THE USE OF THE ENVIRONMENT AS A RESOURCE FOR CROSS-CURRICULAR MATERIALS DEVELOPMENT IN OUTCOMES-BASED EDUCATION

BY

KHOKHIWE MAYVIS MHLONGO

9804631

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ABSTRACT.

All schools exist in a particular environment. No matter what environment the school is in, the educator can make use of it as a learning resource. The environment is a critical aspect at all levels of education and in all programmes to create environmentally literate and active citizens.

This study focussed on the use of the environment as a resource for cross-curricular materials development in Outcomes-Based Education. It is essential for all the driving forces of the education system to understand, that materials development is the process of designing and developing learner-support materials (resources) to enhance the teaching-learning process. Therefore, developing cross-curricular materials is a requisite for assisting learners to master the necessary knowledge, skills, values and attitudes. Developing cross-curricular materials promote integrated learning as enccuragec by Outcomes-Based Education.

The findings for this study indicate that some educators stil lack skills for developing cross-curricula materials. The findings also indicate that, educators from rural schools mostly depend on waste materials as their teaching-learning resources. The study also indicate some recommendations that could be used to empower educators to master competent materials development skills. Quality teaching and quality learning mostly depend on adequate resources that could assist the learner to master the required knowledge and skills.

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DEDICATION.

I love to dedicate my study to DUMISANI E.NGCOBO for all the moral support and sacrifices he demonstrated, whilst I was doing my Masters Degree. I also love to dedicate my study my MOTHER-MARGARET N. MHLOMGO for teaching me to be the hard-worker and the dedicated person in everything in life.

DECLARARTION.

I KHOKHIWE MAYVIS MHLONGO, declare that this disse tatic n s my own work, and has not been submitted previously for any degree.

RESEARCHER: K. M. Mhlongo **DATE:** 12-08-2003.

SUPERVISOR BHEKI KHOZA (SB) **D ATE:** 12-08-2003

LIST OF PLATES.

TABLE OF CONTENTS.

CHAPTER 1: Introduction.

1.1. INTRODUCTION.

The South African Constitution protects the rights of every citizen to a healthy environment (Bill of Rights, 1996). The environment is a critical aspect at all levels of education and in all programmes to create environmentally literate and active citizens. This can help ensure that South Africans have a decent quality of life through sustainable use of resources (White Paper on Education, 1995 and White Paper on Environmental Management Policy, 1992). The General Education and Training Band of National Qualification Framework (NQF) confirms this where the phase organiser "the learner in the environment" is included in all the phases of schooling, being Foundation, Intermediate and Senior Phases.

One of the roles of educators describes the educator as an interpreter and designer of learning programmes and materials (Asmal, 2001). The educator should understand and interpret learning programmes that are provided, design original learning programs, identify the requirements for a specific context of a learning area and select and prepare suitable textual and visual resources for teaching and learning (Government Gazette, 2000). This clearly indicates that the process of materials development is essential in the education of earners.

The competence of an educator as a learning programme developer is vital. The role of an educator as mediator and facilitator of learning will inform the type of learning opportunities that will be designed to develop skills, knowledge values and attitudes in learners. Facilitation of skills and co-operative learning strategies and techniques are key competences that will inform good learning programme design. The need for a thorough understanding of the role, use, selection and creation of learning support materials is as important as a key competence, (Government Gazettee, 2001).

Outcomes-Based Education is based on the principle that decisions about learning programmes be driven by outcomes that learners are expected to demonstrate at the end of the learning experience. Outcomes-Based Education emphasizes learning that is relevant and connected to real life situations, active-creative learners, critical thinking, learner-centredness and problem solving, (Spady, W. 1998). Therefore, the success of effective implementation of Outcomes-Based Education is depends strongly on innovative, creative educators who are capable of developing materials (resources) that promote resource-based learning as well as activity-based learning, which can contribute very positively to the quality of teaching and learning.

1.2. RATIONALE FOR THE STUDY.

The new curriculum places a strong emphasis on learners demonstrating an understanding of the inter-relationships between people and the natural environment. Learners can develop these skills by observing accurately, collecting data and writing up their observations. The formulation of the programme organiser (themes) in Outcomes-Based Education takes into account the needs of the community and events taking place in the environment where the school is situated.

One of the critical outcomes outlined by SAQA stipulates that learners should demonstrate the use of science and technology effectively and critically, sharing responsibility towards the environment and the health of others. The twenty-first century is the techno-information era where the enrichment of learner's competences, as future citizens, is one of an educator's greatest responsibilities,(SAIDE, 2002). This critical outcome places the environment as the starting point for learners to master technological skills required for lifelong learning.

In Outcomes-Based Education the learner's pre-existing knowledge and the use of concrete materials play a significant role in the comprehension of the content. Every school exists in a particular environment. The pre-existing experiences that learners bring to school could assist educators in creating an opportunity for co-operative learning.

Educators dedicate much of their energy making learner-support materials, the materials or resources that learners can interact with when they are engaged in learning activities. The inclusion of the phase organiser, "the learner in the environment" in all phases of schooling drew my interest and raised certain questions as to why the environment was made one of the key common concepts in all phases. I was also inspired by the way some educators could improvise, drawing on their school environment. That challenged me a great deal in conducting this study on using the environment as a resource for developing materials essential for outcomes-based learning.

I noticed that the curriculum review committee (2000) and the recently released National Curriculum Statement (NCS: 2001) place strong emphasis on equipping educators with skills of developing learner-support materials for implementing Outcomes-Based Education successfully in South Africa. The department of education in Kwa-Zulu Natal, under the leadership of Dr Guma, working collaboratively with the Media In Education Trust (MIET) initiated the Zikhulise Materials Development Project (Educator Empowerment and Curriculum Materials Development Project) with funding from United State of America Aid (USAID). This project was implemented in all the regions of Kwa-Zulu Natal, mainly in disadvantaged and under-resourced schools. That made me question what those schools could use to develop materials that could help improve the quality of their learners' education. The environment where the school is situated

was the only constant and this is why the study is based on using the environment as a resource for materials development.

Since 1995, I visited some neighbouring schools when they were celebrating intra-festivals on environmental events such as Water Day, Arbor Day and Environmental Day. During such events, I discovered a range of resources that were developed by learners when demonstrating their activities, such as models, poetry, drama, dialogues, music and project presentations. While attending science festivals I also noticed numerous resources that were made from low-tech materials on display. Such events cultivated inspired me to look more closely at what exactly educators do use in developing the materials suitable for their teaching, considering the apparent lack of resources.

During my involvement in the Technology 2005 Project in 1998, I conducted a study on the use of the environment as a resource for cross-curricular materials development in Outcomes-Based Education. The knowledge and skills gained from the project showed that there might be a close correlation between Environmental Education, Technology Education and Outcomes-Based Education, seeing that all emphasize the importance of the environment, creativity, hands-on-practice and problem solving.

I specialised in Educational Technology, during my Bachelor of Education and Coordinated Masters Education and Training (COMET) Studies. The materials

development module was the most valuable of my modules, as it equipped me with skills of making resources I could utilise in my day-to-day teaching. The skills and techniques gained from this module greatly motivated me to conduct this study, hoping that more people in the education sector will benefit from the findings and recommendations of the study. I strongly believe that the success of our education is dependent on adequate use of resources and activity-based learning. Therefore, educators need to be more creative in developing materials that will assist learners to acquire competent skills needed in the work force.

1.3. CRITICAL QUESTIONS

1.2.1. What are educator's perceptions on the use of the environment as a resource for developing cross-curricular materials?

1.2.2. How can the environment be used by educators as a resource for developing cross-curricular materials in Outcomes-Based Education?

1.2.3. How widely is the environment used by educators in developing cross-curricular materials?

The first question will seek to obtain the views of educators about using the environment as a resource for developing cross-curricular materials. The second question will seek to clarify approaches or methods that educators use in developing materials in Outcomes-Based Education. It also looks at their utilization in the teaching-learning process. The third critical question will seek for evidence as of how widely is the environment used in developing cross-curricular materials.

1.4. THEORETICAL FRAMEWORK

Outcomes-Based Education requires educators to design learning programmes. A useful way of thinking about the design is informed by the Interpretive Theory of Janse van Rensburg (1995). Interpretivist Theory is based on constructivist approach. It involves actualizing the potential of the whole person by enabling people to develop according to their needs and visions (Janse van Rensburg, 1995). This theory correlates with Outcomes-Based Education, which is governed by a holistic approach to education. The needs of the community are taken into consideration when involving educators as well as parents when programme organisers (cross-curricular themes) are chosen.

This study is both a descriptive and an interpretive study because its purpose is to describe, clarify and interpret aspects of education as they presently exist. Strategies and methods of Interpretivist Theory comprise a needs assessment, followed by working with communities on practical problems. As such, interpretive methods include inquiry and experiential learning which involve non-prescriptive, non-rote and non-authoritarian group learning, employing a broad cross-curricular approach where educators are engaged in facilitation of learning. Within the Interpretivist Approach, interaction and qualitative evaluation of learner's work is done on a continuous basis (Van Rensburg, 1995)

The interpretive perspective is more readily reconciled with Outcomes-Based Education. Examples include, the conviction that learning should be relevant and

connected to real life situations; that learners should take responsibility for their own learning and that input from the wider community should be encouraged. For instance, with Outcomes-Based Education, knowledge of water pollution may be best acquired by investigating a nearby water resource.

The interpretive perspective involves constructivist theory of learning, emphasizing the importance of the knowledge, beliefs and skills an individual brings to the experience of learning. It recognizes the construction of new understanding as a combination of prior-knowledge, new information and readiness to learn. Individuals make choices about what new ideas to accept and how to fit them into their established view of the world (Marsh, 1998). All these objectives are similar to the critical outcomes of the new education system in South Africa.

The constructivist educator sets the problem and then monitors learner's exploration, guides the direction of student enquiry and promotes patterns of thinking. The constructivist educator refers to raw data, primary sources and interactive materials to provide experiences for learners (Feinberg, W. and Soltis, J. 1997). Interpretivist Theory will guide this research study, hence the environment is regarded as the primary source for learners to acquire skills, knowledge, values and attitudes needed in adulthood.

1.5. RESEARCH METHODOLOGY

This research study is focuses on the development of materials that are essential for teaching and learning in primary schools. Purposive sampling was used for sampling schools that were included in the study. Three primary schools from the Inanda district were chosen as research sites, each representing a different circuit. The selected schools were labeled School A; School B and School C. For the study, one educator was chosen per grade per school; one head of the department (HOD) of a particular phase per school; one parent representative of the School Governing Body per school; a subject advisor for natural science; a materials coordinator from the Media in Education Trust (MiET) and a sample of learners from the three schools. All subjects were selected through purposive sampling, because they are informative and knowledgeable about the phenomenon.

Research instruments such as semi-structured interviews, questionnaires and observations were used to gather data. The study covered three different phases of schooling. These are Foundation, Intermediate and Senior Phase. Therefore, the following educators and heads and departments per school were used as focus groups for semi-structured interviews.

- School A: A Grade One educator and a Foundation Phase Head of Department.

- School B: A Grade Four educator and an Intermediate Phase Head of Department.
- School C: A Grade Seven educator and a Senior Phase Head of Department.

The rationale for the above selection was to include all grades from one of the three phases of primary schooling.

Educators; one parent representative of the School Governing Body per school; a subject advisor for Natural Science and a materials development coordinator were requested to complete questionnaires. The researcher conducted questionnaires in the similar chosen grades of the sample schools. The observations were recorded in two phases of each grade.

1.6. LIMITATIONS OF THE STUDY

Limitations are inevitable when conducting a study. It is imperative to stress that the research sites are all primary schools. The limitations that the researcher encountered include the constraints of time, transport and finance.

- **TIME**

According to the researcher's data collection plan, ten months were allocated to complete the study. Due to circumstances the researcher was compelled to re-write the research proposal, which delayed the start of the whole process. As a

result, the study began in April 2001 and less time was available for conducting and completing the study.

The researcher is employed by the department of education and is expected to work for seven hours everyday. The department of education has abolished study leave for educators to further their studies. So, conducting the research study whilst working became extremely difficult. Such circumstances led to the researcher having one option of applying for a limited number of days leave without pay for conducting the study. Piloting the semi-structured interviews was done in the evenings. All observations had to be completed by the end of the third term as schools would be preparing for examinations in the fourth term.

- **TRANSPORT**

The Inanda district consists of schools in peri-urban areas and schools in remote rural areas. The central focus for the study was on schools in remote rural areas, because they are the ones who lack most physical infrastructure and teaching and learning is dependent on low-tech materials. Transport to School C was very scarce, and when it rained there was no transport at all as roads become slippery.

The researcher's visit to school C to conduct observations that were scheduled in August 2001, was unsuccessful, because the transport could not reach the

school as it was raining and the road too slippery to travel on. On the way, the researcher had to phone and apologize to the principal and reschedule the appointment. Although the principal first showed a negative attitude, he finally agreed to another day for the researcher to proceed with the observations at the school.

Piloting the semi-structured interviews during the evenings was not easy and very unsafe due to the lack of transport. Again, requesting the interviews to meet in the library also caused a transport limitation. The researcher had to reimburse the participants for transport costs, from their schools to the Inanda library where the focus group semi-structured interview was to be conducted. If the researcher had her own transport or funds to hire it, this could have solved the problem easily.

