



The Use of Learning Support Materials in Rural Schools of Maputaland, KwaZulu-Natal, South Africa

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Abstract

The African Coelacanth Ecosystem Programme (ACEP) was established in 2002 after the discovery of a colony of coelacanths off the Maputaland coast at Sodwana Bay, KwaZulu-Natal. The environmental education and awareness sub-programme developed learning support materials for use in schools and the materials were disseminated annually through teacher education workshops.

This study aimed to uncover the use of these learning support materials in the rural schools of Maputaland. The active learning framework, originally proposed and developed by O'Donoghue (2001), was used to analyse the materials. Collectively, the ACEP materials cover a range of active learning aspects; however alignment with the curriculum has resulted in an increased focus on experiments, accompanied by a loss of environmental content and a narrowing scope for active environmental learning.

Workshop questionnaires and four school case studies revealed the patterns of practice of use of materials in schools. The stated use of materials by teachers is not fully realised in the actual classroom practice which centres on learning content and concept definitions. There is no culture of use of materials in the schools following the annual introduction of ACEP materials. It was also found that the marine and coastal knowledge holding power is outside the realm of the teachers' practice and control.

The findings of this study come at a time when there is uncertainty over the future of South African education and the curriculum. This research may inform the environmental education and coastal and marine education field as to their role in education and more specifically the development of learning support materials.

Background

The African Coelacanth Ecosystem Programme (ACEP) was established in 2002 after the discovery of a colony of coelacanths, a prehistoric species of fish, off the coast of Sodwana Bay, Maputaland. An environmental education and awareness sub-programme was subsequently formed. Between 2002 and 2009 learning support materials were developed for use in schools with the aim of promoting science literacy and motivating youth to take up future careers in science. The materials were disseminated annually through teacher education workshops (Snow, 2008).

Research for this study involved schools from the Kosi Bay and Sodwana Bay areas on the Maputaland coast where ACEP has distributed learning support materials through teacher workshops. Many of the schools are adjacent to the iSimangaliso Wetland Park. The Integrated

Management Plan for the park states that ‘the distribution of the schools in the region is fairly well correlated with population distribution, distances to schools are often more than 15km in less-populated areas; the teacher to pupil ratios are in excess of 1:40; conditions of classrooms and facilities are generally poor; and a large proportion of teachers are inadequately trained’ (iSimangaliso Wetland Park Authority, 2008:43). The challenges in these rural schools are thus fairly representative of the challenges facing many other rural and under-resourced schools in other regions of South Africa.

The National Curriculum Statement, Learning Support Materials and the Active Learning Framework

The National Environmental Education Programme for General Education and Training (NEEP-GET) documents show how engagement with an environmental focus in Curriculum 2005 allowed environment to become an important part of the curriculum. The Revised National Curriculum Statement made environment an important part of all learning areas and outcomes (Lotz-Sisitka & Raven, 2001). This allowed for inclusion of environmental learning in the curriculum and the formal education system. The NEEP-GET used the active learning framework to frame environmental learning processes (Lotz-Sisitka & Raven, 2001). The roots of this development lie in the White Paper on Education and Training which required environmental education processes that ‘involve an interdisciplinary, integrated and active approach to learning’ (Lotz-Sisitka & Raven, 2001:3).

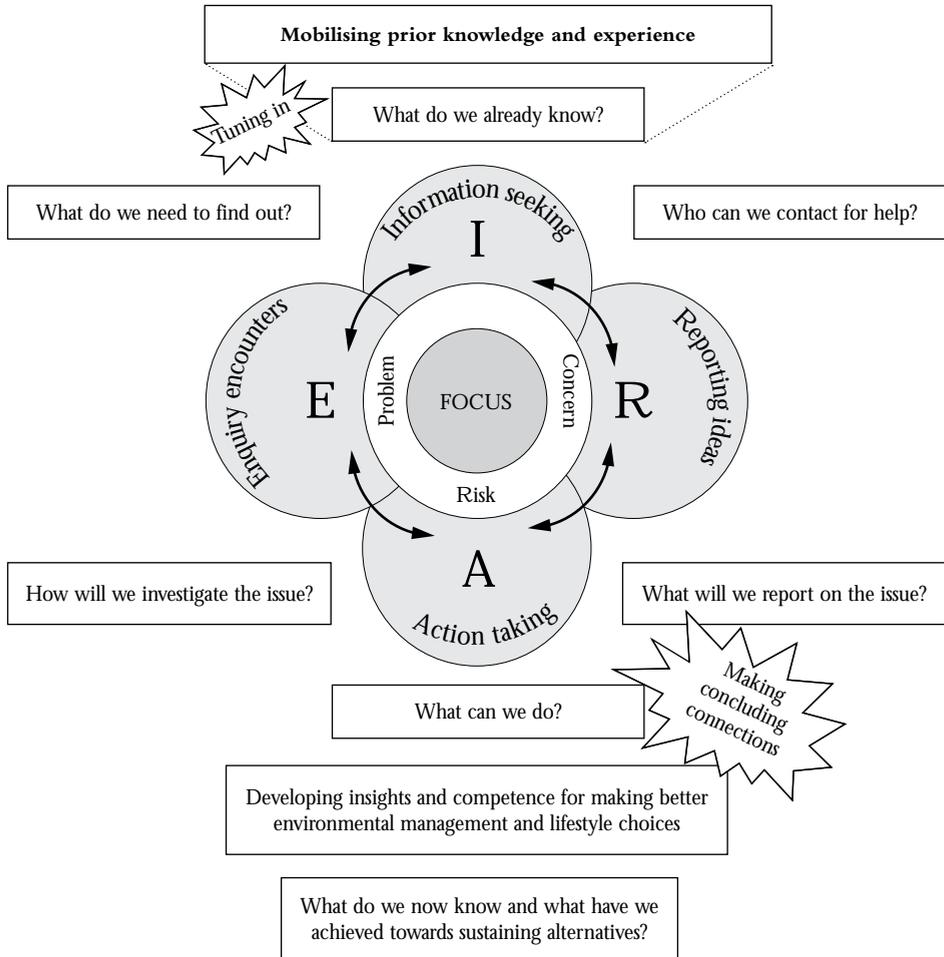
The introduction of Curriculum 2005 and Outcomes Based Education (OBE) after democracy in South Africa brought a new need for learning support materials given that there was less reliance on textbooks and OBE required a stronger resource-based learning orientation that used a wider range of resources than those used in traditional textbook teaching. OBE needed learning support materials that were aligned with the curriculum in order to meet the requirements of a resource-based and learner-centred curriculum approach (Lotz-Sisitka & Raven, 2001).

