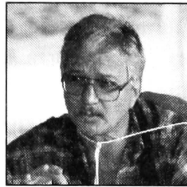# The Emerging Face of Environmental Education in South Africa's Formal Education: Curriculum 2005 and the Environmental Education Curriculum Initiative

ABSTRACT

An indication is given of how the Republic of South Africa's new school curriculum, Curriculum 2005, provides significant opportunity for the inclusion of environmental education. Aspects of the important role played by the Environmental Education Curriculum Initiative in the infusion of environmental education into Curriculum 2005 are outlined. The paper discusses several of the many challenges to be addressed in the implementation of Curriculum 2005 and its environmental education potential, and concludes with reference to the particular place of teacher education in this process.

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Despite some past efforts in South Africa (Department of Environmental Affairs 1989) aspects of environmental education have been present only on an ad hoc basis, largely as nature experience education about and in the environment (Irwin 1990), in an education system which emphasised content, passive rote learning and examinations.

'a period of transformation in every sphere of life'

However, at the time of writing this paper post-apartheid South Africa was in a period of transformation in every sphere of life, including education and training. Significant statements about education and the environment have included the following:

- the Reconstruction and Development Program (African National Congress 1994) advocated "programs to rekindle our people's love of the land, to increase environmental consciousness amongst our youth, to coordinate environmental education with education policy at all levels, and to empower communities to act on environmental issues and to promote an environmental ethic"

- the 1995 White Paper on Education and Training clearly stated that for the first time in South Africa's history, a government had been given the mandate to plan the development and training system for the benefit of the country as a whole and all its people (Republic of South Africa 1995)

- the new South African Constitution protects the right of every citizen to a healthy environment (Republic of South Africa 1996)

- the White Paper on Education and Training (Republic of South Africa 1995) and the White Paper on Environmental Policy (Republic of South Africa 1997) stated that environmental education was critical at all levels of education and in all programs so that environmentally literate and active citizens would ensure that South Africans had a decent quality of life through the sustainable use of resources.

In addition to being a response to the above Curriculum 2005 attends to South Africa's obligations to a national strategy for ecologically sustainable development. The National Curriculum Development Committee's vision for South Africa is the development of a new curriculum which "encompasses a prosperous, truly united, democratic and internationally competitive country with literate, creative and critical citizens, leading productive, self-fulfilled lives in a country free of violence, discrimination and prejudice" (National Curriculum Development Committee 1996).

The national education system and Curriculum 2005

The National Qualifications Framework

A long process of research and development, one accelerated by the election of the new government of national unity in 1994, produced the new education system and its scaffolding, the National Qualifications Framework. The process of fundamentally changing the education and training system in South Africa was led by the education sector and by labour trade unions, training boards and so on, both sectors having reached the conclusion that South Africa was in desperate need of a new education system.

It is intended that the National Qualification Framework will:

- empower South Africa's human resources through education and training of a high standard
- integrate education by closing the gaps between "education" and "training", academic and applied knowledge, theoretical knowledge and skills, and
- link the different levels of learning to each other so that learners can move more easily from one area of work, or from one learning situation, to another (Olivier 1997).

The Framework is organised in several stages as indicated in Figure 1 below.

The new system will both:

- provide learners with access to nationally accepted qualifications through formal, non-formal and informal learning situations, and

- recognise, and register on the National Qualifications Framework, credits for different forms of learning such as fulltime, part-time, distance learning, work-based learning and life experience so that learners who leave school before completing their formal education will be able to combine credits gained at school and in the workplace towards assessment for a certificate.

National Qualifications Framework standards and qualification criteria are being established and the functioning of this system monitored by the South African Qualifications Authority through a number of National Standard Bodies which bring together academic disciplines and employment sectors.

Curriculum 2005 for school education forms a central part of the formal education component of the National Qualifications Framework. The proposed 'critical cross-field outcomes' for the new National Qualifications Framework and for Curriculum 2005 are that:

Figure 1: The structure of the National Qualifications Framework

Structure of the NQF

NQF level	Band	Kinds of qualifications and certificates		Locations of learning for units and qualifications		
8	Higher	Doctorates Further research degrees		Tertiary/Research/ Professional institutions		
7	Education	Higher degrees Professional qualifications		Tertiary/Research/ Professional institutions		
6	and	First degrees Higher diplomas		Universities/Technicons/Colleges Private/ Professional Institutions		
5	Training Band	Diplomas Occupational certificates		Universities/Technicons/Colleges Private/ Professional institutions/Workplace etc.		