THE FINDINGS OF THE STUDY COULD BE USEFUL TO:

- Encourage educators to develop their materials development skills further.
- Encourage educators to use the environment as a fundamental resource for developing materials.
- Encourage educators and Heads of Departments to attend materials development workshops.
- Challenge educators to design learning programmes that will empower learners with competences.

1.7. SCENE FOR NEXT CHAPTER

The second chapter of the study includes the preamble for the chapter, a definition of concepts and a literature review. The literature review is divided into sub-topics which include:

- Materials development: A South African perspective.
- Materials development: An International perspective.
- Materials development in Outcomes-Based Education.
- Materials development in Environmental Education.
- The efforts of the Media in Education Trust (MiET) in materials development.
- The efforts of the Mathematics Center for Primary School Teachers (MCPT) in materials development.
- The efforts of the English Language Education Trust (ELET) in materials development.
- The efforts of the Keep Durban Beautiful Association (KDBA) in materials development.

CHAPTER 2: Literature Review

2.1. PREAMBLE

An outline of the value and prominence of the literature review in this study is given. The literature review aims to broaden and refine existing knowledge; it will help to identify current debates and controversies; it will sharpen and clarify research questions and it can highlight gaps under researched areas (James, et al, 1997). In this literature review concepts, themes, issues, topics and questions relevant to the study are identified. It represents a coherent argument, not just a list of facts, meaning that the researcher engages in a reflective dialogue with data from literature.

The literature review in this study outlines the policy base for the study and explores what educators might say and do in relation to the critical questions. Most literature used is current, taken from current debates and workshops on materials development projects and its practical implementation in schools in Kwa-Zulu Natal, South Africa. The policy emphasizes the motivation and courage of educators becoming creative innovators and being resourceful in enriching their facilitation skills Education Policy Document for Intermediate Phase (1995).

According to Jansen (1994), research findings have clearly indicated that the sufficient use of resources is a pre-requisite for effective implementation of Outcomes-Based Education. Making excessive use of instructional resources not relevant to the real life experiences of the learner can in fact be detrimental to the

teaching and learning situation. Educators are encouraged to skill themselves as materials developers using low-cost means, such as environmental resources.

2.2. DEFINITION OF CONCEPTS

2.2.1. ENVIRONMENT

All schools exist in a particular environment. No matter what environment the school is in, the educator can make use of it as a learning resource. The environment is accessible. The new education system of South Africa places a strong emphasis learners demonstrating an understanding of the inter-relationships between people and the natural environment. I have noticed that the "environment" has become the most common phase organiser at all levels of learning (phases), and that challenges investigation (research) to the research practitioner and to the productive educator.

2.2.2. MATERIALS DEVELOPMENT.

Materials development refers to the process of designing and developing the learner-support materials (resources) that enhance the teaching-learning process Ellington and Percival (1994). Materials development involves using low-tech materials (such as waste, plants, animals, print-media, people) and high-tech materials (such as computers, radios, television, overhead projectors and similar electronic equipment) Mehra, V. (1995). For the purpose of this study, the central focus is on low-tech materials obtainable from the environment.

Different countries use different terms for the concept "materials development". In the United Kingdom, it is referred to as Instructional Design; in the United State of America, it is referred to as Materials or Media Development; in Australia and Denmark, it is referred to as Curriculum Resource Development. The central focus for all these terminologies is based on developing resources that are essential for teaching and learning.

2.2.3. OUTCOMES-BASED EDUCATION.

Outcomes-Based Education encompasses an approach to education that is committed to the holistic development of the learner. The success of Outcomes-Based Education is dependent on outcomes that the learner should achieve at a particular phase. Outcomes are made up of knowledge, skills, values and attitudes, beliefs and understanding that the learner can demonstrate at the end of a learning process. Outcomes are what learners can actually do with what they know and have learnt Lubisi and Parker (1998).

According to Spady (1998), Outcomes-Based Education means focussing and organising the education system around what is essential for al students to be able to succeed at the end of their learning experience. Outcomes-Based Education is meant to enable each learner to accomplish knowledge and skills as well as master processes that are necessary to face the challenges and opportunities of the world of the future Olivier (1998).

Due to the fact that Outcomes-Based Education was introduced to South Africa whilst some educators still lack the competences of developing materials essential for the effective implementation of Outcomes-Based Education, hence Outcomes-Based Education has been simplified to National Curriculum Statement (NCS). Research conducted by Jansen (1994) indicated the unsuccessfulness on the implementation of Outcomes-Based Education in South Africa, because of the absence of sufficient resources in schools. The National Curriculum Statement will be implemented as from next year (2004) in the Foundation Phase and other phases consecutively in the following years.

Outcomes-Based Education is learner-centred. This can only be achieved if educators acknowledge the needs and abilities of learners, involving them in all aspects of learning, accepting the point of departure, that learners must not **cover** the curriculum, but **discover** it Olivier (1998). Outcomes-Based Education encourages and promotes hands-on-practice on the part of learners.

2.3. LITERATURE REVIEW

2.3.1. MATERIALS DEVELOPMENT: A SOUTH AFRICAN PERSPECTIVE

The recent introduction of Outcomes-Based Education in South Africa has resulted in the Ministry of Education providing directives to educators in the form of learning areas. Educators are given the flexibility to determine the content of the learning area and relate this to the context of the school Education Policy Document (1995). Such offers demand creativity on the part of the educator,

which may be difficult not given appropriate curriculum development experiences during teacher-training or in-service training.

The study conducted by Dlamini (1998), on materials development in teaching and learning, concentrated on the materials developed by non-governmental organisations, such as Mathematics Centre for Primary Teaching (MCPT) and Primary Science Project (PSP) and their impact on teaching and learning. The analysis of the study indicated that, although instructional materials developed by non-governmental organisations are useful, they do not empower educators with skills of developing their own resources. The findings also indicated that non-governmental organisations are unable to supply schools with adequate materials and they are only able to give samples to schools.

An illustration of this is that during 2001, MCPT donated one box of mathematics materials to each school in KZN, regardless of the size of the school. The use of sufficient, relevant resources is a pre-requisite for Outcomes-Based Education Jansen (1994). That is why the researcher decided to conduct the study that is focussing on educator empowerment, so that educators become motivated to inspire their learners with same skills, thus producing a better quality teaching and learning.

Research on engineering materials development was conducted by Waghid (1995). The project involved a consortium of technikons, (Peninsula, ML Sultan,

Northern Gauteng, Eastern Cape and Mangosuthu). In this research, it shown clearly that "well-designed interactive study material" is a key element of resourced-based learning National Commission on Higher Education (NCHE) (2000). The National Commission on Higher Education further states that the use of well-designed learning resources with which students can interact at an appropriate pace, enables academic staff to shift their emphasis away from lecturing towards curricular and course design. If implemented successfully, this approach (resourced-based learning) should enable the academic staff to lead and direct well-designed learning environment for large and more heterogeneous groups of students (NCHE, 1996:119-120).

Although the mentioned study focussed on developing materials for engineering students only, as a research practitioner, I felt that a similar study could be conducted, but with more focus on developing materials that can assist in teaching and learning at schools.

Educator development through a curriculum materials development project is the only initiative that will assist learners to acquire lifelong learning Guma (2001). Including materials development in the teaching-learning process is done to ensure the success of effective implementation of an Outcomes-Based Approach, which relies on using concrete, sufficient and relevant resources and well-planned activities.

The Green Paper on Higher Education Transformation (GP: 1999) endorses the NCHE's recommendation to develop quality and cost-effective resources-based learning materials which are well designed to meet the challenges of "greater success and enhanced quality in the context of resource constraint and a diverse student body". Most parents at rural and peri-urban schools are unemployed, and some places still have a poor physical infrastructure. Therefore it was projected that by developing learning materials using low-tech materials, learners can be educated, learning from those environments.

Some studies in South Africa refer to materials development as instructional design. According to Johnson (1989) instructional design involves organising and using "tools" of the mind and "tools" of learning to improve the conduct of education. Instructional design provides a set of tools that allow us to maximize individual learning potential These "tools" tend to refer to materials manipulated during teaching and learning, which assist the learner to realize his or her potential and to have their learning needs met.

The manipulation of materials in class can play the significant role for the learner to actualize the knowledge, skills and values. Kember and Murphy (1995) hold that instructional design not only transmits knowledge structures, but also is aimed at accomplishing conceptual change in learners. These studies further indicate that instructional design (materials development) is a strategy or

procedure which uses certain tools (materials in this case) to improve instruction and learning.

The action research on curriculum development in Science –Teacher Education, conducted by Pillay (1996), focuses on students developing curriculum materials related to a topic or topics selected from the primary school Science syllabus. An integrated learning approach is adopted in Outcomes-Based Education. I decided to conduct a similar study, but focussing more on developing the materials that will accommodate the integration of learning, hence the focus of this study is on cross-curricular materials development.

The findings of a similar study on curriculum development in Science-Teacher Education showed different facts in different times; but took longer as it was the action research based. This approach strives to improve the phenomenon while the study is being conducted. The findings of another similar study (action research conducted by Pillay, 1996) revealed that exposure to curriculum development of that study did not meet expectations, namely, that students would continue developing science materials and use it at school during their practice-teaching. The action research conducted by Pillay also indicated that when educators commence teaching, they do not have curriculum development skills. This was attributed to the lack of exposure to adequate curriculum development practices during the pre-service teacher education programme. The analysis showed that educators felt dis-empowered due to the lack of curriculum development skills. It is such analysis that gave insight, and further influenced me

to conduct this study. It became clear that it is essential for all educators to receive continuos training support on developing cross-curricular materials needed for the integrated approach used in outcomes-based education.

2.3.2. MATERIALS DEVELOPMENT: AN INTERNATIONAL PERSPECTIVE

The study on Instructional Design where educators developed resources for teaching and learning has been conducted in America by Ellington and Pearce, (1995). The focus of their study was on educators being equipped to develop resources using high-tech equipment, such as computers, video-cameras, developing slides, using videocassettes, trigger videos, cartoons and many other types of technology. In the United Kingdom a similar study was conducted but focusing again on equipping educators with skills of developing teaching and learning resources using high-tech materials. Curriculum development research conducted in Denmark by McMillan (1993) showed that educators are skilled in developing curriculum materials, but they often find it problematic, as they are restricted by having to follow the centralized syllabi from the Danish Provincial Education Department. The literature again indicates that in China, the hands-on-practice model during teaching and learning plays a significant role to help skill educators in developing learning materials using modern technology.

South Africa is a developing country with the majority of its schools still lacking physical infrastructure and facilities. Hence I decided to shift the focus of this study to the use of low-tech materials when developing learning resources. I

focused specifically on the use of the environment as a resource, since it is something that is available to any educator in any context.

2.3.3. MATERIALS DEVELOPMENT IN ENVIRONMENTAL EDUCATION.

Literature indicates that environmental concerns have been emphasized in many policy documents in South Africa, (RDP, 1994; Environmental Management Bill, 1998; White Paper on Education and Training, 1995, as well as Bill of Rights of the new South African Constitution which mandate healthy environment for all citizens). The Growth Employment and Redistribution (GEAR) strategy gives direction in developing people with skills, ensuring environmental sustainability (HSRC Business Plan, 1997/98, Article 3). These policies give a clear indication that the concept of environment and empowering educators, learners and parents with necessary skills are part-and-parcel of Outcomes-Based Education.

The researcher's literature review indicated that this research study is dependent on two specialization strands. These are, a focus on environmental education and on educational technology. The concept "environment" is most commonly used in environmental education and "materials development" is most commonly found in educational technology. The critical outcome mentioned earlier [that learners should demonstrate the use of science and technology effectively and critically, sharing responsibility towards the environment and the health of others], clearly gives an indication of the roots of this study. Technology deals with the development of self-confidence in a modern real environment (Weks, 1995). Self-

confidence is developed through opportunities of creating something that could solve problems in our everyday lives, and in this case in our everyday teaching and learning processes.

Pre-existing knowledge, meaningfulness and relevancy to real life situations are utmost priorities in the new education system of South Africa. As all schools are located in particular environments, creating a coherent link with existing knowledge, together with the environment should be considered as the starting point for learners to comprehend whatever content is being facilitated. It became clear that a holistic approach, governing Outcomes-Based Education (Hager, 1999 et al) aims at equipping children with competent skills for techno-information era in the workforce.

The environment provides essential resources for economic and social development. Links between environmental education organizations and environmental health educators must be created to promote collaboration in co-ordinating environmental management programmes (Environmental Management Policy for the Durban Metropolitan Area, 1998). This implies that, it is essential for schools to fully adopt a community-based approach, where all community educational initiatives are given full cognizance to the school curriculum. This could inspire parents and learners in sharing skills and expertise. Using the environment as a resource for developing materials could play a significant role in teaching and learning of our future citizens (learners).

The International Union for the Conservation of Nature and Resources (South African Journal of Environmental Education, 1993) maintains that the environmental objectives are:

- **AWARENESS-** This helps the learners and social groups to acquire an awareness of and a sensitivity to the total environment and its allied problems. Learners and educators should become observant towards environmental occurrences and try to negotiate some productive inputs into it. Every citizen should learn that the environmental concerns or problems should become one's concern. Problems such as negative impacts on the environment like pollution and uncontrolled waste should challenge both educators and learners to take initiatives.

