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## **Measuring the Effectiveness of Environmental Education Programmes in Promoting Sustainable Living in Secondary Schools**

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**Abstract.** Environmental education has been contemplated as the field of study enabling people to live a sustainable livelihood. In recent years, the South African government took an initiative to integrate Environmental Education into all learning areas or subjects. Despite such inclusion, a gap still exists between what is learned in class and what learners are actually doing in their daily activities. Alexander and Poyyamoli, (2014: 1) suggest that Environmental Education is an essential advancement to encourage learners to save, protect and improve the local environment. As a result, the present paper seeks to examine the effectiveness of environmental education programmes in enforcing sustainability behaviours in school children and how it fosters the acquisition of knowledge and understanding, skills, attitude and behaviors compatible to sustainability. The paper employed sustainable indicators as an instrument to evaluate the effectiveness of environmental education programmes in promoting sustainable livelihood. Questionnaires were distributed to teachers, principals and learners from twenty schools in the district. Participants were subjected to pre-test, innovative sustainable living programmes, and post-test assessment. The results of the pre-test portrayed a gap of learners' knowledge, skills and attitude towards their environment, whereas the post-test results confirmed that EE promotes sustainable living when forged with EE programmes.

**Keywords.** Environmental Education, sustainable living, environmental education programme, sustainable schools, sustainability

### **Introduction**

Notwithstanding collaborative deliberations and initiatives implemented by our governments and non-governmental organisations to inculcate the concept of sustainability of our environments through the teaching of environmental education, a gap nevertheless exists between what is learnt in class and their everyday activities. The school curriculum is in most cases concerned about knowledge transfer (knowledge about), Hungerford (1985) views environmental education as one-sided radical approach to educate the public about conservation as a result it lacks rigorous sustainable learning programmes of actions. What is learnt in class lacks practice and therefore, learning is about achieving a promotion. This paper introduces the integration of what is learnt (theory) to rigorous sustainable learning programmes of action (practice). It is for this cause that most schools continue threatening the integrity of the

environment through wasteful consumption of resources such as water, energy, paper, inks, toners and environmental pollution. What exacerbates the present-day situation is a lack of practice, ignorance or negligence and negative attitude toward the environment. This whole state of affairs warrants an alternate in the current way of teaching about the environment to the new innovative approaches which involve the implementation of environmental education programmes. Environmental education, therefore, should unfold as a pivotal approach to encouraging learners to utilize school and environmental resources sustainable. Alexander and Poyyamoli, (2014: 1) assert that environmental education is a holistic approach to encouraging learners to conserve and protect the physical environment in schools and neighborhoods.” According to the Belgrade Charter, the purpose of EE is to develop a world population that is knowledgeable, skilfully and concerned about the environment and its linked problems (UNESCO, 1980, Hungerford and Peyton, 1976). The present investigation corroborates with the preceding studies by demonstrating that learners who had been directly engaged in hands-on activities had been able to considerably extend their learning capacity in contrast to those who were not (MacDiarmid & Duval, 2014).

### **History of Sustainability**

The concept of sustainability has reached a good reputation in almost all spheres of life in the world even the politicians have turned it into their slogans when claiming and making future promises (Reidel (2010). The notion of ‘sustainability’ can be used across a wide range of topics or in conjunction with many concepts such as economic, environmental and social, hence sustainable economy, sustainable development, sustainable growth, sustainable living, and sustainable future (Fien, 1991). The most used definition of sustainability was first pronounced by the World Commission on Environment and Development also known as Brundtland Commission in 1987. The Commission defined sustainable development as the development which satisfies the needs of the present population without infringing the opportunities of the future generations to satisfy theirs. In the current paper respondents defined sustainable living as an approach to maintaining and improving the quality of our life such that others in future will benefit in the same way as we did”. It further defined ‘sustainable living’ as living within the carrying capacity of the environment, caring for the earth and preserving of our natural resources for our benefits and for the benefits of others to follow (Mbokazi, 2016: 177). Therefore, sustainable living in schools refers to the sustainable consumption of energy, water, inks and toners, papers, procurement, waste management, health and well-being, travel and traffic management. Lukk, Veisson, and Ots, (2008: 35) view sustainable living as the approach that encourages us to conserve and enhance our resource base, by gradually altering the ways in which we develop and use technologies and by altering our present unsustainable approaches into sustainable ones.

