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Professional Development of Teachers in the Tshwane District for Effective Environmental Education

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Abstract

Many teachers in South Africa may have had little exposure to environmental education, yet the revised National Curriculum Statement emphasises the infusion of environmental education into all learning areas. The question arises whether professional development of teachers in environmental education is required for effective teaching in this field. The main aim of this study was to ascertain whether teachers have acquired the knowledge and skills necessary to infuse environmental education in all learning areas. Besides a literature review of sources, a questionnaire was developed as a research tool and 163 teachers in the Tshwane North District Office were involved in the survey. The results suggest that environmental education will have to be addressed in the professional development of teachers to ensure effective implementation of the National Curriculum Statement.

Introduction

As professionals are those who are qualified in a particular profession, teachers should accordingly be judged as professionals. The teaching profession is one that requires lengthy and continuous training, involves theory as background to practice, has its own code of behaviour, and has a high degree of autonomy (Dean, 1991:5). For the most part, tertiary education prepares a young person for a specific profession, yet concern for his or her welfare abruptly ceases once he or she is placed in their first year of teaching (Holy & McLoughlin, 1989: 34). Under these circumstances, the teacher's pre-service training may become inadequate or outdated, as requirements change. Although the signs of inadequacy are evident in the first years of teaching, teachers in service are also affected by changes in education with regard to the curriculum, outcomes, methodology, content, assessment and approaches (Lotz, *et al.*, 1998:4–5).

In the South African context, both pre-service and in-service teachers are challenged by changes in the curriculum, such as the replacement of content-based education by outcomes-based education, Curriculum 2005 and the Revised National Curriculum Statements (RNCS). The implementation of Curriculum 2005 took place in an environment characterised by enormous infrastructural backlogs, resource limitations, inadequate supply of quality learning materials and the absence of common national standards of learning and assessment, and was further accompanied by frustration with its design and implementation (Choma, 2003:15). In addition, the teacher development framework was not yet in place, and the policy guiding the

professional development and conduct of teachers was under revision (Janse van Rensburg & Lotz-Sisitka, 2000:3).

The Curriculum 2005 review committee confirmed the limitations of Curriculum 2005. The RNCS changed and reduced some features of Curriculum 2005 to critical and developmental outcomes, learning outcomes and assessment standards (Department of Education, 2001:3). The committee also recommended that Curriculum 2005 be streamlined and strengthened to emphasise environmental education (Lotz-Sisitka & Raven, 2001:9) and that environmental education should receive 'special attention' in the revised curriculum (*ibid.*, 2001:67). In light of this, a need arose for the development of teachers (both pre-service and in-service) for effective implementation of environmental education in schools. As an infused 'theme', professional development of teachers in environmental education needs to address the critical thinking and reflection of practitioners so that they can identify the means to better achieve the goals of environmental education (Heck, 1994:46) such as those stipulated by the Tbilisi conference (UNESCO, 1980) namely to '… provide every person with opportunities to acquire knowledge, values, attitudes, commitment and skills needed to protect and improve the environment'.

In order to eventually contribute to the protection of the global environment, teachers, as agents of change have to be environmentally educated to be able to help their learners acquire the necessary knowledge, skills, values and attitudes to improve and maintain their environment. Effective environmentally educated teachers should at least have basic competencies in professional education, environmental education content and environmental action skills (Oulton & Scott, 1995:229–231).

Problem Statement

Based on the preceding discussion, the following questions have to be answered regarding environmental education and professional development of teachers in this field:

1. Should the professional development of teachers address environmental education in particular for the effective infusion of the environment in all learning areas?
2. If there is a need for professional development of in-service teachers for effective environmental education, what kind of professional development is required and which strategies should be followed?

Research Method and Data-collection Techniques

A survey was conducted using a closed questionnaire that was based on a thorough study of the literature on professional development of teachers for effective environmental education. The questionnaire consisted of 71 statements with a five point Likert scale. A pilot study was carried out in the Brits Area Project Office with teachers in this region. Six categories of items were covered in the questionnaire.