Further Education and Training Certificate

4	Further Education	School/College/Trade certificates Mix of units from all		Formal high schools/Private/ State schools	Technical/ Community/ Police/Nursing/ private colleges	RDP and Labour Market schemes, Industry Training Boards, unions, workplaces etc.
3	and Training	School/College/Trade certificates Mix of units from all				
2	Band	School/College/Trade certificates Mix of units from all				

General Education and Training Certificate

1	General	Std 7/Grd 9 (10 years)	ABET Level 4	Formal schools (Urban/Rural/ Farm/Special)	Occupation/ Workbased training/RDP/ labour market schemes/ Upliftment programmes/ Community programmes	NGOs/Churches/ Night schools/ ABET programmes/ Private providers/ Industry Training Boards/unions/ workplaces etc.
	Education	Std 5/Grd 7 (8 years)	ABET Level 3			
	and	Std 3/Grd 5 (6 years)	ABET Level 2			
	Training	Std 1/Grd 3 (4 years)	ABET Level 1			
	Band	1 year Reception				

"[Learners should be able to]

1. Identify and solve problems in which responses display that responsible decisions using critical and creative thinking have been made.
2. Work effectively with others as a member of a team, group, organisation, community.
3. Organise and manage one's activities responsibly and effectively.
4. Collect, analyse, organise and critically evaluate information.
5. Communicate effectively using visual, mathematical and/or language skills in the modes of oral and/or written presentation.
6. Use science and technology effectively and critically, showing responsibility towards the environment and the health of others.
7. Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not arise in isolation." (South African Qualifications Authority, 1996).

In addition to the above it is intended that individuals become aware of the importance of:

- Utilising strategies to learn more effectively
- Participating as responsible citizens
- Being culturally and aesthetically sensitive
- Exploring education and career opportunities
- Developing entrepreneurial abilities.

These generic and cross-curricular outcomes are not restricted to any specific learning context but inform the formulation of specific outcomes in individual areas of learning for all learners at all levels on the National Qualifications Framework. They are working principles which are intended to direct teaching, training and education practices and the development of learning programs and materials.

The development of Curriculum 2005

'a major paradigm shift in the education system in South Africa'

The infusion of the new curriculum, which draws on models from Australia, Canada, New Zealand, Scotland and Africa will be phased in by starting with Grade 1 in 1998 and then take shape over a period of at least eight years ending in 2005—hence "Curriculum 2005"

The new curriculum, officially launched by the national Ministry of Education on 24 March 1997, marks the beginning of a lifelong learning approach to education which also encourages learners to develop at their own pace. It represents a major paradigm shift in the education system in South Africa in that it:

- changes the focus of the education system from content to outcomes
- is result, not content, driven
- supports learners in developing in a holistic manner as they progress in achieving outcomes
- aims to equip learners with the knowledge, competences and orientations needed for success once they have left school or completed their training, and for adult life in general (Olivier 1997).

Learning areas and outcomes

'Eight core learning areas......replace the previous system of school subjects'

Eight core learning areas, which replace the previous system of school subjects, have been identified by the Working Group of the National Curriculum Development Committee which consisted of representatives from a wide spectrum of interest groups. The learning areas were approved by the provincial Council of Education Ministers as the framework and foundation for the new school curriculum. The core learning areas and their focuses are shown in Table 1.

Table 1: Core learning areas

Learning Area	Focuses
Language, Literacy & Communication	Official, classical, eastern & modern European languages
Human & Social Sciences	Time, continuity & change; place and space; religious studies; social services - including education, law and security
Technology education	Technology, computing, technical
Mathematical literacy, Mathematics & Mathematical Sciences	Mathematics, statistics
Natural Sciences	Biological & physical sciences, agriculture, engineering
Arts and Culture	Dance, drama, music, arts
Economic and Management Sciences	Economic principles, economic education, business management (including entrepreneurship)
Life orientation	Health education, physical education, intra- and interpersonal development, guidance, occupational learning

The new school curriculum consists of four phases, as indicated in Table 2 on the next page.