Environmental education has been on the podium for so long, therefore, diverse African cultural groups have lived and practiced the concept of sustainability in a variety of ways. In the African culture, children were made to believe that they would bear a gender modification when playing, urinating and or defecating in water. As a result, children learnt to protect and preserve water. Children were also taught plant preservation strategies as they were taught that when harvesting fruits, in the bush they should not cut branches because the tree will not bear fruits in future. Even the traditional herbalists conserved plants as they propagated them after uprooting or cutting stems and branches for making muti (traditional medicine). These practices were performed to forge biodiversity conservation which resulted in the promotion of sustainable living. Imagine what would happen if traditional herbalists were to uproot plants without replanting them. This evinces that indigenous human beings have lived sustainably

livelihood in many locations around the world, however as our world has modernized many societies have adopted increasingly wasteful habits of consumption and moved away from living sustainable lives (Cirillo, & Hoyler, 2011). Therefore, diverse cultural groups have defined the concept in a variety of ways that meet their own needs.

Sustainability aspiration has emerged as an outcome of the modernization of the world. Sustainability endeavours to help modern societies reconnect with the seasoned tradition of taking care of all living things within the means of nature (Cirillo, *et al.* 2011). The concept of 'sustainable development' was welcomed and widely used during and after the World Commission on Environment and Development (WCED) report, 'Our Common Future or Brundtland Report'. The report paved a trajectory for broadcasting the concept. It outlined the path for global sustainable development and served as a key role for the introduction and implementation of the concept of 'sustainability'. The United Nations Conference on Environment and Development held in Rio de Janeiro in 1992 provided the fundamental principles and the programme of action for achieving sustainable living. In this important gathering of the statesmen, Agenda 21, a roadmap to achieving sustainable development was adopted. The publication of Agenda 21 signaled the introduction of sustainable development discourse as well as Education for Sustainable Development into school curricula throughout the world (Kopnina, 2011: 3). The World Summit on Sustainable development (WSSD), held in Johannesburg, in 2002, intensified the implementation of sustainable development. It pursued new initiatives on the implementation of sustainable development and building of a sustainable future. The WSSD adopted resolution 57/254 to actualize Decade of Education for Sustainable Development (DESD) spanning from 2005-2014, which sought to implement ESD in the school curricula. DESD envisaged a world wherever everyone has the chance to receive a high-quality education and learn skills, values, attitudes and new lifestyle appropriate for living a sustainable livelihood. The Earth Summit was the third international conference on sustainable development (SD), focusing on adapting the economic and environmental goals of the worldwide community, held in Rio de Janeiro, Brazil in June 2012. The participants reaffirmed their political will and declared their commitments to the promotion of a sustainable development. To adopt this view, we need to turn our schools into sustainable schools.

### **Sustainable schools**

Living sustainably is something that affects every person on the earth. The way we live now affects our lives today, as well as the future population. Some people believe that sustainability and living green will not matter to them as the effects of their actions will not manifest in their lifetime, but generations to come. Therefore, sustainable schools are encouraged to promote sustainable behaviours to school children and staff members through its teaching and their day to day operations. The practice of these schools is environmentally friendly. It is a model of good environmental practice, as it provides learners and staff members with concrete opportunities to contribute towards sustainable environment (MacDiarmid, 2014: 11). Sustainable schools therefore promote sustainable use of material and equipment; provide opportunities to embrace sustainable practices, such inclusion of food growing, biodiversity conservation, and natural play in the school grounds thereby increasing learning value. Sustainable schools make huge savings from the use of models energy efficiency, renewable energy, and water conservation, by implementing methods such as wind, solar and biomass energy, rain water harvesting and grey water recycling. Also are model suppliers of healthy, local and sustainable food and drinks. Gough & Sharpley, 2005: 7) argue that for schools to be sustainable schools require the involvement of all stakeholders, namely educators, non-educators, learners, parents as well as departmental officials serving the school. Fien (1993) is

