported by (Esa, 2010: 39) that "teachers are most influential in educating children and teenagers to be leaders of tomorrow in protecting the environment". Taylor, Doff, Jenkins and Kennelly (2007:367) argue that "if teachers are to engage their students effectively in Environmental education, it is a reasonable assumption that they should have an understanding and a secure knowledge of key contemporary environmental issues and a positive attitude towards the environment". Lahiri (2011:39) argue "that individuals who display attitudes towards the environment that recognize the importance of nature and the environment, valuing it for its own sake, tend to display higher levels of self-reported or observed pro-environmental behaviour than those with anthropocentric environmental attitudes".

Economic activities involve production and consumption processes which cannot be disentangled from the environment in which they are located. As such, as the economy grows its impact on the environment increases (Kahuthu, 2005). Nwonwu (2007:148) argue that "the pressure on the environment to provide goods and services for domestic consumption, raw materials for industry, and in acting as sink for the aftermath of social and economic activities, is constantly increasing at an accelerated rate. The abuse and misuse of the environment in the pursuit of economic growth is a potential hazard and we lack accurate and complete knowledge on how, where and when such hazards will occur, their magnitude and gravity if and when they should occur and the number of victims that will be affected by their occurrence".

• Research questions or hypotheses
What is the attitude of economics teachers towards environmental sustainability?

• Study aims and objectives
The aim with this research is to measure the attitude of school economics teachers towards environmental sustainability. When the attitude of school economics teachers are known, then the relevant role-players can construct intervention processes and programmes to assist teachers, both in training and in-service, in altering their attitudes towards environmental sustainability.

• Concise summary of the methodology
This study will use the research survey approach. The research survey will be an appropriated measurement to study the attitudes of economics teachers. Burns (2000:555) argues that research surveys are methods of obtaining research data through using the quantitative research approach. This research study will not include any observations, interviews or any consultations as techniques of gathering data. In this research survey I will measure the attitudes of economics teachers by developing a 5 scale Likert scale. The questionnaire consist of 25 statements that must answered by the participants. The statements set will measure the attitudes of teachers towards environmental sustainability and it will be expected of the respondents to indicate whether they 1= strongly disagree to 5 = strongly agree. The data will be statistically analysed. Stangor (2004:15) argue that quantitative research uses questionnaires which are designed to be subjected to statistical analysis.

*3. When do you plan to start your data collection? (date format e.g. 14-Jul-2014)

23-Jan-2017

*4. Data collection end date (date format e.g. 14-Jul-2014)30-Sep-2017

3.1 Data collection commencement

Yes No *1. Has data collection already commenced?

4. Keywords

Click on the yellow + to add Keywords, then click on the edit icon. To Select a word from the list you must select the word, click on Select and then click on Save.

*Please select 3 keywords or phrases from this list that can be attributed to your study. Please note you can only select 1 word from the list at a time. Before you can add an additional keyword you must click on the yellow plus this must be done before every addition.

EDUCATION

Environmental Studies

Economics

4.1 Keywords not listed above

Yes No *1. Were you able to find all the keywords in the above list?

*2. Keywords not found in the above keywords list may be added here
Environmental Sustainability

Page 4

5. Investigator information

*1. Is this research for degree purposes?
Yes No

2. What degree?
Masters degree in Ed

*3. Name of institution where degree will be obtained

Stellenbosch University

NB! PLEASE NOTE IF YOU ARE NOT CURRENTLY A SCHOOL OF PUBLIC LEADERSHIP (SPL) REGISTERED STUDENT OR STAFF MEMBER TO QUESTION 5 PLEASE SELECT "NO" AND QUESTION 6 MUST REMAIN BLANK. IF THIS IS COMPLETED INCORRECTLY YOUR FORM WILL BE SENT TO THE WRONG DESK WHICH WILL RESULT IN A DELAY IN THE REVIEW OF YOUR APPLICATION.

*5. Are you based at the School of Public Leadership (e.g. a registered student or staff member at SPL)? No

If this study is for degree purposes, please ensure that you add your supervisor's details under Section 5.1. Stellenbosch University Investigators

Please Note

1) Students not yet registered or Stellenbosch University affiliated persons (eg. staff or external supervisors) not listed on the Human Resource system or SunID database will not be able to login to InfoEd and will not be listed in the personnel drop down list below in section 5.1.

2) If you cannot find a student, staff member or affiliated person in Section 5.1 please make sure with your department that the person(s) has been added to one of the official university systems (Student Information Systems (i.e. a registered student) or HR, or SunID). If they aren't your department will first have to add them before you can add them to your application.

3) Students who wish to apply for ethics clearance before they are registered must do this in consultation with their relevant department. The department will have to add them to the Information Technology SUNID temporary user database so that the student can be issued a username and password by IT. Please note that the SUNID process is not an ethics process, it is a completely separate process and is handled entirely by the relevant department/ division and the IT helpdesk.

4) **CHECK Stellenbosch University Staff and Student Contact Details:** Please note that you must check the information in the column "Name and Surname" for every person added. Should you encounter any inaccuracies in the contact information (e.g. email, department etc.) displayed in the table below please contact your Human Resources Practitioner for staff members and Student Information for students to have it corrected before continuing with this form. **DO NOT SUBMIT THIS APPLICATION BEFORE THE INFORMATION HAS BEEN CORRECTED.** We rely solely on this information when sending correspondence and information may not reach you if the contact details are not correct.