Table 2: Phases of the new curriculum

Phase	Grades/Content
Foundation	Grades 1–3 Numeracy, Life Skills, & Literacy (equal emphasis on each)
Intermediate	Grades 4–6 Language, Literacy and Communication; Mathematical literacy, Mathematics, and Mathematical Sciences; Natural Sciences and Technology; Human, Social, Economic and Management Sciences; and Arts, Culture and Life Orientation
Senior	Grades 7–9 All eight learning areas
Further Education Band	Grades 10–12 Content and structure still under debate

A rigid division between academic and applied knowledge, theory and practice, knowledge and skills is rejected by Curriculum 2005, and the integration of knowledge is one of its key principles. A strong emphasis is also placed on highly contextualised and largely integrated teaching and learning via cross-curricular themes or topics in both the Foundation and Intermediate phases.

One of the major tasks of a series of Learning Area Committees, completed with the assistance of a Canadian delegation, was to classify the broad critical outcomes referred to above into specific outcomes. There are between seven and ten of these for each Learning Area, as set in Appendix A. The intention is that they inform classroom teaching and learning on a day-to-day basis.

Learning Programs

A Learning Program serves a similar function to that of a traditional syllabus, except that it will allow for individual interpretation by the teacher, and is also intended to serve as suggested guide for units of work. Each Learning Program consists of combinations of specific outcomes from the eight learning areas. Because of the initial plan to implement Curriculum 2005 in 1998 on two levels, namely Grades 1 and 7, draft Learning Programs for these two grades were completed at national level in June 1997. Since then, implementation of Grade 7 has been put on hold—nobody seems to be sure until when!. The final Learning Programs for the whole compulsory General Education and Training (GET) band—Grades 1–9—are eventually to be decided on by the nine provincial education departments. At this stage progress maps have been finalised for Grades 1–3. These have been piloted up to November 1998 and feedback given to the provincial Educational Head Offices.

'Thus 'environment'.....[is] a cross-curricular feature of all new learning programs'

Three national Phase Committees—one each for the Foundation, Intermediate, and Senior curriculum phases—were established to refine the curriculum for the respective phases. The specific outcomes in the Learning Programs have been clustered by the Phase Committees around certain focal points, called Phase Organisers. These Phase Organisers—'Communication'; 'Culture and Society'; 'Environment'; 'Economy and Development'; 'Personal Development and Empowerment'—facilitate integration within Learning Programs and give the Learning Program a science, environment and society outlook. Thus, because 'environment' is one of the Phase Organisers it is a cross-curricular feature of all new learning programs. To develop units of work, or classroom-based learning programs, teachers select and use central topics or Program Organisers to contextualise the learning experience according to local needs.

In practice, then, the following arrangement might occur:

- Learning program: Literacy
- Phase organiser: Environment
- Program organiser: Pollution

This example indicates how 'environment' can serve a contextualising and integrating function in the new curriculum. The materialisation of this in classrooms, however, is totally dependent on teachers' understanding of 'environment' as an organiser and their competence in applying it when developing their learning programs.

To assist teachers in their implementation of the new curriculum, a Learning Program Committee was established to develop exemplars of learning programs, using each of the six Phase Organisers.

Initial implementation of Curriculum 2005

A national pilot study was undertaken in schools in each province. Each province selected thirty schools to take part in the pilot project to trial Curriculum 2005, the draft learning programs and the learner support materials. Pilot schools were from urban, rural, farm and informal settlement areas. Provinces were also asked to include schools for children with special educational needs and to invite independent schools to join.

Teachers in the different provinces could apply on a regional basis for the positions of trainers. These training teams consisted of ten selected teachers from the Foundation curriculum phase, one representative of each of the eight learning areas, and the heads of inservice training for the province. They were trained and divided amongst the different regions in the particular province to assist

Grade 1 teachers in implementing an outcomes-based education philosophy and methodology as reflected in Curriculum 2005, in the pilot schools over a six-week period which started on 8 August 1997. Once the training of the Grade 1 teachers in the pilot schools was completed, the provincial training teams started with intensive training of all Grade 1 teachers. This happened on a district basis within the mentioned educational regions within each province, using the cascade training model: Educational District officials and selected teacher representatives from each district attended intensive residential workshops, whereafter these teacher representatives then intensively trained all Grade 1 teachers in each district through hands-on workshops. This took place over the remainder of the 1997 school year. The aim was to ensure that, by the end of 1997, all Grade 1 teachers throughout the country would have been supported in the shift to the outcomes based education intended by Curriculum 2005. Based on the feedback received from the piloting process, and from submissions from the public, the final document on implementation for Grade 1 in 1998 had been developed by December 1997. This would inform future training and development of support materials.