The content of the items in the questionnaire represents the construct to be measured, namely the professional development of teachers for effective environmental education. Content

validity was determined by two specialists in the field of environmental education prior to the implementation of the research instrument. During the pilot study, the questionnaire was given to teachers who teach learners in the intermediate phase. These respondents were identified from a population similar to the target population. Parts of the questionnaire were designed with reference to topics taught in the intermediate phase learning areas. The questionnaire also determined the teachers' pre-service and in-service training with regard to effective teaching and learning of environmental education, such as conceptualisation of the term 'environmental education', environmental literacy, teaching methods appropriate to the teaching and learning of environmental education, outdoor activities, school environmental education policy and environmental issues.

The Cronbach-Alpha type of internal consistency was used in this study because it is generally appropriate to ascertain the reliability of survey research and other questionnaires in which there is a range of possible answers for each item (McMillan & Schumacher, 2001:242).

The necessary official permission was obtained from the office of the senior manager Strategic, Policy, Research and Development of the Gauteng Provincial Department of Education. The purpose of the questionnaire was explained to the teachers and confidentiality assured. The selected sample consisted of 216 intermediate phase teachers in the Tshwane North District. Of these, 163 returned the questionnaires giving a 75.5% response return.

Discussion of the Results

To ensure the effective implementation of environmental education in all learning areas, teachers need to be skilled in the approaches, methodologies, concepts, content, theory, and classroom practice of environmental education that will help them and their learners acquire the necessary environmental competences and skills. The findings reflected in Table 1 indicate that teachers participating in the survey were mostly female (75.5%), between the ages of 31 and 50 (81.6%) and teaching in a school in an urban or peri-urban area (76.1%). The majority of the respondents (92%) had more than five years of teaching experience. Most of the respondents (79.1%) were on Post Level (PL) 1 and held different academic qualifications, though most gained their professional qualifications by means of a teacher's diploma. The findings also indicate that the majority of teachers have no pre-service training in environmental education probably because no offerings were available during their initial teacher training. Only 45.4% of the teachers participating in the survey had received some form of pre-service training in environmental education and a mere 17.8% of teachers are qualified to teach environmental education. An overwhelming majority (82.2%) of teachers do not have any qualification in environmental education. This should be a concern for the Department of Education which, according to many of the respondents (42.9%) should take responsibility for the training of teachers in environmental education (Table 2). As most of the teachers do not have any qualifications in environmental education, they are probably not able to facilitate environmental education even though they may know what environmental education entails. Consequently, many of these in-service teachers may not tackle interdisciplinary themes and issues, and may consequently be reluctant or incapable of addressing environmental issues in their schools.

Table 1. Biographical data of respondents

	Category	Number (n=163)	Percentage (%)
Gender	Male	40	24.5
	Female	123	75.5
Age group in years	20–30	11	6.7
	31–40	77	47.2
	41–50	56	34.4
	50 +	19	11.7
School location	Informal settlement	39	23.9
	Rural area	0	0
	Peri-urban area	44	27
	Urban area	80	49.1
	Farm	0	0
Years of teaching experience	Less than 5 years	13	8.0
	5–10 years	36	22.1
	11–20 years	75	46
	More than 20 years	39	23.9
Current post-level	Educator PL1	129	79.1
	Head of Dept PL2	22	13.5
	Deputy/Principal PL3	8	4.9
	Principal PL4	2	1.2
	Other	2	1.2
Professional training	PTC	6	3.7
	PTD/STD	64	39.3
	UED	17	10.4
	SED/HED	62	38.0
	Other	14	8.6
Academic qualifications	Matric/Std10	51	31.3
	3-year degree	70	42.9
	Honours	26	16.0
	Masters	1	0.6
	Other	15	9.2
Pre-service training in environmental education	Yes	74	45.4
	No	89	54.6
Qualification in environmental education	Yes	29	17.8
	No	134	82.2

The results in Table 2 further show that the majority of the teachers (85.3%) have not attended any courses or training in environmental education so most of the courses or workshops that have been attended (74.8%) addressed other educational issues and not environmental education *per se.* By changing the focus of these in-service opportunities to environmental education, more teachers could be introduced to appropriate teaching and learning resources and to new approaches to teaching in which environmental education is infused into every learning area of the National Curriculum Statement.