- **KNOWLEDGE-** This can help learners and social groups acquire a basic understanding of the total environment, its associated problems and man's critical responsible presence and role in it.

- **SKILLS-** This can help learners and social groups acquire skills for solving environmental problems. Learners need to be enlightened with skills of dealing with common environmental problems such as pollution and bio-degradation. To assist learners in developing such skills, the school should formulate an integrated pollution and waste management policy. Such a policy should give a guide as to how learners can acquire such skills.

- **EVALUATION ABILITIES-** Helping learning and social groups evaluate environmental measures, conditions and educational programmes in terms of ecological. Management of environmental resources and environmental impacts shall seek to promote social economic and environmental justice to accommodate all citizens including children in particular.

Educators and learners should have a shared responsibility in contributing to the improvement of their environmental quality and human health and well being. Using the environment effectively as a resource may promote economic activity that maximize job opportunities (Environmental Management Policy for Durban Metro Area, 1998). This can be done through the initiation of small community projects where schools can engage themselves in activities such as market gardening, craftwork and similar related projects.

The National Environmental Education Program (NEEP) (2001) has developed an Active Learning Approach, indicating how any theme focussing on the environment could be explored. The *Plate 1* illustrates the approach:

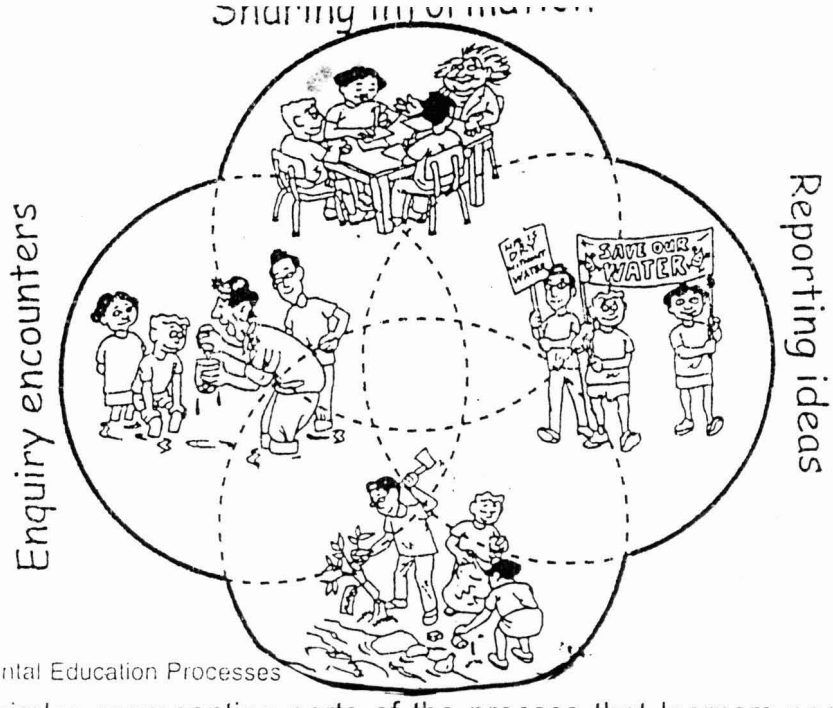


Figure 1: Environmental Education Processes

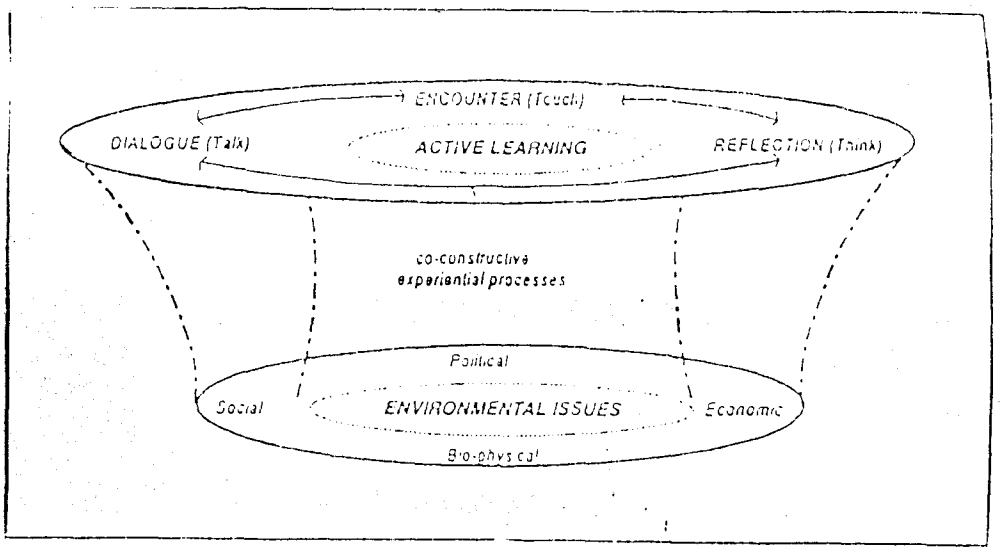
It shows four circles representing parts of the process that learners need to go through, to help them acquire the necessary knowledge, skills and understanding needed for an active approach to whatever theme or issue is focussed on. These circles illustrate methods learners can use to acquire knowledge, skills, values and attitudes (EnviroTeach, May 2001). Learning **about** the environment (Sharing Information) increases knowledge and understanding of the biophysical, social, economic and political processes that shape the world. It enables users to make informed decisions about how to interact with the world. Learning **in** environment, (Enquiry Encounters) provides opportunities to practically investigate environmental problems and designing procedures of resolving them.

Taking action for the environment (Acting and Reporting), empowers one to make changes for a better world and to respond to local issues and risks. Implementation of projects within the community should form part of acting and reporting. Giving learners some topics to conduct research on could form part of sharing information. Educators should take great cognizance of learner's –pre-

existing knowledge, giving them opportunities to assess and reflect on what they have learnt and achieved.

An integrated approach to learning is promoted, as it involves critical processes and cross-curricular themes for all learning areas National Environmental Education Programme (2001). Active learning and problem solving activities in the local environment characterise broader understanding, more participation, more local and more action-based approaches to Outcomes-Based Education. Using the environment as a resource for developing materials promotes a process of active learning. The facilitation methods, first-hand encounters (hands-on), dialogues (discussion) and reflection foster greater awareness and influence meaningful change. *Figure 2* illustrates how the active learning approach takes place through focussing on the environment as a key resource for developing cross-curricular materials.

ACTIVE LEARNING APPROACH



The active learning approach provides educators with more advanced and diverse instructional and cooperative learning strategies. The significant shift to activities, the learning outcomes expected to be achieved, as well as assessment criteria to use, all play a major role ensuring effective teaching and quality learning.

The Active Learning Approach could contribute a great deal to learners becoming explorers and discoverers of information. Learners can easily adopt the culture of sharing ideas, skills and expertise. They could also learn to research information on their own and become confident to take constructive actions seeking to improve their current situation. Educators need to be empowered with creative and innovative skills to set good role models for their learners. It will be impossible for them to impart such skills using abstract, inaccessible examples. This implies that the use of the environment, which is always accessible, plays an important role for both educators and learners to become creative, innovative lifelong learners.

2.3.4. MATERIALS DEVELOPMENT IN OUTCOMES-BASED EDUCATION.

The South African vision is that all learners must have access to quality education. Large amounts of money are spent on learner support materials, but

the reality is that the haves are getting more, and the have-nots still have little or nothing University of Natal (1997). The process of materials development could be the only sword to rescue the have-nots, by developing their own materials to enhance the quality of teaching and learning in their schools. The new curriculum focuses on knowledge, skills, attitudes and values (that is outcomes), which learners should develop rather than only on the content that they are given by the educator. However, if the educator did only this, learners would not fully develop their range of thinking, communication and problem-solving skills. In order to achieve these competences, learners need to be actively involved in the learning process. This requires that they spend more time on solving problems, making models, designing plans, working in groups, making posters, trying out ideas, applying knowledge in different contexts as well as understanding the information given to them.

The introduction of Outcomes-Based Education in South Africa has challenged educators to become curriculum designers and developers. The capability of designing and developing the curriculum demands creativity in designing activities and relevant learner-support materials on the part of the educator so as to enable learners to achieve the specific outcomes for a particular learning experience. Such initiatives require competency, courage, dedication and enthusiasm on the part of the educator.

The educator should develop activities that will give learners an opportunity to gain new knowledge, develop new skills and think about their attitudes and values. Materials development plays a significant role by equipping educators with skills in planning meaningful learning activities and developing resources that can assist learners to achieve specific outcomes Africa Development (2002).

Developing educators is the key to better education Sekete (1998). In literature, it is emphasized that if education is to deliver well-educated human resources for South Africa to become a winning nation in the next century, our teaching corps (educators) will have to improve. Both educators and learners need to become lifelong learners Butler (1999). This is why Guma (2000) of the Department of Education pointed out that materials development is meant for educator empowerment and that would give them more confidence and courage to implement Outcomes-Based Education in their schools.

Parker, Lubisi and Wetekind (1999) pointed out that the Traditional Approach to teaching and learning concentrated on the Atomistic Approach, giving the cognitive aspect the best attention, thus ignoring other aspects of life. Although the principle of teaching the child, as the "totality" was part of the education system, the department of education made no provisions for the development of "the affective and physical aspects". Fortunately, Outcomes-Based Education is based on the principle of a holistic approach (Hager, 1997). The provisions for developing knowledge, skills, values and attitudes are favoured Although such

provisions have been made, some researchers still confirm that the shortage of resources and creative skills among educators will still hinder the process of implementing Outcomes-Based Education (Jansen, 1998).

Researchers of quality education believe that the utilization of instructional materials will make a difference to learners (Sieburth, 1989; Commonwealth Secretariat, 1991). Indeed, the use of instructional materials such as textbooks in the classroom does not necessarily raise learner's competences. Many can attest to the fact that most schools rarely use textbooks but keep them in boxes for fear of getting them lost. Even where they are used, it cannot be assumed that their utilization bring about change in the classroom practice that could result in quality learning and mastering of skills (Dlamini, 1998).

The literature affirms that Outcomes-Based Education distinguishes between outputs (outcomes) and inputs. The outcomes are what learners know and can do and inputs are experiences from which they learn and the arrangement for learning (Malcolm, 1997). In this study, the materials are inputs, their utilization in the teaching-learning process and the outputs being the achievement of outcomes demonstrated by mastery of performance indicators. It is at the level of inputs that the educator may play the significant role as materials developers (developing resources). Developing resources using accessible environment as the resource would assist educators being able to design activities relevant to learner's local context.

The new education system in South Africa expects every educator to become researchers of information SIDA (2002). Materials development motivates, encourages and equips both educators and learners to always indulge in action research. Through materials developed for a particular activity, educators always reflect back on the progress or shortfall, and attempt some improvement of enhancing the quality of learning.

Project-Based Instruction builds on real world situations to provide learning experiences and in engaging at-risk learners who are not accustomed to succeeding in schools (Resmick and Rusk, 1996). Such activities may aid and motivate all types of learners who have doubts about their capability in science and technology due to adverse cultural, ethnic and environmental influences. Outcomes-Based Education encourages learners to explore the synthesis of ideas and practice, and of technology on societies and environmental experiences, interests and aspiration in technology (Marsh, 1998). Project-based instruction can bring great success if learners are given the autonomy of demonstrating their innovations by doing some projects of their own. Creative and critical thinking can only be developed if such opportunities are open to future citizens.

The system of education in South Africa expects schools to provide inclusive education, in order to accommodate learners with special needs. The education

of such learners is dependent more on project-based learning because it is linked more with skills or trade learning (Marsh, 1998). It is essential to emphasize the fact that the education for learners needs to be enriched with technical skills. The situation in our country demands that the future citizens must never learn to become job seekers, but become job-creators. Technology education and science education serve as the important weapons for preparing learners to cope with this situation in the work force.

Systems Approach of Educational Technology is also appropriate for teaching and learning in schools. It involves planning, developing and utilizing both strategies and resources that assist learners in achieving specific outcomes. Hence, the integration of learning areas is highly recommended by the new education system, it is also advisable that the materials serve the cross-curricular needs (Ellington, 1994). Teaching across the curriculum brings the complete integration of learning areas. This can only be successful if educators are competent enough to develop materials that can promote the integration.

It is advisable for educators to acquaint themselves with the systems approach in their teaching as it incorporates all teaching and learning aspects, which include learners; educators; content; media; methods; objectives; parents and environment. Systems approach also involves planning, developing and utilizing both strategies and materials for assisting learners to achieve specific outcomes. The utilization of relevant materials can enable learners to show good

performance of the skills facilitated. Therefore, the environment where the school is located serves as the primary place to obtain concrete materials that could be easily understood by learners and contribute to the enhancement of their learning.

Most literature on Outcomes-based education emphasizes the point that educators should decide in advance as to what support materials they will require for the enhancement of quality and effectiveness of learning. Educators should decide on activities that correlate with developing materials that aim to assist learners in mastering lifelong learning. Educators should thus design materials, which are suitable and relevant to the learning programmes and objectives.

