



An Analysis of the Policy Coverage and Examination of Environmental-impact Topics

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Abstract

Environmental education and education for sustainability are educational responses to negative environmental impacts both locally and globally. In South Africa, the schooling sector has experienced several shifts in the curriculum since 1994, with implications for the coverage, teaching and examination of environmental-impact topics in subjects such as Life Sciences, Physical Sciences, Life Orientation, Agricultural Sciences, and Geography. The aim of the research reported here was to investigate the coverage and examination of environmental-impact topics in the Further Education and Training (FET) Phase of the South African school curriculum. Data sources were the Curriculum and Assessment Policy Statement (CAPS) documents and examination papers. In analysing the coverage and examination of environmental-impact topics, thematic content analysis was used. The findings indicate that there is unequal coverage of environmental-impact topics in the curriculum, despite the CAPS indicating that environmental content should feature in all subjects. The present paper shows that Life Sciences has the widest coverage and that Geography examination papers sometimes exceed the policy allocation. Agricultural Sciences has the least coverage. The study also found that there is general, but not complete, alignment between policy and examination papers. The study concluded that there is too little focus in the FET curriculum on environmental education and warns that this will constrain the development of a pro-environmental culture among learners. This has relevance for curriculum and policy developers in responding to societal and environmental issues.

Keywords: Environmental education, education for sustainable development, environmental-impact topics, curriculum.

Introduction

Among the biggest challenges facing humans today are environmental pollution, land degradation and global warming. Sitarz (1994) noted that the increase in the world's population and in consumption, particularly in the industrialised countries, had stimulated economic growth but also worsened negative environmental impacts. Erdogan, Bahar, Ozel, Erdas and Usak (2012:3259) blame 'science and technology, industrialisation, changes in life habits and routines' for environmental pollution and the destruction of nature. The nations of the world now recognise that the exploitation of the Earth's resources has degraded the environment and generated unmanageable amounts of waste and pollution. They agree that there is an urgent need to address environmental threats and their consequences for the future of humankind.

The United Nations declared the period from 2005 to 2014 to be the Decade of Education for Sustainable Development. This was followed in September 2015 by the adoption of the 2030 Agenda for Sustainable Development, which includes a set of 17 Sustainable Development Goals (SDGs) (UN, 2016). South Africa is a signatory to these goals and needs to play its part in achieving them.

One way to do this is by means of educating young people on environmental-impact topics. Kyburz-Graber (2013) argues that education is essential in solving environmental problems. She states that environmental education was launched in many countries towards the latter part of the 1960s as a new demand in education systems in response to the growing fears about the degradation of the environment.

This paper examines the South African school curriculum, and, specifically, the inclusion of 'environmental-impact topics', that is, topics that cover negative effects on people or the environment. These may encompass rising levels of carbon dioxide in the atmosphere, global warming, the depletion of ozone in the atmosphere, deforestation, and improper waste disposal (see, for example, Rockström *et al.*, 2009).

One of the studies conducted in South Africa on the incorporation of environmental education in the curriculum (Togo, Zhou & Khan, 2015) noted that issues such as climate change are well covered in policy documents such as the 1995 *White Paper on Education and Training* (Ministry of Education, 1995), yet not much has been achieved in translating this into curriculum and teaching. According to the Department of Basic Education (DBE, 2016), the national curriculum aims to ensure that learners acquire and use knowledge and skills in ways that change their lives for the better. We would argue that this implies that the curriculum should promote knowledge in local contexts by integrating environmental education in all subjects taught in the school system. To fulfil this obligation, the curriculum must encourage respect for human rights, inclusivity, and environmental and social justice.

It is important that environmental-impact topics be sufficiently covered not only in curriculum documents, but also in examinations in order to instil the values of sustainable development in the minds, attitudes and behaviour of the youth (Hill, Alan & Woodland, 2006). Fundisa for Change (2013) highlights that many national curricula, such as South Africa's CAPS, are rich in environment and sustainability content where the subjects address aspects of sustainability. However, it is also necessary to analyse coverage in examinations. Birdsall (2013) argues that the infusion of environmental concepts into learning areas will be negatively impacted and the goal of education for sustainability will be compromised if there is low coverage of environmental themes in examinations.