Table 2. Training in environmental education

Statement	(n =163)	%
Have you attended any courses or training in environmental education?		
• Yes	24	14.7
• No	139	85.3
How does your school assist you most in your professional development? As a teacher?		
• Send you to courses or workshops	122	74.8
• Motivate you to read and study further	19	11.7
• Informal and individual discussions with teachers	14	8.6
• Work sessions during meetings	8	4.9
Which institution/sector, in your opinion, should take the responsibility for the training of teachers in environmental education?		
• In-service centres/teacher centres	36	22.1
• Private sector/NGOs	11	6.7
• Universities/Colleges	46	28.2
• Department of Education	70	42.9
Doing a course that prepares a teacher to be professionally competent in environmental education should be regarded as:		
• Knowledge expansion	69	42.3
• Continuing education	39	23.9
• Becoming a better teacher/further study	52	31.9
• Unnecessary	3	1.8
In your opinion, how important is environmental education in the school curriculum?		
• Very important	117	71.8
• Important	42	25.8
• Not important	4	2.4
Do you think that there is a need for training in environmental education?		
• Yes	130	79.8
• No	33	20.2
If you were given a chance to attend a professional development course or training in environmental education, what would be your area of need?		
• Knowledge about relevant content	18	11
• Skills needed for teaching environmental education	16	9.8
• Both of the above	114	69.9
• I have no need for further development	15	9.2

The teachers who participated in the survey regard environmental education as very important to the curriculum (71.8%), and suggested that becoming a competent environmental education teacher entails knowledge expansion (42.3%) more than continuing education (23.9%) or becoming a better teacher through further study (31.9%), even though 46.6% consider environmental education most relevant to the natural sciences and technology. If given the opportunity to attend a professional development course in environmental education, almost 70% indicated that the programme should include knowledge about the relevant content, as well as the necessary skills to infuse environmental education into their teaching. The respondents also indicated that there is a call for training in this field (79.8%). This suggests that efforts should be made to offer teachers some form of professional development in environmental education.

When questioned about environmental education in the school curriculum (Table 3) the majority of the respondents indicated that they implement environmental education in their classes (62%) and that they consider the outcomes in the revised National Curriculum Statement relevant to environmental education (72.4%). More than half of the teachers (54%) are of the opinion that environmental education should be a learning area on its own. This may be due to the possibility that teachers have a problem with infusing environmental education into all learning areas and would prefer it to be a separate learning area.

Table 3. Environmental education in the school curriculum (n = 163)

Statement	Yes (n)	(%)	No (n)	(%)	Unsure (n)	(%)
Does your school have an environmental education policy?	54	33.1	41	25.1	68	41.7
Do you think that environmental education deserves to be a learning area on its own?	88	54	64	39.3	11	6.7
Do you implement environmental education in your school and class?	101	62	55	33.7	7	4.3
Do you think that outcomes in the Revised National Curriculum Statement are relevant to environmental education?	118	72.4	10	6.1	35	21.5

Respondents were requested to indicate whether their schools had an environmental education policy. An environmental education policy is a plan that enables better teaching and learning, contributing to a healthy, enriching and more sustainable environment, by ensuring that the environment is integral to each learning area (Deenanath, 2004:4). In order for environmental education to be functional and effective, guidelines for implementing mechanisms such as environmental audits, programmes, action plans, policy statements, evaluations and reviews, must be given (Deenanath, 2004:5). Environmental education is implemented in the school via the environmental education policy. Such a policy is an agreed expression of principles and values to guide action plans for improving school-based environmental activities (Deenanath,

2004:6). What is disconcerting is the fact that almost half of the respondents (41.7%) were unsure of whether or not their school had an environmental education policy. This implies that even if such a policy exists, it may not be implemented in the schools' programme. A further 25.1% indicated that their schools did not have an environmental education policy, suggesting that most schools are not addressing this issue.

Environmental literacy is the disposition of teachers towards the environment and environmental education that determines to a large extent whether learners are educated to become adults who take responsibility to maintain the environment and improve the quality of life (Swanepoel, *et al.*, 2002:282). Although the survey suggests that teachers understand basic environmental concepts and show positive environmental behaviour (Table 4), the crucial issue of their ability to facilitate effective environmental education in the classroom needs to be addressed. The fact that some 20.3% of the teachers responded 'undecided' and 'disagree/ no' to whether they are willing to get involved in a project to develop a school garden, suggests a limitation in the eagerness of some teachers to participate in environmental matters. The development of a school garden could lead to the achievement of the Natural Science Learning Outcome 1: Scientific Investigation (Concepts of Life and Living) (Deenanath, 2004:88).

