

University of Zululand

Topic:

**Managing the Curriculum with specific reference to
Technology as a Learning Area.**



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**Managing the Curriculum with specific reference to
Technology as a learning Area.**

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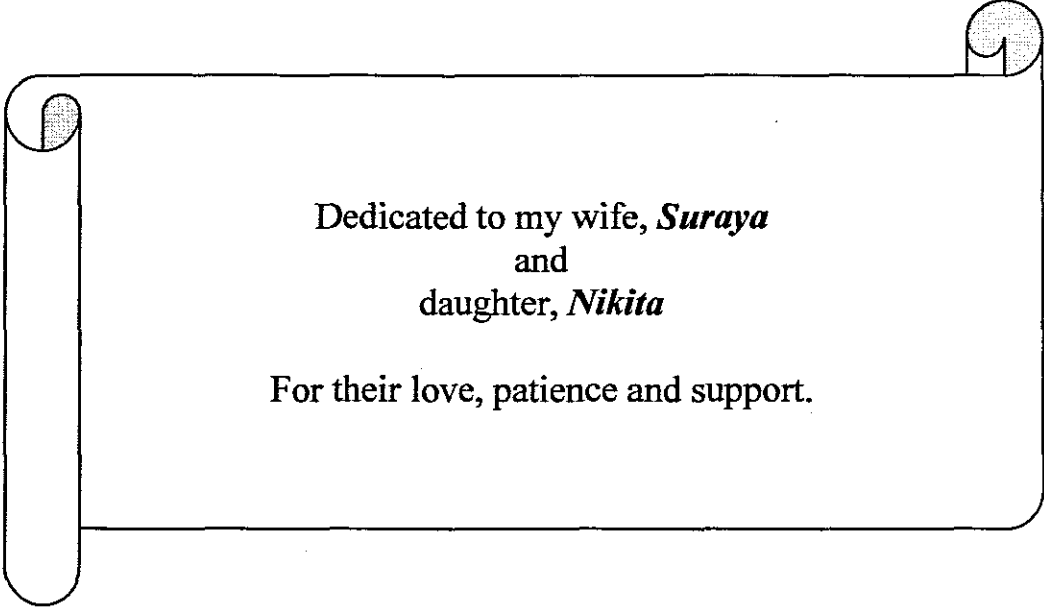
in the

Faculty of Education

University of Zululand

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Date : November 2006



Dedicated to my wife, *Suraya*
and
daughter, *Nikita*

For their love, patience and support.

DECLARATION

I declare that **MANAGING THE CURRICULUM WITH SPECIFIC REFERENCE TO TECHNOLOGY AS A LEARNING AREA** is my own work and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references.


Rohith Rambrij


DATE

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ABSTRACT

Technology is a key subject within C2005-RNCS and is targeted as a learning area which will contribute towards preparing learners for their roles in society and in the world of work. School principals are tasked with the responsibility of ensuring that Technology as a learning area is successfully implemented at schools in line with national and provincial guidelines.

This research examined management of the curriculum with specific reference to Technology as a learning area. The management role of principals is central to implementation of this learning area, including provision of resources for teaching and learning and assignment of technology education to qualified educators.

A literature review was undertaken to establish the relevant technical knowledge and professional skills that the principal would be required to possess in order to bring about meaningful changes and to implement Technology education.

The study revealed that there are challenges regarding management of Technology curriculum and resources to implement the learning. The study also revealed that in spite of barriers to successful implementation school principals have devised measures to implement and manage the curriculum, including communicating with the interest groups.

The researcher has made recommendations regarding management and implementation for Technology education.

ACRONYMS

ABET	Adult Basic Education and Training
ANC	African National Congress
AS	Assessment Standards
CS	Civil Society
DoE	Department of Education
EMIS	Education Management and Information Systems.
ELRC	Education Labour Relations Council
GET	General Education and Training
KZNED	Kwa-Zulu Natal Education Department
LO	Learning Outcomes
NECC	National Education Coordinating Committee
NEPI	National Education Policy Investigation
NGO	Non-governmental Organization
NQF	National Qualifications Framework
OBE	Outcomes-Based Education
RSA	Republic of South Africa
RNCS	Revised National Curriculum Statement
SACE	South African Council of Educators
SKAVS	Skills Knowledge Attitude Values
SPSS	Statistical Package for the Social Sciences
STEM	Science, Technology, Engineering and Mathematics
UNESCO	United Nations Educational, Scientific and Cultural Organization
HED	Higher Education Diploma
FDE	Further Diploma in Education
PTC	Professional Teachers Certificate
NPDE	National Professional Diploma in Education
UDE	University Diploma in Education

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ABSTRACT

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This research examined management of the curriculum with specific reference to Technology as a learning area. The management role of principals is central to implementation of this learning area, including provision of resources for teaching and learning and assignment of technology education to qualified educators.

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The study revealed that there are challengers regarding management of Technology curriculum and resources to implement the learning. The study also revealed that in spite of barriers to successful implementation school principals have devised measures to implement and manage the curriculum, including communicating with the interest groups.

The researcher has made recommendations regarding management and implementation for Technology education.

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CHAPTER 1

ORIENTATION

1.1 INTRODUCTION

The Constitution of the Republic of South Africa (Act 108 of 1996) provides the basis for curriculum transformation and development in South Africa. The curriculum has an important role to play in developing the full potential of each learner as a citizen of a democratic South Africa (DoE, 2002:01).

Prior to the first democratic elections in 1994 there were very limited changes made to the education system of this country. The curriculum under the apartheid government was not responsive to the needs of society, and there was very little pre-service and in-service training for principals and educators. According to Dekker & Van Schalkwyk (1989: 476) the curriculum was by far too academic, failing to prepare students for a vocation. About 95 % of matriculants followed a broad academic course. Only 9% of white matriculants and 1 % of African matriculants followed a technical course. The result was that most matriculants did not find employment in the formal sector, partly due to their irrelevant school training (Dekker & Van Schalkwyk 1989: 476).

In the mid-1980's things began to change in the field of education and training with huge pressure being brought about by the mass democratic movements made up, in the main, of non - governmental organisations.

According to the National Education Policy Investigation report (NEPI, 1993:104) the National Education Coordinating Committee, a nominal alliance of progressive education and labour stakeholders in 1990, initiated the national education policy investigation into the status of the education system in South Africa. One of its findings was that The Department of National Education was responsible for determining policy of the curriculum. The racially divided education departments were responsible for applying and carrying out curriculum policy. In effect the white "own affairs" House of Assembly and its provincial departments decided the national policy. The result of this arrangement was that the other education departments had very little participation in

planning and designing of the curriculum. They were expected to use the information in their schools without questioning its relevance. What was more astonishing was that there were 1400 registered syllabuses from Sub A to Std.10 (NEPI, 1993:104). None of the syllabuses covered management and implementation of Technology as a learning area, whilst some of the syllabuses contained a few subjects such as handwork and basic techniques.

Principals worked in an environment that was closely regulated and were used to receiving and giving instructions although the Department of Education made management decisions. A principal was seen to be successful if he/she was a good administrator. The principal did not manage the curriculum, but merely implemented it as it was. District and Circuit level structures were no more than administrative units and could not respond to community needs (DoE, 2000(a):1).

Resistance to Apartheid had, by the end of 1990, shown that certain education practices did not work (DoE, 2001(a):1). The culture of opposition had undermined the legitimate role of school management and leadership. The rising unemployment in the country caused people to demand an education system that would provide them with skills for employment. They sought a curriculum designed to cater for an academic career but also where Technology would be part of that programme which would enable learners to attain the necessary skills and experiences to make informed choices about future careers and employment. It should also include females whose choices of subjects were previously limited in schools.

According to Naicker & Waddy (2003:08) many changes were made after the first democratic elections in 1994, especially in the education and training sector. By integrating education and training in one system, within a credit-based qualifications framework, known as the National Qualifications Framework, it is envisaged that all citizens would be able to develop their capacities whether they are in full-time or part-time study, employed or unemployed, in general education or occupational preparation. Thus, for the first time Technology was included as part of the compulsory school curriculum and its implementation would have to be carefully managed. As a new learning area it would have to be incorporated into the curriculum and establish

itself, as an area to be managed and sufficiently resourced. All role players in education would have to contribute towards its effectiveness.

Technology is one of the learning areas that could contribute immensely towards meeting some of the challenges by promoting a thirst for knowledge, a love of learning and a determination to succeed. Technology as a learning area will contribute to learners attaining good work habits and work skills which are essential in the work place today irrespective of the type of employment one is in, be it self employment or fixed employment. Viljoen (1997:6) argues that if Technology as a learning area is managed and implemented correctly it would assist our people, particularly our young learners in need of relevant and useful education and training by preparing them for their roles in society and in the world of work.

1.2. STATEMENT OF THE PROBLEM.

According to Viljoen (1997:6) modern economies throughout the world rely increasingly on developing, adapting, and using Technology to create jobs, wealth and an acceptable quality of life for people. Our economy needs to expand and generate wealth in order to cope with the needs of a growing population as well as to become internationally competitive. On the average wealth generating countries such as Germany and Japan create 7 technicians to every 1 university graduate (this is optimal). South Africa creates 0,8 technicians to every 1 university graduate. South Africans, and in particular the youth, need relevant and useful education and training that will prepare them for their roles in society and in the world of work (Viljoen, 1997:6).

According to Mtshali (1998:05) the South African government has acknowledged the importance of Technology as a springboard to the future amongst the youth and through the Department of Arts, Culture, Science and Technology released a White Paper on Science and Technology. The White Paper on Science and Technology describes the vision for Science and Technology where the barriers of ignorance are broken down and the population as a whole acknowledges Science and Technology as beneficent forces propelling the nation towards a better future (Mtshali, 1998:05).

On the 11th December 2001, at the Hilton Hotel, Durban, the then Provincial Minister of Education, Kwa-Zulu Natal, the Hon. Prof. L.B.G. Ndabandaba, MPP, stated in his opening speech at the International Forum on Technology Education that South Africans need to grasp subjects such as Technology, Science and Mathematics, subjects that will contribute towards growth of the economy (Ndabandaba, 2001:12:11).

Mphahlele (2005(a): 4), the manager responsible for Science in the National Department of Science and Technology, stated in his key message quoted in the second issue of the South African Youth Card Magazine, that the Department needs to respond to what the research and development strategy of the Department described as 'frozen demographics'. He explained the meaning of the concept 'frozen demographics' by saying that our most productive human resources in the science system are old, white and male. In order to build a responsive technology system, it is important to ensure both representativeness as well as renewal of productive human resources in our technology system. This requires more of our youth enrolling for Science, Technology, Engineering and Mathematics (STEM) courses in tertiary education. This means that a great effort must be made by every learner to incorporate STEM courses in his/her curriculum long before he/she reaches grade 12.

Mphahlele's (2005(a): 5) statement that more learners should do STEM courses makes sense because our country is a major supplier of raw material to many countries around the world, where the raw materials are refined into manufactured goods and are resold back to us at a much higher price. According to Viljoen (1997:7) these raw materials create jobs for the citizens and wealth for the country. Jobs allow people to attain skills and contribute to the economic development of the country. If we were the manufacturers of finished goods, there would be more people employed and we would have an internationally competitive manufacturing industry with high levels of skills.

President Thabo Mbeki, cited in Mtshali (1998:08), supports the statements of Viljoen, Mtshali, Ndabandaba and Mphahlele by emphasising that the vision of an African Renaissance belongs to Science and Technology, when it touches every child by its wonders.

According to the Educations Labour Relations Council, Policy Handbook for Educators (2003:H44) South Africa currently has a national curriculum in place, which has replaced the traditional school subjects with eight learning areas, of which Technology is the newest, within the General Education & Training Band. The inclusion of Technology as a learning area presents its own challenges to school management teams, who not only have to manage this change in education, but also have to provide curricula, financial, human and physical resources for the implementation of Technology as a learning area.

The flood of a whole lot of new information regarding Curriculum 2005 and its substitute called Revised National Curriculum Statement (RNCS), which inter alia includes Technology as a new learning area, was introduced within a short space of time. This poses a great challenge for school managers and educators alike in the absence of adequate training to manage this curriculum effectively. Principals will not only need to be conversant with the aims and content of Curriculum 2005-RNCS, but they would also need to find ways and means of ensuring that a learning area like Technology is dove-tailed into the school curriculum, an area which schools did not have to worry about in the past.

According to C2005 – Towards a Theoretical Framework (DoE, 2000(b):06) Curriculum 2005- Revised National Curriculum Statement (RNCS is regarded as a key project by the South African government to transform apartheid education. This has changed the role of school principals and has put them in the front line of the struggle to develop new ways of doing things in schools. The principals have not been adequately prepared for the changes to their job description and this has resulted in many principals experiencing problems, much of it around the implementation of new policies and the curriculum, and thus by implication managing the curriculum.

Whilst South Africa needs many more people who are trained in the field of Technology, the non-implementation of Technology as a learning area will result in not only the learners' and the countrys' being deprived of important future skills but also the employers' having to look elsewhere for skilled workers. In essence the success of Technology as a learning area will depend on strategies that school management teams

implement. After all, a quality curriculum is synonymous with quality education and training, only if the curriculum is managed correctly.

This study has investigated the management of Technology as a curricular component in schools.

The study has endeavoured to find answers to questions such as the following:

- Are schools sufficiently resourced with regard to the implementation and management of Technology as a learning area?
- Are school principals sufficiently familiar with current trends in education to enable them to manage the curriculum?
- Are school principals familiar with the terminology used in the documents to implement Technology?
- Are there previous benchmarking regarding Technology as a learning area where teachers can draw from?
- What is the standard of in-service training and the management thereof with regard to Technology as a learning area?
- Do schools have educators who are certified to teach and implement Technology as a learning area?
- How effective is the curriculum, and specifically Technology managed as a learning area in schools?

1.3 PURPOSE OF THE STUDY

The purpose of this research was to investigate management of Technology as a school curriculum component. In this exercise the objectives of the study were:

- To determine how principals manage implementation of Technology as a learning area.
- To determine the extent of resourcing of Technology as a learning area.
- To determine the extent of consultation regarding the implementation and management of Technology as a learning area
- To determine the challenges faced by principals in the implementation of Technology.

- To assess measures which have been devised by the school to dovetail Technology as a learning area.

1.4 ELUCIDATION OF CONCEPTS

1.4.1 Management

According to Koontz and O'Donnel cited in Mampuru & Spoelstra (1994:17) management is an accomplishment of a desired objective by establishing an environment favourable to performance by people operating in organized groups.

Barnhart (1988:1263) refers to management as the administrative skill on managing control, handling and directing.

Loock (1999:1) refers to management as leading and guiding which is usually described as the activity or task which influences people in such a way that they will willingly work and strive towards achieving the goals of the group.

Kreitner (1989:9) defines management as the process of working with and through others to achieve organizational objectives in a changing environment. Central to this process is the effective and efficient use of limited resources.

Mary Parker Follet cited in Stoner & Freeman (1992:06) defines management as the art of getting things done through people. She argues the fact that managers achieve organizational goals by arranging for others to perform whatever task may be necessary, not by performing the tasks themselves.

1.4.2 Leadership

Hersey and Blanchard cited in Loock (1999:1) described leadership as the activity of influencing people to strive wilfully for group objectives.

Cawood and Gibbon cited in Loock (1999:1) suggest that the word "lead" strongly denotes interpersonal relationships between those who go ahead and those who follow. A leader then is one who not only leads but who is also followed.

Stoner & Freeman (1992: 472) defines leadership as a process of directing and influencing the task related activities of group membership which includes three important implications for the definition, i.e. other people, unequal distribution of power and the power to influence followers' behaviour.

1.4.3 Curriculum

Stenhouse cited in Carl (2001:31) argues that the definition of the concept curriculum do not solve curriculum problems, but rather offers perspective from which the problems may be looked at. To him the curriculum is the way in which educational aims are realised in practice.

Marsh cited in Jacobs, Gawe & Vakalisa (eds) (2002:99) defines curriculum as an interrelated set of plans and experiences, which a student completes under the guidance of the school.

Kerr cited in Kelly (1989:14) defines curriculum as all the learning which is planned and guided by the school, whether it is carried on in groups or individually, inside or outside the school.

1.4.4 Technology

The Revised National Curriculum Statement Grades R- 9 Schools Policy (RSA 2002:4) defines Technology as the use of knowledge, skills and resources to meet peoples needs and wants by developing practical solutions to problems, taking social and environmental factors into consideration. Viljoen (1997:1) concurs with this description of Technology.

The above policy document further emphasizes that in the Technology learning area, learners are provided with opportunities to interact with businesses and various industries that help them to understand and adapt to changing economic realities. They learn to generate creative and innovative ideas and to cooperate in translating their ideas into actions.