Once implementation of Curriculum 2005 started in 1998, its progress has been monitored at selected schools in each province by independent agencies such as a university department or other institution.

Curriculum 2005 - a critique

Despite the well-founded intentions of governments and curriculum writers Curriculum 2005 and its guiding principle, outcomes based education, have met with criticism. Although outcomes based education may be described by its proponents in positive terms such as those used by Mamary (1991) and Spady (1988) it appears to have been borrowed, warts and all, from New Zealand/Australian/Scottish/Canadian educational systems (Committee for Development Work on the NQF: appendices B, C, G, H and I: 1996). Apparently no thought has been given to factors such as South Africa's:

• unique cultural diversity

• relatively less economically developed status

• enormous problems of inequity brought on by decades of apartheid policy

• less favourable status with regard to educational facilities, teacher education and remuneration, general community literacy levels and numbers of pupils per classroom, in some rural classrooms in South Africa a teacher:pupil ratio of 1:80 and higher being common.

It was the view of Jansen (1997a) that to simply transplant a curriculum paradigm and design that worked well in educationally robust environments on to one that was impoverished in many regards, without any significant modifications, would be to invite disaster.

There are practical difficulties which might lead to a clash between ideals and reality. Jansen (1997b) has remarked that:

> *outcomes-based education is supposed to create learner-centred classrooms, substitute memory learning for understanding, and develop learners who critically apply and demonstrate what they have learnt in different contexts. How will this happen for an underqualified teacher with 60 children in a classroom designed for 25 learners with no resource material? How will this happen when in many urban township schools more than 30% of learning time is lost to non-school activities? And how can this happen without sustained training at the classroom interface?*

Jansen (1997b) has also argued that the language associated with outcomes based education is too complex, since a teacher attempting to make sense of it will have to come to terms with more than 75 new concepts. For example: critical outcomes, specific outcomes, unit standards, range statements, notional time, performance indicators, assessment criteria, bands, levels, phases, and their relationship to South African Qualifications Authority, the National Qualifications Framework, National Standards Setting Bodies, Education and Training Qualifications Authorities and so on. Perhaps the most trenchant criticism of Curriculum 2005 is contained in Jansen's (1997b) statement that:

> *the new plan offers a narrow, instrumentalist view of knowledge inappropriate for classroom teaching. There is a fundamental contradiction in insisting that students use knowledge creatively only to inform them the desired learning outcomes are already specified.*

From a different angle, some critiques state that the agenda for Curriculum 2005 is political and a form of affirmative action to redress the educational wrongs of the past. It is also seemed to be aimed at scoring political points for the 1999 general election (Rapport 1997).

It seems as if the national educational authorities give little credence to the above mentioned critique from different sources. No major adjustments were made in either policy and practice of Curriculum 2005, although some of the realities, referred to earlier in this section, forced the government to reschedule the implementation time frame; instead of launching the new curriculum in 1998 in both Grades 1 and 7, it was eventually decided to limit this to Grade 1 only.

The Environmental Education Curriculum Initiative and the place of environmental education in the new curriculum.

The nature and origin of the Environmental Education Curriculum Initiative

The Environmental Education Curriculum Initiative was established in 1996 to continue the work of the Environmental Education Policy Initiative which had been active since 1992, and to encourage a broad, participatory process of curriculum development for environmental education in South Africa. It is a movement or initiative supported financially by Gold Fields Mining Company through the Green Trust (SA) and the Department of Environmental Affairs and Tourism, and contributed to by at least four groups of stakeholders:

- environmental education interests in formal and non formal educational sectors from South Africa's nine provinces and different educational levels in South Africa, for example Teachers' organisations, Universities, Colleges, Parks Boards, Non-governmental organisations, and individuals described as "friends of environmental education"

- the Environmental Education Association of Southern Africa

- the Department of Environmental Affairs and Tourism which provides the communication and infrastructure support

- the Human Sciences Research Council's Division for Environmental Management which in 1997 launched a number of research projects within the framework of a broader project called 'A Facilitative Program for Environmental Education Curriculum Development'.