The Active Learning Framework (O’Donoghue, 2001) has been used to frame and scaffold the design of materials for curriculum use in OBE. This framework (see Figure 1) also picks up on the environmental focus of each learning area and allows for learning that can develop from the learners’ prior knowledge to more sustainable living and environmental management (O’Donoghue, 2001).

As indicated in Figure 1, the Active Learning Framework involves not only providing information about the environment and environmental issues, but also investigation into local contexts and practical actions, indicating a shift from content-based teaching which was the norm in the previous education system. The framework is a guide to ‘inscribe environmental learning in school curriculum contexts’ and does so in all learning areas of the curriculum (O’Donoghue & Russo, 2004:344). Mbanjwa (2002) found that using the active learning framework in developing materials affected what learning processes took place and the outcomes of these processes. The relationship between active learning, OBE and learning support materials development is ingrained in the context of South African school-based

environmental learning. The Active Learning Framework and its history therefore created a good framework to investigate the use of learning support materials in the schools and the aims that follow.

Figure 1. O'Donoghue's Active Learning Framework (2001)



Research Design

This research aimed to investigate how learning support materials are used in the rural schools of Maputaland. The goals of this interpretive research were:

- To critically review the historical development of the ACEP materials.
- To survey their current curriculum use.
- To probe the implicit and existing patterns of use and teaching practice in four local learning contexts.
- To discuss the data with teachers and materials developers to verify initial findings and uncover contradictions and possible solutions.

The research started with contextual profiling of the development of the ACEP materials and the school dissemination process. Survey questionnaires with 21 teachers from primary and high schools took place. In-depth studies of four school cases were done using interviews and classroom observations. These data were then coded and analysed according to the implicit use in the ACEP materials design, the teachers' implicit use of materials and the observed teaching practice in four school cases. The findings from these data collection processes were then used in two feedback discussion workshops. The first workshop was with marine and coastal environmental educators developing materials and the second was with the teachers from the case-study schools. During these workshops the findings were 'mirrored' back or shared with the participants in order to verify these data and discuss key contradictions and possible solutions to the problems.

The Active Learning Framework was used as a lens to gain insight into how the ACEP environmental education learning support materials were used within a South African curriculum context. In this second level of data analysis, the Active Learning Framework was used to analyse the design of the ACEP learning support materials and how these could be used by teachers. Teaching practices in the classroom were observed by using this framework in mind to uncover the relationship between practice and materials design and use.

The open-ended Active Learning Framework involves the following approach: 'Tuning-in which mobilizes prior experience and knowledge around an environmental focus, learning activities which develop and refine knowledge, skill and value orientation, and concluding connections which engage the challenges of sustainable environmental management and lifestyle choices' (O'Donoghue, 2001:1). The materials were analysed using the following activity categories relating to the Active Learning Framework:

- Reading for information.
- Concepts and factual content provision.
- Experimental modelling of natural concepts and processes.
- Experimental modelling of issues, processes and practices.
- Role-play and simulation.
- Audits and enquiry activities including data interpretation.
- Hands-on fieldwork encounters and experiences.
- Deliberation, debate and reporting towards decision-making.
- Action-taking, trying out and change practices.

Findings

The activities within each ACEP material are represented in diagrams to gain a clearer picture of the scope of active learning. The different materials and their development over time can then be compared. The observed teaching practice and the teachers' implicit use of learning support materials (how they said they could use learning support materials) was then analysed according to the categories of active learning developed above. The analysis revealed the following findings:

Finding 1: Alignment of the materials with the requirements of the curriculum has placed an emphasis on experiments with a loss of environmental content and a narrowed scope for active environmental learning.

If one looks at the trends in the ACEP materials development over time (between 2002 and 2009) in relation to active learning, there is a shift from an emphasis on environmental content and opportunities for various active learning activities to a narrowing of the scope for active environmental learning activities as the materials become more focused on technical experiments which model natural concepts and processes. The environmental content, as a result, is gradually lost (see Figures 2–6).