1.5 RESEARCH METHODOLOGY

1.5.1 Research design

The function of research design is to help us obtain clear answers to meaningful problems. For this study descriptive research was undertaken. A questionnaire was used to illicit the necessary responses. Research with regard to this study was conducted as follows:

- A descriptive literature study of available and relevant literature was undertaken.
- A pilot study of primary schools outside of the random sample was undertaken. The questionnaire was administered to three schools with the aim of ensuring that the information that is required is provided accurately. From the comments received the questionnaire was amended and the necessary changes made. The questionnaire was then re administered to the schools with the view of ensuring its correctness. After this process the necessary changes were made. The instrument was then distributed to school principals selected through the random sampling process.
- A questionnaire consisting of both closed questions and open questions was used to illicit information from the respondents.

1.5.2 Population and Sampling

The circuit of Chatsworth was used to draw the population from. Chatsworth is made up of four wards. Chatsworth East (Ward 117) has forty one schools, Chatsworth West (Ward 118) has thirty two schools, Queensburgh (Ward 119) has thirty five schools and Mobeni (Ward 120) has thirty three schools, making up a total of one hundred and forty one schools. There are seventy nine primary schools in total in the four wards. In some wards there are more primary schools than others, therefore to ensure that a fair sample is obtained from each ward, it was decided that a high percentage of schools, approximately seventy percent be sampled. This was done to accommodate schools that might not respond to the research instrument (questionnaire) and still provide a sample that reflect the status of Technology in those wards. Fifty six respondents (school principals) was selected, fourteen from each ward by means of the random sampling

method. Names of all of the primary schools will be put into a hat and the first fourteen drawn from the hat (per ward) was used to gather data from.

1.5.3 The Instrument

For the purposes of this research the self administered questionnaire was chosen so that the respondent would be able to complete the questionnaire without undue stress being brought upon the respondent with the researcher being present. In this way the respondent will be able to supply the information that is unique to their institutions. The researcher would also not be able to prompt the respondents with the type of answers that he/ she would need, thereby eliminating the process of researcher biasness. The self administered questionnaire also allows for the questionnaire to be completely filled as the respondent is allowed sufficient time to complete the instrument in the absence of the researcher.

1.5.4 Administration of the Instrument

With the aim of administering questionnaires it will be necessary to first request the permission of the Director, Provincial Department of Education: Research, Strategy Development and EMIS. The researcher would first supply the director with a copy of the research proposal, a copy of the questionnaire, a list of all the schools to be sampled and a letter from the university stating the status of the researcher. On receipt of the letter granting permission to conduct research in the circuit, the letter will then be forwarded to the Circuit Manager concerned-Chatsworth Circuit and principals of schools, informing them of the research to be undertaken at their sites. An appointment will be made to visit the schools selected through random sampling, meet and hand over the questionnaire to the respective principals. In some instances where the school principal was not available the questionnaire was handed to the person next in charge, i.e., the deputy principal or the head of department.

1.6 Limitations of the study

On account of the timing of the distribution of questionnaires i.e. the middle of the third term of the school year many principals were engaged in attending to departmental returns and submitting promotion documents and other school activities, a great deal of extra time was taken to complete the questionnaires. The following factors might have impacted on the investigation

- Many principals had to be coerced into completing the questionnaire. The researcher made many telephone calls to check on the progress, and some schools had to be visited many times before the questionnaire could be picked up.
- Disadvantages of the questionnaire as a research instrument may have limited the outcome of the research, eg. the fact that participants are not honest in their responses.

1.7 FURTHER COURSE OF STUDY

Chapter 2 covers a literature study done on relevant aspects of curriculum management, focusing on the role of the principal in managing and implementing Technology as a learning area,

Chapter 3 deals with the design of the research and a description of the methodology, as well as data collection.

Chapter 4 contains the presentation and analysis of data gathered from the empirical study.

Chapter 5 summarises the study, present certain findings and propose recommendations based on the findings.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Issues around the curriculum have always been hotly debated issues.

Over the past 30 years a lot of pressure to change has been put on the educational system by politicians and business. According to Skinner, cited in Jansen & Christie (1999:117), the arguments about education's political agenda revolve crucially around the nature of the curriculum. Questions that are usually asked are: Who decides on the content of the curriculum? What are the political implications of the kind of knowledge presented? How will students be expected to acquire it and to what kind of use can and will that knowledge be put?

According to Stoner (1992:04) for most of our lives, we are members of one organisation or another, a school, a union, a religious group or civic organisation. Some organisations like the army are very formally structured, others like a local swimming club are more casually structured.

All of these organisations, formal or informal have several elements in common. The most obvious of these basic elements is a goal or purpose. The goal may vary: to win a league championship or to sell a product. But without a goal no organisation would have a reason to exist. All organisations also have some program or method for achieving their goals. Organisations also have leaders or managers responsible for helping them achieve their goals. These leaders may be more obvious in some organisations than in others, but without effective management, the organisation is likely to flounder.

According to Naicker & Waddy (2003: 03) school management teams must have a good understanding of and insight into, the curriculum policy documents, so as to *implement the curriculum and realize the vision of quality education* otherwise it would pose serious challenges for the implementation of the curriculum. The principal is the instructional leader of the school who is responsible for taking the lead in putting the school curriculum into practice and improving on it. After all it is the

principal's responsibility to ensure that good teaching and learning actually happens. For this reason management of the curriculum is the most important management function of the principal. All other functions such as financial management, human resource management, school administration and governance are there to support curriculum management, as it serves the goal of quality teaching and learning. The members of the school management team are instructional leaders who are expected to practise and improve on it.

Preedy (1989:ix) supports the argument of Naicker & Waddy by stating that curriculum management is the central activity for schools and colleges to create the framework for effective teaching and learning to take place. The overall responsibility for managing the curriculum lies with the principal, who is in fact the head teacher (Preedy, 1989:185).

In South Africa the issues around content, skills, knowledge, assessment and preparation for both the formal and informal economy are addressed through the (Curriculum 2005) Revised National Curriculum Statement (RNCS) which includes Technology as a learning area. As national policy it is compulsory for all schools in the country to include and implement Technology as a learning area and part of the school curriculum. According to the Department of Education the learning outcomes for Technology are determined by National Policy. The National Policy for Technology as a Learning Area contains grade specific Assessment Standards for Technology (DoE, 2002:01).

McNeil (1996:217) argues that the principal as director of learning is in the forefront of designing curriculum plans consistent with the provincial and national goal. It is the responsibility of the principal to lead and guide the task of implementing and managing Technology as a learning area within the school curriculum.

The principal will therefore have to use his/her power, authority and leadership skills so that he/she can positively influence the implementation of Technology. Hord and Hall cited in Glatthorn (1997: 23) conclude that strong leadership on the part of the principal plays a key role in determining the extent of curriculum leadership.

The literature study revealed different management styles and theories, the understanding of which, according to source evidence will provide guidelines for the development of solutions to everyday practical problems (Stoner 1992:28). This view is supported by Van der Westhuizen (1994: 188).

2.2 MANAGEMENT STYLES

The role of leadership in management is largely determined by the organizational culture of the school. The principal's beliefs, values and assumptions are of critical importance to the overall style of leadership that the school adopts. There are several different leadership styles that can be identified within each of the following management techniques. Each technique has its own set of good and not so good characteristics, and each uses leadership in a different way. For effective management of Curriculum 2005-RNCS and the implementation of Technology, the principal may adopt one or all styles depending on the circumstances of the school.

Table1: Management styles

Autocratic	Laissez-faire	Democratic
<ul style="list-style-type: none"> • Dominates staff members • Uses unilateralism to achieve an outcome • Passive resistance from staff members • Continuous pressure from the principal to get things done. 	<ul style="list-style-type: none"> • Exercises little control over staff members • Allows staff members to sort their roles and problems their way • Rarely participates in managerial processes • Staff members lack motivation and direction • May be effective in a highly skilled and motivated staff 	<ul style="list-style-type: none"> • Consults the staff before making a decision • Maintains control over the staff members • Delegates roles and responsibilities • Empowers and encourages participation • May be interpreted as being unsure of himself

Adapted from Van der Westhuizen (1994:190)

Educational leadership in South Africa has historically been extremely authoritarian (DoE, 1996 (b):20). With the implementation of Curriculum 2005-RNCS and the inclusion of Technology as a learning area, a more facilitative type of leadership and management style has emerged. The authoritarian style was exploited under the auspices of the apartheid government. The new government functions in accordance with a democratic constitution. This democratic culture features and filters to institutions and school governance and management.

One of the drawbacks of the facilitative type of leadership is that it at times can become *laissez-faire*, allowing many discussions, without providing adequate guidance. Heron (1993:110) supports an approach to leadership and management, which recognise the need for directness within a culture of negotiation, and a commitment towards building autonomy for all participants.

According to Naicker & Waddy (2003:13) the principal, deputy principal and head of department form the school management team and they must lead and manage the school as a team including developing the curriculum. The principal facilitates the process in a collaborative effort.

2.3 MANAGEMENT THEORIES

Educational management is a means of realising the educational and teaching objectives of a community in a formal (i.e. consciously, planned and calculated) manner and as effectively as possible. The manager carries the responsibility of taking all the necessary steps (i.e. management actions) to ensure that the functional activities (i.e. educative teaching) are performed effectively. The management actions or management functions which the educational manager has to perform include policy making, planning, decision making, organising, the recruitment, development and motivating of staff, the financing of all operations, control leadership and overall administration. All the above actions are a means of ensuring attainment of the objectives.

The educational manager's management actions will lead to the establishment of the formal structures e.g. schools, supporting services including the management and

administrative structures required to realize the aim of education. The school principal will not be able to attain the aim of education, relying on experience alone to guide him/her by shunning theory. In deciding on a response to a problem, principals draw on a range of options suggested by previous experience with that type of problem.

Copland, et. al., cited in Bush (2003:23) argue that it is wishful thinking to assume that experience alone will teach principals everything they need to know. Everard and Morris (1996:14) argue that before a manager can set about their managerial role and mission, they need some skill in relating to other people. They need to understand the various behavioural processes, which may be at work, and use their knowledge to influence or 'lead' individuals or groups. They further maintain that in a meeting, decisions can be influenced far more effectively by using the behavioural 'process' of the meeting than by simply restating one's argument, however sound it is. An understanding of management theories will help them understand managerial behaviour.

Kroon (1996:03) postulates that a knowledge of the theory of management should make it possible for principals to prepare themselves for the roles. It will help them understand how a school should be managed and what should be done to achieve these goals of the school (and possibly also their own personal goals) as efficiently as possible.

Stoner (1992:28) maintains that by studying theories, it will help us understand underlying processes, and on that basis, choose an effective course of action. He further argues that valid theories help us predict what will happen under certain situations. With this knowledge, we can apply different management theories to different situations.

Kroon (1996:03) asserts that the first task an employee has to learn is how to be a good subordinate. All employees are subordinate to somebody else. For example, the managing director is accountable to the board of directors and the board has to answer to the shareholders. Ultimately all of us, as stewards, are accountable. One of the best ways of being a good subordinate is to understand the task and roles of the manager.

According to Stoner (1992:29) there are many different theories of management. Some of them evolved during the industrial era (1890), such as the classical theory of Henry Fayol. Others evolved after the first world war (1914-1918) such as the behavioral school, or the scientific management theory of Frederic W Taylor. Other management theories that had an impact are the systems approach (1950) and more recently the contingency approach (Stoner, 1992:29).

According to Livingstone, cited in Stoner (1992:18) whilst there are many different theories about management, effective managers are made, not born. In supporting the statement of Livingstone, the Department of Education has set up a special unit to train and develop the quality of school managers. This unit is known as Education Management Development Unit, which specializes in the training of school management (DoE, 1996(b):11).

Knowledge and understanding of some of the management theories that would assist the principal in managing C2005-Revised National Curriculum Statement and contribute to the successful implementation of Technology as a Learning area are:

- Collegial – Theory (democratic theory)
- Cultural – Theory (the human relations theory)
- Formal – Theory (bureaucratic theory)

2.3.1 Collegial-theory (democratic theory)

According to Campbell and Southworth, cited in Bush (2003:64) the notion of collegiality became enshrined in the folklore of management as the most appropriate way to run schools and colleges in the 1980s and 1990s. It was closely associated with school effectiveness and school improvement and was then regarded as ‘the official model of good practice’. This notion is shared by Wallace, cited in Preedy (1989:182).

The collegial theory assumes that decisions are reached by consensus, rather than by divided opinion. The belief that there are common values and shared objectives leads to the view that it is both desirable and possible to resolve problems by agreement. There may be differences of opinion but they can be overcome by the force of argument. The decision –making process may be extended by the search for

compromise but this is regarded as acceptable price to pay to maintain the aura of shared values and beliefs (Bush 2003:65).

The case for consensual decision-making rests in part on the ethical dimension of collegiality. Bush (2003:67) argues that it is wholly appropriate to involve people in decisions that affect their professional lives. *Imposing decisions on staff is considered morally repugnant, and inconsistent with the notion of consent.*

Hoyle, cited in Preedy (1992:189) supports the argument of Bush, and goes a step further by stating that schools that practise collegiate management are effective in implementing all kinds of curriculum and organisational innovations.

Fullan, cited in Preedy (1992:190), support the use of the model, but argues that it would be unwise to regard this model as a 'blueprint for perfection.' The people involved, the challenges they face and the experience upon which they draw are continually changing.

Bush (2003:64) presents a case of South Africa where the normative dimension of collegiality is particularly evident in post apartheid South Africa. This is particularly evident in the decision to establish governing bodies in all schools, and in the representation of both teachers and students on to these bodies.

The collegial theory style of leadership both influences, and is influenced by, the nature of the decision making process. Because policy is determined within a participative framework, the principal is expected to adopt strategies, which acknowledge that issues may emerge from different parts of the organisation and be resolved in a complex interactive process.

Preedy (1992:192) supports the use of this theory as she argues that the collegial model promotes organisational effectiveness. However, he maintains that it is necessary for each school to develop a management policy as part of its activities to develop staff and to review individual and school wide needs. Once priorities are established, suitable activities are selected, implemented and evaluated. The collegial approach to curriculum management would seem particularly appropriate for promoting Technology, as it creates the environment for its successful

implementation by networking and collaborating with all the stakeholders in the decision making process.

According to Bush (2003:76) the collegial theory typifies the principal as a facilitator of an essentially participative process. The principal's credibility with his/her colleagues depends on providing leadership to staff and external stakeholders while valuing the contributions of specialist educators. The principal is the instructional leader who is responsible for taking the lead in putting the school curriculum into practice and improving on it. It is the principals' responsibility to ensure that good teaching and learning actually happens (Naicker & Waddy, 2003:13).

This type of management and leadership is ideally suited to secure and implement Technology as a learning area as it espouses collaboration. In this manner, teachers talk about teaching, there is shared planning and preparation and there is mutual training and development. One of the contributions of this theory is that staff will have a common understanding of what is expected of them during and after the implementation of Technology. The second contribution is that teachers are comfortable to make suggestions in an open environment in the absence of the 'red tape', which advocates teacher participation in decision-making.

2.3.2 Cultural theory (human relations theory)

According to Hoy and Miskel (1996:12) the cultural theory was developed in reaction to the formal traditional theory of the classic models of administration. Mary Parker Follet believed that the fundamental problem in all organisations was developing and maintaining dynamic and harmonious relationships (Hoy and Miskel, 1996:12).

The cultural theory emphasizes the informal aspects of organisations rather than their official elements. The theory focuses on the values, beliefs and norms of individuals in the organisation and how these individual perceptions coalesce into shared organisation meaning. The cultural theory is manifested by symbols and rituals rather than through the formal structures of the organisation.

According to Owens (2001:110) the overarching concept of this approach is that of building human capital: that organisations are made more effective as the people in

them grow and develop personally and professionally over time so that they become increasingly effective not only in their individual work but as participants in a work group that also is becoming increasingly more adept and effective in cooperative endeavor.

The cultural theory focuses on values and beliefs, shared norms and meanings, rituals and ceremonies that are used to support members of the organisation. The values and beliefs underpin the behaviour and attitudes of individuals within schools. According to Morgan cited in Bush (2003:160) the assumption of shared beliefs, meaning, understanding and values also provide a basis for making one's own behaviour sensible and meaningful.

Bush (2003:161) argues that the development of shared norms and meanings between members of the school eventually leads to behavioural norms that gradually become cultural features of the school. He also points out Bush that if one adheres to these rules of behaviour one will be successful in constructing an appropriate culture (Bush, 2003:161).

Culture is typically expressed through rituals and ceremonies that are used to support and celebrate beliefs and norms. Schools, in particular are rich in such symbols as assemblies, prize-giving's, awards functions, Technology interest club and open days to market the institution (Hoy cited in Bush, 2003:161).