Compatible with the Interpretive model, is one approach, the ASSURE Model, a model to assure learning. The educator should first analyze learner's characteristics (A), state objectives (S), select-modify or design materials (S), utilize materials (U), require learner response R, and lastly evaluate its impact (E), that is the ASSURE (Linzowiski et al, 1997). The literature emphasizes something very significant and most relevant to this study, the inputs---teaching-learning process----outputs as clarified before.

The ASSURE Model stipulates that thorough planning is the pre-requisite in any teaching-learning process. Firstly, the educator has to identify the learner's knowledge, skills and attitudes about the chosen programme organiser (cross-

curricular theme). Then select the appropriate objectives derived from the needs assessment of the school environment. Once the objectives have been stated, build a bridge (integration) using available materials, modify and then design new resources best for co-operative learning. Thereafter, the resources could be utilized in the facilitation process whist observing learners responses, and evaluate the impacts. Outcomes-Based Education training sessions should sensitize educators with the above mentioned model, as it teaches about prominent aspects and steps of teaching and learning processes.

The literature clearly indicates that learners represent a rich array of different backgrounds and ways of thinking. The classroom should provide a space where learners exchange their personal views and test them against the ideas of others. Hands-on- activities, observations and explorations of the world provide shared experiences (NCLRC, 2002). Through such experiences, the learners may gain self-esteem and personal responsibility, over an above acquiring new cognitive and instrumental skills, as well as new knowledge. This means that opportunities to practice acquiring the habit of and the ability for continual learning, must be provided by the educator.

2.3.5. THE EFFORTS OF THE MEDIA IN EDUCATION TRUST (MiET) IN MATERIALS DEVELOPMENT.

The Media In Education Trust (MiET) is a non-governmental organisation committed to developing resources essential for teaching and learning as well as

empowering educators with skills of developing materials necessary for their teaching. MiET is working collaboratively with the Department of Education. Such a collaboration is evident in the co-operation that exist between the materials development facilitators from MIET and materials development coordinators from the Department of Education, when they visit cluster schools and conduct materials development workshops co-operatively.

Research done by the University of Natal (in 1997 and again in 2000) showed that only fifty percent (50%) of distributed materials reach schools. Of this, only twenty percent (20%) finally make it into classrooms. Rural educators and learners, who need the materials the most, are by far the least likely to get them. What aggravated the situation is that most educators are not capable of using the materials unless someone shows them how to use the materials.

MiET in partnership with the Department of Education through Zikhulise Materials Development Project, are making a great effort to equip educators from disadvantaged schools with skills of developing materials suitable for learning experiences (USAID,2001). Through the Resources And Information Network (RAIN) project, MiET is distributing teaching and learning support materials such newspaper education supplements, support materials for matric students, health promotion and HIV/AIDS educational materials, as well as and SABC educational materials directly to disadvantaged schools throughout KZN.

MiET conducts different projects aimed at equipping educators with skills and courage to develop their own learning materials. Some of these projects are the Zikhulise materials development project, the Resources And Information Network, the Learn Education Supplement. User-support workshops have motivated and skilled educators to attempt utilizing materials delivered to their schools. There seems to be an improvement in the utilization of materials as was shown through an evaluation process conducted by Ruby Peinke MIET (October 2001) at three schools from Inanda district.

MiET is also working collaboratively with Independent Newspapers, using teams of educators and department officials from all regions of KwaZulu Natal to develop materials. These were published in the Daily News as education supplements and distributed to schools through the Resource And Information project. The supplements consist of different learning activies designed around a specific theme, as well as learner support materials needed for each activity.

MiET also conducted several workshops in which educators are skilled in the effective use of newspapers in an integrated approach and effective use of learner supplement supplied to schools. Dr Jeff Matthews, a manager at the Print Media in Education (1999) strongly recommended the use of newspapers and magazines in the classroom (The Teacher, 1999). He further stated that old newspapers and magazines could be used as valuable resources for all learning areas because the content of each learning area is vastly represented in the newspapers.

Newspapers serve as cost-effective significant materials in the teaching and learning environment, as it provides educators and learners with current and relevant information. They bridge the "real world" and the classroom because learners become more knowledgeable about what is happening in their country as well as other countries. Learners enjoy finding articles in the newspapers and cut out pictures and articles to make their own learning resources such as posters.

Workshops conducted by materials development coordinators from MiET on the use of newspapers and learner supplements in an effective way, have equipped educators with various skills of using newspapers in different learning areas. The following few examples illustrate how educators can use newspapers when teaching different contents in different learning areas.

- **Human and Social Sciences (HSS)**

Newspapers report history as it is happening. Educators use newspapers to teach learners about important issues and incidents within the country as well as other countries. In that manner they help learners to link learning to the real world. Educators often use the weather map or report as a resource for teaching weather symbols and practicing reading maps.

- **Economic and Management Sciences (EMS).**

Educators and learners use newspapers to compare the value of a rand and a dollar or other currencies from other countries and get some insights how that affect the economy of the local country. Educators often use advertisements found in newspapers to instill the entrepreneur skills and potentials among learners. They usually ask learners to design the advertisements of certain products of their own choice and present to class.

- **Mathematics Literacy, Mathematics and Mathematical Sciences (MLMMS).**

Most advertisements in the newspapers include the prices of items. Educators use such advertisements to teach the four basic operations. They facilitate the operations through topics such as buying and selling, budgeting, sharing of amounts, saving and spending of money and many others. Learners practise the skill of estimating or rounding off numbers using prices from supermarket advertisements. Some information in the newspapers is represented through column or bar graphs and pie charts. Educators use such graphs to help learners practise their graph reading skills. Foundation phase educators often use newspapers to help learners identify and cut out different shapes like squares, triangles and rectangles.

- **Language, Literacy and Communication (LLC).**

Educators often use newspapers to promote reading and comprehension skills by extracting some passages from the newspapers and letting learners read and answer some questions. In such cases newspapers perform the similar function

as the textbook. Again, educators use newspapers to help learners develop literacy skills—being able to understand and criticize messages in newspapers and magazines because learners are exposed to media messages every day. Learners find pictures of people or certain incidents and describes what they see happening in the picture and then write a story about that picture.

- **Life Orientation (LO).**

Learners are urged to choose jobs they want to "apply for" from the advertisement in the classified section Learners can practice writing application letters for different jobs. Educators also use articles on issues like HIV/AIDS or child abuse for discussions thus sharing some ideas.

The posters, worksheets, activities and tests found in learner supplements contribute a great deal to teaching and learning. It is clear that newspapers play a significant role as low-cost learner-support materials for teaching and learning, especially in less-resourced schools.

2.3.6.THE EFFORTS OF MATHEMATICS CENTRE FOR PRIMARY TEACHERS (MCPT).

Mathematics Centre for Primary Teachers is a non-governmental organisation that is working in partnership with the department of education. This organisation

has committed itself to develop educators with creative skills of teaching mathematics in an effective contextualised outcomes-based approach. Mathematics Centre for Primary Teachers conducts workshops during each term for educators of different phases from Inanda District.

Mathematics Centre for Primary Teachers also develop instructional materials for mathematics. Before supplying the boxes of mathematics materials to schools, they first workshop educators on how to use such materials when teaching mathematics. Each box contains learner's book. Although the boxes of materials are not adequate for each school, they do teach educators the theory on how they can develop similar materials using any accessible means. Mathematics Centre for Primary Teachers encourages educators to bring cartons, containers and other waste matter from home. Through such initiatives it can be deduced that Mathematics Centre for Primary Teachers is making the great contribution to the process of materials development in schools.

Outcomes-Based Education encourages the teaching of mathematics in a contextualized form thus avoiding teaching learners numbers with no meaning to them. Therefore this challenges educators to have sufficient mathematics learner-support materials.

The problem of getting inadequate instructional mathematics materials from Mathematics Centre for Primary Teachers turned to be a golden opportunity because educators use the theory gained from workshops to actually practice hands-on skills by having to develop more materials. Educators use boxes and cartons to develop similar materials. Teaching and learning of mathematics through using concrete materials and real situations demand a lot of creativity. The common summative tests that are conducted by Mathematics Centre for Primary Teachers at the end of each term in all primary schools at Inanda motivate and challenge each mathematics educator to enrich his or her standard of teaching.

Although the schools receive insufficient materials from the above mentioned organisation, the skills of developing mathematics materials by educators are contributing a great deal to the improvement of learning in the mentioned learning area in primary schools in Inanda. This has been witnessed by the good performance demonstrated by learners in the 2001 Mathematics Olympiad, conducted yearly in the district by the Mathematics District Committee in collaboration with mathematics subject advisors. During the Olympiad, the researcher noticed that mathematics is comprehended far better if facilitated through the utilization of concrete materials and real situations. That was the first Olympiad where mathematics was demonstrated live and in the context of real examples.

2.3.7. THE EFFORTS OF ENGLISH LANGUAGE EDUCATIONAL TRUST (ELET) IN MATERIALS DEVELOPMENT.

English Language Educational Trust is also a non-governmental organisation committed at developing English classroom resources. English Language Educational Trust often invite educators for Literacy and Literacy Language and Communication (LLC) to attend training sessions on developing reading materials. These training sessions are offered at no cost. Knowledge and skills of developing their own reading materials are intensively facilitated.

English Language Educational Trust is working collaboratively with Readathon, a project initiated by English subject advisors from the department of education with the aim of improving learners' reading skills. They train educators to become teacher librarians at their schools or classes. Skills on forming mini-libraries or classroom media centres are facilitated. Readathon also visits schools with the aim of supporting and equipping learners more with skills and techniques for reading. Readathon also conducts English festivals where learners from different schools in the district gather and demonstrate their talents and abilities in reading, poetry, dialogue as well as drama, all created and composed by educators. English Language Educational Trust often supplies schools with storybooks.

Materials development is about designing learning programmes, activities, resources, assessing them, therefore, such efforts by English Language Educational Trust contribute a lot to materials development with an object of enhancing teaching and learning processes in schools.

English Language Educational Trust is also working collaboratively with Open Learning Systems Education Trust (OLSET). OLSET sponsor schools with radios and radio-cassettes and educational cassettes that educators could use when teaching English through activities. Educators first receive training before they use the equipment as well as skills how they can create poems, stories, activities and tape them then present to the class. Such lessons teach, develop listening, speaking and role-plays skills among learners and arouse interest. Foundation Phase educators are now equipped to facilitate story telling through radio listening. Demonstrations of dialogues and poems done by learners in class, recorded and learners are given the chance to re-listen to themselves and appreciate their efforts. Educators keep the recorded cassettes to media storehouse for the class for future use thus increasing learning resources.

The skills development programmes offered by the English Language Educational Trust have empowered educators a great deal, because educators are becoming less dependent on textbooks for teaching stories, poems and dialogues, but instead they are capable of composing their own activities, stories dialogues, drama and poems. Such dedication by educators has been witnessed

by the English Day celebration on 15th August 2001, organized by Ngcobo Dumisani (HOD from Umzinyathi Primary School). Schools from Inanda North circuit gathered and learners demonstrated their talents in poetry, speeches, dialogues, drama and music. Readathon conducted a similar festival in September 2001 at Inanda Library, where all schools from the district were invited to take part in reading, dialogues, poetry rhymes and drama. During the festival it was noticeable that all presentations were not taken from textbooks but often composed by learners and educators, using current occurring issues and events in the country. The researcher noticed the great efforts made by English Language Educational Trust in materials development process in the schools at large.

Primary schools within the district have become more enthusiastic in celebrating the environmental events such as Water Week, Arbor Day as well as World Book Day. During such events it is where the skills that educators gained from English Language Education Trust are demonstrated in open. Learners presented poems, dramas, dialogues, speeches, rhymes and music related to the event celebrated. These efforts by English Language Education Trust contribute to offering quality meaningful learning in schools.

2.3.8. THE EFFORTS OF KEEP DURBAN BEAUTIFUL ASSOCIATION IN MATERIALS DEVELOPMENT.

Keep Durban Beautiful Association (KDBA) is an educational component under Durban Solid Waste (DSW) of Durban Metropolitan Area. This is one of the education services that the council provides to its residents. Keep Durban Beautiful Association focuses on educating learners on the importance of managing waste matter. It is noticeable that everyday people throw piles of rubbish, and this waste cannot be burned, as it may pollute the atmosphere. Therefore, it is very important to teach learners about the processes of managing waste to keep environment clean and healthy. Protecting the environment is central to Curriculum 2005. Using waste in the classroom promotes awareness that the earth's resources are scarce and should be carefully used and reused.

Keep Durban Beautiful Association is working co-operatively with Zikhulise Materials Development Project team as well as schools. Keep Durban Beautiful Association visits schools and conduct workshops for educators on how they can develop or transform waste into useful learning resources. They also teach learners how they can manage waste through processes such as waste auditing and recycling. Keep Durban Beautiful Association also encourages and teaches schools about permaculture and greening the environment as important aspects of gardening. Through gardening schools can produce fresh vegetables, flowers and plants which can be sold and contribute to school fundraising. Keep Durban Beautiful also develops learning programmes (dealing with waste) where activities, worksheets and hints on waste resources to use are developed.