5) If you are a student please make sure you add your supervisor. Please note that the list of information in 5.1 comes from our official sources and therefore your Supervisor will be listed by their surname and their first name which may differ to the name they use in their day to day interactions so please make sure you have their full name before you start the application. If your supervisor is not listed please contact your department/ division to ensure that your supervisor (especially in the case of an external supervisor) has been added either on HR or SunID by your department/ division before you submit this application.

6) Note: If you selected a person by mistake, you can make use of the remove button (blue arrow) next to the person's name and then add the correct name. If you added a row and want to delete the entire row, click the Delete button (bin icon) .

7) Should you not find Stellenbosch University Investigators or students please also notify Lee Louw (leelouw@sun.ac.za/021 808 9444/ 021 938 9092) or Nicole Walker (nwalker@sun.ac.za/ 021 808 4914).

5.1. Stellenbosch University Investigators (Please click on the yellow "+" in the right hand corner to add people) (Fields that are not applicable can be left blank)

*Internal Personnel	*Highest qualification	*Professional registration	*Registration number	*Role in project	Cell number																		
<p>Green, Andrew AC</p> <table border="1"> <tr><td>Full Name</td><td>Green, Andrew AC</td></tr> <tr><td>Address 1</td><td></td></tr> <tr><td>Address 2</td><td></td></tr> <tr><td>City</td><td></td></tr> <tr><td>Zip</td><td></td></tr> <tr><td>Email</td><td>ANDREW.GREEN@WESTERNSCAPE.GOV.ZA</td></tr> <tr><td>Phone</td><td>828501573</td></tr> <tr><td>Employee/Student ID</td><td>SU_17807905</td></tr> <tr><td>Department</td><td>Curriculum Studies</td></tr> </table>	Full Name	Green, Andrew AC	Address 1		Address 2		City		Zip		Email	ANDREW.GREEN@WESTERNSCAPE.GOV.ZA	Phone	828501573	Employee/Student ID	SU_17807905	Department	Curriculum Studies	BEd Hons	None		Primary Investigator (PI)	082850
Full Name	Green, Andrew AC																						
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Address 2																							
City																							
Zip																							
Email	ANDREW.GREEN@WESTERNSCAPE.GOV.ZA																						
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<p>Le Grange, Lesley LLL</p> <table border="1"> <tr><td>Full Name</td><td>Le Grange, Lesley LLL</td></tr> <tr><td>Address 1</td><td></td></tr> <tr><td>Address 2</td><td></td></tr> <tr><td>City</td><td></td></tr> <tr><td>Zip</td><td></td></tr> <tr><td>Email</td><td>llg@sun.ac.za</td></tr> <tr><td>Phone</td><td>218082280</td></tr> <tr><td>Employee/Student ID</td><td>SU_12677663</td></tr> <tr><td>Department</td><td>Curriculum Studies</td></tr> </table>	Full Name	Le Grange, Lesley LLL	Address 1		Address 2		City		Zip		Email	llg@sun.ac.za	Phone	218082280	Employee/Student ID	SU_12677663	Department	Curriculum Studies	PhD	None		Supervisor	
Full Name	Le Grange, Lesley LLL																						
Address 1																							
Address 2																							
City																							
Zip																							
Email	llg@sun.ac.za																						
Phone	218082280																						
Employee/Student ID	SU_12677663																						
Department	Curriculum Studies																						

5.2 External Investigators cont.

Yes No *1. Are there any personnel external to Stellenbosch University involved in conducting this research?

Page 5

6. Familiarity with codes of ethical conduct

- *1. I have familiarised myself with the [SU Ethics Policies](#).
- *2. I have familiarised myself with the professional code(s) of ethics and/or guidelines for ethically responsible research relevant to my field of study.
- 3. Specify the professional code(s) of ethics and/or guidelines that were consulted.

7. Nature of the proposed research

Is the study:

- Yes No *1. Part of a bio-medical research project
- Yes No *2. A multi-institutional project
- Yes No *4. Funded from sources other than SU or self

Page 6

8. Participants

Does the study **intentionally** involve the collection of data on people in the following categories?

Yes No *1. Minors

Yes No *2. People living with, or affected by HIV/AIDS

Yes No *3. Prisoners

Yes No *4. People living with disabilities

*5. Other category deemed vulnerable (see Glossary in REC SOP)

Yes No

Yes No *6. Stellenbosch University staff, students, alumni or other persons/organisations associated with the university

8.2 Participants continued

Does the proposed research involve processes regarding the selection of participants in the following categories:

Yes No *1. Participants that are subordinate to the person doing the recruitment for the proposed research

Yes No *2. Third parties that are indirectly involved because of the persons being studied (e.g. family members of HIV patients; parents or guardians of minors, friends)

8.3 Participant recruitment

*1. Briefly describe the inclusion and exclusion criteria to be used and explain why they are appropriate to this study (if your sample includes vulnerable sub populations please justify their inclusion and describe safeguards to minimise risk)

Teachers who wish to participate are required to complete the questionnaire anonymously. Teachers have the right to complete the questionnaire because participation is voluntary. Teachers also have the right to stop at any time and not to participate anymore without fear of retribution or punishment.

It will be my wish to issue the questionnaire to every Grade 10 -12 teacher in the province (over the 8 districts) but I will have no control over who return the questionnaire.

*2. How will participants be invited to take part in this study, please also specify the time and place where applicable.

The questionnaire will be disseminated to the Economics teachers in the different districts at the planning meeting at the beginning of the year. I will request the Subject Advisers to place the questionnaires on the tables of the teachers and just make a friendly request for them to complete it and place it in a box. I will collect the questionnaires from them again.