of the idea that sustainable schools should in their curriculum include three linked components identified as education about, through and for the environment. Fien claims that education about the environment put emphasis on the acquisition of knowledge about the environment and its processes. Palmer (1998) argues that the acquisition of knowledge and understanding of the environment enables learners to store relevant concepts, facts, and figures and to critically evaluate issues and situations in the light of informed understanding. Another component, education through the environment is a powerful way of learning (Kanyimba, *et al*, 2014), involving learners in the natural environment, uses the environment as a resource learning (Fien, 1998). Education for the environment is action-oriented, empowering and participative. According to Palmer & Neal (1994), education for the environment is the most effective way of helping learners become empowered and participate actively in promoting sustainable living and sustainability of the environment.

### **Theoretical framework**

Several researchers such as Barrett (2006), Potter (2009), Robottom (2013), and Reid (2019) have called for an approach to EE that shares some of the characteristics of Participatory Action Research (PAR): it should be proactive, interdisciplinary, contextual, critical, holistic, action-oriented, and participatory, qualities represented by the ‘education for the environment’ theory. As a result, Participatory Action Research is chosen as the theoretical framework of this study. The objective of this paper is to explore the effectiveness of environmental education programmes in promoting sustainable living in secondary schools, embracing participatory action research (PAR). Gills & Jackson, (2002: 264) view participatory action research, as an approach of gathering and analysing data and putting it into action and creating meaningful knowledge. It is based on reflection, data gathering and actions that aim to sustain and improve environmental by involving learners who will, in turn, take action to solve environmental issues. According to McDonald (2012: 35), PAR focuses on social change that promotes democracy and challenges inequality, is context specific, often targeted on the needs of a particular group and often seeks to liberate participants to have a greater awareness of their environment in order to take action. PAR is relevant to this study as it involved the researcher and participants working together in taking action (Kanyimba, 2014; Kondon, Pain & Kesby, 2007) to solve environment problems. It also follows the five strategies of action research namely the identification of a problem, collecting data, analyzing data and writing reports about the problem. Learners were involved in identifying problems analysing the problem while carrying out environmental education programmes designed for the study. They were also involved in active learning. Previous research revealed that knowledge acquisition improves significantly when learners were engaged in the active learning process (Alexandar & Poyyamoli, 2014; Nundy, 1999; Grant 1997, and McKenzie & White, 1982).

### **Research methodology**

The empirical research adopted a mixed research design, known as concurrent triangulation method as both quantitative and qualitative approaches were employed in combination and complement each other (McMillan & Schumacher, 2010: 403). James, Milenkiewicz, and Buckman (2008); Kondon, Pain, and Kesby (2009); argue that the survey, phenomenological inquiry and participatory evaluation are relevant methods used in PAR. This approach combines measuring of learning competencies using a questionnaire with observation of learning processes (Ballantine, Packer & Everette, 2005: 1). Therefore, the study presented both numerical and descriptive data relating to the measuring the effectiveness of environmental education programmes in promoting sustainable living in secondary schools. In the quantitative

approach, a questionnaire was administered and in the qualitative approach, an observation method was pursued using observation schedule. The participants were subjected to both pre- and post-test examinations. A pre-test was administered to measure the amount of pre-existing knowledge of participants and to determine whether participants live a sustainable livelihood or not. A post-test was embraced to measure the learning as a result of the research experience and to ascertain whether participants gained or improved knowledge as a result of the engagement in learning activities (environmental education programmes). The post-test was administered six months following the engagement in environmental education programmes which comprised of a series of teaching and learning strategies such as field trips, hands-on activities and audio-visual programmes (television programmes:50/50 in SABC 2, Geographical Wild in DSTV and DVD's on Nature Conservation programmes). The participants were conveniently selected from fifteen sampled secondary schools. Non-probability, convenient sampling was embraced in this study. Our participants were composed of seven learners, three teachers and one administration clerk from each school since they are paramount to sustainable living in secondary schools, Msezane and Mudau, 2014: 369). The confidentiality of all participants was observed through withholding their identity in the report. The data in the quantitative approach was captured and analysed using micro-soft excel spreadsheet. The spreadsheet was used to generate tables and graphs and Wilcoxon signed-rank test was applied to analyse data. Equally important, is the qualitative data collected through observation method which was analysed using content analysis.