Bush argues that the principal have the main responsibility for generating and sustaining a culture and communicating core values and beliefs both within the organization and to parents, educators and students. Whilst principals may have their own values and beliefs arising from many years of successful professional practice, they are also expected to embody the culture of the school (Bush, 2003:169).

According to Bush (2003:169) the cultural theory emphasis the bonding together of teachers, students and parents as believers in the work of the school. As people become members of this strong and binding culture, they are provided with opportunities for enjoying a special sense of personal importance and significance (Bush, 2003:169).

According to Van der Westhuizen (1994:74) the cultural theory stresses in particular one part of management theory, namely control and organisation, which are important when implementing a new learning area such as Technology.

2.3.3 Formal theory (bureaucratic theory)

Since the dawn of organisational studies in the twentieth century, people have generally elected to conceptualise organizations in one of two disparate ways. One, the classical, traditional view, is often called "bureaucratic" though in the rhetoric of educational reform in recent years many choose to speak of it as "the factory model" of organisation (Owens, 2001:61). To this day the bureaucratic organisation remains worldwide by far the most common ideal of organisation. To many people the formal theory is the defining concept of what an organisation is (Owens, 2001:61).

According to Van der Westhuisen (1991:191) this type of manager adheres strictly to the letter of the law. Owens (2001:61) describes this type of manager as "going by the book." Both authors, concur, with the description of the bureaucratic manager.

According to Owens (2001:62) the bureaucratic theory is probably the most important of the formal theories. There is substantial literature about its applicability to schools. It is often used broadly to refer to characteristics, which are generic to formal organizations. Bush (2003:43) argues that the 'pure' version of the bureaucratic theory is associated strongly with the work of Weber who argued that in formal organizations bureaucracy is the most efficient form of management. From a technical point of view, 'it is' capable of attaining the highest degree of efficiency and is in this sense formally the most rational means of carrying out imperative control over human beings. It is superior to any other form in precision, stability, stringency of its discipline, and in its reliability (Bush, 2003:43).

According to Bush (2003:44) in bureaucracies decisions and behaviour are governed by rules and regulations rather than personal initiative. Schools typically have rules to regulate the behaviour of pupils and often guide the behaviour of educators through devices such as the personnel administrative measures document. The South African

Schools Act 84/1996 code of conduct is aimed at regulating the behaviour of pupils (Education Labour Relations Council Policy, Handbook for Educators, 2003:B7-C58).

These rules may extend to the core issues of teaching and learning. This theory stresses the importance of the hierarchical authority with formal chains of command among different positions in the hierarchy i.e. the principal, deputy principal, head of department and the educator (Naicker & Waddy, 2003:14). The pyramidal structure is based on the legal authority vested in the officers who hold positions in the chain of command. In educational institutions teachers are accountable to the head of department or principal.

According to Bush (2003:44) the bureaucratic theory emphasises impersonal relationships between staff. This neutrality is designed to minimize the impact of individuality on decision-making. According to Owen (2001:63) many educational leaders of effective schools think of the bureaucratic model highly to improve the functioning of schools. Good schools depend in part on the quality of personal relationships between teachers and pupils.

Glatthorn (1997:25) argues that principals should confer with the school management teams and build a school model of curriculum leadership. They could use the system to decentralise the power base by spreading the tasks and harnessing the talents of others in the decision making process. The structures should not only be top down but also bottom up. In this way effective implementation can be attained (Glatthorn, 1997:25).

Scott, Ahadi and Krug cited in Glatthorn (1997:25) argue that the principal must understand that curriculum leadership do not exist in a vacuum but is simply one component of effective organisational behaviour. They also point out as the role of the principal, to facilitate the communication process, create a positive open climate, build a vision with the staff, develop the staff through involvement and be an effective and positive role model and mentor.

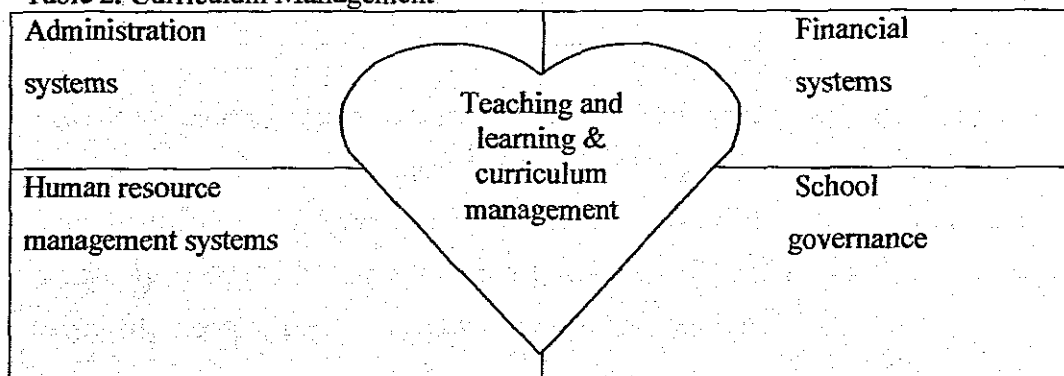
Stoner (1992:29) states that no general theory unifies or dominates the field of management. Instead, the eclectic approach - the practice of borrowing principles from different theories as required by circumstances - is the state of the art in management theory and practice. Stoner maintains that managers need to keep an open mind and become familiar with each of the major theories that currently coexist.

2.4 CURRICULUM MANAGEMENT

The key objective of curriculum management involves establishing an agenda for teaching and learning which goes beyond the mere transmission of knowledge and skills to include monitoring, evaluating and providing support to learners, educators and all stakeholders in education and training. It also requires that people change their attitude so that the purpose of the new curriculum model, such as the successful implementation and management of Technology as a learning area, is attained.

The illustration presented hereunder is an organogram of how the Kwa-Zulu Natal Education Department organise the management of the curriculum (Naicker & Waddy, 2003:13)

Table 2: Curriculum Management



Teaching and learning and curriculum management is the most important function of the School Management Team. The heart is demonstrated as the driving force impacting on other core roles and responsibilities. All other sub-systems such as administration systems, financial systems, human resource management systems and school governance are there to support curriculum management, as it serves the goal of quality teaching and learning.

In summary it can be said that curriculum management entails implementation of Technology as a learning area. It includes tasks such as, planning, organising and so on. Curriculum planning and curriculum change are attended to in response to the needs of learners, parents, employers, the community. Successful implementation of Technology should take place alongside with the other seven learning areas.

Knezevich cited in Van der Westhuizen (1994:44) provides the following comparative summary of a manager's tasks according to different viewpoints:

Table 3: Summary of managers' tasks

Fayol (1916)	Gulick&Urwick (1937)	Newman (1950)	Campbell et al (1958)	Johnson et al (1967)
<ul style="list-style-type: none"> • Planning • Organising • Commanding • Coordinating • Controlling 	<ul style="list-style-type: none"> • Planning • Organising • Staff Guiding • Coordinating • Reporting • Budgeting 	<ul style="list-style-type: none"> • Planning • Organising • Collecting sources • Guiding • Controlling 	<ul style="list-style-type: none"> • Decision making • Programme development • Stimulating • Coordinating • Approving 	<ul style="list-style-type: none"> • Planning • Organising • Communicating • Controlling

Each of these management tasks has a number of sub-tasks, which have a supportive function in carrying out the main task. Van der Westhuizen (1992:44) argues that from the summary by Knezevich, it can clearly be seen that there is a measure of uniformity among the different authors with regard to the tasks of a manager (principal), although their classification may not be identical.

2.5 CURRICULUM PLANNING

Quality education depends on, and is supported by, sound management practices. It is, therefore crucial that the principal as curriculum manager, together with all the other roleplayers decide on how to plan and manage the curriculum.

Curriculum planning includes decisions about what should be taught and for what purpose it should be taught. It occurs at different levels of remoteness (distance) from

intended learners. These levels are societal, institutional, instructional and personal. Participants in the societal level include boards of education, publishers and national curriculum reform committees. At the institutional level, administrators and faculty groups are the main participants. Parents as well as learners play a role in institutional decision making about the curriculum.

The instructional level refers to teachers deciding the purpose that are appropriate to the learners. According to the Department of Education the new education paradigm calls for the participation of all school stakeholders in leading and managing schools. Very often, however, it is the school principal who ends up taking responsibility for making things happen (DoE, 2000(a):12).

According to Van der Westhuizen (1992:140) the school leader must apprise himself of the policy at national and provincial levels, as well as policy previously decided on by the school regarding the planned activity. This view is supported by, Robbins (1980: 128-129) and De Wet and Hechter quoted by Van der Westhuizen (1994:140). It can then be stated that the principal as the instructional leader is specifically responsible for overseeing the planning of the curriculum, including managing such planning.

In the last ten years the national influence, together with business and economic interest, has dominated the development of the curriculum. Their interest in curriculum development is two fold: the first - one is to prepare and provide learners with skills and knowledge for employment, and the second interest is that the programmes offered must contain specific competencies, or learning outcomes, so that when learners enter the workplace they have some knowledge and background of the basic skills for that occupation.

As stated by Van der Westhuizen (1992:140) it is important for the principal to keep abreast of current trends in education and the changes taking place at various levels, even if the principals are not directly involved at higher levels, so that when it comes to the implementation stage of the planning they would be able to manage that task. Naicker & Waddy (2003:15) support Van der Westhuizen by stating that it is the principal's responsibility to liaise with the relevant structures with regard to curricula

and curriculum development. This includes developing and achieving the educational objectives in accordance with the needs of the school.

Squelch (Lemmer (ed.), 2003:139) states that the school principals no longer play the role of primary decision-maker because of the new laws that govern South African education, which decentralizes governance and enhances shared decision-making at local school level. They now find themselves as members of the governing bodies which are dominated by parents and non-educationists. She argues that despite this position, the primary locus of power, authority and decision-making often remains with the principal because he/she is the key educational leader in a school and responsible for its day to day running. Ultimately it is the principal who provides the leadership to reform the curriculum and effect changes.

Presently in South Africa, curriculum planning for Technology, takes place across three levels at school for all learning areas including Technology as a learning area, namely:

- Planning for the whole phase, this is called a Learning Programme.
- Planning for a year and grade within a phase. This is called a Work Schedule.
- Planning for groups of linked activities or single activities. These are called Lesson Plans (DoE, 2003(a):01).

This level (whole phase – Learning Programme) of curriculum planning according to Choen, Manion & Morrison (2001: 77) takes account of external and internal factors, in short it rehearses the ‘situational analysis’, which contributes to effective teaching. The role players who are involved in this level (whole phase – Learning Programme) include the members of the School Management Team, educators, School Governing Body, the representative council of learners and parents.

2.5.1 Learning programmes

A learning programme is a phase –long plan that provides a framework for planning, organizing and managing classroom practice for each phase doing Technology as a learning area. It specifies the scope for teaching, learning and assessment for the phase and is a structured and systematic arrangement of activities that promotes the

attainment of learning outcomes and assessment standards for the phase. A learning programme is a tool for ensuring that the learning outcomes for Technology as a learning area are effectively and comprehensively attended to in a sequential and balanced way across the phase (DoE, 2003(a):02).

The learning programme also considers how integration within and across learning areas will happen, as well as what resources are available and needed to deliver teaching and learning activities. The learning programme will in turn be translated into year long, grade-specific work schedules and shorter activity-long lesson plans.

The following Technology learning programme is adapted from: the RNCS GradeR-9 Teachers Guide for the Development of Learning Programmes: Technology (RSA, 2003 (a):41).

Table 4: Learning programme

Term	Grade 4	Grade 5	Grade 6
01	LO 1 AS1-5 LO 2 LO3 <u>CONTENT</u> Structures-Design and make a portable tent with a light frame <u>INTEGRATION</u> Language Natural Science Maths Social Studies Social Science <u>RESOURCES</u> Pictures Newspapers books bricks straws pins Card waste materials <u>ASSESSMENT</u> Assignment Practical work Test Project portfolio	LO1 AS1-5 LO2 AS 1 LO3 AS 2 <u>CONTENT</u> Structures-Design and make a trailer that can withstand a heavy load <u>INTEGRATION</u> Language Natural Science Maths <u>RESOURCES</u> Ruler, pencils scissors Plywood plastic straws glue lid of shoe box cardboard boxes <u>ASSESSMENT</u> Assignment Practical work Test Project portfolio	LO1 AS1-5 LO2 AS 1 LO3 AS 2 <u>CONTENT</u> Structures-Design and make a low cost house <u>INTEGRATION</u> Language Natural Science EMS Arts& Culture Maths <u>RESOURCES</u> Example of houses(models) glue plastic straws pencil rulers scissors electrical wires globe bulb holders paper clips drawing pins, waste materials <u>ASSESSMENT</u> Assignment Practical work Test Project portfolio

Elucidation:

Learning Outcomes [LO]

In Technology there are three learning outcomes [LO].

- LO 1 addresses the technological processes and skills. During technological activities, the learner engages in investigating, designing, making, evaluation and communication solutions.
- LO 2 addresses the technological knowledge and understanding. There are three core content areas in this learning outcome, i.e. structures, processing, and systems and control. Whilst engaging in the actual practical activities the learner, will have to demonstrate an understanding of the relevant technological knowledge, ethically and responsibly.
- LO 3 addresses technology, society and the environment. All technological development takes place in an economic, political, social and environmental context. Values, beliefs and traditions shape the way people view and accept technology, and this may have a major influence on the use of technological products. In choosing a technological solution, the costs and benefits of the choice must be taken into account. The need to understand the inter-connection between technology, society and the environment is addressed in the work of the learners.

The learning outcomes for the General Education and Training Band builds on the critical and developmental outcomes that were inspired by the RSA Constitution. (DoE, 2003(a):1)

- Assessment Standards [AS]

Assessment standards are the benchmark against which learners' work is assessed. It is the knowledge, skills and values that learners need to show to achieve the learning outcomes in each grade. For example, in Grade 6 under AS 1, (content structures), a learner would have to demonstrate knowledge of materials suitable for supporting loads and how the structure can be made stable. As a continuation of AS I (1.1), the learner will have to demonstrate knowledge of purpose of the structure and what the product will do.

It should be clear from the following explanation that, during the learning programme stage, everything that is going to be taught is included across the grade. Areas where integration is going to occur with other learning areas are also included.

The learning programme is the most common area for curriculum planning in the school. According to Naicker & Waddy (2003:60), the principal at this level displays leadership that invests in people, decentralizes decision-making, trusts the judgement of others, facilitates participation, embraces the ethical implications in every decision, and recognises the complexity of contemporary society.

For Technology as a learning area the school's management plans would include the school development plans, curriculum goals, school policies, staff development plans, curriculum needs, provisioning and areas such as staffing.

2.5.2 Work schedule

A work schedule is a year long programme that shows how teaching, learning and assessment will be sequenced and placed in a particular grade. It is a delivery tool, a means of working towards the achievement of the learning outcomes specified in the Learning Programme. It and incorporates the Assessment Standards which will be achieved in that grade (DoE, 2003(a):44).

Glatthorn (1997:94) states that the year plan is a very useful document. It fosters collaborative planning by a grade-level or subject team. It is recommended that teachers work together in producing the plan. Such plan provides a foundation for the more detailed unit plans by translating the curriculum guide into a series of units. It facilitates co-ordination across learning areas and provides a simple means for examining the flow of instruction in two or more learning areas. It operationalises the school's decisions with respect to curriculum integration. Most importantly it shows clearly the time allocations teachers have made for several units, thus providing a useful tool for curriculum monitoring.

Although each school will use its own system for accomplishing the planning process the principal as head of the institution is responsible for accomplishing this task with

significant teacher input. For a new learning area such as Technology, teacher input is vital if it has to survive and take its rightful place within the curriculum.

A typical example of a Technology learning area work schedule is the following:

Learning Area: Technology

Content/Knowledge/Context: Structures

Grade: 4

Term: 01

Table 5: Work schedule

Week	Learning outcome	Assessment Standards	Content/ Core knowledge context	Integration	Resources	Activities	Assessment
1	1	1.1.	Introduction Investigate frame & natural structures	Language Natural Science	Examples	Learners use the table to classify structures	Assignment
2	1	1.2.	Resource Task 1 Investigate natural & man-made structures	Language Natural Science	Examples	Learners use table to classify structures	Assignment
3	1	1.3.	Resource Task 2 Investigate indigenous dwellings	Language Natural Science Maths	Pictures	Learners experiment with papers shapes /strength	Assignment
4	2	1	Resource Task 3 Investigate how shapes make structures strong	Language Natural Science Maths	Paper, tape straws	Learners experiment with paper & straw structures/strong	Practical work
5	2	1	Resource Task 4 Make a swing with straws	Language Maths	Straws ruler, scissors	Learners experiment with straws/enquire how to makes structures strong	Practical work
6	2	1	Resource Task 5 Make shapes strong with triangulation	Language Maths	Strips of cardboard scissors, slit pins	Learners work with resources/learn to make triangles	Practical work
7-10	12	1-5 2	Capability Task Design and make a portable tent with a light frame	Language Natural Science Maths	Waste materials, appropriate tools	Learners use Project portfolios to design and make	Project portfolio, test

Adapted from: C2005-RNCS Grade-9 Teachers Guide for the Development of Learning Programmes Technology (DoE, 2003(a):44)

Recording at the work schedule level for Technology includes all the aspects for the phase plan, as well as the resources required for teaching and learning.