Yes No *3. Will an advertisement or flyer be used in recruiting participants for this study?

Page 7

9. Steps to ensure established ethical standards are applied

Yes No *1.1. Has provision been made for written informed consent ?

Yes No *1.2. Has provision been made for verbal informed consent ?

Please complete the section "Consent forms" below.

Please click [here](#) for a template consent form.

Yes No *2. Will participant(s) be informed that they have the right to refuse to answer questions?

Yes No *3. Will participant(s) be informed that they have the right to withdraw from participation at any time?

Yes No *4. Will steps be taken to ensure personal data of informants will be secured from improper access?

***4.1. Explain these steps**

The participants in the study will complete the questionnaire voluntarily and anonymously.

Yes No *5. Will confidentiality of data be maintained?

***5.1. Explain the process(es) for maintaining confidentiality**

The data gathered will be kept strictly confidential and will only be used for the research purpose.
The data gathered will be stored on software and only be accessible by the researcher.

Yes No *6. If unexpected, unsolicited data is revealed during the process of research, will data be kept confidential and only revealed if required by law?

Yes No *7. Will anonymity of participant(s) be maintained during reporting of results?

***7.1. Describe process(es) for maintaining anonymity**

The participants will complete the questionnaire anonymously.

Yes No *8. 1. Will research assistants or fieldworkers be used to collect data?

9.1 Consent form(s) (Please click on the yellow "+" in the right hand corner to add)

Participant group	Home language	Specify other home language (if applicable)	*Upload consent form(s)
Teachers	English		

10. Risk of harm

*1. What is the likelihood that mitigation of risk of harm to participants (making use of suitable persons or organisations that are able to offer counselling or assistance to participant(s) during or after the research) will be required?

Low

Yes No *2. If an unexpected emergency situation is revealed during the research, whether it is caused by your research or not, will it immediately be reported to your supervisor/promoter and/or Departmental Chair for further advice?

Page 8

11. Institutional / Organisational permission

Yes No *1. Is institutional/ organisational permission required to gain access to subjects/participants?

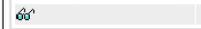
Yes No 2. Is/Are (a) all permission letter(s) available?

Yes No 3. Are only some permission letters available?

Please upload permission letters below.

11.1 Permission letter(s) (Please click on the yellow "+" in the right hand corner to add)

*Upload permission letter(s)



Page 9

12. Data collection instrument

Yes No *1. Will (an) existing instrument(s) to which copyright applies, be used to gather data?

Yes No *2. Is/are the instruments that will be used to gather data, classified by law as psychological tests?

12.2 Method of Data Collection

*Select all applicable methods *Specify Other *Attach Here (if applicable)

Questionnaire 

13. Conflict of interest

Yes No *1. Are you aware of any actual or potential conflict of interest in proceeding with the proposed research?

Page 10

14. Risk classification

*1. Please assess the risk of potential harm as a result of the proposed research (download the [DFESC guidelines](#)) here. 2. Low risk

Established ethical standards apply

15. Additional documents to be uploaded (Please click on the yellow "+" in the right hand corner to add)

Document Name Upload

Translations

If any documents will be translated into any language other than Afrikaans or English attach convincing evidence that the translation is an accurate and complete representation of the original document i.e. statement by a certified language practitioner or equivalent.

16. Additional Information

Please provide any additional information that you deem relevant to your application

I am the subject adviser for Economics.

I will request the teachers in my district as well as other district to complete the questionnaire.

The completion of the questionnaire will be anonymous and totally voluntary.

I just need to clarify my position within the study.

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17. Willingness to be contacted for research purposes

The Research Ethics Committees: Humanities at Stellenbosch University is part of the academic complex. As such vital research around research and ethics of research is encouraged. Please indicate your willingness to participate in such research by answering the following questions:

Yes No *1. May the information provided in this application be used in research around research and ethics?

Yes No *2. May approved researchers contact you regarding the information submitted here?

Submitting this application

1. Please remember that in order to complete this form you must complete all the mandatory sections, scroll to the top of this page and then tick the complete box. To save a copy of this application click on the PDF icon on the top left of the form. Then click on the red cross and the form will then be closed.

2. Only tick Complete once you are done with the form. Please note that every time you tick complete (i.e. click on complete then untick complete (to make edits) and then click on complete again) a new version of the form is created. So please only click on complete when you are sure you are done with the form in order to control the number of versions created.

3. Please note that completing this form does not mean it has been submitted you must still submit this application on the InfoEd Components of Initial Application Screen to submit this submission to the HREC, this is the page where you added the eform on. If this page is closed please follow the steps in the manual on how to retrieve your form.

For further instructions on this please consult [the InfoEd Manual for Researchers](#) or contact Clarissa Graham cgraham@sun.ac.za

Appendix 2

Approval to conduct research



UNIVERSITEIT • STELLENBOSCH • UNIVERSITY
jou kennisvenoot • your knowledge partner

Approved with Stipulations New Application

09-Jan-2017
Green, Andrew AC

Proposal #: SU-HSD-004053
Title: The attitude of Economics teachers towards environmental sustainability

Dear Mr Andrew Green,

Your New Application received on 07-Dec-2016, was reviewed
Please note the following information about your approved research proposal:

Proposal Approval Period: 09-Jan-2017 -08-Jan-2020

The following stipulations are relevant to the approval of your project and must be adhered to:
The researcher is reminded to submit to the REC proof of permission from the participating schools as soon as it has been received.