### **Findings**

Observation was an ongoing process, that it was conducted prior, during and after environmental education programmes implementation. Prior to EEP implementation it was observed that all schools had no environmental education books, magazines, pamphlets and newsletters. Amazingly, six months down the line after following the intensive EEPs all schools had stock of Environmental newsletter and magazines, such as Water Wheel, Envirokids, Step by Step Stories of Change, Yes Stories of change and calendar for Environmental Special Days. Some schools had modified their school grounds and had celebrated environmental days such as World Water Day (22<sup>nd</sup> March) and International Day for Biological Diversity (22<sup>nd</sup> May). The observational procedure was remarkably successful, learners shown great grasp of knowledge, attitude and skills in identifying the extent to which learners were engaged in learning during the implementation of various environmental education programmes Ballantine, Pack & Everette, 2005; 27). The socio-economic factors exhibited extreme levels of poverty as this was substantiated by many families depending on Child Support Grant (CSG) and Older Person's Grant (OPG) (figure 3). This was also affirmed by the high rate of unemployment amongst the community. Their average monthly income was far less than R2000, which is far below their budget. Poor education, as well as poverty, are the major contributory factors to unsustainable practices. People over-utilise resources for their personal satisfaction and quest for leading a better life, without considering their impact on the environment and future generations. The results also revealed the strong link between water, electricity consumption and bills paid and most participating schools paid high monthly bills prior to exposure to environmental education programmes due to high resource consumption; however, the post-test results exhibited a decrease in schools paying high bills (figure 1 and 2).