Table 4. Knowledge and understanding of basic environmental education concepts and attitudes toward random environmental issues (n = 163)

Statement	Agree/ Yes (n)	%	Undecided/ Unsure (n)	%	Disagree No (n)	%
Do you know what the World Summit on Sustainable Development entails?	117	71.8	4	2.4	42	25.8
All living things depend on air, water, food and soil to survive	153	93.9	1	0.6	9	5.5
Plants, minerals, soil, water and animals need to be conserved	154	94.5	3	1.8	6	3.7
Burning of coal releases gases into the atmosphere, which affect the survival of living things and cause air pollution	154	94.5	5	3.1	4	2.4
People should live in harmony with nature in order to survive	151	92.6	8	4.9	4	2.5
I am willing to be involved in a project to develop a school garden	130	79.7	20	12.3	13	8.0
Tree-planting days will increase public awareness of the necessity of trees	151	92.6	7	4.3	5	3.1

Table 4. Continued

Statement	Agree/ Yes (n)	%	Undecided/ Unsure (n)	%	Disagree No (n)	%
Family planning is important to avoid overpopulation	141	86.5	11	6.7	11	6.7
Conservation is a responsibility to be shared by individuals, industries, social groups, all levels of government and education	146	89.6	13	8.0	4	2.4
It is important to repair leaking taps	154	94.5	6	3.7	3	1.8
When shopping, I avoid buying products known to be harmful to the environment	129	79.1	20	12.3	14	8.6
I normally leave the water running when I brush my teeth	39	23.9	4	2.4	120	73.6
I take a shower instead of a bath to save water	62	38.0	12	7.4	9	54.6
Only science teachers should know how the environment works	10	6.1	4	2.5	149	91.4
Use of unleaded petrol reduces air pollution	99	60.7	34	20.9	30	18.4
I don't think it is my responsibility to teach environmental issues in the normal classroom situation	15	9.2	12	7.4	136	83.4
I encourage people to start using electricity for cooking, so that smoke pollution from homes can be reduced	123	75.5	17	10,4	23	14,1
I always switch off lights when I don't need them	147	90.2	2	1.2	14	8.6
I encourage my learners to write on both sides of the paper	145	89	4	2.4	14	8.6
I encourage my learners to pick up tins, bottles and papers at school	151	92.6	1	0.6	11	6.7

Recommendations

Based on the results it is apparent that many teachers require some form of development to enable them to successfully infuse environmental education into their teaching. The principle of infused environmental education learning is integral to the outcomes-based approach and the revised National Curriculum Statement. This infusion would ensure that learners experience learning areas as linked and interrelated. As environmental education is a functional field of study, it is advisable to integrate it as often as possible within all learning areas, through holistically planned approaches to lessons.

It is important that institutions that offer pre-service teacher training programmes focus on the infusion of environmental education into their programmes so that the interdisciplinary nature of environmental education is apparent to all prospective teachers. Some institutions in South Africa, such as Rhodes University, have a professional development programme aiming to strengthen environmental learning in schools through supporting teachers to get to know the RNCS, and to plan and implement lessons that are based on it, and that are situated in school-community contexts (Lotz-Sisitka & Schudel, 2007:252). By doing this, the professional development programme aims to foster applied competence amongst teachers, and teachers participate in cluster-based activities. This is an ideal strategy to address professional development in environmental education. Tertiary training institutions should critically assess their programmes to ascertain whether they do provide teachers with the opportunity to develop the necessary skills, knowledge and attitudes needed to successfully integrate environmental education in all their teaching.

It is also highly recommended that in-service programmes and workshops are established for in-service teachers to provide them with the necessary competences and skills to become active participants in promoting effective teaching and learning of environmental education. This should be done under auspices of the Department of Education.

In addition, teachers should engage in institutional and non-institutional professional and academic programmes aimed at improving skills to implement the curriculum and to ensure professional growth on an on-going basis. Based on the findings of this study, there is little doubt that teachers should be offered the opportunity to gain the necessary environmental education competences to ensure that all outcomes in the RNCS are met.

Conclusion

It is necessary to plant the seed of environmental education teaching and learning approaches during pre-service teacher training, and to nurture the seedling continuously during in-service training to strengthen effective environmental learning in schools. Through environmental education learners will become environmentally knowledgeable, skilled and dedicated citizens, who are willing to work individually and collectively to improve or maintain the quality of the environment (Fien, 1993:13). Learners will then become responsible adults who are willing to maintain a healthy environment (Republic of South Africa, 1996:11). Educating learners in

environmental education will result in educating the community, nation and future generations, contributing to sustainable development.