Please provide a letter of response to all the points raised IN ADDITION to HIGHLIGHTING or using the TRACK CHANGES function to indicate ALL the corrections/amendments of ALL DOCUMENTS clearly in order to allow rapid scrutiny and appraisal.

Please take note of the general Investigator Responsibilities attached to this letter. You may commence with your research after complying fully with these guidelines.

Please remember to use your proposal number (SU-HSD-004053) on any documents or correspondence with the REC concerning your research proposal.

Please note that the REC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

Also note that a progress report should be submitted to the Committee before the approval period has expired if a continuation is required. The Committee will then consider the continuation of the project for a further year (if necessary).

This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki and the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health). Annually a number of projects may be selected randomly for an external audit.

National Health Research Ethics Committee (NHREC) registration number REC-050411-032.

We wish you the best as you conduct your research.

If you have any questions or need further help, please contact the REC office at 218089183.

Included Documents:

DESC Report

REC: Humanities New Application

Sincerely,

Clarissa Graham

REC Coordinator

Research Ethics Committee: Human Research (Humanities)

Appendix 3

Consent to participate in Research



Directorate: Research

Audrey.wyngaard@westerncape.gov.za

tel: +27 021 467 9272

Fax: 0865902282

Private Bag x9114, Cape Town, 8000

wced.wcape.gov.za

REFERENCE: 20160128 -7121

ENQUIRIES: Dr A T Wyngaard

Mr Andrew Green
31 Rustenburg Road
Idas Valley
Stellenbosch
7600

Dear Mr Andrew Green

RESEARCH PROPOSAL: THE ATTITUDE OF ECONOMIC TEACHERS TOWARDS ENVIRONMENTAL SUSTAINABILITY

Your application to conduct the above-mentioned research in schools in the Western Cape has been approved subject to the following conditions:

1. Principals, educators and learners are under no obligation to assist you in your investigation.
2. Principals, educators, learners and schools should not be identifiable in any way from the results of the investigation.
3. You make all the arrangements concerning your investigation.
4. Educators' programmes are not to be interrupted.
5. The Study is to be conducted from **23 January 2017 till 30 September 2017**
6. No research can be conducted during the fourth term as schools are preparing and finalizing syllabi for examinations (October to December).
7. Should you wish to extend the period of your survey, please contact Dr A.T Wyngaard at the contact numbers above quoting the reference number?
8. A photocopy of this letter is submitted to the principal where the intended research is to be conducted.
9. Your research will be limited to the list of schools as forwarded to the Western Cape Education Department.
10. A brief summary of the content, findings and recommendations is provided to the Director: Research Services.
11. The Department receives a copy of the completed report/dissertation/thesis addressed to:

**The Director: Research Services
Western Cape Education Department
Private Bag X9114
CAPE TOWN
8000**

We wish you success in your research.

Kind regards.

Signed: Dr Audrey T Wyngaard

Directorate: Research

DATE: 04 November 2016

Lower Parliament Street, Cape Town, 8001
tel: +27 21 467 9272 fax: 0865902282
Safe Schools: 0800 45 46 47

Private Bag X9114, Cape Town, 8000
Employment and salary enquiries: 0861 92 33 22
www.westerncape.gov.za

Appendix 4

Letter to participate in research



UNIVERSITEIT • STELLENBOSCH • UNIVERSITY
jou kennisvenoot • your knowledge partner

STELLENBOSCH UNIVERSITY CONSENT TO PARTICIPATE IN RESEARCH

TITLE OF THE RESEARCH PROJECT:

The attitude of Economics teachers towards environmental sustainability

You are asked to participate in a research study conducted by: **Andrew Charles Green (Student number 17807905)**.

[QUALIFICATIONS: Bed HONS in curriculum studies (Stellenbosch University); Higher Diploma in education (University of the Western Cape); B. Econ (University of the Western Cape); Post Graduate Diploma: Human Resource Management (Cape Peninsula of Technology).

Currently, under the supervision of **Prof: LLL Grange** from the **Faculty of Education (Curriculum studies)** at **Stellenbosch University**.

You were selected as a possible participant in this study since you are an Economics teacher in the FET-phase. I believe your knowledge and experience teaching environmental sustainability topics in the Economics curriculum will help me to obtain the information required for the completion of my study.

1. PURPOSE OF THE STUDY

The aim of my study is to investigate and measure the attitudes of economics teachers towards environmental sustainability.

2. PROCEDURES

If you volunteer to participate in this study, I will ask you to do the following things:

You will be asked to participate in this study by completing a questionnaire. The aim of the questionnaire is to enable me to gain insight and knowledge about your attitude towards environmental sustainability. The questionnaire can be completed any at your convenience. The questionnaire consists of two parts:

- (a) Biography questions such as your gender, teaching experience, age, years of tertiary training, in-service training and education district.
- (b) The questionnaire which include 5 statements each on five dimensions of environmental sustainability:
 - 5 questions with regard to the Biophysical dimension
 - 5 questions with regard to the Economic dimension
 - 5 question with regard to the Political dimension

5 questions with regard to the social dimension

5 questions with regard to education

3. POTENTIAL RISKS AND DISCOMFORTS

There are no risks associated with this study.

4. POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

The literature reviewed reveals that so far no study has been conducted in measuring the attitude of Economics teachers towards environmental sustainability.