Keep Durban Beautiful Association plays the significant role by equipping educators with skills on how waste can be used across the curriculum in all levels and learning areas, in almost any contexts. Educators gain skills and ideas on how waste can promote hands-on practical skills. Learners through using waste develop lot of models (KDBA Workshop, 2002).

Materials development is seen as the effort to increase professional competence improvement through better courses professional improvement, higher quality teaching and personal development (Miller, 1981, NCHE, 1996 Shepherd and Richardson; White Paper on Education, 1995 and 1997). Materials development cultivates and restores the culture of being the educator by providing the excellence of being a creative participant in the teaching-learning process. Through materials development, educators engage themselves to action research unintentionally, because they often reflect to the progress and shortfalls brought by the materials they have utilized during the teaching and learning process.

During teaching and learning, educators often use waste matter such as boxes, tins, wires, containers and others as concrete learning materials. Educators sometimes transform the same waste into advanced learning materials such as using plastics for knitting hats, bags and making mats; using tins and rubber tubes for making music instrument and using old boxes for making files. Educators collect different plants and cook them to make natural dyes, for

example cooking beetroot to make purple dye. The gardening skills facilitated by Keep Durban Beautiful Association have inspires most schools in the district to re-adopt the culture of planting vegetable gardens. Gardening teaches learners many constructive innovative skills, provide real concrete learning materials as well as contributing to school fund raising when selling those vegetables.

2.4. SCENE FOR NEXT CHAPTER.

The next chapter contains the preamble for the chapter; sampling and data collection procedures. The chapter will clarify and illustrate the sampling technique used, research sites and sources of data that were used. Data collection procedures are sub-divided into research instrurnents that are used for collecting data. These include semi-structured interviews, questionnaires and observations. The justifications for sources of data and those for research instruments will also be clarified in the next chapter.

CHAPTER 3: Research Methodology

3.1. PREAMBLE.

The research methodology chosen for this study guided the researcher as to how data should be collected and when. Some of the research methodology for this study will be explained, such as the sampling procedures used, the selection of participants for the study, the choice of research sites where data was collected as well as the research methods used for collecting data.

Research instruments such as semi-structured interviews in the form of focus group interviews with educators and Heads of the Departments focused on the perceptions of educators on the use of the environment as resource for developing cross-curricular materials. Questionnaires were given to educators of different grades; one parent representative per School Governing Body per school; the subject advisor for Natural Science and the materials coordinator from Media In education Trust. Observations were also made in the chosen grades of each school.

This is a qualitative study which is descriptive and interpretive as it describes conditions, situations, events, clarifies and interpret aspects of education as they presently exist. It is an enquiry into the process of understanding a social or human problem based on building a complex, holistic picture, formed with words, reporting detailed views of informants and conducted in a natural setting (Cresswell, 1994). One of the important reasons for conducting a qualitative

study is to be able to explore ideas, suggestions, insights and experiences of participants. Not much has been written about the topic or population being studied, and the researcher aimed to listen to informants and to build a picture based on their ideas.

3.2. SAMPLING.

Sampling is the selection of participants or subjects as sources of data for the study Patton (1990). Three primary schools from Inanda district were selected as research sites. The status of each school which includes its physical infrastructure, location and buildings and assets, were considered as prominent factors for its selection. Each circuit is represented by one school. The selected schools were named as school A, school B and school C.

Purposive sampling techniques were used to select the sources of data. According to Patton (1990), purposive sampling is the selection of information-rich participants. It is done to increase the utility of information obtained from the small sample. The sources of data were selected because they are informative and knowledgeable about the phenomenon. The power and logic of purposeful sampling are that few subjects are studied in depth yield many insights about the topic (Patton, 1990).

Sources of data for this study were **educators, heads of departments, members of school governing body, subject advisor, materials**

development coordinator and learners. The participants of the study comprised of females and males. This was done purposely to avoid gender biases that might influence the findings of the study.

3.2.1 Educators

Educators are the captains of the teaching-learning processes, because they are the ones who design, plan and organise how learners can acquire and master competent skills for lifelong learning. Educators are the ones who decide, choose, develop learner-support materials and activities that can assist learners in achieving specific outcomes. Therefore, it is very much important to involve them as sources of data for this study as they are the driving-forces in the learning process.

3.2.2 Heads of Department.

Each phase in the primary school has a **Head of Department.** Heads of departments are entitled to ensure that effective teaching and learning is taking place, and also ensuring that learners always receive quality learning. Heads of the department must always empower educators with creative skills and then instill them to learners (job-discription for heads of the department). Heads of the departments should always give continuos support (mentoring) to other educators and learners in developing their expertise in teaching effectively. The researcher was confident that the ideas, views and suggestions that educators and heads of the departments would share during the focus group interview

could contribute a lot to the valuable findings of the study. Observing educators practically teaching in class would give a hand in gathering data on how widely is the environment that was being used as a resource for materials development in Outcomes-Based Education.

3.2.3 School Governing Bodies

According to South African Schools Act 84 (1996), all schools should have **School Governing Bodies** consisting of democratically elected parents representing the community where the school is located. Parents have rich knowledge about the environment where the school is situated. Parents also have some dreams about how the society can benefit from the school. During the macro-planning, schools must invite parents to decide jointly the themes (programme organisers) to be taught in the school (Education Policy Document, 1995). Therefore, involving members of the governing body will strengthen the opinions, skills of formal and informal education for learners.

Education policies emphasize that parents must have a sense of belonging to the school. Parents are often encouraged to assist their children with homework. Giving the parent body the opportunity of making some inputs (initiatives) as how the school could use the environment as a resource for developing materials for teaching, would serve as an honour to them. The members of the school governing body will be requested to complete the questionnaires. The researcher was hopeful that the insights that parents could share on how the environment

can be used as resource for developing materials, would provide most of the answers to the second critical question. Their participation in the study would be helpful in breeding quality outcomes for all those desiring to enhance the quality of teaching and learning in schools.

3.2.4 Subject advisors

Subject advisors are learning area specialists employed by the department of education. Their responsibility is to empower or develop educators with skills and expertise of particular learning area or learning programme he or she is facilitating (Government Gazettee, 1996). Subject advisors are responsible for conducting developmental workshops for educators and visit individual schools for monitoring the progress with an aim of giving educators and learners the support that they might need. Subject advisors should ensure that effective teaching and quality learning is taking place in each school within the district. It is clear that they are part-and parcels of the teaching –learning process. Subject advisors are knowledgeable and informative on how effective learning should be organised and implemented.

3.2.5 Materials development coordinator

The **Materials Development Coordinator** is a specialist in developing materials, meaning being highly competent in developing learner-support materials. Materials development coordinator is the specialist in developing materials that learners can interact with enabling them to achieve knowledge, skills, values and

attitudes. Involving materials development coordinator as the source of data would bring great insights because of the vast knowledge that she has as far as developing the materials is concerned.

3.2.6 Learners

The critical and specific outcomes laid by National Education Policy are meant to be achieved by learners. As a result, **learners** formed another source of data. The materials (resources) development negotiated in this study are aimed at assisting and equipping learners with competent skills needed in their adulthood. During the learning process, learners are given tasks to do by utilizing different materials and even develop models in the form of projects, enhancing the learning experience facilitated in that particular time. The types of materials that learners will be utilizing will determine how widely is the environment being used as the resource for developing materials essential for teaching and learning.

3.3. DATA COLLECTION PROCEDURES

3.3.1. SEMI-STRUCTURED INTERVIEWS.

The interview is the form of data collection in which questions are asked and participant's responses are orally recorded. There is direct verbal interaction between the interviewer and the interviewee. Due to the fact that the first critical question seeks for educator's views on using the environment as resource for developing materials, so verbal interaction would play the significant role in uncovering the perceptions of educators.

The study covered three different phases of schooling, that is Foundation Phase, Intermediate Phase and Senior Phase. The following educators and heads of departments were invited for focus group semi-structured interviews:

- **School A:** Grade one educator and Foundation Phase Head of Department
- **School B:** Grade four educator and Intermediate Phase Head of Department.
- **School C:** grade seven educator and Senior Phase Head of Department.

The principle guiding the above choice of grades was to have one grade from each of the above phases of schooling. Interviewing educators of different grades and Phase Heads of Department would lessen the potential for biases.

Semi-structured interviews were used because they allow depth to be achieved by providing the opportunity on the part of the interviewer of probing, expanding the respondent's responses, follow-up and clarification. The semi-structured interviews do not have pre-determined structured choices rather the questions are open-ended yet specific intent, allowing individual responses (Ackroyd and Hughes, 1994). More accurate responses are obtained as the interviewer could clarify questions that the participant may have and follow-up leads. The interviews were conducted in the month of June 2001.

The interview schedule has been attached in the **APPENDIX Number Two**. The researcher has chosen the semi-structured interviews for collecting data because of their practicality as they allow access to so many different groups of educators

and different type of information as Ackroyd and Hughes (1994) put it. Ackroyd and Hughes further state that using data on what the respondent says about herself potentially offers the researcher's access to vast storehouse of information. Interviews are more flexible as they allow freedom of expression, thus assisting the researcher to extract factual information from participants.

Nowadays more educators are motivated by the inspirational desires to share ideas, skills and expertise. This has been demonstrated by their enthusiasm and co-operation for sharing ideas and expertise during materials development workshops conducted quarterly at the Inanda district. Conducting the interviews would give the participants the opportunity of voicing out their views, ideas and the opportunity of sharing some skills and expertise for teaching and even discuss some of the problems and successes they are facing in their profession.

Qualitative researchers learn a lot by careful observation, by watching, listening and paying attention (Cresswell et al 1994). But often a more intrusive form of data collection such as asking participants questions and recording answers is needed. Semi-structured interviews have been used to gather data that cannot be obtained from a field of observation and to verify observations. Focus group semi-structured interviews will help to expand the participant's point of view, how they think and how they interpret and explain behavior within a given setting.

Interviews can be held with groups or individuals. The key informant interview is chosen as the most suitable for this study. Key informant interview is based on the assumption that in-depth interviews with a "few-key" participants, individuals who are knowledgeable and articulate will provide insights and understanding about the problem. Educators and heads of the departments as sources of data will serve the best. The key informant interview will take the form of focus group interview (Cresswell et al, 1994). A focus group interview is a one to two hours interview of about ten persons. It is designed to promote interaction among individuals and lead to a richer understanding of whatever phenomenon is being studied.

The researcher spent three days piloting the questions to educators from other schools not participating in the study. Forty (40) minutes were spent for each pilot interview. All pilot interviews were conducted during the evening in the agreed venue where the interviewee felt more comfortable. The focus group semi-structured interview took place in one day within a period of two hours. More time was allocated for this interview to allow the flexibility when participants share their views.

The interview was conducted at Inanda Library in one of the discussion rooms. The booking for the room was done in advance to avoid delays caused by clashes. The researcher first requested a permission for using a tape recorder from the participants as it would be impossible to employ a secretary to take brief

notes whilst the researcher was interviewing the participants due to financial constraints. Recording the whole interview would assist the researcher to re-listen to responses and re-capturing everyone's response to each particular question, thus giving more time to focus on analysing each response without missing some important information.

Semi-structured interviews conducted in the form of focus group interview could provide some insights, opinions about the concept of using the environment as resource for cross-curricular materials development. A group of people from different environments, given a chance to voice out their ideas, about one notion could assist the researcher to obtain various insights and opinions in a relaxed atmosphere.

3.3.2. QUESTIONNAIRES

A questionnaire is written document containing statements or questions that are used to obtain participant's perceptions, attitudes, beliefs, values, perspectives and other traits (Ackroyd and Hughes, 1994). Questionnaires are the most widely used technique for obtaining information from participants. Questionnaires are extensively used because they provide the best way of gathering data for a wide range of research questions.

Educators, one parent representative in School Governing Body per school, a **Subject advisor** for Natural Science and a **Materials Development**

Coordinator were requested to complete the questionnaires. The researcher was very much confident that ideas, insights and suggestions that all these sources will share could give a picture on how the environment can be used as resource for cross-curricular materials development in Outcomes-Based education. Questionnaires were administered in the last two weeks of April 2001 and first three weeks of May 2001. Data collection through questionnaires was planned to be completed in five weeks.

It is essential that questions or statements in the questionnaire be clear and be relevant to the participant's everyday work experience to enable him or her to supply valid information. That is why information-rich participants had been purposively selected for this study. Educators, members of the governing body, materials coordinator have vast knowledge on what to teach and how to teach, for learners to acquire knowledge, skills, values and attitudes as they are the vehicles of the education system of our country. Questionnaires were used to obtain opinions and suggestions on how the environment can be used as resource for developing materials essential for enhancing Outcomes-Based education. The questionnaire attached as **APPENDIX Number Three**, comprised of open questions and statements using Likert Scale measure level of agreement to a statement.

3.3.3. OBSERVATIONS

Observations are the best means of studying interaction, participation and communication in teaching-learning process. Observations were aimed to assist the reseracher in gathering raw data from the actual process of teaching and learning. Observations provide means of obtaining a valid picture of reality to such an extent that through observing the researcher would be able to get some evidence as how widely is the environment used as resource for developing cross-curricular materials essential for integrated learning. Observations provide first hand picture of data required for the particular study. It requires the researcher to spend more hours in the site so as to get depth of data being collected. Observations were conducted in August 2001.