Working groups to identify needs and initiate projects for teacher education, curriculum research, development of resource materials, and learning program development have been established by the Environmental Education Curriculum Initiative.

The role of the Environmental Education Curriculum Initiative in developing environmental education in Curriculum 2005

The Environmental Education Curriculum Initiative has formally contributed to the development processes of Curriculum 2005 in participating in the Department of Education's national curriculum workshops during 1996 and in having representation on the Learning Area Committee for Human and Social Sciences. It has also been represented at all the Coordinating Committees and phase committees involved in the development of learning programs for the new curriculum.

With the commencement of the education reform process, the Environmental Education Curriculum Initiative published a discussion document which was circulated to all stakeholders involved in the curriculum development process, in an attempt to support policy and curriculum initiatives. In this document, the following range of policy options for environmental education in a new curriculum were proposed (Environmental Education Curriculum Initiative 1996b):

- In the case of a curriculum where traditional disciplines have been clustered into learning areas:

  - an integrated approach—environmental perspectives are present in all learning areas.

The Phase Organiser "Pollution" mentioned earlier is an obvious example of a perspective that can be approached within any learning area.

- In the case of a curriculum which is still based on the traditional disciplines:

  - environmental education as a separate discipline with its own set of outcomes.

This could take the form of disciplines such as Environmental Studies or Education for Sustainable Living.

  - environmental education as a separate component or module within a discipline. Examples of this would be in Chemistry, where the environmental implications of use of resources, or of by-products, chemical waste and so on are examined, or in a History component considering environmentalism as a social movement (see Goodall 1994).

  - environmental education as local, environmental problem-solving curriculum action.

This would involve a participatory approach to local environmental issues and, ideally, teacher action research towards continual improvement of curricula. (see for example Robottom, 1994).

'Environmental Education.....a cross-curricular concern'

In April 1997, when it had become clearer in which direction the curriculum developing process was moving, the Environmental Education Curriculum Initiative released a document, "Enabling Environmental Education as a cross-curricular concern in outcomes-based learning programs" (Environmental Education Curriculum Initiative 1997). This was also in response to further developments in Curriculum 2005 which saw the original 500 specific outcomes generated by the eight Learning Area Committees reduced so that only 66 specific outcomes remained, some of which did not link up directly with environmental education, for example A2, A5, B8, C4, D1, D2, D6, E6, E8, F3 in Appendix A.

The document indicated how specific outcomes without an

obvious environmental education link could be interpreted so that an environmental education approach was possible without jeopardising the context of those outcomes. It expressed "grave concern [at] ... the disregard for issues of sustainability and cross-curricular inclusion of environmental concern", and showed how environmental concerns were an integral part of each learning area, thus demonstrating the cross-curricular nature of environmental education (Environmental Education Curriculum Initiative 1997). Three possible ways of developing environmentally contextualised learning programs were proposed—a topic-outcomes approach; a thematic-outcomes approach; and an issues-based approach—and examples of the implementation of these approaches in the different learning areas were given.

The implementation of Curriculum 2005 has much potential for school environmental education in South Africa because some of the most prominent essential characteristics of education for the environment are in line with the kind of outcomes based approach which forms the basis for the new curriculum. For example, Fien (1993) proposed the following essential elements of education for the environment.

1. The development of
   - a critical environmental consciousness based on:
     - an holistic view of the environment as a totality of the interdependent relationship between natural and social systems
     - an historical perspective on current and future environmental issues, and
     - the study of the causes and effects of environmental problems, and alternative solutions to them, through an examination of (i) the relationships between ideology, economy and technology, and (ii) the linkages between local, regional, national and global economies and governments.
   - problem-solving and critical thinking skills through a variety of interdisciplinary, practical learning experiences which focus on real-world problems and involve the study of a wide range of sources and kinds of information
   - the understandings, attitudes and skills of political literacy which promote participation in a variety of forms of social action to help improve and maintain environmental quality
   - an environmental ethic based upon sensitivity and concern for environmental quality
   - skills needed to identify, investigate, and take action toward the prevention and resolution of environmental issues.
2. Employment of teaching strategies and methods that are consistent with its goals, including the provision of experiences in the active resolution of environmental

issues and questions as students apply the awareness, knowledge, action skills and environmental ethics they acquire.