Therefore, the findings of this study promise to:

- Make a meaningful contribution towards improving teachers' professional classroom practices.
- Make a meaningful contribution towards teachers' in-service professional training and development
- Make a meaningful contribution towards improving student teachers training.
- Provide much needed baseline data for future studies in this area.
- Open up debate on the attitude of Economics teachers towards environmental sustainability

5. PAYMENT FOR PARTICIPATION

No financial remuneration is involved for participating in this study.

6. CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained at all times. The data will be kept in my private computer and in memory sticks which is only accessed by me. These will be located in a private room which is not shared with other students.

The information could be released to my supervisor should the need arises. He is fully aware of the University regulations concerning the protection of participant confidentiality. The information could be released only if I experience problems in analysing the data. The information would not be released to anyone else other than my supervisor.

7. PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind.

8. IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact me Andrew Charles Green at Stellenbosch University, Faculty of Education at Department of Curriculum Studies. Tel: +27828501573 or by email: andrewcgreen1@gmail.com

9. RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development.

Appendix 5**Questionnaire****Dear Colleague****Please complete the questionnaire by making a cross (x) in the appropriate block.**

What is your gender?	Male		Female	
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How long have you've been teaching?	Less than 5 years	
	6-10 years	
	11-15 years	
	16-20 years	
	More than 21 years	

What is your age?	20 - 29 years	
	30 - 39years	
	40 - 49years	
	50 - 59years	
	60 - 65years	

How many years of teacher training do you have?	1 Year	
	2 years	
	3 years	
	4 years	
	More than 4 years	

Did you receive any In-service training towards environmental Sustainability?	Yes	No

In which Education District are you teaching?	Metro North Education District	
	Mero East Education District	
	Metro South Education District	
	Metro Central Education District	
	Overberg education district	
	West Coast education district	
	Eden Karoo education district	
	Winelands education district	

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	Biophysical	1	2	3	4	5
1	Other species and the biophysical world should be valued equally to humans.					
2	I am willing to change my current lifestyle if it will prevent the extinction of species.					
3	More land should be made available for conservation than for development.					
4	The number of children that people can have should be limited to 2 children per household.					
5	People should not have the right to exploit the natural environment to satisfy their unlimited needs and wants.					
	Economic					
1	Companies that are environmentally sustainable are more likely to be profitable in the long run.					
2	Consumers should receive rewards from retailers if they purchase environmentally friendly goods.					
3	Managers and executives of companies must be criminally charged when their companies are found to be polluting.					
4	I am willing to promote the principles of a green economy even if people tell me that it is an unachievable dream.					
5	Multinational corporations should be forced by law to adhere to the environmental laws by governments even if there is a threat that lucrative business contracts might be terminated.					
	Political					
1	Governments should provide tax incentives to companies who produce environmental friendly products, e.g. build electric cars.					
2	The government is right in to make consumers pay for the use of environmentally damaging products such as non-degradable plastic bags.					
3	Changing peoples' lifestyles to be more environmental sustainable should be enforced and regulated by governments.					
4	Citizens should vote for political parties whose manifestos focus mainly on environmental sustainability.					
5	Governments should spent more money on the conservation and preservation of the environment even if it means that less money is available for other government services.					

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	Social					
1	Controlling the growth of the world population should take precedence over peoples' personal, religious and cultural beliefs.					
2	Overuse of natural resources is a serious threat to the health and welfare of future generations.					
3	I have more confidence in social movements that promote environmental sustainability than governments.					
4	Environmental sustainability cannot be achieved without eliminating poverty.					
5	Environmental sustainability can be achieved if communities work together to solve local environmental problems.					
	Education					
1	Environmental sustainability should be taught in all school subjects and in all the grades.					
2	Economics teachers should find every available opportunity in the curriculum to address environmental sustainability issues.					
3	There should be compulsory professional development programmes for all Economics teachers on environmental sustainability issues.					
4	Environmental sustainability education must be a compulsory module in all student teacher training programmes.					
5	Economics teachers should teach environmental sustainability topics even if it not prescribed in the curriculum.					

Thank you very much for completing the questionnaire.