Figure 2. The scope of active learning in the 2002 Intermediate and Senior Phase packs

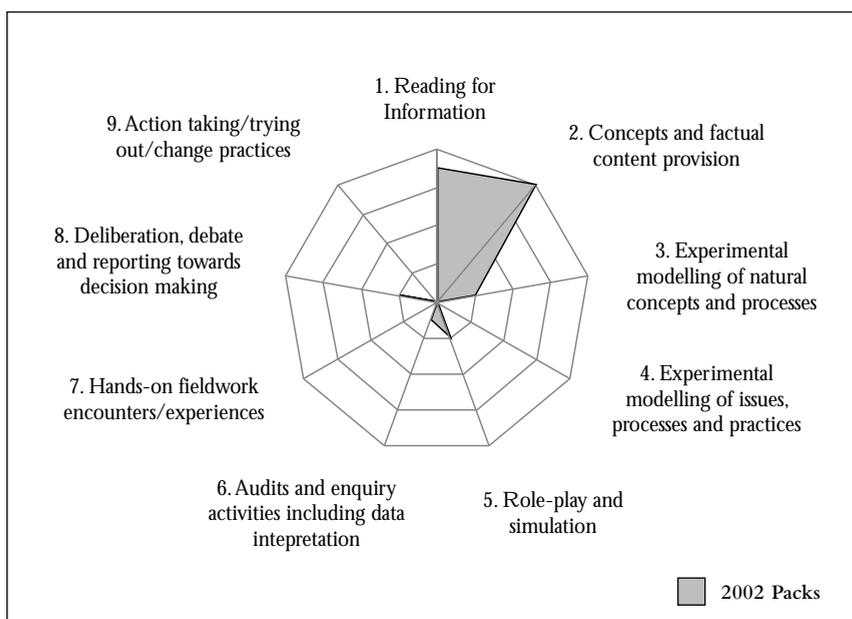
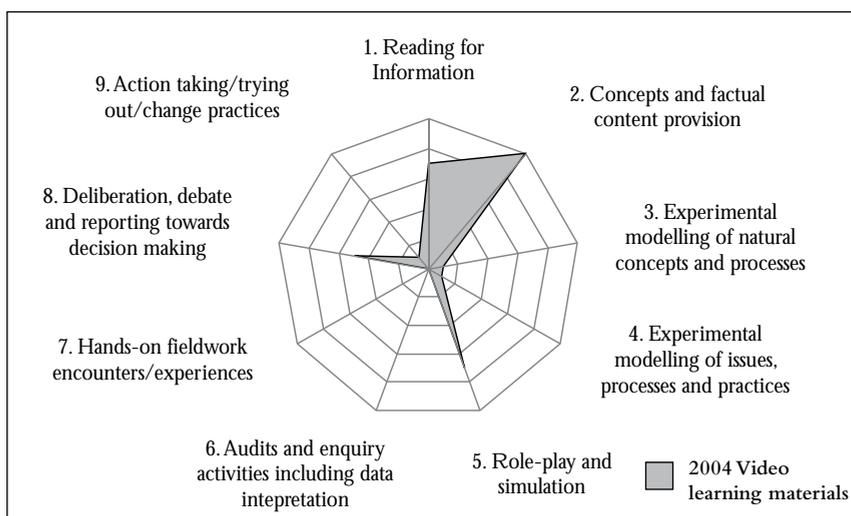
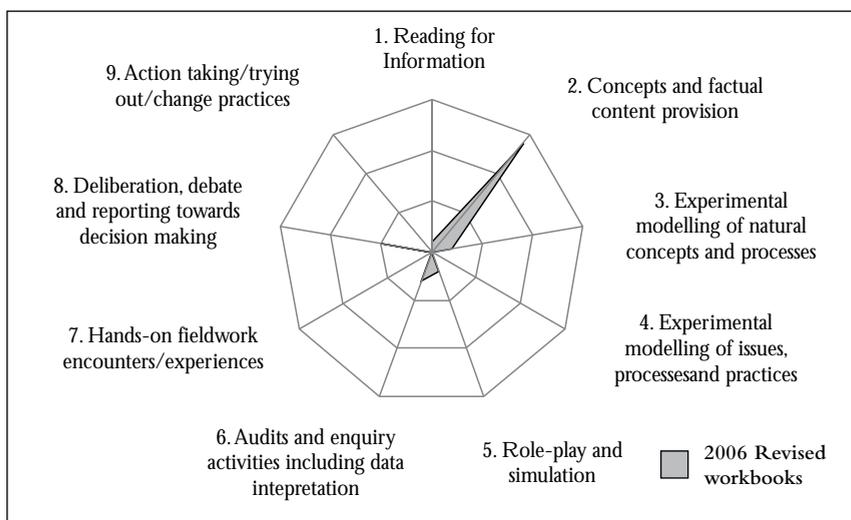


Figure 3. The scope of active learning in the 2004 video learning materials**Figure 4.** The scope of active learning in the 2006 revised workbooks

Prior to 2003, the materials were developed in relation to the curriculum in a flexible and adaptable way. After 2003, the materials were developed and aligned with the curriculum with the help of curriculum specialists. The materials were also further developed according to certain requirements of the South Africa Department of Education. The earlier materials (Figures 2–4) focused on environmental content knowledge provision. The environmental content in the materials decreased and the final ACEP products focus primarily on technical experiments for modelling concepts and processes. In 2009 ACEP developed materials for