In the interest of sustainable development and the alleviation of environmental problems, this research therefore aims at analysing environmental-impact topics in South Africa's FET curriculum and how they are examined. The FET curriculum forms the focus of this study because it is the final stage of schooling, at the end of which learners write the Grade 12 exit-level examinations that determine whether they can progress to tertiary education. The study investigates CAPS documents as well as examination papers set between 2012 and 2015 for the Grade 12 exit examinations. The policy documents and past examination question papers were sourced from the DBE's website (2016).

The analysis is based on three subjects: Life Sciences, Geography and Agricultural Sciences. These subjects were selected after initial data analysis of all 11 core subjects taught in Grade 12, which indicated that only three subjects showed environmental-impact topics coverage in both the policy and in the exit-level examinations. These subjects were then purposefully sampled for further analysis in this study. The paper adopts Margaret Archer's ideas as proposed in her work, *Realist Social Theory (RST): The morphogenetic approach* (1995), in order to evaluate the depth of the concept of environmental education in the selected subjects.

Environmental education and the school curriculum

While it may be widely accepted that environmental education has to be accommodated in the goals and structural organisation of schools, Stevenson (2007) notes that the critical enquiry and action orientation inherent in environmental education create a challenging task for schools. This challenge is at the root of the purpose of this paper.

Has educational change kept pace with developments in the global environment? There is a need for education to make people aware of their influence on nature and the consequent effects on their quality of life. Erdogan *et al.* (2012) argue that the increase in environmental problems and issues has resulted in global conferences and events focusing on a sustainable environment as well as in environmental-impact topics starting to be incorporated in school curricula. For example, environmental-impact topics are mandated in the current school policy in Serbia, which envisages that environmental education should be implemented through curricular, extra-curricular and after-school activities. According to Stanišić and Maksić (2014), environmental-education topics in the Serbian curriculum include the living and non-living aspects of nature and the impact of human activities on the environment.

Hill *et al.* (2006) pointed out that environmental education should not just blindly reproduce the current realities of living with nature, but should allow people to explore alternate realities, enable them to critically evaluate these realities, and help them to make informed decisions as to what the appropriate interaction with nature should be in their local context. On this aspect, Lotz-Sisitka (2013) remarks that environmental education curriculum research has been shaped and influenced by post-structuralism and critical realism.

The present study is an attempt to develop a better understanding of the way in which environmental education is incorporated, or not incorporated, in the South African FET curriculum, and is being approached from a related theoretical framework, which is outlined next.

Theoretical Framework

This paper adopts Archer's (1995) Realist Social Theory (RST) as a meta-theoretical framework. This explanatory theory seeks to understand the operations of social programmes by evaluating their operational successes and failures for various interest groups functioning in a particular context (De Souza, 2013). De Souza (2013) describes RST as a social theory focusing on how individuals and society are related and how the interactions between them might bring about or hinder change in the social context of interest. Young (2008) and Creswell (2011) explain that knowledge is socially produced and that it is dependent on social

interests and the related dynamics of power as individuals seek understanding of the world in which they live and work. For example, students would interact with society by applying knowledge they have learnt in school through environmental education, and teachers would interpret the content of the curriculum they ought to teach in relation to their understanding of their work context, as reflected in examination papers.

Archer (1995) explains that the work on RST has generally been directed at explaining society and its transformation or reproduction. In order to describe and explain the mechanisms of the workings of a society, social realists have adopted certain terminology. Such terminology includes 'structure', 'culture', 'agency' and 'relations' (De Souza, 2013). In this paper, 'structure' refers to prevailing institutional structural conditions that can produce a particular outcome, such as the curriculum as it is actually taught. 'Culture' refers to dominant ideas or prevailing cultural conditions that can affect an individual's perception of what can or cannot be done in a social context, such as including certain forms of knowledge in a curriculum or excluding them from the curriculum. 'Agency' is related to beliefs and reasons that people use to justify actions they take, or do not take, such as policymakers and curriculum writers choosing what knowledge to include in the curriculum, and how to do so. The possible interaction of individuals with policy documents and examinations may result in a change of behaviour towards the environment. Extensive coverage of environmental-impact topics in the curriculum may shape a new culture of responding proactively to environmental issues.