Resource Tasks [RT] are small practical activities that are taught to learners to empower them with skills, knowledge, attitude and values prior to the practical project been undertaken. It also assists in identifying learners who experience problems / barriers to learning, thereby allowing the educator to assist those learners (Clitheroe, Dilly & Van der Westhuizen (eds), 2001:10).

Integration is a key principle of the Revised National Curriculum Statement Grades R-9 (Schools), that requires learners to use their knowledge and skills from other learning areas, or different parts of the same learning area, to carry out tasks and activities (DoE, 2002:62).

Capability Tasks [CT] are projects that involve designing and making a product that works. Learners will have the opportunity to apply the knowledge and skills that they gained from doing resource tasks in the capability tasks (Clitheroe, Dilly & Van der Westhuizen (eds), 2001:10).

2.5.3 Lesson plan

A lesson plan is the next level of planning and is drawn directly from the work schedule. It describes concretely and in detail teaching, learning and assessment activities that are “to be implemented in any given period of time”. Adapted from: (DoE, 2003(a):45) The figure represented here- under is an example of a Technology lesson plan.

Table 6: Lesson plan

This is the minimum information for a lesson plan					
LEARNING		AREA:		Technology	
Grade: <u>4</u>		Topic/Content/Context/Focus: <u>Electricity: simple circuits and switches</u>			
Day & Date	SKAV's	Activities		Resources	Assessment
		Teachers	Learners		
Day 1	Observation of safety rules Analysing of properties of materials Use of hand tool and equipment Adhering to safety regulations	LO 1 AS1-5 LO 2 AS1 LO 3 AS2 <u>Teachers Activities</u> Conduct baseline assessment Provide learner support materials Arrange classroom for practical activities Outline conditions and expectations: safety, behaviour awareness, sharing, listening. Demonstrate use of tools and equipment <u>Integration</u> Natural Science Maths Life orientation Social Science Economic Management Sciences	Respond to questions and contribute to lessons Pupils support and negotiate conditions Observe and contribute to practical aspects. Communicate and share resources Prepare their work using resources provided	Chalk and talk Demonstration on workplace safety and use of safety apparatus Tools and equipment	What? Group work Project portfolio/practical work How? Observation Group work Written tests/ Completed tasks
Expanded opportunities / enrichment RESEARCH THE USE OF CIRCUITS					

Adapted from: C2005-RNCS Grade-9 Teachers Guide for the Development of Learning Programmes Technology (DoE, 2003 (a):45)

A lesson plan for Technology as a learning area could range in duration from a single activity to a term's teaching, learning and assessment and in terms of actual time. It may last from a day to a week or a month. For Technology it will include teaching style, approach and methodology, learning outcomes and assessment standards to be covered, resources to be used in the lesson and conceptual links to previous and future lessons.

Glatthorn (1997:100) points out that many teachers never move beyond short-term planning. They plan for one week or one day at a time. As a result, their teaching often seems fragmented and disjointed. Many principals reinforce emphasis on short-term planning by checking daily lesson plans and ignoring the need to help teachers to develop units. In Technology a unit could range in duration from a single lesson designed to teach a particular piece of knowledge, to a larger unit which may include many lessons designed to cover a range of activities covering one of the learning outcomes and including assessment strategies.

Glatthorn supports the thought that the principal should help the teachers to develop units, because unit planning has several advantages. First, unit planning stresses the holistic nature of learning: Students see a bigger picture rather than bits and pieces that do not seem to fit together. Second, the unit is the best level for integrating the curriculum. For a learning area such as Technology, integration will not only promote its existence but also highlight its importance for the country. Units also provide the best means for emphasizing skills across the curriculum, including reading, drawing and writing. These skills are easier to build into a unit structure rather than a stand-alone lesson. Most units should culminate in the demonstration of learning.

He stresses that principals need to take active leadership in helping teachers to understand the importance of unit planning and to accomplish the task in a more systematic manner. Glatthorn postulated that the principal should provide the initial training needed through staff development on an on-going basis.

Technology as a learning area will need all the support and assistance it can get from the principal so as to sustain its viability. This can only be achieved by providing the educators with the necessary skills, knowledge and resources to work effectively.

The role of the national curriculum model such as the Revised National Curriculum Statement is to provide the framework that informs the planning for whole school development. It identifies the areas that the SMT must address at macro level, such as time- tabling, grade organization, provisioning and staffing (DoE, 2003(a):2).

Today many service providers/outside agencies conduct workshops on how to plan and implement curriculum activities. But this can only be successfully implemented if the educators are committed. The principal as curriculum manager should lead the curriculum development activities within the school, to ensure that it is conducted and supported in the interest of developing a common vision of what the school is attempting to do for the learners, the community, parents and employers.

2.6 CURRICULUM AIMS AND PRINCIPLES.

When learning programmes are to be designed and implemented, this needs to be done within the framework that includes the aims, principles and procedures of an education system. These components are contained in the framework of most countries that have a common national curriculum.

According to Dekker & Van Schalkwyk (1995:10) an educational aim is an ideal or objective which is striven for. Such an aim or objective is normally inserted in educational policy documents and education legislation. A national education system is a means or vehicle to attain a nation or community's educational objectives. Dekker & Van Schalkwyk point out that although each community has its own specific educational objectives, such objectives are all related to one or more of five basic categories, namely:

- intellectual objectives;
- occupational, career and economic objectives;
- personal, human objectives;
- social objectives;

- political objectives.

These five categories form the backbone of the aims and principles to be found in the curriculum frameworks.

Fafunwa (1992:09) supports the argument by Dekker & Van Schalkwyk. During his comparative research of African education he also found that African education systems contained five identical categories that formed the framework of traditional and indigenous educational systems that emphasised:

- social responsibility;
- job creation;
- political participation;
- spirituality;
- moral values.

These five aims that Fafunwa (1992:09) makes mention of in his findings are encapsulated in the critical and developmental outcomes, which is directly related to the overall goal of C2005 - RNCS Grades R-9 (Schools) Technology Policy (DoE, 2002:2). Learners experience all these values on a first hand basis during their interaction with the Technology learning area resource tasks.

Technology is defined as the use of knowledge, skills and resources to meet people's needs and wants by developing practical solutions to problems, taking social and environmental factors into consideration (DoE, 2002:04).

The envisaged outcomes of the Technology curriculum is to build on the critical and developmental outcomes (cf. 49) that were inspired by the Constitution and developed in a democratic process. This is intended to develop the full potential of each learner as a citizen of a democratic South Africa – a citizen who is:

- confident and independent;
- literate, numerate and multi-skilled;
- compassionate;
- respects the environment;
- able to participate in society as a critical and active citizen(DoE, 2002:01).

In South Africa the vehicle designed to drive the curriculum is known as The Outcomes-Based model. It strives to enable all learners to achieve to their maximum ability. It is therefore crucial for the school principal, as head of a learning institution to ensure that these values, to develop the full potential of each learner who is able to participate in society as a critical and active citizen are included in the management and implementation of the curriculum (DoE, 2002:01).

2.7 CURRICULUM VALUES

Globalisation and the advent of new technologies has had a profound influence on the economic and education systems of all countries. According to Claassen, cited in (Lemmer , 2003:29) globalisation is a process, which has its origins in economics, and has spread to influence other aspects such as culture and education. Some of the facets that have contributed to it are, technology, the changing workplace and post modernism. Claassen states that many studies indicate that proficiency in Mathematics, Science and Technology are prerequisites for economic success.

Fernando(2001:08) concurs with Claassen. He also stresses that technology is a tool, not just a reward, for development which will affect developing countries and poor people. Lack of desirable knowledge and technological capacity could become a source of exclusion and conflict.

The need for skills has imposed changes on the traditional, aristocratic, and elitist curriculum system. According to Pratt (1980:45), the curriculum had to be justified. The national curriculum has to contribute towards improving employability. This view is also supported by Kelly (1989:07). Globalisation and the advent of new technologies require the education system to produce graduates with relevant knowledge, critical and higher-order skills and proper attitudes.

According to Van Niekerk in Lemmer (2003:07) the school curriculum which previously embraced certain values such as religion class or social status, would now have to service the nation's economic needs by providing suitable qualified manpower. Van Niekerk is of the opinion that we are moving towards a more post-

modern world where grand schemes are no longer considered to be as important as local, smaller and creative establishments.

Toffler, cited in Lemmer and Badenhorst (1997:411) emphasises that creativity and entrepreneurship will become of vital importance. In order to survive the new era, people will need to function successfully within an economy in which identifying and filling niches are more important than mass production according to the modern way.

Homes (1987:07) says that Technology as part of the school curriculum will also contribute towards attainment of the aims of education, i.e. to develop the all-round intellectual, moral and physical capabilities of individual children and to contribute to economic and social development.

As part of the national curriculum in South Africa, Technology will contribute to equality in education by providing opportunities to all learners. In an inclusive education system it will cater for all types of learners, irrespective of, race, colour, gender and disability.

Technology is unlike Technical and Vocational education, which prepares learners for specific careers. The Technology curriculum strives to improve technological literacy by giving learners the opportunity to:

- develop and apply specific skills to solve technological problems;
- understand the concepts and knowledge used in Technology, and use them responsibly and purposefully;
- appreciate the interaction between people's values and attitudes, technology, society and the environment (DoE,2002: 04).

To be able to implement Technology as part of the school curriculum the principal should first have some knowledge of the contents of the Technology learning area statement, which sets out its learning outcomes and assessment standards. This knowledge will enable the principal to determine the resources needed to implement Technology.

2.8 HIDDEN CURRICULUM

Ornstein & Hunkins (1993:369-370) states that every school has a planned or formal curriculum, that is, a stated and structured set of objectives, with related content and learning experiences and expected outcomes. But there is also an unplanned and informal curriculum, or what is called the hidden curriculum. According to Jacobs (Jacobs, et al. 2000:107) the hidden curriculum behind the curriculum model is that it is the method that principals and teachers can employ to make their curriculum planning more effective. It is a process not only for curriculum development but also for making teachers more skilful and more effective, putting them more in control of the curriculum and the teaching and learning process.

The hidden curriculum is not consciously planned or intentionally taught, but it influences the learners to a large extent in their development and outlook towards their way of life. The hidden curriculum encompasses all school-related experiences that are not described in the curriculum statements, includes policies and directives that are issued by the Department. Examples may include gender related opportunities or limitations in subject choices i.e. girls are not allowed to do Technology in the woodwork room, bias in classroom interaction and inclusivity. Principals need to be aware of the social, emotional, physical and other needs of the learners as they manage the development of their Learning Programme. This is also another aspect of the curriculum which the principal must manage.

Jacobs in Lemmer (2003:107) supports the argument of Ornstein & Hunkins by also stating that the hidden curriculum indicates a wide variety of planned as well as unplanned experiences which students and teachers have at schools but which are not stipulated in departmental rules and regulations.

Stenhouse (1987:40) concurs with the argument of both authors. He supports the view that the culture of the school influences the experiences of the learners and teachers who work in the school in unplanned ways. He also maintains that the hidden

curriculum is not publicly acknowledged as its curricular intentions escape policy control within the school, since it is taken for granted.

Jacobs, in Lemmer (2003:108) points out that the hidden curriculum exerts both positive and negative influences on learners. The school and classroom experience that influence the learners are incidental and cannot be assessed. In the case of the educators it influences them to continuously improve their teaching, by attending in-service courses to improve their knowledge and skills and to upgrade specialist rooms, such as the technology room. To highlight the importance of the hidden curriculum Jacobs divides it into three broad categories, hidden micro, hidden meso and hidden macro curriculum.

Chalufu, in Lemmer (2003:107) maintains that educationists interested in the hidden curriculum often focus their debate on the hidden macro- curriculum, which is on covert school experiences that take place on a national level, often as a result of government and political influences. A government has complete control over the vast amount of state money available for education in a country. It some times uses that economic power to create a hidden curriculum, which helps it to achieve certain political goals and in this instance, the implementation of Curriculum 2005 (Lemmer 2003:107). The hidden macro- curriculum, therefore tends to be related to politics.

The hidden meso-curriculum is operational at the level of the school. According to Naicker & Waddy (2003:07) whilst the term "hidden curriculum" suggests something sinister, the things that learners experience are often positive and valuable.

For example, in schools where there is respect for human rights, learners acquire social skills that are based on trust and respect through their interaction with other learners as well as with educators.

It is at the meso-level that the principal interacts with the hidden curriculum. We are aware that the formal curriculum focuses on goals, subject matter, and organisation of instruction. His role is to recognise the hidden aspects of the formal curriculum, especially potentially dysfunctional or negative learning experiences, and wherever possible to control and improve the situation during the planning and implementation process. This may include what subjects are accorded high and low status and who is

taught and what, i.e which learning areas are offered to learners' according to the learners ability levels.

Most importantly, the school principal has to demonstrate a clear understanding of how the hidden curriculum is serviced and resourced, and how it reflects the need and interests of those it serves. This includes learners, educators, the community, the nation and employers.

Put differently, the hidden curriculum 'oils the wheels' for the smooth running of the school and of the classes of students within it. As Ornstein & Hunkins (1993:370) asserts: We need to be sensitive when we implement the curriculum i.e. all factors both known and unknown must be considered prior to implementing. This accounts for Technology as well.

2.9 IMPLEMENTING THE CURRICULUM

The principal is the chief executive officer and the education department's representative tasked with the obligation of implementing the curriculum at meso level. According to Naicker & Waddy (2003:15) the principal is required to liaise with relevant structures, the school management team and educators with regard to managing and implementing the school curriculum development.

According to Walker cited in Pratt (1980:425) an important realization for curriculum managers is that the process of implementation is one of persuading people to make certain decisions As such it is neither a curriculum process, nor an academic process, nor an intellectual process. Walker also says that curriculum changes are necessarily subject to the operation of enormously powerful social forces that cannot possibly be brought under the control of any technical procedure or systematically designed process.

Preedy (1989:147) concurs with Walker, that implementation means curriculum change. For teachers in classrooms, new materials are important, but are ineffective by themselves. Change also involves new behaviors and practices, and ultimately new beliefs and understanding. It involves changes in what people know and assume.

The principal is at the heart of curriculum implementation and management as the visionary, organizer, cheerleader, and evaluator. The principal's leadership promotes and ensures participation of the school management team in developing a successful programme.

According to Naicker & Waddy (2003:19) to manage the curriculum effectively, school management teams must be conversant with the policies, regulations and legislation that governs the education system. In South Africa currently we have a national system of education, known by its brand name of Revised National Curriculum Statement which uses the principles of the Outcomes-Based model to drive the process of implementation (DoE, 2000(b):02).

2.10 CURRICULUM DESIGN

Kelly (1989:17) states that curriculum planning is not a simple matter that some seem to think. The school principal and the school management need to have sufficient knowledge of the different curriculum models of design so that in their planning process they are able to make informed choices which will contribute to successful teaching. Curriculum models also contain the building blocks for the development of the curriculum as well as to grasp reality with its complexities. According to Preedy (1989:107) curriculum design provides us with the context within which to consider our own practice and aspirations.

Currently educational objectives and subject matter are being subjected to change as society imposes new social and political demands on schools, and new knowledge is created. An understanding of the curriculum design models presents the principal with various kinds of content and processes upon which he or she can draw from to develop and reinforce the implementation of Technology as a learning area.

Most importantly knowledge of curriculum design assists the principal in translating curriculum theory into practice. It also increases the confidence and authority of school principals by acquiring a greater understanding of Technology and its place in the curriculum.

The following curriculum design models highlight the need for different learning goals, flexible new knowledge, collaboration and effective curriculum management:

- The Saber-Tooth model
- The Tyler model
- The Taba model
- Outcomes- Based model

2.10.1 The Saber-Tooth model

According to Benjamin cited in Preedy (1989:104) this is one of the most entertaining and perceptive accounts of curriculum development. New-Fist-Hammer-Maker, lived in Chellan times and was the first great curriculum theorist and practitioner, who developed the Saber Tooth curriculum, for a better life for his children.