Environmental education as outlined above can contribute significantly to the realisation of each of the Critical Outcomes set out in an earlier section of this paper.

Engelson and Yockers' list (1994) of aims for environmental education also suggests a strong link between environmental education and the Critical Outcomes contained in Curriculum 2005. These are: perceptual awareness; knowledge; environmental ethics; citizen action skills; and citizen action experience.

Environmental education also links up closely with the outcomes based approach of Curriculum 2005 with regard to assessment and the role of the teacher. In outcomes based education the role of the teacher is that of facilitator, support and guide who assists the processes of working in a team. Assessment becomes an integral part of learning; it is on-going and assesses attitudes—learners' ability to describe their attitudes and the implications of them, rather than whether learners possess certain "right" or "appropriate" attitudes—and learners' skills, as well as knowledge; it helps learners to succeed and to improve; teachers and learners use a variety of assessment methods to assess learning progress towards specified outcomes.

'environmental education.....potentially integral to each of the eight learning areas'

This paper proposes, then, that environmental education clearly fits into the outcomes and the methodology of the new curriculum. Further, the Environmental Education Curriculum Initiative (1996c) considered that environmental education was potentially integral to each of the eight learning areas mentioned earlier, permeating them as an approach to education and as a particular focus, amongst others, within each one and that "all the eight areas of learning mentioned can be extended and enhanced significantly by the principles, processes and concepts central to environmental education" (Environmental Education Curriculum Initiative 1996a).

It is hoped that the above mentioned and further inputs of the Environmental Education Curriculum Initiative will contribute to environmental education taking an effective place in education in South Africa. Towards this the Environmental Education Curriculum Initiative sees its role changing from a curriculum initiative to a curriculum capacity building project. This has already started materialising in the sense that different stakeholders in the EECI have recently become involved in various ways—primarily to support teachers in developing competency in the implementation of 'environment' as an organiser in the development of learning programs. For example: the sub-directorate for Environmental Education of the Department

of Environmental Affairs and Tourism (DEA & T), as well as some universities, the provincial education departments and many non-governmental organisations (NGO's) in the environmental education field, have embarked on (Tselane, 1998a):

- intensive programs of workshops for grade 1 teachers in different provinces (Tselane, 1998b). Feedback from these workshops has indicated at least some success. For example, exemplars of learning programs with 'environment' as organiser, developed by teachers in Northern Cape province, were recently published by the DEA & T

- the development and distribution of resource material. This includes the intention to carry out an audit of existing resource material in environmental education in order to help teachers and teacher educators become aware of what local material is available and of how and where to use these in the curriculum, and to stimulate development of own low cost material

- teacher education support for environmental education in outcomes based education. One workshop has been held already, during which a need to restructure college courses was identified

- research projects, coordinated by the Human Sciences Resource Council, aimed at building the capacity of teachers and teacher educators in collaborative research into different aspects of developing the kind of environmental education that is desirable and practicable in the new curriculum.

Teacher education—a further challenge for environmental education in Curriculum 2005

The importance of teacher education

Discussion earlier in this paper has acknowledged some of the difficulties which need to be overcome if the potential of Curriculum 2005, and its environmental education content, are to be realised. In any country the need to reform teacher education poses such a difficulty—and further challenges to the implementation of environmental education.

'teacher education.....could become a significant bottle-neck'

It is regarded as a priority activity and a key factor in the development of environmental education (Brundtland 1991, UNESCO-UNEP 1988, Fien et al 1993). A similar view has been echoed in several South African sources (for example, Committee on Teacher Education Policy 1994, Department of Education 1995, Department of Environmental Affairs and Tourism 1995). In addition to this the Environmental Education Policy Initiative (1995) considered that, if it were not treated as a priority, teacher

education—especially with regard to environmental education—could become a significant bottle-neck in the delivery process inherent in educational innovation and the restructuring of the education system.