Figure 1

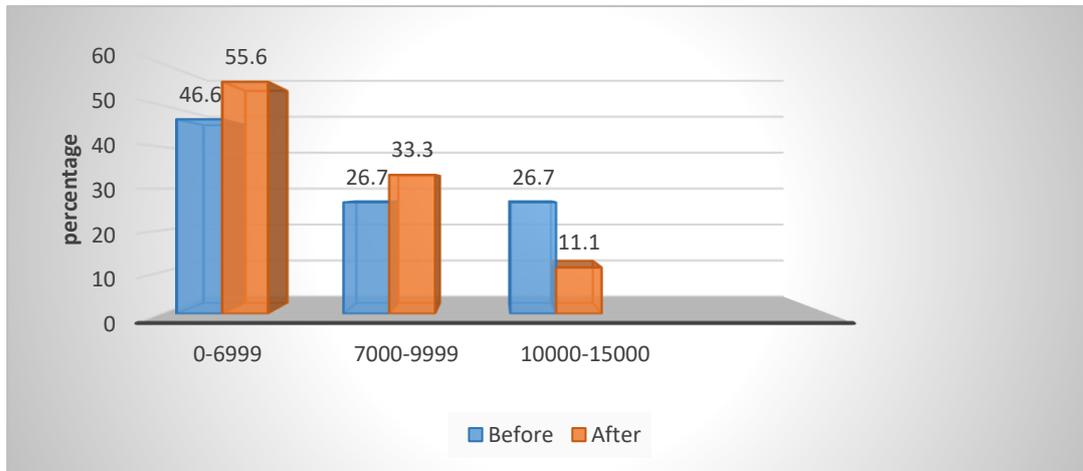


Fig. 2 electricity bill

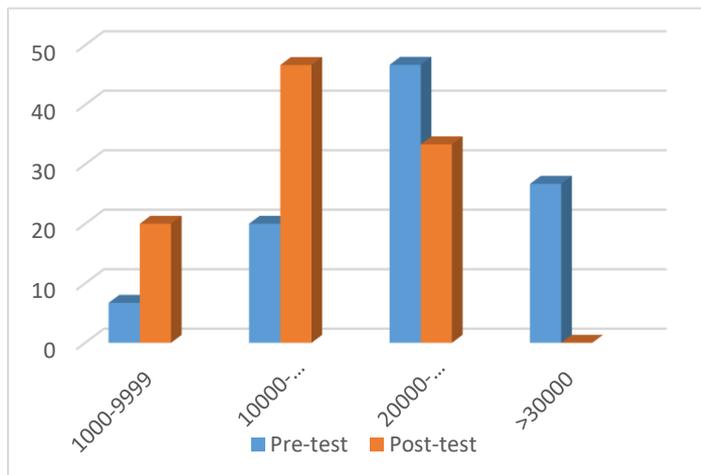
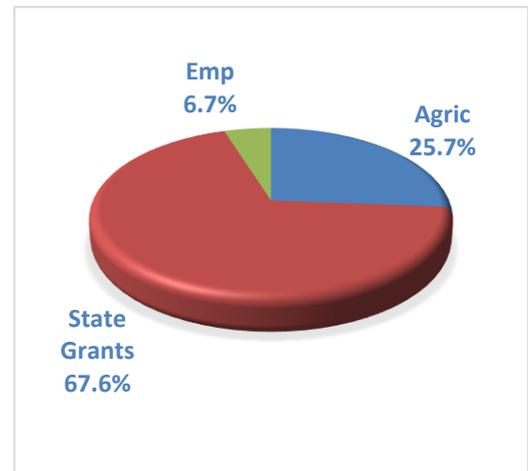


Fig. 3 employment



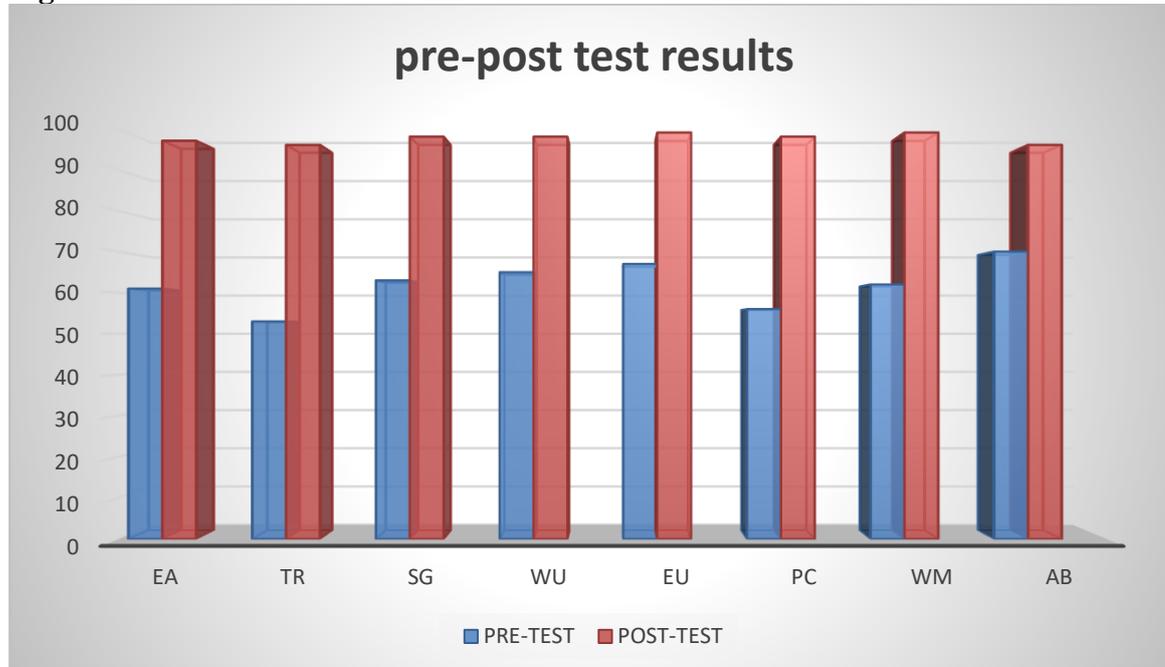
In all instances, the significance (P-value) was less than 0.001 which means that the improvement was significant at the 0.1% level of significance. The differences (Post– Pre-) of the responses were computed per item, and the differences were all positive, meaning the respondents gave, on average, a higher rating Post- than Pre-test.