The Saber tooth curriculum included activities such as saber-tooth- tiger-scaring-with-fire which was taught in a practical way to the children. The benefits of such an induction into these forms of knowledge soon became evident. Despite initial objections by the more conservative and theologically minded members of the tribe, tiger-scaring i.e used for the purpose of giving noble courage into all the affairs of life and the other activities soon became accepted as the heart of true education. Most importantly it contained the knowledge and skills that was most beneficial to the learners during that period.

According to Reid, Hopkins and Holly, cited in Preedy (1989:104) all continued well for some generations until the approach of a new ice age drastically changed the environment. The skills acquired through the Saber-tooth curriculum were no longer appropriate to the new conditions in the cave realm (kingdom) and the prosperity and equanimity of the tribe suffered. What is important about this curriculum to modern day thinking is that even during the earliest of times the body of knowledge had to be relevant to keep pace with the changing conditions, such as changes in the climate and environment.

The Saber tooth curriculum also highlights the need for change, innovation, transfer of knowledge, education verses training and vocational relevance, all of which are relevant today. Even in those early times the leader of the tribe (the principal) had to make certain decisions. Because the whole tribe refused to adapt to changing times, it was left to archaeologists to unearth the remains of that society - a few phrases carved in stone by village elders (Peddiwell cited in White, 2001:11).

According to Preedy (1989:104) the Saber -Tooth curriculum highlights three points to the modern day thinking:

- The term curriculum is an ambiguous one; it is open to many different interpretations and can be put to many different purposes.
- Successful teaching is related to thoughtful and systematic curriculum planning.
- The responsibility for curriculum development needs to be located close to the classroom. The Saber- Tooth parable is illuminating. It also provides a context when investigating the progress in curriculum development since Chellean times. Most importantly, it highlights the need for Technology.

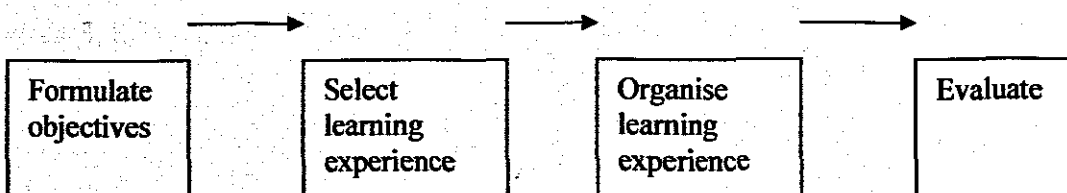
Changing conditions require that mankind adapts and develops technologies and skills to keep in touch with the changing conditions. Failure to change and transform will result in similar situations as New-Fist-Hammer-Maker's tribe- extinction.

2.10.2 The Tyler model

According to Lemmer & Badenhorst (1997:264) Tyler based his approach to curriculum design and development on four main questions:

- What educational purposes should the school seek to attain?
- What educational experiences can be provided that are likely to attain the purposes?
- How can these educational experiences be effectively organized?
- How can we determine whether these purposes are being attained?

Table 7: Tyler model



This model is known as the linear or step by step model. It relied on general goals and more specific objectives being predetermined and later used in evaluation. Learning outcomes were decided on beforehand and content, study material, and teaching methods were specified. It is criticised for being a highly technical approach that kept control in the hands of the hierarchy. It prescribed particular methods of attaining the aims of education, the curriculum and schooling, with a view to delivering end products comparable to a factory setup.

According to Preedy (1989:108) the Tyler model has been enormously influential, so much so that most curriculum or lesson plans appear to be to some extent based on this approach. The hierarchy in days gone by would constitute the school principal and the management team which excluded other role players.

2.10.3 The Taba model

According to Reid, et. al. cited in Preedy (1989:108), Taba believed that those who teach the curriculum should participate in developing it. She advocated what has been called the grass roots approach, a model whose steps are similar to Tyler's. Although Tyler did not advocate that his model only be employed by persons in the central office, educators assumed that authorities in the central office had the knowledge for creating and developing the curriculum. This was a top down approach. Ideas from curriculum experts were frequently given to teachers to develop, and then administrators supervised the teachers to ensure that the ideas were implemented.

Taba believed that the administrative model (top down approach) was really in the wrong order. The curriculum should be designed by the users of the programme. Taba insisted that teachers take an inductive approach to curriculum development, by starting with specifics and building to a general design, as opposed to the more traditional deductive approach, which starts with the general design and working towards the specifics.

According to Ornstein & Hunkins (1993:269) Taba noted seven major steps to her grass roots model in which teachers would have major input. These are:

1. Diagnosis of needs.
2. Formulation of objectives.
3. Selection of content.
4. Organisation of content.
5. Selection of learning activities.
6. Organization of learning activities.
7. Evaluation and means of evaluation.

Although Taba's model has much merit, it is criticized for the amount of effort put into a grass roots frame work which weakens it. Zias (Ornstein & Hunkins, 1993: 269) maintains that the primary weakness is that it applies the concept of participatory democracy to a highly technical, complex, and specialized process. Zias states that this does not mean teachers cannot be involved; indeed, they must be, if the curriculum is to be actually used in the classroom. It does mean, however, that a "one person – one vote" rationale will not guarantee an effective curriculum. Also, the grass roots design assumes that teachers have the expertise and perhaps more importantly the time to engage in such extensive curricular activity. He argues that we need to recognize that the grass roots approach has made it abundantly clear that a broad base of involvement is essential for curriculum decision making. Traditionally the principal is charged with directing the actions that enable the various participants to engage in the development of the curriculum. In a non-traditional approach educators are given the responsibility for developing the curriculum.

2.10.4 The Outcomes-Based model

The Outcomes-Based model is a curriculum approach to teaching and learning that requires a shift from teacher input through syllabuses to a focus on learner outcomes (Jacobs, et. al. 2000:92). According to Lemmer & Badenhorst (1997:264) technological, social and individual change has resulted in the explosion of knowledge that has created a need for new educational principles and aims. This view is shared by Jacobs, et. al. (2000:92). Important curricular issues in this regard are the

principles of lifelong learning and open learning, as well as the aim of personal change assisted by education within and beyond the school situation. They pointed out that in this context a person should be able to reflect on what he/she can do both intellectually and practically.

Human capability should be taken into account more especially when the learner should be assisted in:

- becoming a person through change on her/his own terms;
- establishing meaning through discourse and personal choice;
- being creative, including exploring alternative ways of solving problems.

According to Sawada & Caley cited in Lemmer & Badenhorst (1997:265) the Outcomes-Based model is based on the premise which defines the role of the learner, the role of the teacher, and the aims and content of teaching. As the learner grows and develops, the his or her participation in the educational and schooling activities increases along with the capacity to accept responsibility for his/her actions, investigations, beliefs and thoughts. The learner moves towards becoming a student. In this regard education and schooling are regarded as a process of dialogue and discourse

Classroom practice is based on the acceptance that both the teacher and the learner are striving towards the same aim. The role of the teacher shifts from one of transmitting information to that of a facilitator.

The Outcomes-Based approach to curriculum design and development may include various approaches to help and guide the activities as long as they do not control the learning process. There is a need for knowledge (subjects, problem solving core knowledge, and personal interests), classification and organization in view of learner development, with emphasis on a holistic approach to curriculum development.

According to Jacobs, et. al. (2000:103) South Africa has a unique Outcomes-Based model using terminology not found in any other country. Although the word 'outcomes' is common in all models, each country creates its own supporting terms and definitions when they design Outcomes-Based programmes. The designers of the

South African model believed that some of the old teaching terms should be replaced by new terms that are in line with outcomes based education.

The following changes of terms have been made in South Africa:

- aims and objectives are replaced with outcomes;
- evaluation is replaced with assessment;
- pupils and students are replaced with learners;
- school standards are replaced with grades;
- subjects have been replaced with learning areas;
- syllabus have replaced with learning programme.

(Jacobs, et. al. 2000:103)

The Outcomes Based model is concerned with the outcome of a curriculum from the learner's point of view. Such a result may either be observable or refer to internal change in the learner. According to Lemmer & Badenhorst (1997:272) this model represents a shift from a content-based approach towards a learner-based approach.

The curriculum design approach generally begins by establishing what competencies are needed to enable the learner to be successful in life. In contrast to other models, which started by studying existing curriculum in order to determine objectives, this approach examines and defines various areas of learning (Lemmer & Badenhorst, 1997:272).

The types of high quality knowledge outcomes that Spady argues for are contained in the unique features and scope in Technology for example, Technology learning area gives learners the opportunity to:

- learn by solving problems in creative ways;
- learn whilst using authentic contexts that are rooted in real situations outside the classroom;
- combine thinking and doing in a way that links abstract concepts to concrete understanding;
- carry out practical projects using a variety of technological skills-investigating, designing, making, evaluating, communicating-that suit different learning styles;

- use and engage with knowledge in a purposeful way;
- learn by dealing directly with inclusivity, human rights, social and environmental issues in their project work;
- use a variety of life skills in authentic context (e.g. decision-making, critical and creative thinking, co-operation, needs identification); and
- create more positive attitudes, perceptions and aspirations towards technology-based careers (DoE, 2002:05).

Current thinking among decision makers in various countries, such as Australia, United Kingdom, New Zealand, United States of America, and South Africa suggests that Outcomes-based education encourages teachers and learners to focus on outcomes that have a real life application.

All curriculum models have their constraints; no one model or approach is perfect. The principal as head of the institute must take a leading role in the continuous development and improvement of the curriculum by using an integrated management approach. As the instructional leader of the school, the principal has the obligation to develop and promote the school's goals and objectives to enhance student achievement. With the big picture of the school in mind, the principal has the power and authority to implement a curriculum management process that includes all stakeholders.

2.11 THE TECHNOLOGY CURRICULUM

As illustrated in the following figure, the Technology Curriculum is organized within the General Education and Training Band of the National Qualifications Framework in South Africa.

Table 8: National Qualifications Framework

SCHOOL GRADES	NQF LEVEL	BAND	Types of qualifications & certificates	
	8	Higher	Doctorates-Further research degrees	
	7	Education	Degrees	
	6	and	Diploma	
	5	Training	and	
		Band	Certificates	
Further Education and Training Certificates				
12	4	Further	School/College/NGOs certificates, Mix of units	Training
11	3	Education and	School/College/NGOs certificates, Mix of units	Training
10	2	Training Band	School/College/NGOs certificates, Mix of units	Training
General Education and Training Certificates				
9	1	General Education And Training Band	Senior Phase	ABET 4
8			Intermediate Phase	ABET 3
7				
6			Foundation Phase	ABET 2
5				
4				
3	Pre-school	ABET 1		
2				
1				
R				

Adapted from Lemmer (ed.) (2003:119)

Technology is situated in level one of the National Qualifications Framework. It encompasses all learning that takes place within the General Education and Training Band, between Grades- R and Grades-9.

The significance of Technology lies its use is to develop citizens who can display competencies and values, encapsulated in the critical and developmental outcomes (DoE, 2002:04).

The critical outcomes envisage learners who are able to:

- identify and solve problems and make decisions using critical and creative thinking;
- work effectively with others as members of a team, group, organisation and community;
- organise and manage themselves and their activities responsibly and effectively;
- collect, analyse, organise and critically evaluate information;
- communicate effectively using visual, symbolic and/or language skills in various modes;
- use science and technology effectively and critically, showing responsibility towards the environment and the health of others; and
- demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation (DoE, 2002:01).

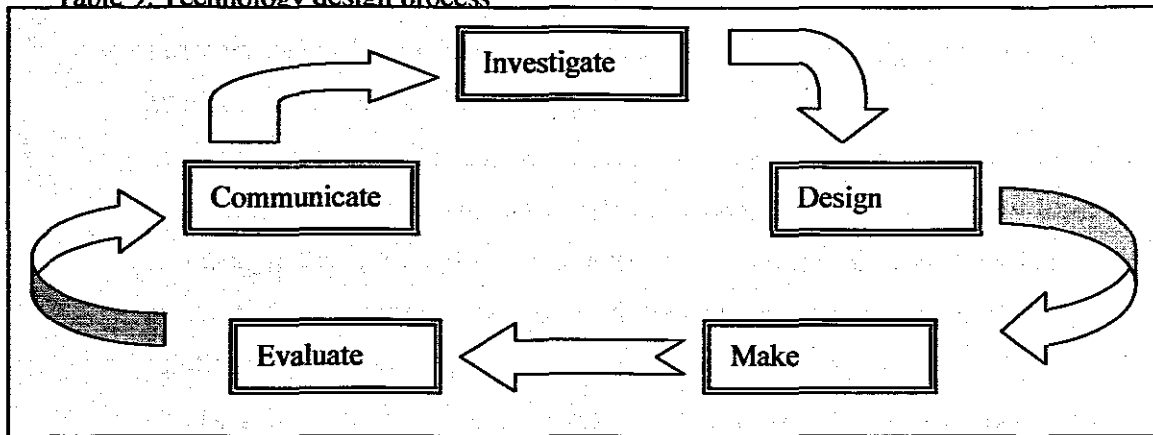
The developmental outcomes envisage learners who are also able to:

- reflect on and explore a variety of strategies to learn more effectively;
- participate as responsible citizens in the life of local, national, and global communities;
- be culturally and aesthetically sensitive across a range of social contexts;
- explore education and career opportunities;
- develop entrepreneurial opportunities (DoE, 2002:02).

The essence of the Technology Learning Area in the General Education and Training Band involves the application of the Technology design process(see figure*: At the heart of this process is the identification of everyday problems, needs or wants of people, and the selection and application of appropriate resources, knowledge, skills and values to develop practical solutions. The design process encourages the development of critical and creative thinking skills.

The Technology design process

Table 9: Technology design process



Source: Basset, et al. (2005:07)

Technology offers authentic, real-life opportunities for learners to interact with each other within teams when they develop technological solutions as follows figure:

- **Investigate:** When studying Technology, the main objective is to investigate problems in the context in which they occur, and attempt to solve them by finding out more about them.
- **Design:** This process identifies and solves problems by applying knowledge, skills, values and attitudes. Once the product or system has been completed, it can be tested to determine whether or not it in fact it serves its purpose.
- **Make:** In the making stage the planning and making of the product needs to be very carefully considered. Firstly, planning should be done in advance to get materials and equipment together. Secondly, a flow chart should be drawn up so that the learner can set a time frame for each component of the project.
- **Evaluate:** When a project is completed, it is necessary to evaluate or test the project. One needs to see whether it meets the requirements that were set to guide a person to build it. This stage requires the use of probing questions, fair testing, and analysis.
- **Communicate:** The assessment evidence of the processes followed in any project - that is the ability to analyse, investigate, plan, design, draw, evaluate and communicate - is presented. This could be done in oral, written, graphic or

electronic form. A record of the design process from conception to realisation is kept in the form of a Project Portfolio (DoE, 2002:07).

- Learners also interact with their communities when, for example, they test and market products that they made themselves.
- On a personal level, Technology learners become more and more aware of their responsibilities within their classrooms, families and society. They learn to manage the technological resources at their disposal when developing products. They also learn to minimise the potentially negative impact that their solutions could have on the environment and on human rights.
- Learners in Technology classrooms work in groups to analyse the given information in order to create practical solutions. They co-operate and communicate with each other, often combining verbal and graphic modes of communication. Discussion and reporting techniques and use of appropriate terminology are encouraged during technological activities.
- The Technology Learning Area contributes to the intellectual and practical development of learners, to enable them to cope with challenges of a technological society. Through its open-ended, problem-solving approach, Technology links knowing with doing. It affords learners opportunities to apply and integrate their knowledge and skills from other learning areas in real and practical situations that can be further developed in various situations throughout their lives.
- Learners explore both positive and negative impacts of Technology on their political, social, economical and biophysical environment. This will be done when they evaluate the product they have made, using criteria like affordability, safety, fit for purpose, effect on the environment, and so on. This will enable learners to develop into critical consumers.
- Learners are provided with opportunities to interact with business and various industries that help them to understand and adapt to changing economic realities. They learn to generate creative and innovative ideas, and to co-operate in translating their ideas into action. They gain skills, knowledge, competencies and confidence that equip them to contribute to South Africa's social and economic development. This process also allows them to explore various opportunities for further education and future careers (DoE, 2002:04).

The tasks that the management would be involved in will include:

- Develop a learning area policy to ensure that quality teaching and learning takes place.
- Provide all the resources required, including human, financial and physical resources required so that the learning area can be implemented successfully.
- Provide the necessary support and motivation so as to create a positive attitude among staff, learners and SGB members.

2.12 MONITORING AND EVALUATION AS ASPECTS IN THE MANAGEMENT PROCESS

Curriculum evaluation generates a host of responses, according to McNeil (1996:263). Some educators fear the power and control it might give school principals, whilst other educators are reassured by the evaluations.