Figure 5. The scope of active learning in the 2008 Climate Change Kit

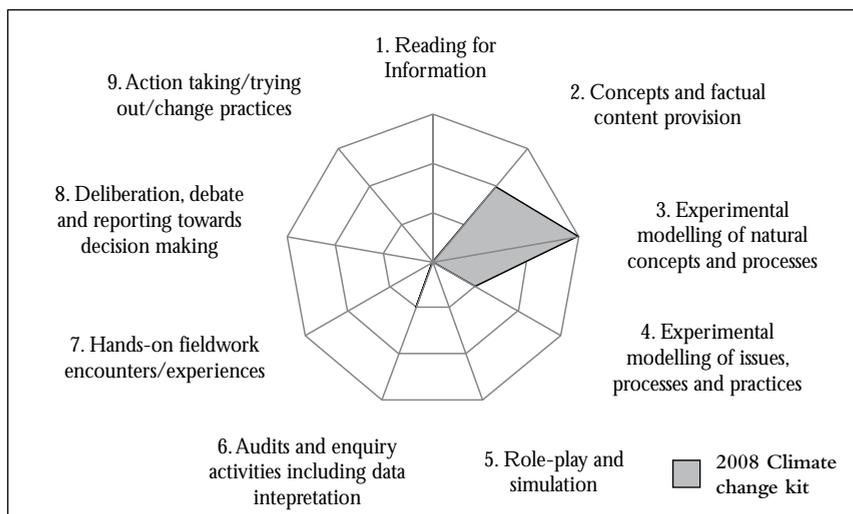
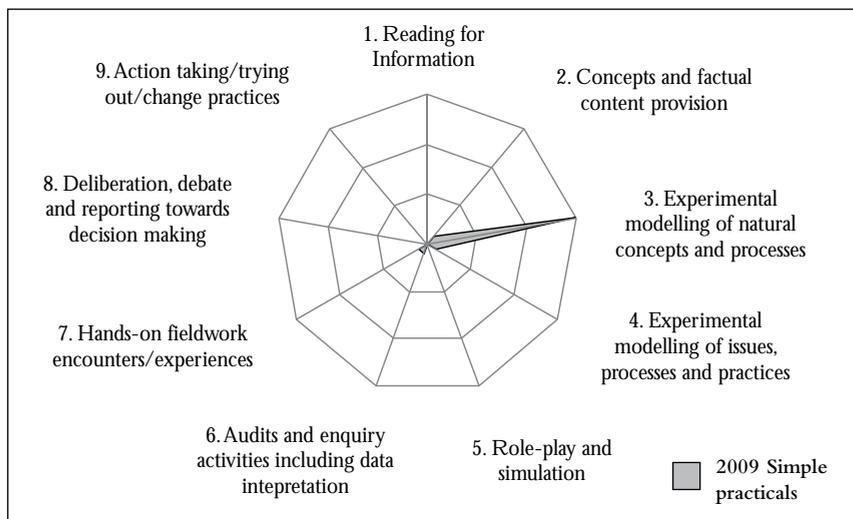
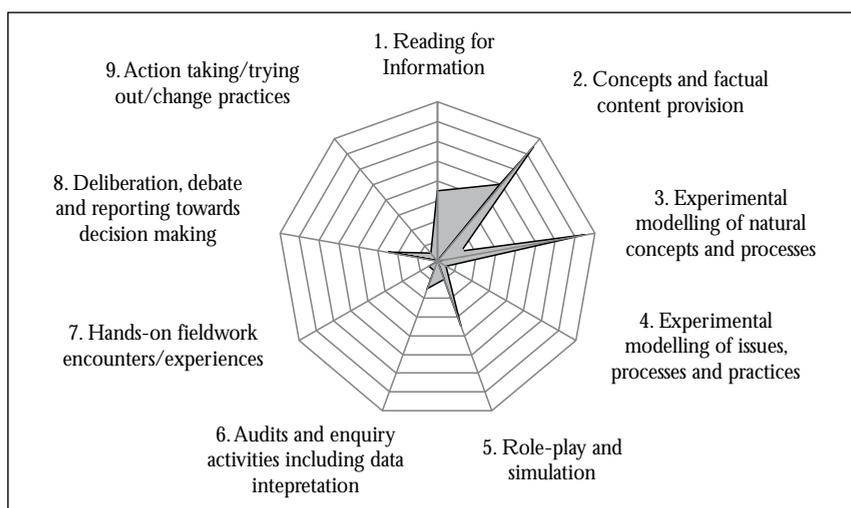


Figure 6. The scope of active learning in the 2009 simple practicals



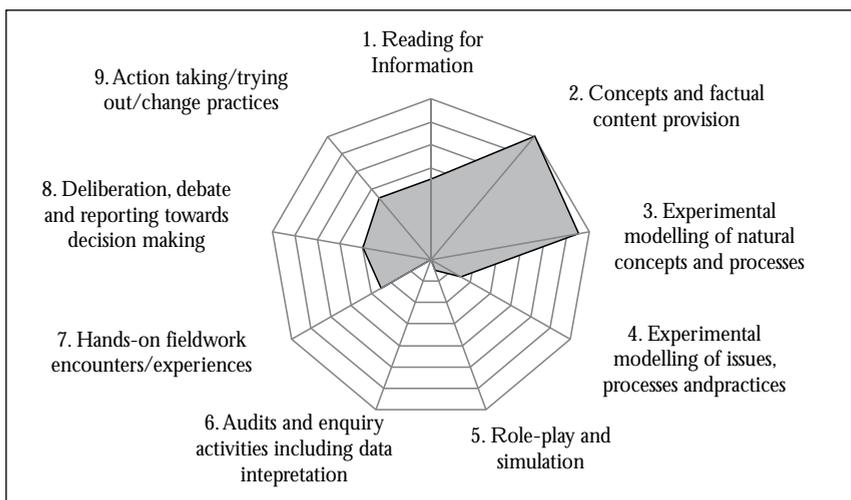
science experiments, following requests from the Department of Education because teachers were not doing interactive experiments or practicals in the classroom. When looking at all of the combined materials, there is an overall coverage of active learning with an emphasis on content and experiments (see Figure 7).