Andrew Green

Number	District	Respondent	What is our gender 1 = male 2 = Female	How long have you've been teaching? 1 = Less than 5 y 2 = 6 - 10 Y 3 = 11 -15 Y 4 = 16 -20 Y 5 = More than 21 Y	What is your age? 1 = 20 -29 Y 2 = 30 -39 y 3 = 40 -49 y 4 = 50 -59 y 5 = 60 -65 y	How many years of teacher training do you have? 1 = 1 y 2 = 2 y 3 = 3 y 4 = 4 y 5 = More than 4 Y	Did you received any In-Service training towards environmental sustainability? 1 = Yes 2 = No	In which Education District are you teaching? 1 = North 2 = East 3 = South 4 = Central 5 = Overberg 6 = West Coast 7 = Eden Karoo 8 = Cape Winelands	Biophysical					Economic					Political					Social					Education						
									Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2
96	4	C1	2	5	4	5	2	4	5	5	4	5	5	5	5	5	5	4	5	5	4	4	4	5	5	4	5	5	4	5	5	5	5	4	
97	4	C2	1	5	4	5	2	4	4	3	3	2	5	4	4	4	4	4	4	4	4	4	2	4	4	4	4	4	4	4	4	4	4	4	
98	4	C3	2	5	4	4	2	4	4	4	3	5	2	5	3	4	4	5	4	4	3	2	2	4	4	3	4	4	4	5	5	5	5	5	
99	4	C4	1	5	3	0	1	4	4	4	4	3	4	4	4	5	5	5	5	5	3	4	3	3	5	4	4	4	5	5	3	4	4	5	
100	4	C5	1	3	3	2	2	4	4	4	4	3	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
101	4	C6	1	3	4	4	2	4	4	4	4	3	4	4	4	5	4	5	4	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
102	4	C7	1	4	3	5	2	4	4	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4	4	3	3	4	4	4	4	4	4	4	
103	4	C8	2	5	5	3	2	4	5	5	4	5	5	4	3	4	4	4	5	3	4	5	3	5	4	4	4	5	5	5	5	5	5	5	
104	4	C9	2	5	4	5	2	4	4	4	3	4	1	4	4	4	4	4	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
105	4	C10	2	5	4	5	2	4	4	4	4	5	5	4	4	5	4	4	4	2	3	2	2	4	4	4	4	4	5	5	4	4	4	4	
106	4	C11	1	1	4	1	2	4	1	5	3	2	5	2	4	5	5	4	4	4	4	4	1	5	2	5	5	5	5	5	5	5	5	5	
107	4	C12	1	5	4	5	2	4	4	5	4	2	5	5	5	5	5	5	4	5	5	4	2	4	5	4	5	5	5	5	5	5	5	5	
108	4	C13	1	4	3	4	2	4	4	4	4	1	2	4	4	4	4	4	4	2	4	4	2	1	5	4	4	4	5	4	5	5	4	4	
109	4	C14	2	2	3	2	1	4	4	4	4	4	2	4	4	4	4	4	4	4	5	3	2	2	4	4	2	5	4	4	4	3	3	3	
110	4	C15	1	2	2	1	2	4	2	4	4	4	4	3	3	4	4	4	4	4	3	4	4	4	4	4	3	4	3	3	3	3	3	3	
111	4	C16	2	5	4	4	2	4	4	4	3	4	4	4	4	4	4	4	4	3	4	4	4	4	4	4	2	4	4	4	4	4	4	4	
112	4	C17	2	5	4	4	2	4	4	4	4	3	2	4	3	4	4	5	4	4	2	3	2	2	4	4	4	4	4	3	3	3	3	3	
113	4	C18	2	5	4	5	2	4	4	4	4	5	5	4	3	4	4	5	5	5	5	2	3	2	5	5	4	2	5	4	4	4	4	4	
114	4	C19	1	5	4	4	2	4	4	4	2	3	4	4	4	4	4	4	4	4	2	3	2	4	4	4	2	4	4	4	4	4	4	4	
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117	4	C22	2	5	3	4	2	4	5	4	4	5	3	4	3	5	5	5	4	3	3	3	1	4	4	4	3	5	5	4	4	4	4	4	
118	4	C23	1	5	4	4	2	4	4	4	4	3	5	5	5	5	5	5	4	4	3	4	3	5	5	5	5	5	4	3	3	3	3	2	
119	4	C24	1	1	2	4	2	4	4	5	3	2	2	4	3	4	4	4	5	5	3	2	3	4	5	4	4	5	5	5	5	5	5	5	
120	4	C25	1	1	4	5	2	4	4	3	2	1	4	4	4	4	4	4	4	4	2	3	2	4	4	2	4	4	4	4	4	4	4	4	
121	4	C26	2	2	4	5	2	4	4	4	4	5	4	5	4	5	4	5	5	5	3	3	4	3	5	4	3	5	5	5	4	3	4	4	
122	4	C27	2	2	2	1	2	4	2	5	3	1	5	3	5	5	5	5	5	4	3	3	1	1	3	5	3	5	3	2	2	4	5	5	
123	4	C28	1	4	4	4	1	4	3	5	3	3	5	3	5	5	5	5	4	1	3	1	3	4	4	5	5	4	4	4	4	4	4	4	
124	4	C29	1	4	4	3	2	4	4	5	2	1	4	4	2	1	1	1	1	1	1	2	1	5	4	3	5	5	4	5	4	5	2	2	
125	4	C30	2	1	2	4	2	4	4	4	4	2	3	4	5	4	4	4	4	4	4	3	2	1	3	4	4	4	4	4	4	4	4	4	
126	4	C31	2	3	3	4	1	4	4	5	5	2	2	4	4	5	5	5	5	5	4	4	2	2	5	5	5	5	5	5	5	5	5	5	
127	5	O1	2	5	4	4	2	5	4	4	3	5	5	5	4	4	4	4	4	5	3	3	3	4	3	4	4	5	5	5	5	5	5	5	
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131	5	O5	2	2	1	4	2	5	1	5	4	5	3	3	5	3	4	4	3	2	3	4	2	3	3	4	3	4	5	5	4	3	2	2	
132	5	O6	2	1	1	2	2	5	3	3	4	3	5	4	2	4	4	4	4	5	5	3	3	2	5	4	5	5	5	4	4	4	4	4	
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135	6	W2	2	5	4	4	2	6	2	4	4	3	4	4	4	4	4	4	4	4	3	3	4	4	4	4	4	4	4	4	4	4	4	4	
136	6	W3	2	1	1	1	2	6	2	2	3	1	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
137	6	W4	1	4	3	5	2	6	3	5	4	3	5	5	5	5	5	5	5	5	5	4	4	5	3	5	4	4	4	4	4	4	4	4	
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141	6	W8	1	5	5	4	2	6	3	5	4	3	1	3	4	4	3	3	3	3	3	2	2	3	3	3	2	4	5	5	5	5	5	5	
142	6	W9	2	5	3	5	2	6	4	4	3	2	4	4	4	4	4	4	4	4	4	2	4	4	4	4	4	4	4	4	4	4	4	4	4
143	6	W10	1	5	4	5	2	6	2	4	4	5	5	4	4	4	4	4	4	4	5	3	2	4	4	4	4	4	4	4	4	4	4	4	4
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145	7	E1	2	5	4	5	1	7	3	5	3	5	5	3	4	4	4	4	4	4	5	4	3	3	4	5	4	5	5	4	3	4	4	4	
146	7	E2	2	1	2	5	2	7	3	4	4	4	4	4	4	5	5	4	5	5	4	3	4	2	5	4	4	4	4	4	4	4	4	4	
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148	7	E4	2	1	1	3	2	7	4	4	5	2	5	4	3	4	5	4	4	4	5	4	3	5	4	4	4	4	4	4	4	4	4	4	4
149	7	E5	2	1	1	1	2	7	4	5	5	3	4																						