People often expect that evaluation will solve many pressing problems such as:

- The public who demands accountability.
- The decision maker who must choose among curriculum alternatives.
- The developer who needs to know where and how to improve curriculum materials,
- The teacher who is concerned about the effect of learning opportunities on individual students.

The monitoring and evaluation process assists both school principals and teachers as a means to improve the quality of teaching and learning.

Monitoring and evaluation are integral components of all curricula. Today it is used not only to inform about the success of teaching and learning within the school situation, but also to monitor the implementation of policy decisions and it is conducted in an open and transparent manner. Monitoring of the curriculum involves the use of processes to determine to what extent the approved curriculum has been implemented.

Whilst Glatthorn (1997:84) argues that monitoring the implementation of the curriculum is one of those issues that seem to be highly controversial and divisive, it is also very necessary, especially for a new learning area such as Technology.

2.12.1 Reasons for monitoring and evaluating the Technology curriculum

The principal's monitoring of the curriculum must be used as part of a broader plan to motivate and develop the staff, so that the objectives and goals of the school can be attained through the removal of barriers that which hinder delivery of the Technology curriculum. Monitoring yields the following results:

- Development of efficiency. Issues around implementation of the national curriculum is not negotiable especially after a great amount of time and money have been spent on training of teachers and developing the curriculum. It would be a manifested waste of time if teachers simply ignored it.
- Consistant development according to Glatthorn (1997:85), if the district curriculum has been carefully sequenced and articulated, monitoring will help ensure that what students are being taught in one grade is actually built on and leads to other grades. It also keeps teachers alert and committed to the task. Cronbach cited in Stenhouse (1987:98) concurs with Glatthorn.

It is noticeable from the reasons provided that evaluation is an important component of the curriculum and cannot be ignored. However, to make it an all-embracing effort, the conditions must be negotiated.

2.12.2 Establishing conditions for monitoring and evaluating.

According to Glatthorn (1997:128) establishing monitoring and evaluation conditions are essential to ensure that there is consensus on what is and what has been agreed upon, namely, that,

- it helps to identify gaps in the levels of understanding;
- it helps to minimize and eliminate conflict;
- it remedies shortcomings;
- it ensures understanding of role functions, and

- it eliminates ignorance on the part of principal, or heads of departments and educators.

Glatthorn (1997:86) also says that monitoring and evaluation efforts are more likely to succeed if certain conditions are present. Such conditions should be created as follows:

- Emphasise mutual accomplishment, not total fidelity. Mutual accomplishment is a type of implementation that develops innovation. The principal accomplishes the central goal of changing the curriculum and the classroom teachers accomplish their goals of influencing the curriculum and maintaining control of the essential elements of classroom life. Mutual accomplishment according to Glatthorn (1997:86) is a win-win philosophy of curriculum implementation.
- Influence the development of a teacher friendly and change simple curriculum.

A teacher friendly curriculum contains the following features:

- It specifically provides time and space for teacher enrichment;
- It is presented in a form that makes it easily assessable, and
- It does not mandate a sequence or teaching approach (Glatthorn, 1997:87).

A change simple curriculum is one that reflects the following characteristics which are important in bringing about effective change:

- First, the curriculum is clear: The terms are defined clearly, and objectives are specified unambiguously.
- Second, the curriculum avoids excessive complexity: It does not expect the teacher to use too many resources, or complicated technology. Nor does it keep too many elements in mind.
- Finally the curriculum is one of high quality, teachers respect it and wish to implement it.

Glatthorn, points out that establishing a culture that values continuous improvement and collaboration is the most crucial condition. The principal should take a leadership role in clarifying the concept of continuous improvement; of emphasizing its role in making the school better; in modeling that philosophy, and in rewarding teachers who

manifest in it. Teachers should understand that curriculum development is an on-going process, not a single event (Glatthorn, 1997:87).

Collaboration is also a critical element in the school's culture. The principal should understand the importance of working together; establish conditions that support collaboration; model collaboration, and should reward teachers who cooperate (Glatthorn, 1997:87).

Monitoring and evaluating are important aspects for the implementation of Technology as this will provide one with information to view how Technology is being delivered, and directed by management.

2.13 MANAGING CHANGE

Change represents the struggle between what is and what is desired. In the context of educational management, change means, for instance, that school principals are exposed to new controls and regulations, growth, increasing technological developments and changes in the workforce.

Beckhard & Harris in Erasmus, et. al. (1996:136) state that further changes in legislation, availability of resources, market demands, and social priorities, often force the principal to re-design the organisation's structure and procedures, to re-define priorities, and to re-deploy resources. This can be seen in the case of Technology, which is the newest of the learning areas and its demands on the management skills and competence of the principal are enormous.

According to Everard and Morris (1996:229) we are regularly aware that something is crying out to be changed, yet somehow the sheer inertia of 'the system' proves too great to overcome. Since managers are there to get things to happen, how is it that they so often fail to achieve significant, timely or orderly change?

Industry, like education, has faced this problem of managing change for many years, and not only is it now more clearly understood, but it is also one that has become the focus of a good deal of management training, with considerable success. In the past

most training has been aimed at helping managers to manage the status quo more efficiently. But as the environment becomes more turbulent, it has become more important to develop their skills, in coping with change, and indeed, in steering it.

The introduction of Technology as a learning area within the school curriculum has made that careful planning and coordination vitally important as its introduction impacts on the political, economic, social and cultural dimensions of life. According to Naicker & Waddy (2003:14) the principal, deputy principal, and head of department form the school management team. They must lead and manage the school, including curriculum planning, management and development as a team. Squelch in Lemmer (ed.) (2003:128) and Sarason in Owens (2001:186) refer to this as part of the decentralised process of school management, reform and change. The authors maintains that active participation of all stakeholders creates the necessary climate, structures and support mechanisms for engendering genuine participation and involvement.

The new education policies, requires school leaders and managers to work in democratic and participatory ways to build relationships and ensure efficient and effective delivery. But many school leaders and managers are struggling to translate policy into practice, due to a lack of understanding of and insight into, the curriculum policy documents (DoE, 1996(b):25).

According to Van der Westhuizen (1995:648) the school principal's support role gives some prestige to the changes taking place in the organisation. Put differently, for a principal to be successful in the task of developing the schools' curriculum, there is a need for a good team to support his or her initiative. Ornstein & Hunkins (1993:219) points out that in curriculum management, school managers must consult with students, educators, parents, community leaders and political officials (stakeholders) interested in education so as to engage them in discussions about the change in curriculum implementation.

Carl (1995:156) is of the view that all consumers must receive, understand and accept specific information before a curriculum can be successfully applied. In this regard it

is of cardinal importance that each person in the school organisation be fully informed and involved, with a view to taking the best decisions and to ensuring optimal development. Change would be unsuccessful if the dynamics of change and certain critical factors and views in regard to people's readiness for change and development, are lost sight of.

2.13.1 The dynamics of change

According to Van der Westhuizen (1995:646) the school as an organisation also has an interactive relationship with the environment and is subject to the laws of change. The events of change are mutual. Under the pressure from environmental factors the school must adapt to changing circumstances, whilst at the same time it influences the environment of which it is a part. In the process of adapting to changing circumstances the school principal fulfils a key role in any change, which takes place at school be it as initiator or supporter.

Kroon (1996:508) says that the process of change can take months, years, even decades. In this process the old dominant institutions, i.e. the former vocational and trade schools, are not agents of change, but are passive and, to a large extent, astonished onlookers. The active agents of change come from the parameters of society. In the case of South Africa this is a known fact. The new system of education requires school managers who are able to work in democratic and participative ways to build relationships and ensure efficient and effective delivery (DoE, 1996(b):25). To date the Department of Education has introduced a number of policies for implementation at school level and for school management teams to implement, so that learners can receive quality of education.

Manneramaa, cited in Kroon (1996:508), maintains that the old and dominant schools, like the former vocational and trade schools, will try and adapt, but they will probably not be capable of changing their basic value systems. This value crisis will be a painful and frustrating experience for the people involved with those institutions.

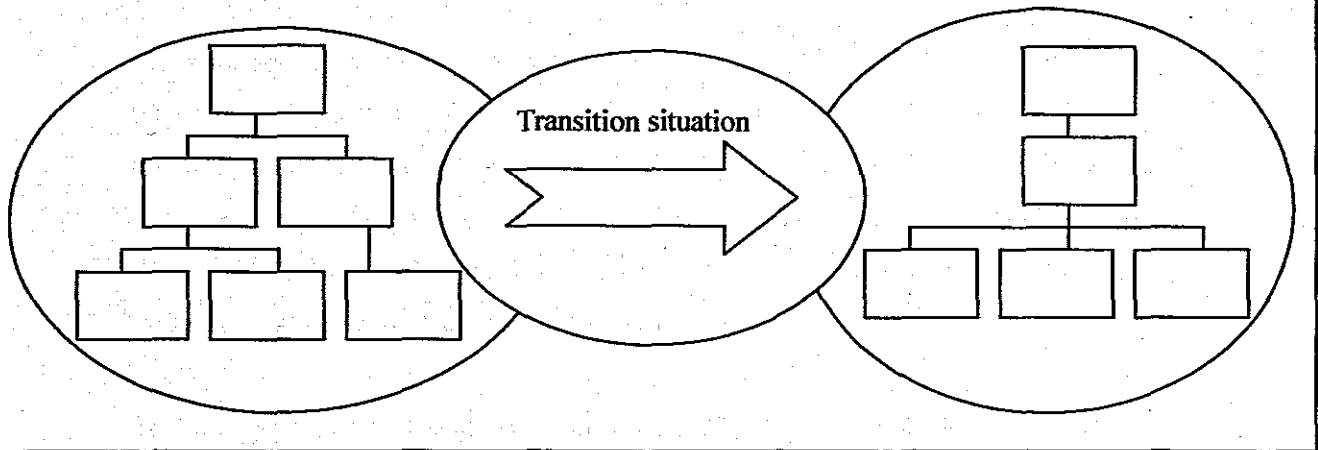
The process of change has three basic components, namely: the status quo or current situation, the transition phase and the expected future situation. It is illustrated in the following diagram:

Table 10: The nature of change

The nature of change.

Current situation

Future Situation



Source: Adapted from Beckhard and Harris in (Kroon, 1996:508)

- The current situation involves the unfreezing of the business (school) to enable it to see the need for change, because it must be accepted that change cannot be introduced without preparing the people involved.
- The current situation is then followed by the transition situation during which new processes are implemented.
- The future situation process has the purpose of supporting the implementation policies. It is here where new behaviours are made permanent through role-playing. (Kroon, 1996:508)

The unfreezing (people become aware of the need for change)-changing (implementing the change)-refreezing (making new behaviours relatively permanent in the new change) model is still used, but the modern concept of change management is a much more complex process and does not merely involve changing people's mind-set (Kroon, 1996:509).

The fundamental approach to change accepts that people can only change their way of thinking through the proper management of change.

According to Everard & Morris (1996:234) an attempt to help people conceptualise change is like tilling the ground before planting the seed; or to use another metaphor, it is like tuning the receiver to the carrier wave before the message of change is transmitted. It involves both helping people to understand change –any change in the abstract, and helping them to apprehend the nature of the particular change being introduced.

These matters have to be discussed face-to- face; it is insufficient to read about them – they must be tossed around and savoured. There must be suitable outlet for fears that the prospect of change evokes in everybody, fears that one will not be able to cope, that one's sense of competence will be eroded and one's occupational identity will be dented. According to Van der Westhuizen (1994:646) an open organizational climate influences the process of change through collaboration.

Technology is part of the change process. It will also go through the three situations, current situation, transition and future situation. According to Jansen & Christie (1999:282) the state has introduced a national policy for change in schools through the introduction of Curriculum 2005. Technology is included as part of that policy and its place within the school curriculum is enshrined within the learning area statements.

The role of management (principals) will be to respond positively to enhance the teaching and learning of Technology. According to Fullan, cited in Preedy (1989:145) this would include identifying the key factors related to success, developing insights into the change process, and developing action programmes.

2.13.2 The school principal, Technology & change

As indicated above, change is a process that needs to be managed. The school principal, is the key figure around whom most of the school's activities revolve. He or she determines to a great extent the school's success and failures when change is implemented. Herman & Herman in Erasmus, et. al. (1996:145) express the view that an educational leader must lead the change, not merely be subject to it. The school principal plays a strategic role in initiating change. As head of the institution he or she will have to develop effective relationships with the school management team, to

improve the implementation of Technology as a learning area alongside the other seven established learning areas.

Gorton & Snowden (1993:128) say that the initial stage in the process of change is the most important one, namely to get the cooperation of the relevant stakeholders. An effective principal will have an operation a needs assessment plan or a developmental plan providing objective information about the strengths and weaknesses of the various educational programmes including Technology. Such an assessment plan will be essential for identifying and validating the need for change. It will also be helpful to others in developing an understanding of Technology and the need for change.

For Technology as a learning area the strategy for change would include facilitating the school development plans, curriculum goals, school policies, staff development plans and curriculum needs. Provisioning such as staffing should also be addressed. In this way it will not only prepare the organisation for change but also overcome initial resistance of the individuals and/or groups, whose behaviour and attitudes are going to be affected by changes. Whilst the three levels of planning, namely learning programme, work schedule and lesson plan (cf. pp. 25-33) address how the school will function as a unit, they do not address the issues of performance facilitation.

Cascio (2003:332) argues that the mere presence of goals is not sufficient. Managers must also be able to measure the extent to which goals have been accomplished. Firstly, they must remove the 'road blocks' that will hinder successful performance. This he stresses can only be attained through a process of collaboration.

Once the roadblocks are eliminated the next step is to provide adequate resources, such as capital resources, material resources and human resources. After all, if employees lack these tools to reach the challenging goals they have set, they will become frustrated and disenchanted. This is specifically applicable to Technology. Put differently, for Technology this would translate into non -implementation of the learning area, as Technology is resource-driven.

Fullan cited in Everard & Morris (1990:240) state that effective educational change cannot occur without improvements on teachers' working lives. Change must not simply aggravate teacher's problems. So what must the principal exactly do to implement Technology as part of the change process? Through the process of collaboration the principal should identify the human resources required and the skills needed to implement the changes (Everard & Morris 1990:240). This would include either employing new staff with the relevant skills and knowledge or otherwise retraining members of the staff, who are prepared to make the journey across. Glatthorn (1997:87) concurs that the staff member would have to go under intensive training either by attending in-service courses offered by the Department of Education or by attending skills development workshops, conducted by other professional development bodies, so as to become more competent. This should result in measurable changes in knowledge, skills, attitude, and / or social behaviour.

Next, the principal should identify a specialist room for Technology and equip it with the necessary tools, equipment and other resources that would support learning. Furthermore a budget that ensures the survival of the learning area should be allocated. Finally, it is imperative to reduce resistance to implement the learning area of Technology. The programme must be open to revision and reconsideration, if experience indicates that changes is desirable. Glatthorn (1997:88) points out that the principal should serve as cheerleader for the new curriculum and remind teachers of the need for effective implementation of Technology.

2.14 CONCLUSION

The South African Education System is under extreme pressure to improve the quality of education and produce capable leaders of the future, including in the field of Technology. Central to this improvement, is the effectiveness of the principal to implement curriculum changes in general and to manage implementation of Technology as a learning area in particular.

Technology as a learning area has a meaningful role to play in addressing the need for skilled people and transformation of the South African society, in relation to the imperatives of globalisation. According to Stromquist (2002:38) our education system

is currently much more attuned to business values and needs than in previous decades. This has not been a natural evolution, but rather the result of explicit pressure of the business sectors on educational systems.

The function of Technology as a learning area is, therefore to develop in learners an awareness and interest in a mixture of skills needed by the career field for which learners are preparing themselves, when they exit the General Education and Training Band to enter the Further Education Band. Even if these learners do not choose careers in the technical and vocational fields, they will, however possess an understanding of complex technologies and the capacity to cope with technological change, as contained in the unique features and scope of Technology.

The principal, as the schools chief accounting officer is in the forefront of the change process, as outlined by the National Department of Education (DoE, 1996(b):48).

It is the principal's responsibility to ensure that Technology as a learning area is successfully implemented and managed in a collaborative manner within the school curriculum. Most importantly the principal must provide continuous leadership and support for Technology as a learning area so as to develop citizens who can display the competencies and values encapsulated in the critical and developmental outcomes. The significance of the Technology learning area is directly related to the overall goal of the Revised National Curriculum Statement (DoE, 2002:04).

This chapter has reviewed relevant literature on various aspects of curriculum management and Technology as a learning area in South African school curricular.

The next chapter deals with field work for this study.

CHAPTER 3

METHOD OF INVESTIGATION

3.1 INTRODUCTION

In the preceding chapter curriculum management and the role function of the principal as manager was discussed. The literature study revealed that there are various factors in the work environment of the principal that have a bearing on management of the curriculum component, such as Technology as a learning area. This chapter deals with the research design and other aspects of empirical investigation for this study.