Figure 7. The scope of active learning in ACEP materials (2002–2009)

Finding 2: How teachers say they could use materials is not fully realised in classroom practice (emphasis on learning content and concept definitions).

At the survey level the teachers mentioned how learning support materials could be used for many of the activities within the categories of active learning. This uncovered their implicit use of materials which is illustrated in Figure 8.

The greatest reference to implicit use of ACEP learning support materials by teachers was in concepts and factual content provision. The teachers also referred to all of the other categories of active learning for the use of learning support materials: reading for information, action

Figure 8. The scope of active learning in teachers' implicit use of materials in Maputaland schools

taking, trying out, change practices, deliberation and debate, reporting towards decision-making and hands-on fieldwork encounters and experiences. There was minimal or no reference made to experimental modelling of issues, processes and practices, role-play and stimulation, audits and enquiry activities.

At a case-study level, teachers said that they could use learning support materials which could provide content information (especially visual aids such as posters, fact sheets, presentations and videos); fieldwork; experiments; audit activities; research projects which require the learners to find out and investigate in their local area; role-play; action activities; discussions; and reporting. Many teachers in this study described successful marine and coastal education lessons as those that provide the teachers with knowledge and successful learning support materials as those that would help to provide knowledge and understanding.

However, during observed lessons within the context of four school cases, all of the teachers did presentations on definitions and concepts. The two high schools did revision lessons. One primary school used a textbook for a short reading and discussion activity and the other primary school did an experiment using the recently acquired ACEP science kit, but most of the lesson time was spent teaching concepts and factual content.

When asked what materials were used for teaching the teacher said that 'normally in class we just do it theoretically' and 'We just theorise. You have seen in the class. Most of the things we theorise because we are running short of teaching material ...'.

During the teachers' feedback workshop where the initial findings were discussed, the teachers agreed with this evidence, saying that they are accustomed to theorising and not using learner-centred approaches. They reported that they are interested in teaching concepts and facts and this is a result of their history which will take much time to change because the curriculum is changing so often. The curriculum allows for different teaching approaches but change in teaching practice is difficult. The teachers said that they had received plenty of training in other methods, lesson preparation, assessment, learning outcomes and classroom management from the Department of Education. However they have not been provided with content. One teacher said: 'How can someone be trained to prepare a lesson when he does not have the content? People do not know new concepts and topics and are never trained to teach these concepts or topics. They are only learning class management.'

Finding 3: There is no culture of use of materials in schools following the annual introduction of new ACEP materials.

Of the 21 teachers who completed questionnaires, only six reported that they had actually used some of the ACEP materials. Some teachers said that they had attended workshops on the ACEP materials even though they had not used the materials after the workshops. ACEP has run workshops with the intention of showing teachers how to use materials and how materials link to the curriculum. Only then could teachers take the materials back to their schools.

During the school visits teachers were questioned in order to locate materials that had been used. I discovered in two cases that teachers who used to work with the ACEP materials had left their schools. Only three schools were able to show the materials that were in storage. In the

other schools that were visited, I tried to locate teachers who had used ACEP materials and had attended workshops but no tangible connections were established.

During the feedback workshop, the teachers agreed that there was a high turnover of teachers in their schools and teachers often wanted to move to urban schools. There was no handover of skills or the actual materials once the teachers left. The teachers did however report that the situation was improving in the high schools and that teachers were staying in the rural schools because the government was offering training on condition that teachers stay.

During this workshop the teachers said that during their teacher training they learnt to mostly 'theorise'. They therefore reported that they had no skills in using learning support materials. They said that they were not 'moving fast enough' with a new learner-centred curriculum and getting the skills in 'handling materials'. Their classes were also extremely large (sometimes 70 learners), which made the use of materials difficult.

The teachers stated that the National Curriculum Statement was very compact and fitting in marine environmental education (even if they wanted to) was difficult as there was no space or time. The teachers had also not been exposed to the marine sciences before and said that this was a new science to them, which meant they were often unable to link the information from materials to their classroom practice.

Finding 4: The marine and coastal knowledge holding power is outside the realm of the teachers' practice and control.

The environmental education initiatives in the area are run by the local community conservation officers. These initiatives include rocky and sandy shores fieldtrips, presentations on turtles, environmental special days, coastal clean-ups, competitions and the Eco-schools programme.

All of teachers in the case study schools referred to field trips when asked to discuss a successful marine and coastal activity. They also mentioned the annual coastal clean-up, the local conservation authority's presentation on turtles, the drama of Peter Tim finding the coelacanth, Eco-schools and a global warming poster competition. Although these activities are broader than only field trips, they are all activities that are initiated by the conservation authority and environmental education service providers. The conservation authority funds the registration of schools in the Eco-schools programme and has sponsored the building of classrooms in some schools.