7.6 West Coast education District

Number	District	Respondent	What is our gender? 1 = male 2 = Female	How long have you've been teaching? 1 = Less than 5 y 2 = 6 - 10 Y 3 = 11 -15 Y 4 = 16 -20 Y 5 = More Than 21 Y	What is your age? 1 = 20 -29Y 2= 30 -39 y 3 = 40- 49 y 4 = 50 -59 y 5 = 60 -65 y	How many years of teacher training do you have? 1 = 1 y 2 = 2y 3 = 3y 4 = 4y 5 = More than 4 Y	Did you received any In-Service training towards environmental sustainability? 1 = Yes 2= No	In which Education District are you teaching? Urban 1 = North 2= East 3 = South 4 = Central Rural 5 = Overberg 6 = West Coast 7 = Eden Karoo 8 = Cape Winelands	Biophysical				Economic				Political				Social				Education								
									Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
134	6	W1	1	4	3	4	2	6	4	4	3	5	5	5	4	5	4	5	3	4	3	3	3	4	3	3	4	5	5	3	3	4	
135	6	W2	2	5	4	4	2	6	2	4	3	2	4	4	4	4	4	4	4	4	3	3	3	4	4	3	4	4	4	4	4	4	
136	6	W3	2	1	1	1	2	6	2	2	3	1	4	4	4	4	4	4	4	4	3	4	3	4	5	4	3	3	4	4	4	3	
137	6	W4	1	4	3	5	2	6	3	5	4	3	5	3	5	5	5	5	5	5	4	5	3	5	4	4	4	4	5	5	5	3	
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142	6	W9	2	5	3	5	2	6	4	4	3	2	4	4	4	4	4	4	4	4	2	4	2	3	4	3	4	3	4	3	2	3	
143	6	W10	1	5	4	5	2	6	2	4	4	5	5	4	4	3	4	4	5	4	3	2	4	4	5	5	2	4	4	3	2	2	
144	6	W11	2	5	3	5	2	6	2	4	3	4	2	4	4	4	4	4	4	4	4	4	2	2	4	4	4	4	4	4	4	4	4