The social reality that this paper deals with is the global environmental crisis as evident in such phenomena as depletion of the ozone layer, rising levels of carbon dioxide in the atmosphere, global warming, deforestation, and improper waste disposal. The development of a curriculum to respond to this reality should involve teachers and the development of resources such as books, journals, worksheets, and water or soil test kits (Schulze, 2014). From a realist perspective, the learner is actively learning through experiences in relation to the environment created by the curriculum and by teachers (Schulze, 2014).

The curriculum, as a structure, is influenced and created in a particular cultural setting by curriculum writers exercising agency in certain ways, either enabled or constrained by the curriculum and the policy environment surrounding it. Curriculum writers need to consider not just what environmental issues and topics are included or excluded. They also need to consider how to encourage and enable the teaching of critical thinking, as well as connections between learners' own views and those of environmentalists, thus encouraging learning and changes in knowledge about, and changes in behaviour towards, the environment.

Research Design and Methodology

Data was selected from the Grade 12 CAPS documents, teacher and learner support materials, and examination question papers in order to analyse the proportion of environmental-impact topics in the curriculum based on the structure of policy documents and examinations between 2012 and 2015. This period was chosen because it followed the introduction of CAPS to the FET band of schooling.

Sampling strategies and population

The sampling method was purposive. An initial analysis of all 11 core Grade 12 subjects revealed that environmental-impact topics occurred in both the policy documents and examination question papers for only three subjects: Life Sciences, Geography and Agricultural Sciences. These subjects were therefore selected. The questions papers were analysed for alignment with what the policy projected in terms of the proportion of coverage of environmental-impact topics. Three subject policy documents and 12 past examination questions papers (2012–2015) were analysed across the three subjects. In each subject, both Paper 1 and Paper 2 were analysed.

The following environmental issues, derived from Dreyer and Loubser (2014), were used to select data from the documents analysed: ozone depletion, global warming, energy consumption, acid rain, air pollution, marine pollution, mineral-resource depletion, soil destruction, soil erosion, desertification, biodiversity reduction, extinction of plants and animals, nuclear reactors and waste disposal, human health and diseases, world hunger, land use, solid-waste disposal, hazardous chemicals, habitat destruction, invasive species, water quality, and wildlife management. An environmental-impact topic was defined as any section, word or phrase having the characteristics of one of these environmental issues.

Data-analysis technique

The Grade 12 CAPS documents and examination papers were analysed to determine the extent of inclusion of environmental-impact topics. The data analysis used focused and indexical transcription in the compilation of the data. Hartas (2010) indicates that focused transcription is helpful when a researcher is interested in recording the ways in which a given discourse was produced. Indexical transcription involves creating an index of the points at which key occurrences are found within the data. Descriptive and analytical coding (Richards, 2005) were also used. This can be seen in Tables 1 and 2 and also Figures 1 and 2.

Results

We begin the results of the document analysis by showing the breadth of content coverage, and then comparing breadth coverage in the different subjects.

Life Sciences requires learners to focus on biodiversity, to understand life-support systems and processes, to master basic ecological principles, and to learn about environmental impacts (Fundisa for Change, 2013). The analysis of the examination papers for Life Sciences (see Table 1) showed that questions were asked on threats to biodiversity. Themes included: the culling of elephants that are damaging vegetation and threatening the human population in the Kruger National Park; spillage of toxic minerals such as copper, thereby causing land degradation; carbon monoxide emissions in the atmosphere; alien-plant invasion; the negative effects of crops; excessive fertilisation of soil; and food wastage (DBE, 2016).

Geography requires learners to understand climate change and changing weather patterns, sustainable-development principles and practices, urbanisation and land-use management and sustainability, the management of natural resources, including water, and solutions that will result in the production of less carbon energy (DBE, 2016). As shown in Table 2, Geography