Most of the teachers stated that marine and coastal education materials could be used in the Natural Sciences. Common focus areas chosen within the materials or topics that teachers were interested in were ecology (food chains, ecosystems, ecology of coelacanths, etc.) and climate change.

There is therefore evidence that the teachers in this area seem to equate marine and coastal environmental education with the activities that are provided or controlled by the local conservation authority. Even when asked to describe the useful marine and coastal learning support materials, the teachers would refer to mostly field trips and competitions run by the authorities and service providers like ACEP.

Discussion of Findings

Alignment of the materials with the requirements of the curriculum has placed an emphasis on experiments with a loss of environmental content and a narrowed scope for active environmental learning.

A constructivist approach underlies the construction of the new South African curriculum that was developed after democracy. This is a learner-centred approach and the teacher is seen as a facilitator of learning – not someone with specialised knowledge. If one takes a progressivist view of curriculum, this curriculum placed emphasis on the processes and everyday knowledge at the expense of conceptual and content knowledge (Chisholm, 2004). Schudel (2010) also states that OBE and Curriculum 2005 prioritised skills and background knowledge at the expense of content.

Chisholm (2004) states that the principles of learner-centredness, relevance, integration, non-discrimination, human resource development, creative and critical thinking, and quality education were good but there were assumptions made about teachers and what was actually going on in the classroom. Teachers were expected to build the content of the curriculum themselves with a curriculum that had complex and difficult terminology and an assessment process which was also difficult.

Young (2008) states the following:

Learning, according to this view, becomes to be seen as little more than the 'construction of meanings' or a 'conversation' – regardless of what these meanings are, what the conversations are about, or whether they give learners any reliable understanding of the world, or power over it. One unfortunate legacy of apartheid is that many curriculum developers have been enthused by what they have seen as the emancipatory possibilities of social constructivism. This has led them to dismiss any notion of curriculum content being prescribed by specialists, and to see syllabuses as inherently authoritarian, rather than as frameworks that are necessary if genuine intellectual development is to take place. (Young, 2008:191)

Through the prioritisation of skills, background knowledge and an outcomes-based curriculum, the content knowledge is sacrificed. This has played out in the situation around ACEP learning support materials which revealed a loss of environmental content over time as they became more closely aligned with the outcomes-based curriculum. This content is the formal or specialist knowledge referred to by Young (2008).

Young (2008) states that 'genuine intellectual development' is dependent on specialist and formal content knowledge. Clear boundaries between informal and formal learning are important because they allow for learning to go further than the 'non-school' local and situated experience. When looking at the South Africa curriculum context, Young (2008) says that when the division between the two knowledge types becomes less apparent, the informal knowledge dominates in the curriculum policy because of this 'blurring of distinctions'. Social constructivism then provides the academic justification of this curriculum policy which has been criticised for not working and has led to confusion amongst teachers. Young

(2008) says that failure of the curriculum therefore came about not only because it was not implemented or resourced adequately, but also because it was based on mistaken assumptions about knowledge construction and the uncertainty of these knowledge boundaries.

The analysis of the ACEP learning support materials also revealed that alignment with the curriculum resulted in a narrowed scope for active environmental learning. Schudel (2010) highlights the importance of developing environmental learning skills and not just the environmental content. Analytical, reflexive, problem-solving, explanation and evaluative skills should be developed for environmental teaching and learning. The teaching methods and skills for active learning should be developed around the content and local environment. Once teachers are given environmental content they need to understand this environmental knowledge in order for their learners to make meaning of the knowledge.

Schudel (2010) also discusses the role of 'new knowledge' for active learning. Informed choice is possible when this knowledge is applied and new knowledge from experts is needed to allow learners to move beyond their prior everyday knowledge. She discusses this in relation to the Vygotskian view that 'new knowledge consolidates and challenges prior knowledge. It feeds new actions. It lays the foundation for informed choice. It is essential for learning concerned with change' (Schudel, 2010:29).

How teachers say they could use materials is not fully realised in classroom practice (emphasis on learning content and concept definitions).

The formal content knowledge loss in OBE is significant. The resulting loss of environmental content in learning support materials such as those developed by ACEP is also significant, especially as evidence suggests that the Maputaland teachers had limited environmental content knowledge and were seeking learning support materials and activities which provide this. In the 2007/2008 Eco-Schools evaluation, Rosenberg (2008) found that teachers had limited environmental content knowledge which is related to the curriculum. Mbuyazwe (2009) also found that teachers did not have the marine content knowledge to teach their lessons. The teachers in her study felt that they needed to acquire content. Mbuyazwe (2009:84) says that 'there is a direct link between the quality of learners' learning and the role of teacher knowledge of content so as to support learning'.

Mbuyazwe (2009:87) states that 'currently naming and defining is still what teachers know and practice in school classrooms'. In her research this teaching practice was shown to influence how teachers searched for content which they already knew when they were selecting materials for lessons. How the materials could support Learning Outcomes and Assessment Standards, their purpose and their curriculum alignment were not considered. The teachers only used the content and factual information. Mbuyazwe (2009) also found that learners were expected to learn through reproducing the facts and content information that teachers had taught.

The curriculum has gone through ten years of intensive reform and this has resulted in much insecurity, confusion, criticism and a lack of confidence in the system (Dada *et al.*, 2009). Teachers have not been trained and prepared sufficiently in teaching methods, especially as regards learning area content. Teachers are also needing guidance in subject-specific teaching methods and understanding the content. In many schools the teachers are not teaching the

same learning area or subject for more than a year as they are rotated and this increases the complexity of this issue (Dada *et al.*, 2009).