7.7 Eden Karoo Education District

Number	District	Respondent	What is our gender? 1 = male 2 = Female	How long have you've been teaching? 1 = Less than 5 y 2 = 6 - 10 Y 3 = 11 -15 Y 4 = 16 -20 Y 5 = More Than 21 Y	What is your age? 1 = 20 -29Y 2= 30 -39 y 3 = 40- 49 y 4 = 50 -59 y 5 = 60 -65 y	How many years of teacher training do you have? 1 = 1 y 2 = 2y 3 = 3y 4 = 4y 5 = More than 4 Y	Did you received any In-Service training towards environmental sustainability? 1 = Yes 2= No	In which Education District are you teaching? Urban 1 = North 2= East 3 = South 4 = Central Rural 5 = Overberg 6 = West Coast 7 = Eden Karoo 8 = Cape Winelands	Biophysical				Economic				Political				Social				Education									
									Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	
145	7	E1	2	5	4	5	1	7	3	5	3	5	5	3	4	4	4	4	5	4	4	3	3	4	5	4	5	5	5	4	3	4	4	
146	7	E2	2	1	2	5	2	7	3	4	4	4	4	4	5	5	4	5	5	5	4	3	4	2	5	3	4	4	3	3	4	3	4	
147	7	E3	2	5	4	4	2	7	4	4	2	5	4	4	5	5	4	5	4	4	4	5	5	5	4	4	5	5	4	5	4	4	4	
148	7	E4	2	1	1	3	2	7	4	4	5	2	5	4	3	4	5	4	5	4	4	3	5	3	4	3	4	5	5	5	5	4	4	
149	7	E5	2	1	1	1	2	7	4	5	5	3	4	4	3	4	4	4	4	4	5	3	3	3	5	4	4	5	4	5	5	5	3	
150	7	E6	1	5	3	4	2	7	2	5	2	2	4	4	4	4	4	4	4	4	4	2	2	4	4	4	4	4	4	4	4	4	4	
151	7	E7	1	5	4	3	2	7	4	5	4	3	5	4	4	5	4	4	4	4	4	3	4	4	4	5	5	5	5	5	4	3	3	
152	7	E8	1	5	4	5	2	7	5	5	4	3	4	2	5	5	5	5	4	4	4	2	3	3	4	5	4	5	5	2	4	3	3	
153	7	E9	1	5	4	4	2	7	4	5	4	5	4	4	4	5	4	4	4	4	4	3	3	4	5	3	3	4	4	4	4	4	4	
154	7	E10	1	5	4	4	2	7	4	5	4	4	4	4	4	5	4	4	4	5	4	4	4	4	5	3	3	4	5	4	5	4	4	
155	7	E11	1	5	4	1	2	7	2	4	4	2	5	3	2	5	4	4	4	3	2	3	4	4	4	3	5	5	5	4	4	4	4	
156	7	E12	1	1	1	4	2	7	1	3	3	5	3	5	5	5	3	5	5	5	4	2	2	5	5	5	5	5	5	5	5	5	5	
157	7	E13	1	1	1	3	1	7	3	3	3	2	3	3	3	3	3	3	2	4	2	3	3	3	3	3	2	3	2	3	3	3	3	
158	7	E14	1	5	4	4	2	7	4	5	4	3	4	4	4	4	5	4	4	4	4	4	3	4	4	4	5	4	4	5	4	4	4	
159	7	E15	1	5	4	4	2	7	5	5	3	3	5	4	4	4	5	5	4	4	5	5	3	4	4	5	5	4	5	4	5	4	4	
160	7	E16	1	5	5	5	1	7	2	5	3	5	5	5	5	5	5	5	5	5	5	2	3	2	5	5	5	5	5	5	3	5	5	
161	7	E17	1	1	2	4	2	7	4	5	5	1	5	5	5	5	4	4	5	4	1	2	4	1	5	1	3	4	5	4	1	3	1	
162	7	E18	2	5	4	4	2	7	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	4	4	3	4	4	2
163	7	E19	2	3	4	5	1	7	4	5	4	5	1	4	5	5	4	4	5	4	4	5	4	4	3	4	4	4	5	4	4	3	2	2
164	7	E20	2	3	4	4	2	7	3	5	3	5	5	5	5	4	5	4	5	4	4	2	3	2	3	5	5	5	5	5	5	5	5	5
165	7	E21	2	4	3	4	2	7	2	5	4	5	5	5	5	4	5	5	4	4	4	4	2	5	4	5	5	5	5	5	5	5	4	4
166	7	E22	2	2	2	1	2	7	4	4	2	2	5	4	5	3	3	3	3	5	3	2	2	2	4	4	4	4	4	5	5	4	3	3
167	7	E23	2	4	3	4	2	7	3	4	4	5	5	3	3	5	4	3	5	4	4	2	3	1	1	3	5	5	5	5	5	5	1	1
168	7	E24	1	5	4	4	2	7	4	4	5	5	3	5	4	4	5	4	4	5	4	3	4	4	4	4	4	4	5	5	5	5	5	5
169	7	E25	2	3	3	3	2	7	4	3	4	5	5	4	3	3	4	3	4	3	4	3	2	3	3	3	5	5	5	4	4	4	2	2
170	7	E26	2	4	3	3	2	7	4	4	4	5	4	4	3	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4

7.8 Cape Winelands Education District

Number	District	Respondent	What is our gender? 1 = male 2 = Female	How long have you've been teaching? 1 = Less than 5 y 2 = 6 - 10 Y 3 = 11 -15 Y 4 = 16 -20 Y 5 = More Than 21 Y	What is your age? 1 = 20 -29Y 2= 30 -39 y 3 = 40- 49 y 4 = 50 -59 y 5 = 60 -65 y	How many years of teacher training do you have? 1 = 1 y 2 = 2y 3 = 3y 4 = 4y 5 = More than 4 Y	Did you received any In-Service training towards environmental sustainability? 1 = Yes 2= No	In which Education District are you teaching? Urban 1 = North 2= East 3 = South 4 = Central Rural 5 = Overberg 6 = West Coast 7 = Eden Karoo 8 = Cape Winelands	Biophysical				Economic				Political				Social				Education									
									Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	
171	8	CWY1	2	5	3	4	2	8	4	5	5	4	3	2	5	4	5	5	5	4	5	3	4	3	5	5	4	5	3	3	2	2	3	
172	8	CWY2	2	3	4	4	2	8	5	4	5	3	5	4	5	5	5	5	5	5	5	4	4	4	5	5	3	4	5	5	4	4	4	
173	8	CWY3	2	3	2	1	1	8	4	5	4	3	3	5	5	5	5	5	5	5	5	5	3	5	5	4	4	5	5	5	5	5	5	
174	8	CWY4	2	2	1	1	1	8	4	5	2	5	4	5	2	5	4	5	4	4	5	5	5	2	5	5	4	5	5	4	4	4	5	5
175	8	CWY5	1	2	2	1	2	8	1	4	4	4	5	4	5	3	4	4	5	4	2	2	2	2	2	2	4	2	4	3	3	4	4	
176	8	CWY6	2	5	3	4	2	8	4	4	2	1	4	2	4	2	3	4	5	4	4	2	2	3	4	3	4	4	4	3	3	4	4	4
177	8	CWY7	2	5	4	1	2	8	4	5	4	2	5	4	4	5	5	4	4	4	4	4	2	5	4	2	5	4	2	5	4	3	4	4
178	8	CWY8	2	4	3	5	2	8	5	5	2	5	5	4	4	5	5	5	5	5	5	4	2	2	5	4	5	5	5	5	5	5	5	4
179	8	CWY9	2	4	3	5	2	8	5	5	2	5	5	5	4	5	5	5	5	5	5	4	2	2	5	4	5	5	5	5	5	5	5	4
180	8	CWY10	1	5	3	4	2	8	4	4	4	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
181	8	CWY11	2	3	3	4	1	8	2	4	4	2	1	5	5	5	5	5	4	4	4	2	2	5	4	2	5	4	4	4	2	4	4	4
182	8																																	