**Table 1**

Component of sustainable living	Pre-Test Results (%)	Post-Test Results (%)	Differences
Environmental Awareness (EA)	61	97	36
Transport (TR)	53	96	43
School Grounds (SG)	63	98	35
Water Usage (WU)	65	98	33
Energy Usage (EU)	67	99	32
Purchase & Consumption (PC)	56	98	42
Waste Management (WM)	62	99	37
Attitude & Behaviour (AB)	70	96	26
Total %			

The data depicted in table 1 is bar-graphical represented hereunder and coded for ease reference as follows: EA- environmental awareness, TR-transport, SG- school grounds, WU – water usage, EU – energy usage, PC – purchase and consumption, WM – waste management, AB – attitude and behaviour.

**Fig. 4 Pre-Post tests**



#### **Environmental awareness (EA)**

The post-test results (99%) revealed a great deal of knowledge and understanding of environmental education concepts whereas pre-test results (61%) revealed lack of basic knowledge of environmental concepts and environmental issues, figure 4. This lack of basic environmental knowledge and understanding as predestined by the pre-test emanates from the lack of environmental books, magazines and environmental programmes on television (TV). There was a statistically significant differences between post- and pre-test results. During observation period, it was noted that in almost all sampled schools, there were neither, environmental magazines, books, nor TV. The sign test was performed to compare the post-pre-test results and all respondents gave a higher average rating for all items in the post-test after learners were supplied with environmental magazines, books and watched environmental programmes. The mean pre-test scores were mostly below 3 and the mean post-scores were all above 3.5. There was a significant difference on learner’s skills, knowledge, and understanding of environmental concepts. During the implementation of environmental education programmes, few environmental magazines such as Wildlife and Environment, Water Wheel, Environment, and Conservation Matters were supplied to participants and the television programmes, such as National Geographic Wild (Nat Geo Wild) were viewed. These activities boosted their interest, knowledge, and understanding of the environment. The high scored of 99% in the overall post-test results revealed knowledge gained and significant improvement.

#### **Transport (TR)**

The sign test conducted exhibited more than 3 mean, post-test score and less than 3 mean, pre-test score. The results were generally high, post-test (96%) than pre-test (53%), as

reflected in table 1 and figure 4. This may be accredited to the fact that most of the participants do not own cars; they are pedestrian and mostly use public transport and bicycles. As a result, they contribute little towards air, noise pollution and other environmental impacts.

#### **School Grounds/ Garden (SG)**

In the case of the school grounds, the pre-test results (63%) revealed that the school grounds were not taken care of, whereas the post-test (98%) results revealed a significant improvement (as depicted in table 1 and figure 4). When the sign test was conducted, the sig 2 tailed, level was 000 which attest that there was a significant improvement after EEP implementation at 0.1% level of significance. The school garden contributes to the aesthetic factor of the school. However, very little has been done on the school grounds to improve it. The reason for the significant improvement of the post-test results was accredited to the involvement of participants' in Environmental Education Programmes which boosted the effective and cognitive domain. The challenge rest upon the willingness of the school to change the way they do things and engage their learners in activities that will enhance interest and love for the environment. School gardening also makes a great contribution to the nutrition of learners especially in nutrition feeding, participating schools. The study conducted by Skanavis and Manolas, (2015), and Genkins, (2014) discovered that gardening increases learners' love and interest in conserving nature and work towards the improvement of the environment. Schools were prompted to make their preferences in respect of the project they intend undertaking either greening the school ground or running a vegetable garden. Schools selecting the greening of the school grounds were advised to plant fruit trees, as this will provide them with shelter and shade during sunny days and at the same time with fruit. Skanavis and Manola, (2015), view school gardens as useful centres or laboratories for environmental learning or hands-on, outdoor learning. The school garden project enhanced interpersonal skills, leadership abilities, teamwork, motivation as well as problem-solving skills that will enable them to deal with local environmental issues.

#### **Water Usage (WU)**

The water usage significantly improved in the post-test results of all participants (table 1 and figure 4). An average percentage of 98% was elicited after participants were vigorously subjected to environmental education programmes designed for the study. The sig 2 tailed was, 000 which showed that there was a significant improvement of results after EEP implementation. The programmes involved identifying water wastage practices and measuring and calculating water usage as well as water losses through leakages. It also involved identifying, promoting, and implementing water-wise or conservation strategies. Crosara and Fehr, (2011), in their study, elicited significant improvement after learners were deeply involved in environmental education programmes, for example, the water consumption reduced drastically per working day per person compared to previous reports. The participants also compared the previous water bills with the water bill after the EEP implementation and the results revealed decreased number of high paying schools. This illustrates a significant change in learners' knowledge, skills and attitude toward water usage.