In order to get a valid picture of reality, the researcher conducted two phases of observations in each grade. Two phases were conducted purposely with the aim of finding out if there was any continuity in materials utilization in whatever context that educators were teaching. One hour was spent for each observation session. The researcher observed Grade one from school A, Grade four from school B and Grade seven from school C.

Conducting observations in different grades assisted in providing information about how widely is the environment used for developing materials. In school A the researcher used appraisal observations as the golden opportunity for collecting data. Such observations entitled the researcher to visit the class

anytime with the researcher's personality being known and well accepted by the person being observed. As a result the researcher assumed the status of being the overt participant-observer. The observation schedule attached in (appendix number four) illustrates exactly what the researcher was observing.

The observation of behavior yields first hand data without the contamination that may rise from tests or other self-report instrument. Observations in a natural setting also allow the researcher to take into account important contextual factors that may influence the interpretation and use of the results (Ackroyd and Hughes, 1994). The classroom is regarded as the natural setting as it is meant for teaching and learning to take place naturally.

Observations were recorded as field notes. Field notes are detailed written descriptions of what was observed, as well as the researcher's interpretations. Field notes constitute the raw data the researcher analyses to address the research problem. The assumption is that nothing is trivial, so what is seen, heard or experienced is recorded and considered. Due to the fact that this is a descriptive study, field notes are in the descriptive form and appear in the next chapter.

Qualitative approaches are much less controlled allowing observer's hunches and judgement to determine the content and sequence of what is recorded. The more the researcher is actively involved, the greater the chance that the

involvement would significantly alter what occurs. Any degree of participation involvement is likely to accept the interpretation of what is observed.

3.4. SCENE FOR NEXT CHAPTER

The following chapter consists of:

- The preamble to the chapter.
- Data Analysis.

The Data Analysis is sub-divided into:

- Findings based on semi-structured interviews.
- Findings based on questionnaires.
- Findings based on observations.

Findings based on observations are further sub-divided into:

- Descriptions of the physical settings (descriptions of each class).
- Field notes analysis.

CHAPTER 4: Data Analysis

4.1. PREAMBLE

This chapter analyses data collected focus group in the form of semi-structured interview, questionnaires and observations. The analysis of data was done qualitatively and guided by the interpretive theory as was clarified earlier in the first chapter. Findings from focus group semi-structured interviews were used to answer the first critical question. Findings from the questionnaires were used to answer the second critical question. Findings from observations were used to answer the third critical question.

4.2. CRITICAL QUESTIONS AND DATA ANALYSIS

4.2.1. HOW DO EDUCATORS PERCEIVE THE ENVIRONMENT AS A RESOURCE FOR CROSS-CURRICULAR MATERIALS DEVELOPMENT?

There were six interviewees that participated in the focus group semi-structured interview in the form of a focus group. They were named nterviewee A, B, C, D, E and F. The rapport that prevailed among the interviewees and the researcher before the actual interview began, showed great enthusiasm and courage to share views and insights. The objective for using focus group semi-structured interview was to obtain views of educators on using the environment as a resource for developing cross-curricular materials.

The researcher began the interview by concentrating on Outcomes-Based Education as the new system of education that is being implemented in schools, hence the development of materials that is debated in this study meant materials that are to be utilized for the effective implementation of Outcomes-Based Education.

Participants expressed their unhappiness about Outcomes-Based Approach and indicated that they often feel hesitant and lack confidence about their teaching due to the shortage of resources in their schools; yet Outcomes-Based Education demands the adequate use of resources. Interviewee B maintains:

"Outcomes-Based Education makes me feel as a failure because I'm always hesitant of my work because OBE needs sufficient use of resources and our school does not have."

Educators need to love, have self-confidence and dedication for their work. Educators must make attempts and initiatives of developing resources that could equip learners with required specific outcomes. Research had clearly indicated that sufficient use of resources is the pre-requisite for the effective implementation of Outcomes-Based education (Jansen, J.1994). Collaboration among educators, parents, materials development coordinators and subject advisors could assist educators and learners to develop required materials for teaching and learning.

Thorough planning of learning activities and resources to utilize could challenge educators to create sufficient materials for conducting the activities.

Curriculum units should take initiatives of equipping educators with materials development skills, as it serves as the heart for effective and meaningful teaching.

It also came up from the responses that overcrowding in classes also make it impossible and difficult for educators to render the individual attention and learner- paced learning as emphasized by Outcomes-Based Education. Interviewee D had this to say:

"Sometimes I feel good, sometimes I feel bad teaching in an OBE because it is not easy to give individual attention to learners and to offer learner-paced learning because our classes are overcrowded."

It is true that it is not easy to teach the overcrowded class. Confidence, dedication and thorough planning serve as cornerstones for curbing any difficulties in teaching situation. Prior planning of learning programmes and resources to use could challenge and motivate the educator to develop sufficient materials to cater all the groups of learners in the class. Sufficient materials could allow learners of the similar pace to work even in pairs. Educators are encouraged to use most accessible means such as an environment to develop materials. Educators from the same grade should work jointly to develop materials and to share them to reduce the burden.

Overcrowding is on of the greatest problems in disadvantaged schools, because there is a great shortage of classes. Again overcrowding will continue being an inevitable problem because of the contradiction that exist in the department policies and acts. For an example, the South African Schools Act (SASA), (1996), contradicts with the recent Admission Policy in public schools. The Admission Policy requires that the educator-ratio be one to thirty-six (1:36) whereas the South African Schools Act expects public schools to admit all school going age children. This verifies the fact that the educators are compelled by this act to exceed the enrolment of thirty-six in classes if there are learners who still need to be admitted.

The researcher gave the interviewees the chance to voice out their opinions about the relationship between Outcomes-Based education and the environment. The phase organiser "***the learner in the environment"*** cited the most common relationship between Outcomes-Based Education and the environment. Respondent F noted this relationship:

"If I remember well, the environment is one of the phase organisers stated in the National Department of Education Policy so there is a relationship".

The inclusion of the above mentioned phase organiser Ilustrates the fact that learners acquire their education mostly from the environment. The education policy also encourages educators to sensitize learners with the importance of their environment.

Outcomes-based Education is an approach that embraces the capacity of learners to think for themselves, to learn from environment and to respond to wise guidance by educators who value creativity and self-motivated learning (Space Science, 2002). Bearing in mind such factors, could make educators and learners to perceive the environment as the basic resource for every learning that takes place.

The respondents voiced out the fact that Outcomes-Based Education is encouraging and promoting relevancy to whatever content or knowledge skills that learners are learning at school. Therefore, using the environment or rather concrete examples of materials collected from the environment could help learners to comprehend the content without any difficulty. Interviewee A further gave more clarity by sharing:

"According to my point of view, OBE emphasizes that learning must be relevant to learner's real life experiences, so teaching them about things found or happening in the environment can help them to understand easily".

It is essential that learners develop an awareness of their environment where their homes and schools are situated. The education policy of South Africa (1996). encourages educators to sensitize learners with the importance of their environments. Learning mostly occurs in the environment where the school is situated. Inter-human relationships often occur in the environment where the learner is growing.

Through defining the concept environment, it came up clear that many things constitute the environment. Interviewee C conveyed the view by saying:

"According to my point of view, environment refers to all the local surroundings, plants, animals, people, ecosystems, as well as social, economic and cultural aspects of life".

The mentioned constituents of the environment highlight the most examples, which are often used in the teaching-learning situations. Rural schools depend mostly on natural resources for concrete learner-support materials for their effective teaching. Therefore, using such materials portray the picture of using the environment as a resource for developing learning materials. People could contribute a great deal as valuable resources in the education of learners.

Most participants understood the resource as similar to the teaching aid. That view was contained in the description of a resource that was communicated by interviewee F where he emphasized:

"According to my understanding a resource, in simple terms, is just a teaching aid".

The researcher probed by requesting the interviewee to give more clarity to his view, and he responded by saying:

"Because it helps the educator to bring clear meaning to what she or he is teaching".

It should be appreciated that educators understood the function of the resource. That alone put a challenge to them to develop adequate resources that could bring meaning and mastering of specific outcomes by learners. I strongly believe that developing the relevant learning materials reduces the rate of theorizing the content that was done in the traditional approach.

The respondents A and D shared different views where they emphasized the point that the resource is not similar to a teaching aid. They stressed the point that teaching aids were used by teachers in the old traditional approach to clarify the meaning for the content, but resources in Outcomes-Based Education refers to the learner-support materials, meaning that resources are utilized by learners to master knowledge, skills and values when doing learning activities. The differentiation between the two terms was further given the clarity by interviewee A when he noted:

"I think a resource is totally different from a teaching aid, I understood it as the learner-support material because its objective is to support the learner to get meaning from what is being facilitated by the educator".

The above mentioned point further received support from respondent D who maintained:

"According to my point of view the teaching aid is used by the educator for clarifications whereas resources are meant for learners to interact with when doing activities in order to master knowledge, skills and values".

A resource could be any material or object that can be used to support learning, to help learners to get better understanding of the content. Hence Outcomes-Based Education is a learner-centred approach, it means resources should mostly be utilized by learners as support materials in achieving the specific outcomes Lubisi and Parker (1998). Both educators and learners should demonstrate their creativity by developing more resources for their activities using the environment.

Both educators and learners need to be creative and inventive in order to master skills required by today's education (Hooks, B. 1994). The views shared by respondents showed some similarities that the "resource" and the "material" have. Both respondents emphasized that any material could be a resource due the fact that any material utilized for teaching and learning could sometimes resume the state of being a resource. This was put forward by the interviewee F who shared:

"Even though, the material refers to any object and it can only be called a resource only if it is used for teaching and learning".

The relationship between the two terms was further elaborated by one interviewee who gave the practical example:

"I suppose there is definitely a relationship because the creative educator can transform any material—(any object) into an excellent learning resource.....like taking a red binder or red paper cover and let learners create emblems for HIV/AIDS or use reed seeds to create beautiful traditional necklaces.....yes that's it".

Creative skills in transforming ordinary materials to comprehensive learner-support materials form the basis of resource-based learning as well as technology-enhanced learning encouraged by lifelong learning. In the classroom learners easily became knowledge navigators, where critical analysis skills and social skills are developed and where group discussion and interaction are paramount (Soloway, 1999).

The participants mentioned various materials which they usually employ during their teaching with an attempt of providing learners quality meaningful learning. Those materials include print media (textbooks, newspapers and magazines), waste materials (empty boxes, containers, tins, bottles, stones, sticks, wires etc), water, animals, people and soil. Participants confirmed the fact that they gather such materials from school surroundings, homes, community and nearby shops. The department of education supplies textbooks and non-governmental organisations like Media In Education Trust donate newspapers and other reading materials to schools. Schools should also appeal to community organisations and local business people for donating resources to schools.

The respondent's views indicated that materials development is the process of planning, designing and making of learning-support materials that will assist learners to master necessary skills ad knowledge. Interviewee D confirmed the view by pointing out that:

"I have no doubt that materials development means the process of developing learner-support materials".

Teaching and learning is an on-going process. I strongly believe that, associating materials development as a process for making learning materials serves as brilliant idea because effective teaching and learning depend on adequate use of relevant materials for planned activities. This gave the indication that materials development is part-and parcel of everyday teaching.

The researcher asked the focus group as to who was responsible for developing materials in their schools. Most interviewees indicated that the educators are responsible for developing the materials. Most views indicated that the educator is responsible for developing materials due to the fact that he or she is the one who plans the learning activities and knows what skills, knowledge should learners master from the activities. Therefore, looking at these views, it became clear that the creativity on the part of the educator serves as a requisite for instilling creative skills among learners. Basically, the educator is the one who plans the lesson and makes preparations on how the lesson would be conducted effectively and productively. It is imperative to point out that learners also develop materials when demonstrating the competences gained from the lesson facilitated, in the form of projects or models and that application denote the performance indicators of the knowledge and skills mastered. For our country to have innovative creative thinkers (future citizens). I belive the driving forces for the system (educators) must take the lead in demonstrating abilities and advance skills and enrich learners with them.

There were differing views on whether educators are competent in developing materials or not. Some participants claimed that the improvisation that the educators do show great competence of developing resources.

The point was emphasized when interviewee A noted:

"I suppose the improvisation that we as educators do shows our competency in developing resources".

Some educators believe that improvisation with concrete materials obtained in the environment serves the purpose of using the environment as a resource for developing learning materials. It is also imperative to stress the point that although improvisation is good but creative skills for developing relevant resources should be the norm for every educator in every day teaching (Katha, 2002). Educators need to empower themselves with competent skills of transforming or rather recycling waste materials into advanced learning materials relevant to planned learning experiences. Such initiatives could assist learners to achieve the required specific outcomes for each programme organiser.

The researcher probed by asking "how does improvising relate to the development of resources" and the views indicated that the waste materials that are often utilized in the classrooms serve as resources. Other interviewees strongly resisted the view that educators are competent in materials development emphasizing that most educators from disadvantaged schools still lack competent skills in developing resources.

Respondent F confirmed the argument by stressing:

"I strongly believe that most of us don't have competence because we normally use available materials and if they are not.....we are still unable to develop required thought provoking resources and we still re-engage ourselves to chalk and talk".