Table 1. Life Sciences Grade 12 results (2012 to 2015)

| Policy document (1) | Environmental-impact topics found | Time allocation | Examination papers | Environmental-impact topics found |
|---|--|-----------------|--|---|
| CAPS Life Sciences (http://www.education.gov.za/ : visited August 2016) | (Revision of Grade 11 topics) | 2.5 weeks | 2012 (DBE Life Sciences Grade 12 final paper: http://www.education.gov.za/ : visited August 2016) | 2012: Threats to biodiversity, culling of elephants that are damaging the Kruger National Park, and current crisis for human survival |
| | Human impact on the environment (p. 51) | | 2013 (DBE Life Sciences Grade 12 final paper: http://www.education.gov.za/ : visited August 2016) | 2013: Carbon monoxide emissions, spillage of toxic minerals such as copper, and invasion by alien plants in the environment |
| | Current crisis for human survival (p. 51) | | 2014 (DBE Life Sciences Grade 12 final paper: http://www.education.gov.za/ : visited August 2016) | 2014: Global warming and negative effects on crops |
| | Problems to be solved within the next generation (p. 51) | | 2015 (DBE Life Sciences Grade 12 final paper: http://www.education.gov.za/ : visited August 2016) | 2015: Illegal killing of wildlife, excessive fertilisation of soil, and food wastage |

Table 2. Geography Grade 12 results (2012 to 2015)

| Policy document (2) | Environmental-impact topics found | Time allocation | Examination papers | Environmental-impact topics found |
|---|---|-----------------|--|---|
| CAPS Geography (http://www.education.gov.za/ : visited August 2016) | Climate change and changing weather patterns, and sustainable-development principles and practices (p. 41) | Not stated | 2012 (DBE Geography Grade 12 final paper: http://www.education.gov.za/ : visited August 2016) | 2012: Impact of climate change, loss of biodiversity, land degradation, drought, river pollution and air pollution |
| | Urbanisation and land-use management and sustainability, management of natural resources, including water, and solutions for low carbon energy production (pp. 8, 9 and 45) | | 2013 (DBE Geography Grade 12 final paper: http://www.education.gov.za/ : visited August 2016) | 2013: Health hazards caused by mines, poverty, the negative impact of human activities on wildlife, and food security |
| | | | 2014 (DBE Geography Grade 12 final paper: http://www.education.gov.za/ : visited August 2016) | 2014: Effects of berg winds on veld fires, and negative effects of overpopulation in urban areas |
| | | | 2015 (DBE Geography Grade 12 final paper: http://www.education.gov.za/ : viewed August 2016) | 2015: Water pollution in the Vaal River, the environmental impact of cyclones, the high levels of pollution of the outskirts of towns, soil erosion, and overstocking |

examinations included questions on such aspects as: the negative impact of climate change; loss of biodiversity; drought; river pollution; the effects of berg winds on veld fires; land degradation and health hazards caused by mines; the negative effects of overpopulation in urban areas; and effective farm management of riverbanks (DBE, 2016). Geography also examines poverty, the negative impact of human activities on wildlife, food security, the effects of soil erosion, the impact of cyclones, pollution, and the effects of overstocking of rivers and dams (DBE, 2016).

In Agricultural Sciences, learners are required to develop an awareness of the management and care of the environment and natural resources, as well as the humane treatment of animals, through the application of science and related technology (DBE, 2016). Agricultural Sciences also encourages learners to be informed and responsible citizens in the production of agricultural commodities, in caring for the environment, and in addressing social-justice issues (DBE, 2016). Table 3 shows that Agricultural Sciences examinations were limited to the effects of alien plants on the environment, the threats from climate change, and the effects on natural resources of overstocking with livestock.

Table 3. Agricultural Sciences Grade 12 results (2012 to 2015)

| Policy document (3) | Environmental-impact topics found | Time allocation | Examination papers | Environmental-impact topics found |
|--|--|-----------------|--|--|
| CAPS Agricultural Sciences (http://www.education.gov.za/ : viewed August 2016) | The management and care of the environment and natural resources, as well as the humane treatment of animals, through the application of science and related technology (p. 13) Being informed and responsible citizens in the production of agricultural commodities, in caring for the environment, and in addressing social-justice issues (p. 13) | Not stated | 2012 (DBE Agricultural Sciences Grade 12 final paper: http://www.education.gov.za/ : visited August 2016) | 2012: Threats from climate change (heat stress in pigs) and adverse environmental conditions |
| | | | 2013 (DBE Agricultural Sciences Grade 12 final paper: http://www.education.gov.za/ : visited August 2016) | 2013: Effects of high temperature on animals |
| | | | 2014 (DBE Agricultural Sciences Grade 12 final paper: http://www.education.gov.za/ : visited August 2016) | 2014: Farm management |
| | | | 2015 (DBE Agricultural Sciences Grade 12 final paper: http://www.education.gov.za/ : visited August 2016) | 2015: The greenhouse effect and the risk to the environment of genetically modified plants |

Breadth of content coverage

'Breadth of content coverage' in this paper refers to the number of environmental-impact topics found in the CAPS documents as well as in Grade 12 examination question papers for the subjects, Life Sciences, Geography and Agricultural Sciences, from 2012 to 2015 (see Table 4).