3.2 RESEARCH AND DESIGN

Research can be defined as a systematic process of collecting and logically analysing information for some purpose (Vos in Wolhuter, et. al. 2003:7). This definition is general because many methods are available to investigate a problem or a question. Van Rensburg, Landman and Bodenstein cited by Vos in Wolhuter, et. al. (2003:7), describe research as a formal, systematic and intensive process of carrying on a scientific method of analysis. Wallen & Fraenkel argue that educational research is a disciplined inquiry in which different disciplines provide different principles of research by which to collect and reason from data (cited by Vos in Wolhuter, et. al. 2003:7).

The research for this study used the descriptive design. The study focused on the practices and processes of curriculum management. The investigation sought to elicit information on management, resourcing and staffing of Technology educators at schools.

3.3 POPULATION & SAMPLING

The researcher focused primarily on the school principal because they are perceived to be the prime initiators for managing and implementing the school curriculum. The primary school principals were chosen as the population of the survey because they are the people who have to manage Technology as a learning area within the General Education and Training Band, more especially in the Intermediate Phase which is targeted for national implementation. More students will also be engaged in Technology activities, and it would

require greater planning on the part of the principal to provide the necessary resources. The study was limited to fifty six public (primary) schools as defined by the South African Schools Act, Act 84 of 1996 (DoE, 1996 (a)).

Due to the nature of the topic, the researcher applied a simple random sampling procedure. Ary, Jacobs & Razavieh's (1990:172) describe the simple random sample as the best known of the probability sampling procedures. Baily (1994:880) supports the description of Ary, Jacobs & Razavieh. He argues that the basic characteristic of simple random sampling is that all members of the population have an equal and independent chance of being included in the sample.

The study was conducted in the Ethekwini Region; Umlazi District, Chatsworth Circuit. The circuit serves urban, peri-urban and rural schools and is made up of four wards. Chatsworth East (Ward 117) has forty one schools, Chatsworth West (Ward 118) has thirty two schools, Queensburgh (Ward 119) has thirty five schools and Mobeni (Ward 120) has thirty three schools, making up a total of one hundred and forty one schools. There are seventy nine primary schools in total in the four wards. In some wards there are more primary schools than others, therefore to ensure that a fair sample is obtained from each ward, it was decided that a high percentage of schools, approximately seventy percent be sampled. This was done to accommodate schools that might not respond to the research instrument (questionnaire) and still provide a sample that reflect the status of Technology in those wards.

Fifty six respondents (school principals) were selected, fourteen from each ward by means of the random sampling method. Names of all of primary schools were put into a hat and the first fourteen schools were drawn from the hat (per ward) and had their names recorded for use in data gathering. The sample constitutes seventy percent of the primary schools in the Umlazi District. Chatsworth Circuit was chosen for the following reasons:

- Schools in this district provide a fertile ground for research because they provide a mixture of urban, peri -urban and rural schools.
- They combine a mix of urban peri- urban rural school population in terms of learners.

- The schools are drawn from three former ex Education Departments, i.e. the Department of Education - House of Delegates, Department of Education - House of Assembly and the Kwa Zulu Natal Department of Education and Training – ex D.E.T.
- The schools are managed by principals coming from the different racial groups, namely African, Indian and Whites. This should also provide some insight as to how these schools are managing Technology as a learning area under a single education department.

3.4 THE RESEARCH INSTRUMENT

A questionnaire was used to obtain research data. In order to add more value to the study and illicit more information from the respondents, the researcher decided to include both, closed and open- ended questions. This was done in order for these types of questions to complement each other as well as to establish whether the respondent (principal) has an understanding of the concept in question. According to Oppenheim (1996:141) both open and closed questions are widely used in research as excellent results can be obtained from them.

3.4.1 Construction of the questionnaire:

According to Vos in Wolhuter, et. al. (2003:14) questionnaire design is an activity that Should not take place in isolation. The researcher should consult and seek advice from specialists and colleagues at all times during the construction of the questionnaire. A question may appear correct to the researcher when written down but can be interpreted differently when asked to another person. Hence the importance of testing the questionnaire in the pilot study. Vos in Wolhuter, et. al. (2003:14) argues that there should be no hesitation in changing the questions several times, when keeping the original purpose in mind, before the final formulation.

Mahlangu cited by Vos in Wolhuter, et. al. (2003:15) maintains that the most important point to be taken into account in questionnaire design is that it takes time and effort and will go through a number of different drafts before being finalised. From the arguments presented, it can therefore be stated that a researcher must ensure that adequate time is

budgeted for in the construction and preliminary testing of the questionnaire.

Babbie (1990:124) regards closed questions as very popular in survey research because they provide a greater uniformity of responses and are more easily processed. The advantages of closed questions are, according to Babbie:

- The answers are standard, and can be compared from person to person.
- The answers are much easier to code and analyze, and often can be coded directly from the questionnaire, saving time and money.
- The respondent is often clearer about the meaning of the question (that is a respondent who is unsure about the meaning of the question can often tell from the answer categories what is expected). There are thus fewer frustrated respondents that answer "don't know" or fail to answer at all. This helps the return rate, since frustration over a single question can lead the respondent to discard the entire questionnaire.
- The answers are relatively complete (if at all appropriate answer categories are provided), and a minimum of irrelevant responses are received. For example, asking rural respondents the open-ended question, "How often do you go to town?" may provide such irrelevant and unusable answers as "Whenever I wish" or "When I can get a ride," when what is required is an estimate of the frequency. A closed-ended question with the response categories, "once a week or less, two to five times a week, every day," will be more likely to elicit usable information.

Baily (1994:119) maintains that the closed question is often easier for a respondent to answer as he or she merely has to choose a category, while formulating an original answer for an open question can be much more difficult.

According to Baily (1994:122) open questions are used for complex questions that cannot be answered in a few simple categories but require more detail and discussion. He further maintains that these questions are used to elicit the respondents' unique views, philosophy, or goals. Bailey's view is supported by Bradburn and Sudman (1997:19) who state that open questions are consistently superior when private or self incriminating issues are being studied.

According to Oppenheim (1996:40) the chief advantage of the open question is the freedom that it gives to the respondent. Freedom to let his thoughts roam freely, unencumbered by a prepared set of replies.

In this investigation, the questionnaire contained a series of statements which were relevant to the area of interest. The questionnaire was redrafted a number of times before being finalised. When formulating the statements, the researcher endeavoured to avoid any ambiguity, vagueness, prejudice or technical language, with the aim of minimizing misinterpretation of the statements and allowing for honest answers.

The questionnaire was divided into two sections. Section one was made up of questions requesting the biographical information of the respondents as well as the educational & logistical information about the schools of the respondents. This section contained thirteen closed questions.

Section two was made up of questions requesting information about the implementation, management & respondents' perception of Technology as part of the curriculum. The information requested was formulated into five themes. Each theme contained a series of closed and open questions.

- Theme 1 contained nine questions of which five were closed and four were open.
- Theme 2 contained five questions of which three were closed with two open questions.
- Theme 3 contained eight questions of which three were closed and five were open.
- Theme 4 contained five questions of which two were closed and three were open.
- Theme 5 contained six questions of which three were closed and two were open.

3.4.2 Characteristics of a good questionnaire

The questionnaire contains a series of questions or statements. According to Oppenheim (1996:121) the function of a question in a questionnaire is to elicit a particular communication. He argues that as far as possible the information needed must be sought with a minimum risk of bias, bearing in mind the difficulties the respondent's may have in understanding the questions. Vos in Wolhuter, et. al. (2003:15), in supporting Oppenheim, argues further that the significance of the topic should be clearly and carefully stated on the

questionnaire and on the accompanying letter. This, she believes, would warrant the respondent's time spent.

Oppenheim (1996:122) maintains that the questions must be adequate for the sampling process, it must not be too one sided, and it must make it easy for the respondent to answer fully. He believes, first of all, that the focus and contents of the questions must be right; second, that the wording must be suitable; and third, that the context, sequence and response categories (if any) must help the respondent without unintentionally biasing the answers. Most importantly it should seek only that information that cannot be obtained from other sources. In considering the abovementioned requirements, the questionnaire met all of the requirements.

3.4.2.1 Reliability and validity of the questionnaire

According to Oppenheim (1996:144) validity and reliability are two concepts that are critical for the measurement and understanding of social science research. Best and Khan (1993:208) concur that validity and reliability are essential to the effectiveness of any data collecting procedure. Oppenheim (1996:114) argues that in trying to assess how well each question, or group of questions, does its job, the concepts of reliability and validity need to be used.

According to Oppenheim (1996:122) reliability and validity are technical terms, and we have to distinguish between them. Reliability refers to the purity and consistency of measure, to repeatedly obtain the same results even if the measure were to be duplicated under comparable conditions. In the case of questionnaires, if it were to be applied to the same object today and next week, the results should be near identical, unless a real change in the object has meanwhile taken place.

Validity, on the other hand, refers to whether the questionnaire measures what it is supposed to measure. According to Ary, Jacobs & Razavieh (1990:286), validity is a more important and comprehensive characteristic than reliability. They argue that it is also more difficult to determine. For this research the Statistical Package for Social Sciences (SPSS) programme was used to determine statistical validity.

3.5 ADMINISTRATION

3.5.1 Permission

A letter (Appendix B) was forwarded to the Chief Director of the KZN Department of Education to request permission to visit schools in the Umlazi District, Chatsworth Circuit with a view to administering the questionnaires (Appendix A). A letter confirming the status of the researcher was enclosed. Permission to conduct research in the relevant schools was granted (Appendix C).

3.5.2 Pilot study

Dane, cited by Vos in Wolhuter, et. al. (2003:16) maintains that a pilot study is an abbreviated version of a research project in which the researcher practices or tests the procedures to be used in the subsequent full-scale project. The pilot study is a preliminary or "trial run" investigation using similar questions and similar subjects as in the final survey. The basic purpose of a pilot study is to determine how the design of the subsequent study can be improved and to identify flaws in the measurement instrument. Kidder and Judd cited by Vos in Wolhuter, et. al. (2003:16) says a pilot study gives the researcher an idea of what the method will actually look like in operation and what effects (intended or not) it is likely to have. In other words, by generating many of the practical problems that will ultimately arise, a pilot test enables the researcher to avert these problems by changing procedures, instructions and questions. It is also a necessity in ensuring the validity and reliability of the instrument. It was therefore necessary that a pilot study be conducted to ascertain whether respondents have the same understanding of the questions that the researcher intended to mean.

For purposes of this study three schools were piloted. The researcher handed out questionnaires to schools that were not part of the randomly selected schools for the survey. After briefing the respondents, the responses that were received indicated that the questionnaire did not have to be altered or adjusted in any way. The respondents were familiar with the language and terminology used in formulating the questions.

3.5.3 Distribution of the questionnaire

In conducting research, the self-administered method was used. According to Guy, et. al. (1990:243) a self administered questionnaire is one personally given to respondents with the assumption that each respondent can read the questions and has the knowledge and interest to answer them and time to complete the instrument.

Oppenheim (1979:36) maintains that this method of data collection ensures a high response rate, accurate sampling, and a minimum of interviewer bias, while providing necessary explanations (but not the interpretation of questions), and giving the benefit of a degree of personal contact.

3.5.4 Response rate

A time frame of three weeks was set to collect the data. The principals of schools in the four circuits were telephonically informed and suitable times to meet with them were arranged. Where this was not possible alternative arrangements were made to leave the questionnaire with the deputy principals or the school secretary. Two days were set aside to drop off questionnaires for each circuit, and five days were allowed for principals to go over the questionnaire and complete it.

After five days the schools were telephoned to inquire about the completion of the questionnaire. Where the response was positive the data was collected. In the instances where the questionnaire was not completed, an appeal was made to the principals on completing it, and an extension of time was arranged. Of the fifty six questionnaires distributed to the primary schools, fifty three responses were returned.

3.6 PROCESSING OF DATA

Once the questionnaires had been returned, the researcher used the Statistical Package for Social Sciences (SPSS) program to analyze and interpret the responses. This involved the careful coding of questionnaires that were completed by principals. The coded data was subsequently transferred onto a computer spread sheet from the Statistical Package for Social Sciences (SPSS) programme. The coded data was submitted to a data analysis from the University of Kwa-Zulu Natal where the data was computer – analyzed using the Statistical Package for Social Sciences (SPSS) programme.

The results were interpreted by means of descriptive statistics. Statistics are methods of organizing and analyzing quantitative data. These methods are tools designed to help the researcher organize and interpret numbers derived from measuring a trait or variable.

According to Babbie (1992:432) and Mouton (1996:163) descriptive statistics is a method for presenting quantitative descriptions in a manageable form. This involves a process of reducing data from detail which are unmanageable to those, which can be managed. Such data are described by the use of frequency tables, histograms and polygons, which help to form impressions about the distribution of data.

A frequency table provides the following information:

- It indicates the number of times that a particular response appears on the completed questionnaires.
- It provides percentages that reflect the number of responses to a certain question in relation to the total number of responses.
- The arithmetic mean (average) can be calculated by finding the sum of all the scores and dividing this by the number of scores.

3.7 SUMMARY

In this chapter the researcher discussed the methodology that was used in this investigation. The data gathered are processed and analysed in chapter 4.

CHAPTER 4

PRESENTATION AND ANALYSIS OF THE RESEARCH DATA

4.1 INTRODUCTION

The purpose of this chapter is to present analysis of data obtained from the fifty three questionnaires which were collected from respondents. The information is analysed and interpreted so that patterns and trends, which are apparent, could be commented on. This is followed by an examination of the responses to the questionnaires. The analysis of the responses to the questionnaire involved coding the fifty three questionnaires that were completed and returned. The coded data was then transferred onto a computer spreadsheet, before being statistically analysed in order to test the relationship between the specific variables in section 4.2.

4.2 DESCRIPTIVE STATISTICS

According to Gay (1987:189) the purpose of descriptive research involves collecting data in order to answer questions concerning the current status of the subject of the study. A descriptive study determines and reports the way things are. Mouton (1996:163) describes descriptive statistics as a process that makes data collection more comprehensible. In this study, descriptive statistics were used to describe the management of the curriculum with reference to Technology as a learning area.

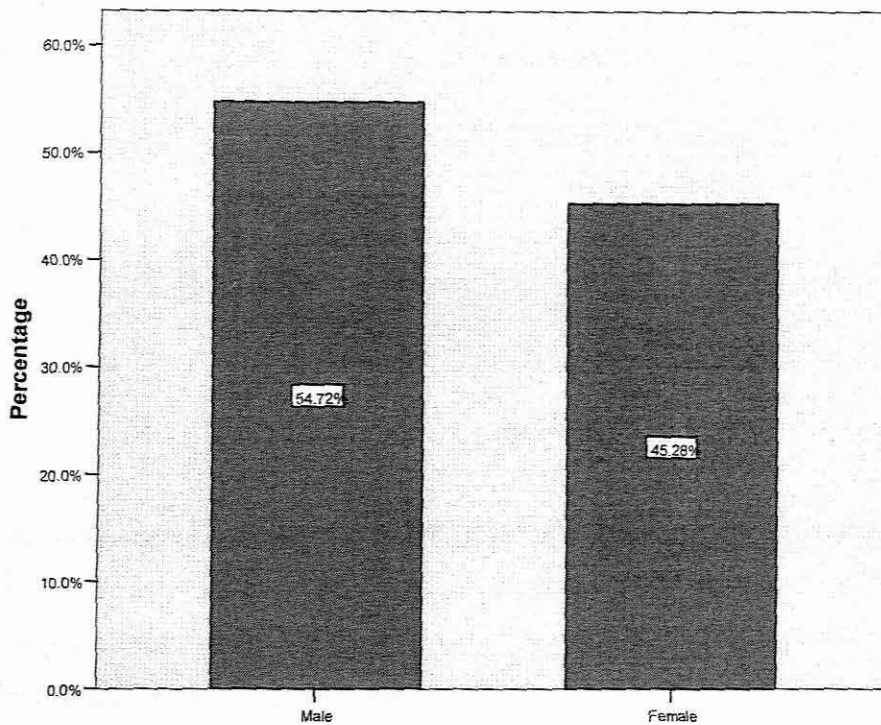
SECTION ONE: BIOGRAPHICAL INFORMATION OF RESPONDENTS

4.2.1 Gender of respondents (1)

Table 11: Frequency distribution according to the gender of respondents.

Gender	Frequency	Percent
Male	29	54.7
Female	24	45.3
Total	53	100.0

Graph 1: Gender of respondents.



The above results indicate that 54.7% of the respondents are males and 45.3% of the respondents are females. The possible reason for this could be that more males have been promoted to principals in the schools targeted with this research.