There is no culture of use of materials in schools following the annual introduction of new ACEP materials.

Like in the ACEP case, in a case study on the Creative Solutions to Waste Project, Mbanjwa (2002) found that the use of environmental education learning support materials was limited and superficial. In a case from the Learning for Sustainability Project (Janse van Rensburg & Lotz-Sisitka, 2000:90), it was found that teachers struggle to use learning support materials within activities and the materials are often used as 'display items'. Mbuyazwe (2009) found that teachers were unable to effectively use materials or structure curriculum-aligned learning activities from the content (facts and definitions).

The ACEP case shows that teachers need skills in taking information from learning support materials and accessing the relevance of the information to 'the learners' capacity, learning area, environmental context, outcomes, and intended pedagogical processes and applying the knowledge in curriculum processes' (Janse van Rensburg & Lotz-Sisitka, 2000:91). Teacher professional development, reflexivity and consideration of the teacher as a researcher and lifelong learner as seen as being important when developing learning support materials. The design of learning support materials should contribute to both teachers' conceptual development and learners' abilities to learn (Mbanjwa, 2002).

Learning theories and teaching methods influence the use of materials. Teachers need to be educated in how to access the materials and the 'relation between teaching methods and the use of the materials' (NEEP-GET, 2005:40). The teacher's role is to be the mediator of the learning processes in selecting the learning support materials and to use these in an adaptive way within the learners' context. However, teachers tend to select materials that are easier to use and understand (NEEP-GET, 2005).

As shown in this study, teachers in rural and under-resourced schools especially require skills to use learning support materials (NEEP-GET, 2005). Learning support materials cannot only be given to teachers, they need to be supported in using the materials (Janse van Rensburg & Lotz-Sisitka, 2000). Teachers should participate in not only the development of learning support materials, but also in discussions around the effective use of learning support materials (NEEP-GET, 2005). Lupele (2002) used participatory approaches to materials development but also used contextual profiling to understand the local context and the factors influencing the participators' practice and educational approaches.

Teachers are the primary mediators of the use of materials in learning processes, especially active learning processes. Lessons need to be planned which meet the criteria of the curriculum and are relevant to the local context and materials should be selected according to how effective they will be in the learning process (Lotz-Sisitka & Russo, 2003). Schudel (2010) speaks of the responsive provision of appropriate learning support materials and how this can support teachers' ability to develop and adapt their own learning support materials for teaching.

The marine and coastal knowledge holding power is outside the realm of the teachers' practice and control.

Environmental education initiatives in the Sodwana Bay and Kosi Bay areas are arranged and supported by local conservation authorities and service providers like ACEP. The teachers associate any environmental education as being part of these initiatives, especially excursions. Kethoilwe (2007a) found that 'normalising strategies' were applied by teachers in their interpretations of environmental education policy. Normalisation is defined in Kethoilwe (2007b) as being 'norms of behaviour, attitudes and knowledge'. The 'powers of expertise' or 'symbols of scientific authority' create assumptions about knowledge which are internalised by individuals and normalised.

The three normalising strategies that were identified in Kethoilwe's research included: equating environmental education with environmental management activities in schools; expressing frustration with a lack of resources to undertake field trips; and equating environmental education with environmental science (Kethoilwe, 2007a).

In this study, teachers only described the environmental education practice that they were comfortable with and they associated environmental education with field work and excursions (showing similar normalising tendencies to those reported in Kethoilwe, 2007a). In Mbuyazwe's (2009) study, the teachers felt that seeing the marine ecosystem would help their understanding. Kethoilwe (2007a) describes this type of normalising strategy of seeing environmental education as fieldwork as reflecting a narrow understanding of increasing human-environment complexities in an African context.

Kethoilwe (2007a) discusses how environmental education policy discourse interpretation is influenced by local power-knowledge relationships. Similar to the Maputaland context, in Botswana environmental education support was provided for by conservation bodies, which led to a conservation discourse and emphasis on fieldwork and environmental management. This in turn influences teaching practice – both epistemological and pedagogical – and creates science-based interpretations of the environment and environmental education. The content and activities were narrowed to only being nature-based and environmental education discourses like problem-solving and issues-based approaches; the social and historical causes of issues and economic development aspects found in issues and risks were left out (Kethoilwe, 2007a). In the Maputaland schools environmental learning support materials were seen to be useful for the Natural Sciences and the chosen focus areas were mostly limited to ecology.

Conclusion

In July 2009 the South African Minister of Education assigned a panel of experts to research the major issues and challenges in the implementation of the National Curriculum Statement and to come up with suitable recommendations for improvement (Dada *et al.*, 2009). The review team in Dada *et al.* (2009) stated that they supported the Department of Education's move away from OBE. In order to address the issues of knowledge gaps, the review suggested that '...outcomes be replaced with clear content, concept and skill standards and clear and concise assessment requirements' (Dada *et al.*, 2009:45).

Schudel (2010) has discussed the role of new knowledge for active learning and environmental education service providers who develop learning support materials (such as ACEP) could take up this role. The existing ACEP learning support materials, when combined (see Figure 7), provide a range of activities for active learning and specialist marine environmental content for 'new knowledge'.