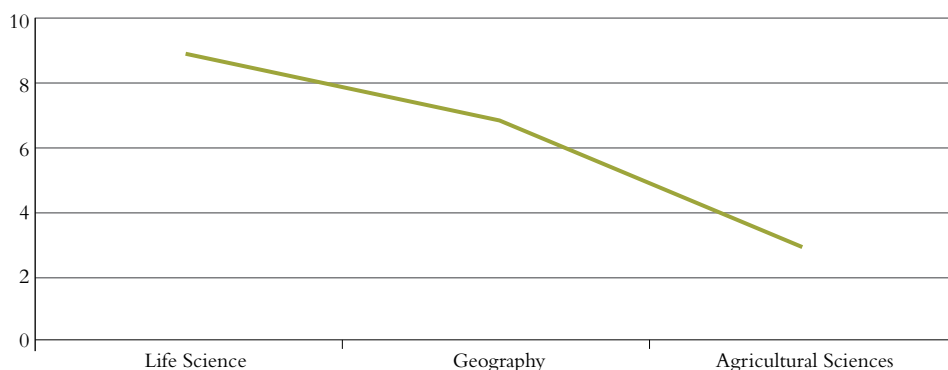
Table 4. CAPS document content coverage within three subjects in Grade 12

| | CAPS documents | | |
|---|---------------------|---------------|-----------------------|
| | Life Sciences | Geography | Agricultural Sciences |
| Total number of curriculum topics | 12 | 31 | 41 |
| Total number of environmental-impact topics | 1 | 3 | 1 |
| Tuition time allocation for all the topics in the curriculum | 28 weeks | 27 weeks | 29 weeks |
| Time allocation for environmental-impact topics | 2.5 weeks | 2 weeks | 1 week |
| Percentage time allocation for environmental-impact topics | 9% | 7% | 3% |
| Mark allocation for environmental-impact topics | 25 marks out of 300 | Not disclosed | Not disclosed |
| Percentage coverage in the examination of environmental-impact topics | 8% | Not disclosed | Not disclosed |

Table 4 shows that the subject policy documents contain only one environmental-impact topic in the Life Sciences, namely human impact on the environment and the sections thereof. Three topics appear in the Geography policy documents: the effects of soil erosion on people and the environment, the impact of coal mining, and the effects on the environment of using conventional energy. Only one relevant topic appeared in the Agricultural Sciences policy document, namely the effects of extensive farming on the environment.

Table 4 and Figure 1 show the extent (proportion) of coverage of environmental-impact topics in the CAPS documents for the three subjects selected for analysis. From Figure 1, it can be seen that Agricultural Sciences has the lowest coverage of environmental-impact topics, followed by Geography, and then Life Sciences, which has the largest proportion of environmental-impact topics. The proportion of environmental-impact topics in the CAPS documents varies. Of the three subjects analysed, Agricultural Sciences had the least coverage of environmental topics in terms of both time and content.

Figure 1. Percentage coverage of environmental-impact topics in three subjects



Proportion of content coverage in examinations

‘Content coverage’, here, refers to the proportion according to which environmental-impact topics in the CAPS curriculum are included in Grade 12 exit examinations in South Africa. In order to ascertain the depth of environmental themes in examination papers from 2012 to 2015, percentages are compared against all other aspects covered in the examination paper using marks allocated for environmental-impact topics (as defined earlier).

Tables 5 and 6 and Figure 2 provide information on the comparison and depth of environmental-impact topics in the three subjects investigated. Figure 2 shows that Agricultural Sciences had the lowest percentage coverage in the examinations, in line with the CAPS document analysis above. Figure 2 also shows that Geography had the largest coverage of environmental-impact topics in 2012, 2014 and 2015. In 2013, Life Sciences recorded the largest coverage when compared with the other two subjects. It should be noted that, although Agricultural Sciences had few environmental-impact topics included, the number increased over the four years investigated. In contrast, the proportional coverage of environmental-impact topics in Life Sciences and Geography decreased from 2012.