That South African teacher education institutions should be involved in training their education students for environmental education has been stated in recent official policy documents (Department of Education 1995, Department of Environmental Affairs and Tourism 1995) and in other sources (Clacherty 1994, Environmental Education Policy Initiative 1995). Unfortunately, at the moment this is only an ideal in the South African context; too many teacher education institutions have not yet made provision for environmental education in their curricula.

'the immediate priority.....must be the provision of inservice education'

Although environmental education in preservice teacher education is important, the immediate priority for the fast and effective implementation of environmental education in schools must be the provision of inservice education to teachers. Several teacher education institutions are now offering underqualified teachers the opportunity to upgrade their qualifications—mainly via inservice teacher education programs and, in many cases, through distance education. Estimates of the extent of un/underqualification of South African teachers range from 50% to more than 80%, suggesting that this upgrading is an enormous task (Kahn 1993, Jaff et al 1994).

Although demographic indications in South Africa, especially the growing proportion of young Africans in the population (Hofmeyr & Buckland 1992), suggest that inservice provisions should mainly be aimed at the primary school level I believe that, to avoid a teacher education backlog as environmental education becomes part of the total school curriculum, we should strive towards improving the environmental literacy of teachers across the whole spectrum of school levels.

Problems to be addressed

Several problem areas exist regarding environmental education in teacher education in South Africa. These include: the need for more financial resources; the environmental education needs of staff in teacher education colleges and universities; the education of teachers in handling large class groups of 80 pupils and more, especially given the interactive and hands-on learning and teaching strategies used in environmental education; the development of innovative models of inservice teacher education for environmental education which employ distance learning techniques incorporating the best international practices of open learning adapted for the South African context. A major challenge will be to comply with the criteria Robottom has identified for environmental

education teacher education programs. These (cited in Fien et al 1993) are that programs should be:

- inquiry based in order to encourage participants to adopt a research stance towards their own environmental education practices
- participatory and practice based
- critical in that they involve an ideological critique of the environmental and educational assumptions and values that underlie environmental education policies, resources and practices
- community based and collaborative.

The holistic, issue based, problem solving approach of environmental education (Eichler 1977, Glasgow 1994, Environmental Education Policy Initiative 1995) emphasises participatory decision making, critical thinking and socially responsive action. This new approach for most teachers, one which in some ways conflicts with traditional teaching practice in most schools is another important professional need of teachers which must be met by in service education.

Summary and conclusion

Curriculum 2 005 has been designed as part of a National Qualification Framework and to be implemented in all South African schools by the year 2 005. It takes an outcomes based approach which involves a series of essential outcomes which are generic and applicable to eight identified core learning areas, together with specific outcomes which are specific to each of the areas of learning. All eight areas of learning can be extended and enhanced significantly by the principles, processes and concepts central to environmental education.

'some important commonalities that are encouraging to environmental educators'

A comparison of the essential characteristics of environmental education for the environment, and those of the essential and critical outcomes of the National Qualification Framework and Curriculum 2 005 respectively, reveals some important commonalities that are encouraging to environmental educators. It opens the prospect of environmental education becoming an integral part of the daily activities in South African classrooms.

A number of significant developments have contributed towards a positive setting for the implementation of environmental education in the new curriculum. These include the Government intention that environmental education form part of the restructuring of new curricula for general education in South Africa, and the contributions to the development of environmental education made by the Environmental Education Curriculum Initiative.

The resolution of several difficulties will be crucial to the successful implementation of the new curriculum and its environmental education content. These include: the enormous task of pre- and inservice teacher education, for outcomes based education in general and environmental education in particular; the very high demands placed on teachers working with large classes in some schools; and the relatively short (and unrealistic?) time span in which the new curriculum is to be developed and implemented.

Despite all this, environmental education has never been in a better position than it is currently to become part of every citizen's education in South Africa. ⬧

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Appendix A: Specific Outcomes for the eight Learning Areas of Curriculum 2005

Language, Literacy and Communication

1. Make and negotiate meaning and understanding.
2. Show critical awareness of language usage.
3. Respond to the aesthetic, affective, cultural and social values in texts.
4. Access, process and use information from a variety of sources and situations.
5. Understand, know and apply language structures and conventions in context.
6. Use language for learning.
7. Use appropriate communication strategies for specific purposes and situations.