Teachers have not been trained and prepared sufficiently in suitable teaching methods, particularly in learning area content. Teachers need guidance in subject-specific teaching methods and understanding of the content (Dada *et al.*, 2009). Environmental education service providers can play a role in the professional development of teachers which addresses these needs. The use of learning support materials, such as those developed by ACEP, can be strengthened by teacher development in the skills and methods needed to implement appropriate environmental learning processes within specific learning areas.

Developers of environmental education learning support materials also need to be responsive in providing learning support materials that are relevant to local needs and fit in with suitable learning processes such as active learning (Schudel, 2010). Active learning allows for learning that can develop from the learners' prior knowledge to more sustainable living and environmental management (O'Donoghue, 2001). A challenge is to respond to changing environmental issues (Schudel, 2010). This challenge is relevant to the Maputaland context where the local people around iSimangaliso Wetland Park in Maputaland face many social pressures such as unemployment, a high population growth rate, increasing casualisation of labour and others which will further increase demands on the local marine and coastal natural resources (iSimangaliso Wetland Park Authority, 2008).

Professional development in the use of environmental education learning support materials will need to consider the power-knowledge relationships and normalisation strategies that have been discussed. While there is a place and role for the local conservation authorities and service providers to create learning opportunities in the form of excursions, presentations and the provision of learning support materials, they should strive to allow the teachers to take ownership of the informal knowledge that they know and the formal knowledge which they are being exposed to. Professional development initiatives should strive to allow teachers to have the confidence and skills to lead in the environmental teaching and learning in various local contexts, including the classroom.

The new curriculum will come into practice in 2011 and the structure of the syllabus will limit teachers in selecting environmental topics that are relevant to local needs and issues (Schudel, 2010). The appropriate learning skills, content and concepts, texts, pedagogical approaches and assessment requirements will be specified in the new curriculum and assessment documents. Textbooks will be reintroduced and a national catalogue of approved and screened, curriculum-aligned learning support materials will be developed (Dada *et al.*, 2009).

With this in mind, there is a question which will ultimately decide the role that these authorities and service providers will play – that is, the question of where they will fit in the new changing curriculum which is more structured and has specified curriculum content. How and what role will they play in learning support materials provision and development? These service providers will need to be strategic and draw on the findings and lessons from

educational research in order to: meet the needs of the curriculum; meet the learning and teaching needs of the learners and teachers; and encourage active environmental learning for more sustainable living in the rural areas of Maputaland.

Notes on the Contributor

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References

- Chisholm, L. (2004). The state of curriculum reform in South Africa: The issue of Curriculum 2005. In Daniel, J. (Ed.), *The State of the Nation 2003–2004*. Cape Town: HSRC Press.
- Dada, F., Dipholo, T., Hoadley, U., Khembo, E., Muller, S. & Volmink, J. (2009). *Report of the task team for the review of the implementation of the National Curriculum Statement*. Pretoria: Department of Education.
- iSimangaliso Wetland Park Authority (2008). iSimangaliso Wetland Park: Integrated management plan (2009–2014). <http://acerafrica.co.za/isimangaliso>, visited 11 June 2009.
- 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.
- Kethoilwe, M. (2007a). Environmental education policy interpretation challenges in Botswana schools. *Southern African Journal of Environmental Education*, 24, 171–184.
- Kethoilwe, M. (2007b). Genesis of environmental education policy in Botswana: Construction and interpretation. Unpublished PhD thesis, Department of Education, Rhodes University, South Africa.
- 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-GET pilot research report. Pretoria: Department of Education.
- Lotz-Sisitka, H. & Russo, V. (2003). Development, adaptation and use of learning support materials: In support of environmental education processes. In *SADC Regional Environmental Education Programme course developers' toolkit*. Howick, Share-Net.
- Lupele, J. (2002). Action research case studies of participatory materials development in two community contexts in Zambia. Unpublished M.Ed thesis, Department of Education, Rhodes University, South Africa.
- Mbanjwa, S. (2002). The use of environmental education learning support materials in OBE: Case study of the Creative Solutions to Waste Project. Unpublished M.Ed thesis. Department of Education, Rhodes University, South Africa.

- Mbuyazwe, M. (2009). Exploring how teachers acquire content knowledge of marine and coastal issues to contextualise the natural science curriculum. Unpublished M.Ed thesis, Department of Education, Rhodes University, South Africa
- NEEP-GET (2005). *Guidelines for developing environmental learning and teaching support materials (LTSM)*. National Environmental Education Project for General Education and Training. Howick, Share-Net.
- O'Donoghue, R. (2001). *Environment and active learning*. NEEP guidelines for facilitating and assessing active learning in OBE. Howick, Share-Net.
- O'Donoghue, R & Russo, V. (2004). Emerging patterns of abstraction in environmental education: A review of materials, methods and professional development perspectives. *Environmental Education Research*, 10, 331–351.
- Rosenburg, E. (2008). *Evaluation of the Eco-Schools South Africa Programme 2007–2008*. Howick: Wildlife and Environment Society of South Africa.
- Schudel, I. (2010). *Schools and sustainability evaluation report: Towards a deeper understanding of environmental education in context*. Grahamstown: Environmental Education and Sustainability Unit, Rhodes University.
- Snow, B. (2008). *Ocean literacy and education*. Anglo American Chairman's Fund Proposal: 2007–2008. Grahamstown: South African Institute for Aquatic Biodiversity.
- Young, M. (2008). *From social constructivism to social realism in the sociology of education*. Routledge: London.

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