#### **Energy Usage (EU)**

Energy usage exhibited a significant improvement in the post-pre-test results, as the results designate a bright spot on energy savings techniques, recording 99%. The results signaled an increase of 32% from the pre-score of 67%. The reduction technique involved simple actions, such as switching the lights off when the room is vacated, unplugging appliances

when finished and switching off computers, printers, and photocopiers when not in use. Consistency in practicing these techniques is the key to success. The programmes designed to reduce energy usage involved determining from the count and power rating of all points of use and compared to the bill from energy utility. It also involved a wide range of strategies such as boiling the exact amount of water needed than boiling a full kettle, replacing high energy user bulbs with energy saver bulbs, preventing and reporting illegal connections and vandalism in schools.

### **Waste Management (WM)**

The average percentage of solid waste management in schools significantly improved from 62% to 99% as shown in figure 4 and table 1. The learners' attitude and behaviour on segregation, sorting and various other solid waste management practices had significantly improved in the case of post-test results. The improvement was significant at the 0.1% level of significance. The implementation of a combination of various environmental education activities/programmes raised learners' knowledge and understanding of waste management concepts such as segregation, sorting, recycling, reusing and reducing. Learners' skills in handling, sorting and classifying solid waste such as paper, bottle and cans were highly improved. Alexandar & Poyyamoli, (2014: 14) perceived skills as an important determinant of environmental conservation and protection.

### **Purchasing and Consumption (PC)**

The purchasing and consumption of resources significantly improved from the pre-test results. As a result, the purchasing of environmental or eco-friendly, light packaged, biodegradable and recycled products increased after the EEP implementation. Table 1 shows the post-test results, 98% in comparison with 56%, pre-test. The improvement was significant at the 0.1 % level of significance. This shows that participating schools adopted sustainable and eco-friendly strategies and promoted sustainable consumption. Schools especially section 21 schools were encouraged to procure goods or services that are environmentally friendly and that are produced locally, in South Africa, hence 'Proudly South African' products. The practice of 4Rs, (reducing, repairing, reusing and recycling) to become the norm of the schools as it increases the value for money. Through recycling of paper, cans, bottles, and cartridges, schools were able to generate funds, save money and improve the school grounds. On completion of EEPs some schools had collected copious amounts of papers which were sold for cash to Richards Bay Reclamation Group.

### **Attitude and Behaviour Change (ABC)**

Since participants were deeply engaged in EEPs, their attitudes and behaviour depicted a shift from negative to positive. There was a significant improvement in the average score for all participants recording 96% post-test compared to 70% pre-test, figure 4. Litchfield and Foster (2009: 6-7) posit that one of the factors that influence behaviour change, along with persons' upbringing or social environment is their intrinsic motivation that they can effect change. The EEPs brought change by instilling love and confidence in participants' ability to improve and solve environmental problems. They became aware of very often, irresponsible human behaviour towards the environment, worsening its quality, and threatening present and future generation (Kostova and Vladimirova, 2010). Pursuing practical work such as waste management, field trips, water management and planting trees was extremely stimulating because it helped learners understand that they could not only study and talk about the environment but they could be actively involved in improving and reclaiming it (Kostova and

Vladimirova, 2010). Sustainability should help learners acquire environmental behaviour and 'develop a set of values and feelings of concern for the environment and the motivation to participate actively in conserving environment (Fien, 1996). Lukk, Veisson & Ots, (2008) suggest that sustainable living has ethical, moral, and spiritual implications, and it calls for lifestyle adjustment through attitudinal and behavioural change.