Figure 2. Percentage coverage of environmental-impact topics in examination papers

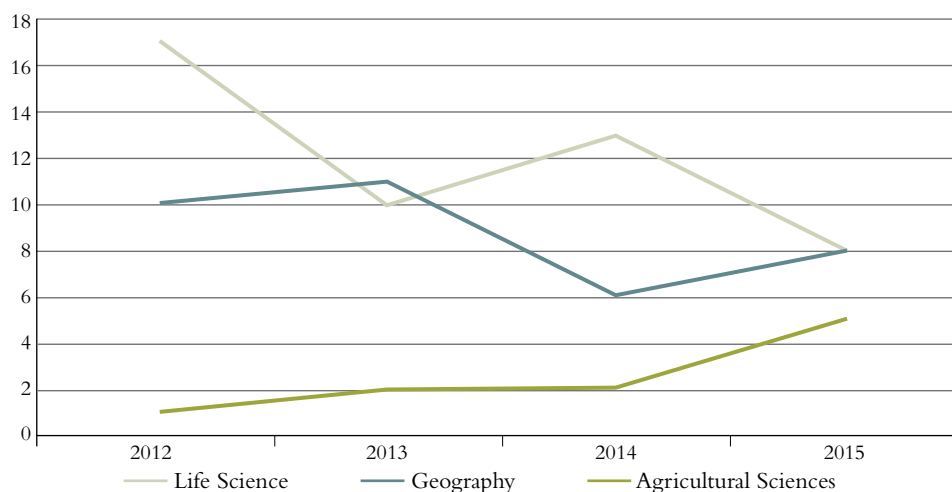


Table 5. Proportion of environmental-impact topics in examination papers (Life Sciences)

| Year | Life Sciences | | | |
|-----------------------------|---------------|------|------|------|
| | 2012 | 2013 | 2014 | 2015 |
| Marks allocated out of 300 | 31 | 33 | 19 | 23 |
| Percentage coverage | 10% | 11% | 6% | 8% |
| Average percentage coverage | 9% | | | |

Table 6. Proportion of environmental-impact topics in examination papers (Geography and Agricultural Sciences)

| Year | Geography | | | | Agricultural Sciences | | | |
|-----------------------------|-----------|------|------|------|-----------------------|------|------|------|
| | 2012 | 2013 | 2014 | 2015 | 2012 | 2013 | 2014 | 2015 |
| Marks allocated out of 300 | 52 | 30 | 40 | 23 | 4 | 6 | 5 | 16 |
| Percentage coverage | 17% | 10% | 13% | 8% | 1% | 2% | 2% | 5% |
| Average percentage coverage | 12% | | | | 3% | | | |

Discussion

The data shows the coverage and proportional coverage of environmental-impact topics for the three subjects in the CAPS document. The number of environmental-impact topics is compared with the total number of topics covered in the subject. In Life Sciences, only one environmental-impact topic is included in the Grade 12 subject policy document out of a total of 12 topics. Within this one environmental-impact topic, there are sub-topics covering human impact on the environment, the current crisis regarding human survival, and problems to be solved within the next generation. However, only 2.5 weeks out of 28 weeks are allocated for environmental-impact topics, which accounts for 9% of the time allocated to tuition.

In Geography and Agricultural Sciences, a total of 31 and 41 topics, respectively, are to be found, with three of these being environmental-impact topics in Geography, but only one being an environmental-impact topic in Agricultural Sciences. Environmental-impact topics constitute 7% and 3% in terms of time allocated for tuition purposes in Geography and Agricultural Sciences, respectively. The CAPS requirement for coverage of environmental-impact topics in Life Sciences, Geography and Agricultural Sciences is 9%, 7% and 3% of tuition time, respectively. These represent a low level of coverage of environmental education in the respective subject curricula, which is likely to constrain the development of a more pro-environmental culture among school learners.

The question that can now be asked is: To what extent are environmental-impact topics given attention in examinations?