The aforesaid view firstly challenges the educators to equip themselves with materials development skills. It also challenges all learning area specialists and materials development specialists to render their fullest support to educators to help them enrich their competencies.

The researcher probed by asking participants what needs to be done in order to help educators acquire competent skills for developing materials. Interviewee C suggested:

"According to my perspective all educators deserve to undergo intensive in-service training for materials development whereby they will get creative skills, courage and confidence in developing required materials for any lesson".

This response revealed the importance of educator empowerment on materials development. Developing our educators is a key to better, quality education (Sekete, P. 1998). Outcomes-Based Education emphasizes the development of critical thinking, innovative skills and problem solving. As a result learners could only assimilate these abilities if they are frequently demonstrated by their educators thus obtaining inspiration and get equipped.

Participants gave various examples of materials that could be developed through using the environment. Among the examples they mentioned are grass mats, plastic mats, wooden spoons, tray cloths, clay toys, traditional music instruments, different transport models made from old wires and boxes. The mentioned examples challenged the reality that schools should restore the culture of facilitating Life Orientation (one of the Learning Areas) productively by re-engaging to hands-on practices such as craftwork, sewing, woodwork, home economics, gardening and other practical learning experiences. These activities could play a significant role in skills development that is highly encouraged by the department of education. Low-tech materials found in the environment could assist learners a great deal in developing technological skills.

Challenging and constructive suggestions were voiced by interviewees on how the environment could be used as the resource for developing materials essential for effective teaching and learning. Among the suggestions, it appeared that inviting local professionals such as nurses, social, workers, police, priests and shopkeepers to conduct workshops or motivational speeches to learners and educators could make the environment the most resourceful resource for enhancing teaching and learning in schools. The suggestions received support from interviewee E who maintained:

"I'm convinced that if schools could invite local professionals such as social workers, police, doctors, priests to conduct motivational talks or some lessons with learners and educators that can make the environment a good resource".

It was illustrated earlier that people form part of the environment.

Education is about people. The learners, their parents and community members are all important and sometimes overlooked resources for learning. Parents and community members could help to show how the different learning areas are relevant to life. They could also share their knowledge, skills and life experiences with learners. This would help them to become actively involved n the education for their children. A community-based approach is highly encouraged by the department of education. This approach vests the powers in community members to have autonomy and the sense of belonging to their schools (SASA< 1996). This implies that schools must appeal and welcome the contributions and initiatives of the parents to the education of their children.

It also appeared from the suggestions that schools could request permission from local public sectors such as clinics, post office, church, shops and others to conduct practical lesson demonstrations. Such attempts could assist each learner to comprehend the content facilitated meaningfully. All the suggestions became an eye-opener to the researcher as how the environment could be used constructively and productively for learners to obtain quality learning.

Educators' perceptions on the use of the environment as a resource emphasized the utilization of waste, newspapers, magazines and natural resources obtainable from the environment. It also appeared that people could be valuable resources for effective meaningful learning to take place in Outcomes-based Education.

4.2.2. HOW CAN AN ENVIRONMENT BE USED AS A RESOURCE FOR DEVELOPING CROSS-CURRICULAR MATERIALS?

Findings from questionnaires were used for answering the above critical question. Eight participants completed the questionnaires. It is imperative to begin by mentioning that some of the questionnaire responses share some commonality with the views communicated in the focus group interview.

It appeared from the responses that the concept "environment" is made of people, animals, homes, non-living things, social and cultural aspects of the society. The description of the environment indicated the importance of the

environment in schools because it serves as the treasure for knowledge where learners could acquire vast knowledge, skills and values.

All participants agreed that the environment and Outcomes-Based Education share a relationship. Their agreement could be confirmed by one of the respondents who stated that:

"*The environment is policised as one of the phase organisers in OBE and OBE emphasizes the fact that all learning should be made relevant to learner's real life situations which take place in the environment".*

The learning materials, which are utilized for Outcomes-Based Approach must be relevant to learner's every day experiences. It is a well-understood reality that learners are familiar with the materials, incidents as well as social events taking place in the environment. Therefore, prioritising the environment as a basic resource could help them to easily comprehend the content facilitated. Relevancy to real life situation functions collaboratively with the principle of teaching from known to the unknown.

Most participants understood the concept of materials development as similar to the creation of teaching aids, learning resources and models developed by both educators and learners. The responses showed different use of terminology, however the ideas were common as they were encompassing the notion of developing learner-support materials.

All responses agreed to the statement that educators use resources during teaching-learning processes. Educators showed great reliance on the employment of waste materials, newspapers and magazines. Such reliance to waste and natural resources indicated that educators only utilize what is available to them.

The mention of school surroundings, homes and community where resources are collected indicated the environment where educators obtain resources from for their improvisation. There is no doubt that homes, community and school surrounding form part of the environment.

Out of a total of eight respondents, six respondents disagreed with the statement that educators are competent in developing their own materials but two respondents strongly agreed to the statement. The views communicated indicated that most educators are not competent with materials development skills. The contradictory of views highlighted the need of empowering educators with materials development skills. Participants agreed that the environment could be used as the resource for developing cross-curricular materials. One such response from the questionnaire stated:

"Learners can use grass and plastics for making mats and hats, wood, clay and plant vegetable garden to get fresh vegetables".

The suggestions indicated that educators rely mostly on natural resources and waste materials to develop teaching and learning materials. Most rural schools lack sophisticated resources, as a result their teaching depends mostly on low-

tech materials from the environment. This means that using the environment as a resource to develop necessary materials could play the significant role in the teaching-learning process.

It appeared essential that educators should use resource tasks (which teach skills and knowledge), case studies (which teach learners to begin to understand how particular technologies meet the needs and wants of users and how the environment could contribute) and capability tasks (projects in which learners design and make real products that work). This can be easily promoted by using materials obtainable from the environment. The transformation to a constructivist framework challenges educators to create environments in which their students are encouraged to think and explore (Brooks and Brooks, 1997).

Among the exemplars mentioned by participants for using the environment as a resource included rivers and playgrounds. They also included programme organisers that could be facilitated to sensitize learners with the importance of their environment to their learning such as means of communication, businesses, people and needs for their environment.

The most common idea that appeared as the necessity for using the environment as the resource for developing materials was that most resources used in rural schools are obtainable from the environment free of charge, and that every educator is obliged to accept and implement the educational policies as

instructed by the department without any alterations or infringements (DEASA, 2002).

The ideas that the participants conveyed in the questionnaire illustrated the fact that most of them are unclear with the concept of materials development. Their responses indicated that they are mostly dependent on waste materials for effective teaching and learning to take place. But their attempts and efforts of using easily accessible materials show great potential for developing materials. Materials development is all about creativeness, designing, developing and utilizing materials and evaluating their effectiveness in the process of teaching and learning (IDZI, 2002). There is no doubt that the environment could be the essential and basic resource for developing materials in Outcomes-Based Education.

4.2.3. HOW WIDELY IS THE ENVIRONMENT USED IN DEVELOPING CROSS-CURRICULAR MATERIALS?

Findings from observations were used to answer the third critical question. The observations were conducted in August 2001 in two different phases for each school.

- **Findings from Grade One Class (School A)**

Grade One classrooms are the oldest in the school, built in 1954 and the floors are still made of planks. The classroom has no cupboard, but two corners are nicely arranged as clearing house of information where textbooks, exercise books, learning resources, newspapers, magazines, containers, boxes, paints are nicely kept. Charts, posters, drawn and painted pictures made by learners were all hung on the wall. Class timetable, class rules, progress chart and duty list was also hung on the wall. Learners sit in-groups of six and each group has a leader. Most of the learning materials that were housed in the class illustrate the fact that some have been collected from the environment, other supplied by the department of education.

The lesson presentation for the first phase in school A was conducted in the veranda. Learners sat in-groups and were urged to play games using stones. After the game the educator asked questions related to counting, addition and subtraction. The Numeracy lesson was presented through using stones. Outcomes –Based Education emphasizes activity based and resource based learning. The educator demonstrated the creative potential to use stones collected in the environment as learning resources. The skills of counting, adding were well demonstrated when learners answered questions correctly and using concrete examples. Again the use of the veranda as a learning space shows a great competency. The researcher observed that most of Grace One learning takes place outside the class in the yard.

It is essential that all educators should be creative in creating a learning space, because learning can occur anywhere (*Costas, 1998).* To witness the observation mentioned above, researcher also noticed that in school A assembly and devotions are conducted in the yard under the big tree. The utilization of concrete materials and flexible learning space bring fun and this aroused learner's interests to enjoy what they were learning.

During the second phase, the learners demonstrated the activity of buying and selling in the spaza shop. The spaza shop was arranged and learners have used empty packets of chips and sweets, boxes of cakes, fruits, marbles, balls all displayed in the table. Each learner had a picture coin as money to buy. It was noticeable that those pictures had been cut from the newspapers. Learners began the game and the shopkeeper sells and gave change if necessary. Therefore, the use of empty packets and boxes collected from the environment gave the picture of how useful the materials found lying in the environment were.

Practical lesson demonstrations help learners to experience and to explore the real situation. Role playing, plays the most significant role in the experiential learning which is the fundamental aspect of lifelong learning, hence educators are preparing learners for adult life (SIDA, 2002).

Group work, which is encouraged in Outcome –Based Education, help learners with mutual co –operation as well as mutual assistance. Through doing group activities they learn that every human is a social being having many wants he cannot satisfy for himself (Aquinas T. 1986)

- **Findings from Grade 4 Class (School B).**

The class had one cupboard where learners exercise books, portfolios, profiles, pencils, paints, crayons are kept. At the back of the class there was a mini – library in which bricks have been used to make shelves. Fiction and non—fiction books, newspapers, magazines and pamphlets were housed. There was a display of spaza shop in one corner and in another corner displaying different models constructed from different types of waste materials. These models include different transports *(made from old wires and cartons)*, different houses *(made from wires and sticks)*, different music instruments *(made from tins, animals skins, rubber tubes, planks, strings)* and variety of craftwork *(made from grass, plastics, wool, cotton)*. The drawings made by learners, duty list, timetable, posters made by learners were all neatly hung on the wall.

During the first phase the learners were busy using plastics, strings, stones and sticks creating kites. Later the educator asked them to move out to the playground and begin playing their kites. He instructed them to observe all the actions whilst playing. Fun began, kites flew high up and there was great joy.

After few minutes he stopped them and asked questions such as "*(what happens if you throw up the kite? What make it fly up?)'* Learners answered positively and satisfactory. The educator ordered them to watch the trees in the environment. The gazing and silence was interrupted by his question (*what is happening with the leaves?) and replied "moving". What make them move? And replied "air'.*

The lesson presentation enlightened the researcher more, that besides using waste materials found in the environment, the playground, the plants from the environment can be transformed into useful resources that can be utilized in the integrated approach (cross- curricular). Learning by doing assist a great for learners to experience and acquire the meaning of the abstract content being facilitated. Playing the kites helped the learners to experience the presence of air in the atmosphere.

During the second phase the researcher observed learners transforming waste materials such as cartons, wires, planks, glue, into different types of transport models. Transforming the materials made for another purpose to serve the learning purpose is called resourced–based learning encouraged by materials development. Constructed models can be used across the curriculum depending on the creativity of the educator. South Africa needs to develop "human capital"—people with skills and education (Mc Gregor, 1997).

Giving learners the opportunity of developing such models promotes skills development emphasized by our system of education. Using playgrounds for learning witnesses how widely is the environment is used are resource.

- **Findings from Grade Seven Class (School C).**

The classroom walls were decorated with art–drawings and posters done by learners. Various learner–support materials including constructed models were nicely displayed in each corner of the class. One corner was used as mini – library where all print media were housed. There was a display of constructed models by learners which included houses (made from straws and wires), pylons and pyramids (made from sticks), guitar drums, xylophone, mats, hats, rubber-sandals, reed- necklaces, calabash and clay pots and another corner was displaying an aquarium where few fishes were kept.

The physical setting of Grade Seven classroom illustrated the picture to the researcher how the environment was used for developing materials. Most people these days survive through collecting materials from the environments and recycle them in order to get money (USAID, 2001). Therefore, observing the models constructed from waste gave the picture that the environment could play a significant role to develop entrepreneurship as well as marketing skills among the learners. Low- tech materials assist learners a great deal to master basic technical knowledge skills.

The educator ordered learners to go out and observe the environment. He motivated them about the importance and beauty of the nature. He motivated them to compose the stories, poem, and song or dialogue after observing the environment. Holding rough books in their hands, swiftly they became scattered over the school surroundings. All students must be given authentic challenging tasks in order to practise advanced skills (Miller, S. 1995). Going around after a while the researcher observed some individual learners imitating some actions and having soliloquy. After thirty minutes, learners were called to settle under the shadow. Volunteers were asked to begin presenting. It was the greatest shock listening to the creative poems about the importance of water, wonders of plants, beauty brought by flowers, the wonders of soil, and the importance of homes. One boy sang an interesting song about cattle and lobola. Other learners wrote different stories about the natural resources found in the environment. Undoubtedly, one would say that was the festival. As a result it became clear that learning should move from requirement of "knowing" to an emphasis of "searching" (Parker, 1998).