Human and Social Sciences

1. Demonstrate a critical understanding of how South African society has changed and developed.
2. Demonstrate a critical understanding of patterns of social development.
3. Participate actively in promoting a just, democratic and equitable society.
4. Make sound judgements about the development, utilisation and management of resources.
5. Critically understand the role of technology in social development
6. Demonstrate an understanding of interrelationships between society and the natural environment.
7. Address social and environmental issues in order to promote development and social justice.
8. Analyse forms and processes of organisations.
9. Use a range of skills and techniques in the Human and Social Sciences context.

Technology

1. Understand and apply technological processes to solve problems and satisfy needs and wants.
2. Apply a range of technological knowledge and skills ethically and responsibly.
3. Access, process and use data for technological purposes.
4. Select and evaluate products and systems.
5. Demonstrate an understanding of how different societies create and adapt technological solutions to particular problems.
6. Demonstrate an understanding of the impact of technology.
7. Demonstrate an understanding of how technology might reflect different biases, and create responsible and ethical strategies to address them.

Mathematical Literacy, Mathematics and Mathematical Sciences

1. Demonstrate understanding about ways of working with numbers.
2. Manipulate number patterns in different ways.
3. Demonstrate understanding of the historical development of mathematics in various social and cultural contexts.
4. Critically analyse how mathematical relationships are used in social, political and economic relations.
5. Measure with competence and confidence in a variety of contexts.
6. Use data from various contexts to make informed judgements.
7. Describe and represent experiences with shape, space, time and motivation, using all available senses.
8. Analyse natural forms, cultural products and processes as representations of shape, space and time.
9. Use mathematical language to communicate mathematical ideas, concepts, generalisations and thought processes.
10. Use various logical processes to formulate, test and justify conjectures.

Natural Sciences

1. Use process skills to investigate phenomena related to the natural sciences.
2. Demonstrate an understanding of concepts and principles, and acquired knowledge in the natural sciences.
3. Apply scientific knowledge and skills to problems in innovative ways.
4. Demonstrate an understanding of how scientific knowledge and skills contribute to the management, development and utilisation of natural resources.
5. Use scientific knowledge and skills to support responsible decision making.
6. Demonstrate knowledge and understanding of the relationship between science and culture.
7. Demonstrate an understanding of the changing and contested nature of knowledge in the natural sciences.
8. Demonstrate knowledge and understanding of ethical issues, bias and inequities related to the natural sciences.
9. Demonstrate an understanding of the interaction between the natural sciences and socio-economic development.

Arts and Culture

1. Apply knowledge, techniques and skills to create and be critically involved in arts and culture processes and products.
2. Use the creative processes of arts and culture to develop and apply social and interactive skills.
3. Reflect on and engage critically with arts experience and works.
4. Demonstrate an understanding of the origins, functions and dynamic nature of culture.
5. Experience and analyse the role of the mass media in popular culture and its impact on multiple forms of communication and expression in the arts.
6. Use art skills and cultural expressions to make an economic contribution to self and society.
7. Demonstrate an ability to access creative arts and cultural processes to develop self esteem and promote healing.
8. Acknowledge, understand and promote historically marginalised arts and cultural forms and practices.

Economic and Management Sciences

1. Engage in entrepreneurial activities.
2. Demonstrate a personal role in economic environments.
3. Demonstrate the principles of supply and demand and the practices of production.
4. Demonstrate managerial expertise and administrative proficiency.
5. Critically analyse economic and financial data to make decisions.
6. Evaluate different economic systems from various perspectives.
7. Demonstrate actions which advance sustained economic growth, reconstruction and development in South Africa.
8. Evaluate the interrelationships between economic and other environments.

Life Orientation

1. Understand and accept themselves as unique and worthwhile human beings.
2. Use skills and display attitudes and values that improve relationships in family, group and community.
3. Respect the rights of people to hold personal beliefs and values.
4. Demonstrate value and respect for human rights as reflected in Ubuntu and other similar philosophies.
5. Practice acquired life and decision making skills.
6. Assess career and other opportunities and set goals that will enable them to make the best use of their potential and talents.
7. Demonstrate the values and attitudes necessary for a healthy and balanced lifestyle.
8. Evaluate and participate in activities that demonstrate effective human movement and development.