The CAPS documents do not mention the Geography and Agricultural Sciences mark allocations for the actual final examination paper in Grade 12. However, the Life Sciences document indicates an average of 25 marks in a paper marked out of 300 (8%). Thus the Life Sciences policy document assists the examiners in knowing the specific proportion of environmental-impact topics that needs to be covered in the examinations. From this analysis, it is clear that Life Sciences is the subject where the most emphasis is placed on environmental-impact topics. If teachers and learners know there will be a summative assessment at the end of the year with questions on environmental-impact topics, they are likely to place emphasis on teaching and learning with regard to these topics. This may also lead to teachers and learners developing cultural values pertaining to the sustainable use of natural resources, as well as to the cascading of good environmental behaviour to communities. RST as a social theory

focuses on how individuals and society are related and how the interactions between them might bring about or hinder change in the social context of interest. Upon learning about environmental-impact topics, learners may be better able to become agents of change in relation to environmental sustainability.

The CAPS curriculum documents require 9% of the content of Life Sciences to be covered through the teaching of environmental-impact topics, and the results show that Life Sciences Grade 12 examinations indeed complied with the policy documents. Table 6 shows that Geography exceeded the 7% stipulated in the CAPS curriculum as shown in Table 4, with an average of 12% coverage in the Grade 12 examinations. The increased coverage of environmental-impact topics in the curriculum may well encourage teachers to continue teaching these topics, as they make up a significant percentage of the examinations at the end of the year. In Agricultural Sciences, there was an average of 3% allocated on the timetable, which is the same percentage as prescribed in the CAPS curriculum document.

The study found that the coverage of environmental-impact topics sometimes drops below the requirements of the policy documents. In Geography, for instance, there was a 9% drop in the marks allocated to environmental topics in the examinations between 2012 and 2015. This reduction of coverage in the examinations can have a negative effect on the way learners and teachers approach environmental content in the subject and could feasibly affect how they regard an environmental culture in the school as well as in society. Culture, according to RST, symbolises dominant ideas or prevailing cultural conditions that can affect an individual's perception of what can or cannot and should or should not be done in a social context. Where there is no alignment between policy coverage of environmental-impact topics with actual proportional coverage in the examinations, this may result in teachers being reluctant to emphasise such topics.

This paper argues that if teachers are going to be agents of change within school structures who act to change conversations and perceptions about environmental problems, they need to be supported by curricula that actively address environmental-impact topics consistently through the years. Consistency in the proportional coverage of environmental-impact topics in the curriculum, and alignment of the policy with actual practice in the examinations, would encourage pro-environment teaching practices, thereby enabling change in the culture of teaching environmental-impact topics. In the social realist analysis, the extent of the coverage of these topics in the examination papers may change the ways in which both teachers and learners focus on environmental-impact topics in their teaching and learning, both within and outside the classroom. A consistent presence of environmental-impact topics in the curriculum, and alignment in documents used by teachers and learners (such as past examination papers and textbooks) could encourage learners to act in order to address environmental issues.

In addition, teacher development is important. John, Mei and Guang (2013) suggest that, in order to successfully introduce a curriculum innovation such as environmental education, teachers need to be carefully and systematically prepared for, and guided during, such changes. For example, they could conduct impact research to support, monitor and

evaluate the changes. Furthermore, there is a need for research and development projects to examine issues such as organisational capacity and curriculum integration. It is on this latter aspect that this study has aimed to make a contribution.

Conclusion

The results show that environmental-impact topics are indeed covered in South Africa's Grade 12 CAPS curriculum, but to varying degrees. The level of coverage of environmental-impact topics in the examination question papers also fluctuates, sometimes to levels below those stipulated in the CAPS documents. The variable coverage of environmental-impact topics in the examinations may have a negative effect on the way teachers address the topics in the classroom. This is based on the observation that teachers tend to focus on topics they regard as important in order to prepare learners for the end-of-year examinations. This paper argues that there can be more coverage of environmental-impact topics in some subjects, because there is much more in the policy compared with what is being offered with regard to examinations.

It is recommended that further studies be conducted to analyse the impact of environmental-impact topics in the curriculum, as well as to evaluate the extent to which the actual content that learners are exposed to is adequate in changing patterns of behaviour with respect to environmental issues. Furthermore, studies can be conducted to evaluate the actual practices of key agents such as teachers and other curriculum implementers. The final recommendation is that policy developers should ensure that coverage of environmental issues in textbooks and summative assessments are aligned with the policy documents.

Notes on the Contributor

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