### **Discussion**

The Caring for Earth, a Strategy for Sustainable Living calls for an environmental education that would enable citizens to understand, appreciate and implement sustainable practices (Tilbury, 1995: 198). While IUCN/UNEP, WWF views sustainable living as the new patterns of living. To succeed in adopting the new pattern of living, a significant change in lifestyles of individuals need to be achieved. The study aimed to measure the success of environmental education programmes in promoting sustainable living. Hence the success of environmental education programmes were exhibited in the knowledge of environmental concepts, environmental issues, and environmental attitude and behaviour of learners in schools. If environmental education is unsuccessful, learners in secondary schools will not model environmental knowledge, skills, and attitude and behaviour as envisaged by environmental education and will continue entertaining unsustainable practices. Since the main goal of environmental education is to improve environmental literacy, evaluating the efficiency of an environmental education programmes, implies assessing the environmental literacy progression in participants (Spinola, 2015, Ballantyne, Packer and Everett, 2006). The current study links with this aim, as it measures the effectiveness of environmental education programmes in promoting sustainable living in secondary schools. It involves the assessment of participants in two phases namely pre- and post-test. The participants were at first pre-tested and thereafter were subjected Environmental Education Programmes (EEPs). EEPs implementation took approximately six months to eight months. At the completion of environmental education programmes implementation, post-testing with similar questionnaire. Pre-testing provided a benchmark for determining growth in learning when compared with the post-test results. In this evaluation approach, the study identified environmental awareness (knowledge), resource utilisation, attitude and behaviour as major components (Spinola, 2015: 397) of sustainable living. The post-test revealed a significant achievement attained after the involvement in environmental education programmes, whereas the pre-testing revealed a shortfall in basic environmental knowledge, skills, and attitudes of participants. As a result, the improvement in the post-test elicited a positive gain in terms of environmental knowledge, skills, attitude and behaviour toward the environment. The post-test revealed that EEPs inspired participants with more basic conceptual knowledge, skills, and positive attitude in relation to water usage, transport, school grounds, purchasing and consumption, waste management and energy usage. Jin & Bierma (2011) opine that guided-inquiry learning is a process by which learners discover basic concepts through active investigation and they discovered that learners achieved higher scores on examinations and quiz question when the guided inquiry approach was applied. Hence environmental education programmes implemented during this study pursued through PAR and guided inquiry approaches elevated participants' knowledge and skills required for sustainable practices (Alexandar and Poyyamoli, 2014:15). The participants were collaboratively and systematically guided through 'action oriented' approach, such as improving school grounds, recycling, undertaking field trips to Isimangaliso Wetland Park and procuring, purchasing and consumption of eco-friendly products. Participants were actively involved in the learning processes and learned by action and acquired knowledge through their own senses via investigations, field trips and games and solving problems (Dengler, 2008;

Jeronen, Jeronen, and Raustia, 2008 and Eison, 2010). Kuhlthau, Maniotes, and Caspiri (2015: 208) purport that guided inquiry provides participants with multiple opportunities to participate in social groups assessing social learning. Alexandar and Poyyamoli (2014: 15) emphasise the importance of field trips in the natural areas as a component for individual development and a sustainable future. Undertaking environmental education programmes in the current study mainly influenced participants' environmental knowledge and encouraged positive attitude and behaviour. Schools must model and motivate learners to lead sustainable lifestyles and to take action for sustainable living in their schools and communities (Jeronen, Jeronen, and Raustia, 2008).

### **Conclusion**

Hungerford (1990) opines that there appear to be few efforts that prepare future citizen to make environmental sound decision or participating responsibly in improving or resolving environmental issues. Environmental education at its current state is not effective in promoting sustainable living as it is mainly concerned with the provision of information and group analysis. It became effective when learners were exposed to logically developed and well-planned environmental education programmes to address environmental issues that affected the community. The environmental education programmes positively influenced learners' environmental knowledge, skills, attitude and behaviour. This implies that the introduction of environmental education programmes (EEPs) that promote proactive, critical, participatory, action-oriented, and holistic inquiry (Pareds-Chi & Viga-de Alva, 2020) is more effective in fostering environmental behaviour compatible with sustainable livelihood in schools. It also suggests that exposure to EEPs encourages learners to change their unsustainable lifestyles to sustainable ones. Therefore, schools must be encouraged to developed EEPs that would promote environmental awareness in their learners and encourage actions to take responsibility for, and care of, the natural environment and the identification of the problems facing the local community, which would be reflected in their daily school activities.

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