Notes on the Contributors

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Reference List

African National Congress (1994). *The Reconstruction and Development Programme – a Policy Framework*. Johannesburg: Umanyano Publications.

Bornman, M. (1997). Environmental Education and the Curriculum: a South African Perspective. *Educare*, 26 (1-2): 56-57.

Choma. (2003). *Phasing in Outcomes Based Education: Further Education and Training,* 15 January 2003.

Dean, J. (1991). *Developing Teachers and Teaching Professional Development in School*. Philadelphia: Open University Press.

Deenanath, G. D. (2004). *Effective Implementation of School Environmental Policies in a School District in Gauteng*. MEd dissertation. Pretoria: University of South Africa

Department of Education (1995). *White Paper of Education and Training.* Pretoria: Government Printer.

Department of Education (2001). *Draft Revised National Curriculum Statements*. Pretoria: Department of Education.

Department of Education (2002). *Revised National Curriculum Statements Grades R-9 (Schools) Policy.* Pretoria: Department of Education.

Department of Environmental Affairs and Tourism (1989). *White Paper on Environmental Education*. Pretoria: Government Printer.

Department of Environmental Affairs and Tourism (1999). *White Paper on Environmental Management Policy*. Pretoria: Department of Environmental Affairs and Tourism.

Fien, J. (1993). Education for Sustainable Living: An International Perspective on Environmental Education. *Southern African Journal of Environmental Education*, xx: 7-20.

Heck, D. (1994). Landcare: New Directions in Professional Development for Environmental Education. *Southern African Journal of Environmental Education*, 14: 46-55.

Holy, M. L. and McLoughlin, C. S. (1989). *Perspectives on Teacher Development*. London: Falmer Press.

Irwin, P. R. (1993). *Environmental Education in Bophuthatswana with Particular Reference to Pre-service Primary Teacher Education*. DEd thesis. Pretoria: University of South Africa.

Janse van Rensburg, E. & Jenkin, N. (1999). *EEASA '99: 'Growing together' Proceedings of the Annual Conference and Workshops of the EEASA*. Grahamstown: Department of Education and Rhodes Environmental Education Unit, Rhodes University.

Janse van Rensburg, E. & Lotz-Sisitka. H. (2000). *Learning for Sustainability: An Environmental Education Professional Development Case Study Informing Education Policy and Practice*. Johannesburg: Learning for Sustainability Project.

Lotz, H.B., Tselane, T. & Wagiet, R. (1998). *Supporting Curriculum 2005: Developing Learning Programmes with 'Environment' as Phase Organiser.* Pretoria: Department of Environmental Affairs and Tourism.

Lotz-Sisitka, H. B. & Raven, G. (2001). *Active Learning in OBE: Environmental Learning in South African Schools – Research report of the National Environmental Education Programme (NEEP) – GET Pilot Research Project*. Pretoria: Department of Education.

Lotz-Sisitka, H. & Schudel, I. (2007). Exploring the Practical Adequacy of the Normative Framework Guiding South Africa's National Curriculum Statement. *Environmental Education Research*, 13 (2): 245-263.

Loubser, C. P. & Ferreira, J. G. (1992). Environmental Education in South Africa in Light of the Tbilisi and Moscow Conferences. *Journal of Environmental Education*, 23 (4): 31-34.

McMillan, J. H. & Schumacher, S. (2001). *Research in education: A Conceptual Introduction*. New York: Longman.

Oulton, C. R. & Scott, A. H. (1995). The 'Environmentally Educated Teacher': an Exploration of the Implications of UNESCO-UNEP's Ideas for Pre-service Teacher Education Programmes. *Environmental Education Research*, 1 (2): 213-231.

Republic of South Africa (1996). *Constitution of the Republic of South Africa*. Pretoria: Government Printer.

Swanepoel, C. H., Loubser, C. P. & Chacko, C. P. C. (2002). Measuring the Environmental Literacy of Teachers. *South African Journal of Education*, 22 (4): 282-285.

United Nations Educational, Scientific and Cultural Organisation (UNESCO) (1980). *Environmental Education in the Light of the Tbilisi Conference*. Paris:UNESCO.