The educator promised them to compile different booklets of their stories, songs, poems and house them in their library for future use. There was great excitement and thereafter they went back to class to proceed with the next Learning Area.

The learner's presentations challenged the researcher's intellect to see the depth of using the environment as resource for developing materials essential for learning. I strongly believe that the success of using the environment as effective

resource depends mostly on creativity and innovativeness more especially on the part of the educator.

During the second phase, the groups made the different dyes by cooking different plants and other foods. For examples one group was cooking betroot and they made purple dye, one was cooking a certain plants and made green dye, another was cooking turmeric curry powder and made a mustard dye. After cooking, the dyes were again tested on papers and cloths and colours were perfect. Dyes were poured in the bottles and kept for a future use. Learners showed many creative skills, collaboration and dedication.

Facing the problem of lacking sophisticated resources have enriched both educator and learners with critical thinking, empowered them with amazing skills and gave learners the chance of experiencing practical and technical education which is the pre-requisite for Outcome Based Education (SAIDE, 2002). Those dyes became prominent learning support materials, obtained though using the environment as a resource.

It became clear that without paying a cent just using the environment as resources, more learner–support materials essential for enriching education for learners could be developed. It is wise to exaggerate that one must learn to see every problem or obstacle as a challenge demanding ones creativity for one to succeed.

Further Education and Training (FET) band of SAQA has been designed and added to school curriculum with an aim of equipping and empowering learners with technical experiential skills required in the workforce. It is very important for primary schools to cultivate a good strong foundation in learners whilst still very young. Possessing such skills at early stage would assist them to transgress all the obstacles on their way to success. I strongly believe that resourceful educators are educators who are rich with creative skills, innovative ideas, dedicated to success of the leaner and committed to nation building. Schools lacking resources, lacking creative educators, lacking physical infrastructure (electricity, water, and road) are facing a huge problem of educating the learners from that environment. Therefore, using something always accessible, cost–effective such as environment for developing materials that would often enhance the education of learners with an object of giving them quality education could play the significant role, even in the effective implementation of Outcome –Based Education.

The findings indicated that all academic activities need to be linked to real life situations (Black, N. 1998). Empowering educators as well as learners with skills of developing materials could play the significant role in the enrichment of education of this country.

4.3 SCENE FOR NEXT CHAPTER

The next chapter consists of:

- The summary of the study.
- Conclusions and Recommendations.
- Recommendations for further studies.

CHAPTER 5: Conclusions and recommendations.

5.1. PREAMBLE

In this chapter the study is summarised, conclusions and recommendations as well as recommendations for further studies are given. The conclusions and recommendations correlate with the critical questions of the study.

5.2. SUMMARY OF THE STUDY

The study focussed on using the environment as a resource for cross-curricular materials development in Outcomes-Based Education. The study is guided by Interpretive Theory. The study concentrated on low-tech materials obtainable from the environment. Three disadvantaged schools from Inanda district were sampled as research sites. The study focussed on three primary phases of schooling, that is Foundation Phase, Intermediate Phase and Senior Phase. Chosen schools were named as A, B and C. The researcher focussed on one phase from each school whereby school A represented Foundation Phase, school B represented Intermediate Phase and school C Senior Phase.

Purposive sampling was used to select the sources of data based on how informative and knowledgeable the sources are about the phenomenon.

One educator and one Head of the Department for each phase per school, one parent representative from School Governing Body per school, the subject advisor for Natural Science, a materials development coordinator from Media In

Education Trust and learners form the selected schools formed the sources of data.

The research instruments such as questionnaires, semi-structured interviews and observations were conducted to collect data with an aim of answering critical questions for the study which are:

- What are educators' perceptions of the use of the environment as a resource for cross-curricular materials development in Outcomes-Based Education?
- How can an environment be used in developing cross-curricular materials?
- How widely is the environment used for developing cross-curricular materials in Outcomes-Based Education?

The findings and data analysis have been done qualitatively hence the study is a qualitative one.

5.3. CONCLUSIONS AND RECOMMENDATIONS

5.3.1. WHAT ARE EDUCATOR'S' PERCEPTIONS ON THE USE OF THE ENVIRONMENT AS A RESOURCE FOR DEVELOPING CROSS-CURRICULAR MATERIALS?

- **CONCLUSION 1:**

Educators' perceptions are that they have to rely mostly on improvisation with waste materials and newspapers. They also feel hesitant about their competence in developing materials. This led the researcher to the conclusion that educators still lack creativeness and competence for developing cross-curricular materials.

- **RECOMMENDATIONS:**

The researcher recommended that curriculum units should take the initiative of organizing educator empowerment (in-service) workshops on materials development. Educators should attend materials development workshops often, organized by non-governmental organisations. It is also recommended that educators should upgrade themselves in the field of materials development, as that could assist them to develop materials with confidence. It is also recommended that a staff development programmes for schools should include more of materials development as that could rescue schools from the shortage of resources.

Educators are encouraged to design active learning approaches, which accommodate more practical activities that could assist learners to master required skills and promote experiential and resource-based learning.

Schools should often invite materials specialists and subject advisors to render their support and share some expertise with educators and learners. Educators should put more effort in their technological skills by advancing from using only low-tech materials obtained from the environment to using more technology-enhanced materials for teaching and learning.

- **CONCLUSION 2:**

  It appeared that local people and public sectors (institutions) form part of the environment. It is concluded that people and public sectors serve as resourceful materials in the teaching-learning process.

- **RECOMMENDATIONS:**

  It is essential to recommend that schools should fully adopt a community-based approach as encouraged by the education department (Asmal, 1998). Skilled and resourceful people from the community should be encouraged to share their skills and resources with the schools. The employment of such an approach could promote the skills development and two-way support initiatives as emphasized by Outcomes-Based Education.

Educators should acquaint themselves with the norm of conducting practical lessons with the aid of public sectors (shops, clinics, post-office etc.). Activity-based learning brings meaningful learning. It is recommended that those practical lessons be videotaped or recorded and the cassettes should housed for future use.

5.3.2. HOW CAN AN ENVIRONMENT BE USED AS A RESOURCE FOR DEVELOPING CROSS-CURRICULAR MATERIALS?

- **CONCLUSION 1:**

Through ideas and suggestions communicated by participants in the questionnaires, it can be concluded that educators are very dependent on waste materials for developing materials.

- **RECOMMENDATIONS:**

It is recommended that educators should equip themselves with technological skills of transforming waste into advanced learning materials. It is also essential for educators to read more literature on resourceful teaching which include more waste-recycling processes and resource-based learning practices. Schools should invite organisations like Durban Solid Waste-education component to share skills and expertise on transforming waste to required teaching-learning materials.

Clusters of schools should conduct an exhibition of materials developed through using waste for educators and learners to share knowledge, skills and expertise. Schools are encouraged to invite materials development specialists from organisations such as the Media In Education Trust to assist schools with the transformation (recycling) of low-tech materials to advanced teaching–learning materials.

- **CONCLUSION 2:**

Through teaching experiences and suggestions conveyed by participants it can be concluded that natural resources (such as plants, animals, rivers, and grass) found in the environment, are often used by educators to develop materials.

- **RECOMMENDATIONS:**

It is recommended that schools should include craftwork and woodwork as part of curricular activities. The inclusion of these aspects could promote experiential learning thus enriching Art and Life Orientation skills. Schools should celebrate events such as environmental week, water week and Arbor Day in the form of academic festivals. All materials developed during such functions could be displayed and then stored for future use.

5.3.3. HOW WIDELY IS THE ENVIROMENT USED AS RESOURCE IN DEVELOPING CROSS-CURRICULAR MATERIALS?

- **CONCLUSION1:**

The physical settings of classes observed, demonstrated different models (such as musical instruments, different crafts, different transports etc) developed from waste and some natural resources. The materials (such as kites, different dyes, composed stories, poem, songs by learners) developed during observations led the researcher to conclude that the environment is a necessity for developing learning materials.

- **RECOMMENDATIONS:**

Educators should design learning activities that would employ more technological skills to develop advanced materials using the environment as a resource. Educators should motivate learners to compose poems and write stories using the environment as a resource. Learners should be given the opportunity to present their work and booklets. These should be compiled and be stored in the class or school library as valuable materials for the future use. It is essential to recommend that educators should use resource-based tasks (which teach skills and knowledge) and capability tasks (projects, in which learners design and makes real products that work).

5.4. RECOMMENDATIONS FOR FURTHER STUDIES

The researcher recommends that further studies be conducted that will give attention to:

- The value of materials development in Outcomes-Based Education.
- The impact of skills development in the teaching profession.
- The need for experiential learning in schools.
- Co-operative and Community Projects.

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APPENDIX 1: DATA COLLECTION PLAN

RITICAL QUESTIONS	DATA SOURCES	RESEARCH INSTRUMENTS	DURATIO-N
What are educators views about using the	**School A:** Grade one educator	Semi-Structured Interviews	One Week
ıvironment as a resource for cross-	Foundation Phase HOD	In the form of Focus Group	
ırricular materials development?	**School B:** Grade four educator	Interview	
	Intermediate Phase HOD		
	School C: Grade seven educator		
	Senior Phase HOD		
. How can an environment be used for	**School A:** Grade one educator	Questionnaires	Five Weeks
eveloping cross-curricular materials?	**School B:** Grade four educator		
	School C: Grade seven educator		
	One parent representative in SGB		
	per school		
	Subject Advisor for Natural Science Materials development Coordinator		

RITICAL QUESTIONS	DATA SOURCES	RESEARCH INSTRUMENTS	DURATION
How widely is the environment used	**School A:** Grade one class	Observations	Six Weeks
r developing cross-curricular	(educator and learners)		
aterials in OBE?	**School B:** Grade four class		
	(educator and learners).		
	School C: Grade seven class		
	(educator and learners)		

APPENDIX 2.

SEMI-STRUCTURED INTERVIEW SCHEDULE.

1. How do you feel teaching in an Outcomes-Based Approach?

Probes: -happy

-not confident

2. According to your experience, what relationship can you mention between the environment and Outcomes-Based education?

Probes: -environment is one of phase organisers.

-OBE emphasizes learning relevant to real life situations

-all schools are built in particular environments.

3. How can you describe the environment?

Probes: -surrounding

-bio-physical factors

-social, economic political and cultural factors.

4. What is a resource?

Probes: -teaching aids

-learner-support materials

-any object or material used when teaching

5. What is the relationship between the material and the resource?

Probes: -same, doing one job

-the material can be any object but a resource is a LSM

6. Which materials do educators often use during their teaching?

Probes: -waste

-newspapers and magazines

-animals and plants

7. Where do educators obtain such resources?

Probes: -homes

-community

- school yard

-nearby shops

8. How can you describe the concept "materials development"?

Probes: -making teaching aids

-creating resources

9. What can you say about educator's competency in developing resources necessary for their teaching?

Probes: -competent in making teaching aids

-not competent in developing learner-support materials

-sometimes they are able, sometimes they are not

10. What exemplars can you suggest, that can be developed through using the environment as a resource?

Probes: -different models

-craftwork

11. What suggestions can you make as to how educators can use the environment as a resource for developing cross-curricular materials in OBE?

Probes: -people as resources

-local sectors

APPENDIX 3

QUESTIONNAIRE SCHEDULE

You are kindly requested to complete this questionnaire as honest as possible. All the information shared will be kept confidential and it will only be used for the purposes of this study.
Complete or answer by words or using X where necessary.

All South African educators are entitled to be competent in implementing Outcomes-Based Education effectively in schools.

1. According to your understanding, what does the concept "environment" mean?

.....
.....
.....
.....

2. All educators teach according to Outcomes-based approach.

agree	Strongly agree	Strongly disagree	Disagree

3.There is the inter-relationship between environment and OBE.

Strongly disagree	disagree	Strongly agree	Agree

3. If so, briefly explain the kind of the relationship.

.....
.....
.....
.....

4. According to your understanding, what does the concept "materials development" mean?

.....
.....
.....
.....
.....

5. Do you think educators should use resources in the teaching and learning process?

Yes	No

6.If yes, briefly explain.

.....
.....
.....
.....

7.Where do you think educators obtain such resources?

.....
.....
.....

8. Educators are competent in developing their own materials.

Strongly disagree	disagree	Strongly agree	agree

9. Do you think an environment can be used as the resource for developing cross-curricular materials?

No	Yes

10. If so, briefly explain.

.....
.....
.....
.....

11. What exemplars can you suggest of using the environment as resource for developing cross-curricular materials?

.....
.....
.....
.....

12. Why is it necessary for educators to use the environment as a resource?

.....
.....
.....
.....
.....
.....

13. Other views or suggestions.

.....
.....
.....
.....
.....

Thank you very much for your cooperation.

APPENDIX 4.

OBSERVATION CHECKLIST.

"How widely is the environment used as a resource for developing cross-curricular materials".

	YES	NO

1. Print media
Examples:.....
How
used:.....
.....

2. Waste
Examples:.....
How
used:.....
.....
.....

3. Plants
How
used:.....
.....
.....

4. Animals:
Examples:.....
How
used:.....
.....
.....

5. People
How
used:.....
.....
.....

5. Community structures
Example:.....
How
used:.....
.....