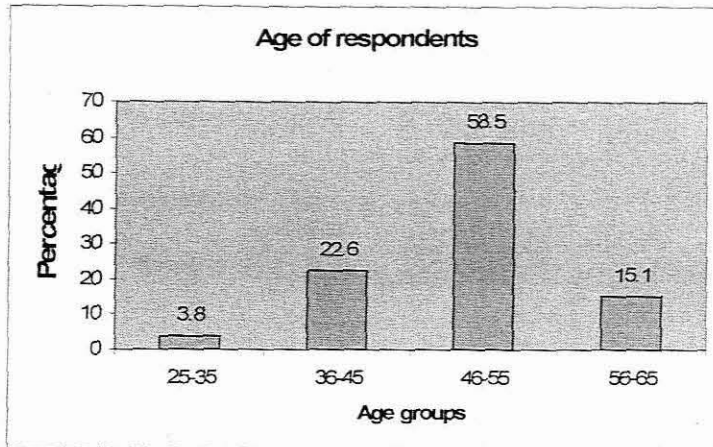
Graph 1 shows that almost half of all the principals are females indicating that the gender gap between male and female appointments as principals might be narrowing in recent times and that more females are probably applying for promotion as principals and are being appointed to such posts.

4.2.2: Age of respondents (2)

Table 12: Frequency distribution according to the age of respondents.

Age	Frequency	Percent
25-35	2	3.8
36-45	12	22.6
46-55	31	58.5
56-65	8	15.1
Total	53	100

Graph 2: Age of respondents



The above results indicates that 58.5% of the principals are between 46-55 and 3.8% of them are between 25-35 & only 15.1% of them are between ages 56 & 65.

The overall age distribution shows that most principals (79.11%) surveyed are within the age group (36-55). One can assume that the majority of principals have a number of years of teaching experience, which would have exposed them to educational issues around the implementation of Technology as a learning area.

4.2.3. Qualifications of respondents (3)

(1) Academic Qualifications (3.1)

Table 13: Frequency distribution according to the academic qualification of respondents.

Qualifications	Frequency	Percent
Matric	10	18.9
Bachelor of Arts	19	35.8
Masters Degree	4	7.5
Bachelor of Education	6	11.3
Other	3	5.7
BA & B Ed	9	17.0
Total	51	96.2
Missing System	2	3.8
Total	53	100.0

The above table of results indicates that 54.6 % of the principals have either a BA, B Ed or a Masters degree, whilst 5.7% of the principal have some or other form of professional qualification. 17 % of the respondents have both a BA & B Ed qualifications. It is important to note that the majority of the principals have attained

graduate status, which would have prepared them for performing management tasks. It is assumed that the 5.7 % of principals that have been appointed to the posts have received some form of management training.

Missing System: 3.8 % of the respondents did not provide a response.

(2) Professional Qualifications (3.2)

Table 14: Frequency distribution according to the professional qualifications of respondents.

	Qualification	Frequency	Percent
Valid	Higher Diploma in Education	12	22.6
	Further Diploma in Education	9	17.0
	Professional Teaching Certificate	4	7.5
	National Professional Diploma in Education	5	9.4
	University Diploma in Education	5	9.4
	Other	14	26.4
	HDE & FDE	2	3.8
	HDE & PTC	1	1.9
	Total	52	98.1
	Missing System	1	1.9
	Total	53	100.0

The above table of results indicates the frequencies and percentages of the respondents' professional qualifications: 22.6% HDE and 17% FDE whilst 26.9% possess other types of qualifications. All of the respondents possess some form of professional qualifications. This is an indication that the respondents are professionally qualified to fulfil the management task.

Missing System: 1.9 % of the respondents did not respond to the question. Possible reasons could be that the respondent felt that the question was probing a personal issue.

4.2.4 Specialisation

(1) Area of specialisation (4)

Table 15: Frequency distribution according to the area of specialization of respondents.

Area of specialisation		Frequency	Percent
Valid	Maths	13	24.5
	Zulu	1	1.9
	Primary Education	14	26.4
	Remedial Educationist	2	3.8
	Technology	9	16.98
	Languages	8	15.09
	Science	2	3.8
	Life Orientation	4	7.5
	Total	53	100.0

The table of results provides frequencies and percentages of specialist fields of the respondents:

24.5 % had Maths specialisation whilst 26.4 % had primary education specialisation, 15.09 % had language specialisation, 7.5 % had life orientation qualifications. It is important to note that 16.8 % of the respondents had qualifications leaning towards Technology as a learning area. One can assume that this status exists only because Technology is a relatively new learning area.

(2) Phase of specialisation (5)

Table 16: Frequency distribution according to the phase specialisation of respondents.

Phase of specialisation	Frequency	Percent
Foundation phase	11	20.8
Intermediate phase	17	32.1
Senior phase	25	47.2
Total	53	100.0

From these results, it is clear 20.8% specialised in the foundation phase, 32.1% in the intermediate phase and the majority 47.2% are in the senior phase. The possible reason for this could be that:

- the majority of the respondents are males, who find it more comfortable

working with older children.

- females presumably have more patience and expertise when it comes to working with younger children.

4.2.5 Years of experience since appointment as principal (6)

Table 17: Frequency distribution according to the years of experience since appointment as principal.

Years	Frequency	Percent
0	5	9.4
1	4	7.5
2	2	3.8
3	3	5.7
4	6	11.3
5	4	7.5
6	2	3.8
7	8	15.1
8	4	7.5
12	3	5.7
15	2	3.8
18	1	1.9
24	1	1.9
30	1	1.9
Total	46	86.8
Missing System	7	13.2
Total	53	100.0

The table of results represents the number of years experience as principals since appointed to the post. 28.3 % of the principals have between 1-5 years experience, whilst 5.7 % of the principals have 12 years of experience. None of the respondents had between 9 and 11 years of experience. The distribution table shows that most of the principals have less than ten years experience, and that most of them have thus been appointed to the post after the first democratic elections. One can only assume that the newly appointed principals would be supporting changes that Curriculum2005 brought about, of which Technology is part.

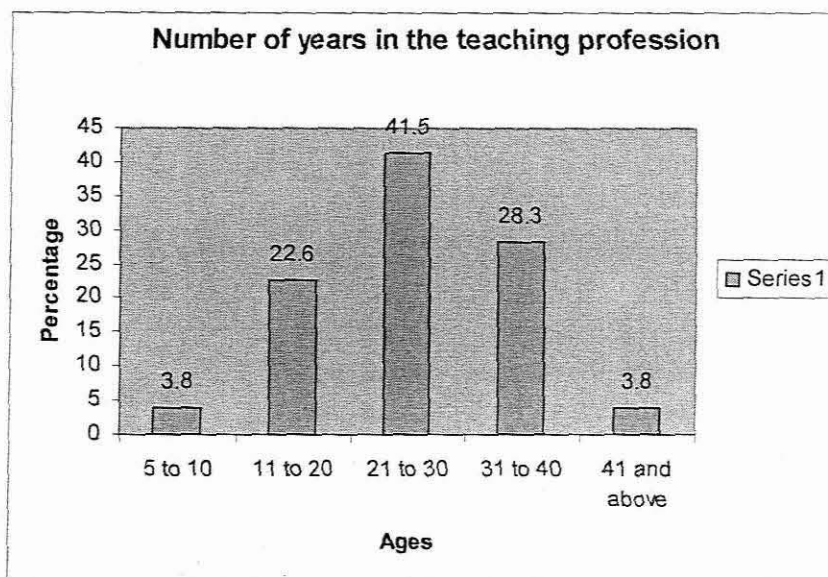
Missing System: 13.2 % of the respondents did not provide a response. Possible reasons for this could be that the question was not important enough to warrant a response.

4.2.6 Teaching experience (7)

Table 18: Frequency distribution according to the number of completed years of respondents in the teaching profession.

years	Frequency	Percent
5 to 10	2	3.8
11 to 20	12	22.6
21 to 30	22	41.5
31 to 40	15	28.3
41 and above	2	3.8
Total	53	100

Graph 3: Number of completed years in the teaching profession



The result indicates the number of years principals have completed in the teaching profession; 41.5 % have between 21-30 years of teaching experience, and 28.3 % have between 31-40 teaching experience whilst only 3.8 % have between 5-10 years and 3.8 % have 41 years and more of teaching experience. It can be assumed that most of the principals (79.54%) have between 21-40 years teaching experience and they possess more than sufficient teaching experience to manage the schools effectively.

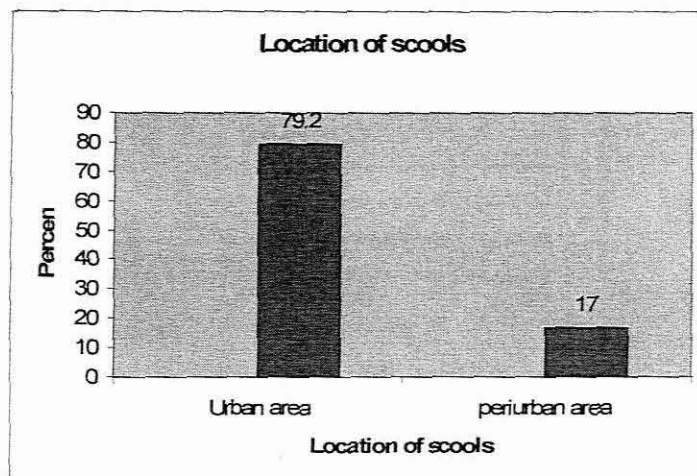
EDUCATIONAL AND LOGISTICAL INFORMATION ABOUT THE SCHOOLS OF RESPONDENTS.

4.2.7 Location of schools (8)

Table 19: Frequency distribution according to the location of schools of respondents.

Location of schools	Frequency	Percent
Urban area	42	79.2
Peri-urban area	9	17.0
Missing system	2	3.8
Total	53	100

Graph 4: Location of schools



The results provide an indication of where the schools of respondents are situated: 79.2 % of the schools are situated in the urban area, whilst only 17 % are situated in a peri urban area. It can be assumed that whilst the majority of the schools are situated in the urban area, it is the minority of the schools that are situated in the peri-urban area that might experience a problem with the implementation of Technology for one of the following reasons:

- A lack of physical and teaching resources.
- A lack of professional and administrative support from the district office.
- Poor communication between district office and schools.

It can be assumed from the results above that the majority (79.2 %) of the schools that

are situated in the urban area would have established a cluster to provide support and assistance towards implementing Technology as a learning area. Schools situated in the peri-urban area could experience problems such as distance & transport in so far as the established clusters go. Networking among these schools could be a little problematic because of the location of the schools, distance and transport.

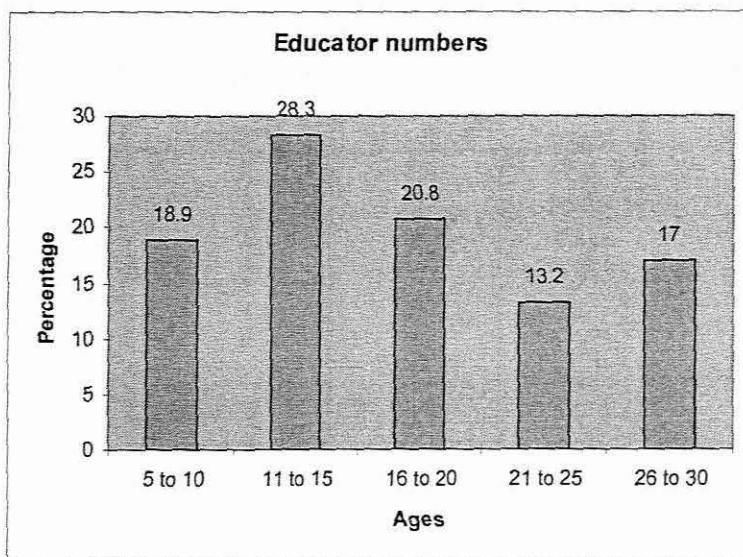
Missing System: 3.8 % of the respondents did not provide a response.

4.2.8 Educator numbers (9)

Table 20: Frequency distribution according to the number of educators on the staff of respondents, including management

Educators	Frequency	Percent
5 to 10	10	18.9
11 to 15	15	28.3
16 to 20	11	20.8
21 to 25	7	13.2
26 to 30	9	17
Total	52	98.2
Missing system	1	1.9
Total	53	100

Graph 5: Educator Numbers.



The results indicate the number of educators employed at respondents' schools. The majority of the schools (28.3 %) have between 11-15 educators. whilst 20.8 % of

schools have between 16-20 educators on the staff. Only a small number of schools (18.9 %) have a small staff, i.e. between 5-10 educators, 17 % of the schools have between 26-30 educators, almost three times the number of staff. The number of educators on a staff can have both a positive and a negative impact on the implementation and management of Technology for the following reasons:

- Large educator group discussions can become disruptive during planning if it is not managed properly. On the other hand if directed positively it can stimulate creativity.
- With small educator groups there is always a likelihood that creativity can be stifled due to a lack of debates and an exchange of ideas. On the other hand small groups work better where each one knows what to expect of the other when it comes to duties.

The attitude support and management skills of the principal can contribute positively towards the implementation of Technology and it is not solely dependent on the number of educators at a school.

Missing system: 1.9 % of the respondents did not provide a response.

4.2.9 Technologically qualified educators (10)

Table 21: Frequency distribution according to the number of educators qualified to teach Technology education.

Educators	Frequency	Percent
0	25	47.2
1	11	20.8
2	5	9.4
3	1	1.9
4	3	5.7
5	1	1.9
8	1	1.9
10	1	1.9
11	1	1.9
13	1	1.9
Total	50	94.3
Missing System	3	5.7
Total	53	100.0

The table of results above provide valuable information regarding the number of educators who are qualified to teach Technology. 47.2 % of the schools do not have any Technology qualified educators to teach Technology whilst 20.8 % have only one educator qualified to teach Technology. The large percentage of schools not having Technology qualified educators, will eventually impact negatively on the implementation of Technology. Educators teaching Technology need specialist skills and knowledge to facilitate the teaching of the mechanical, electrical and hydraulic sections of the syllabus. This may include the use of specialist tools and equipment. It is encouraging to note that 17.1 % of the respondents' schools had 4 and more educators qualified to teach Technology.

Missing System: 5.7 % of the respondents did not provide a response, as they would have deemed it as not relevant to their situation.

4.2.10 Educators teaching Technology (11)

(1) Number of educators teaching Technology at respondents' school

Table 22: Frequency distribution according to the number of educators teaching Technology at the school of respondents.

Educators	Frequency	Percent
1	2	3.8
2	10	18.9
3	12	22.6
4	12	22.6
5	4	7.5
6	2	3.8
7	1	1.9
8	1	1.9
9	2	3.8
10	1	1.9
11	1	1.9
12	1	1.9
13	1	1.9
16	1	1.9
22	1	1.9
27	1	1.9
Total	53	100.0

The above results indicate the number of educators teaching Technology. 3.8 % have one educator teaching Technology. 18.9 % have 2 educators teaching Technology. 45.2 % have between 3 and 4 educators teaching Technology. It can be assumed that in all of the above schools educators are teaching Technology across the whole school and in a specialist room. This argues positively for the implementation of Technology and the distribution, control and use of the resources. In 13.3 % of schools there are 10 and more educators teaching Technology in a single school. It is assumed that at many schools all the educators teach Technology to their form classes. This can be problematic when it comes to monitoring, the distribution and purchasing of specialist tools and equipment. Many educators will encounter great difficulty in acquiring resources. The positive aspect of this situation is that more educators become technologically literate and aware of the requirements of Technology. With the high number of unqualified educators teaching Technology the standard of implementation is questionable. Not all educators teaching Technology will also want to take responsibility for the handling and management of specialist tools and equipment.

(2) Gender of educators teaching Technology: Males

Table 23: Frequency distribution according to the gender of educators teaching Technology at the school of respondents.

	Male	Frequency	Percent
Valid	0	6	11.3
	1	21	39.6
	2	14	26.4
	3	7	13.2
	9	1	1.9
	Total	49	92.5
Missing	System	4	7.5
Total		53	100.0

The table of results indicates that 11.3 % of the respondents did not have any males teaching Technology. 39.6 % have one male teaching Technology and 1.9 % have 9 males teaching Technology. The fact that less than half of the educators are males is in no way a poor reflection on the teaching of Technology as a learning area. What is important is that educators must be knowledgeable and qualified so as to be able to implement Technology.

Missing System: 7.5 % of the respondents did not provide a response. A possible assumption could be that the school did not have any males teaching Technology.

(3) Gender of educators teaching Technology: Females

Table 24: Frequency distribution according to the gender of educators teaching Technology at the school of respondents.

Females	Frequency	Percent
0	4	7.5
1	14	26.4
2	12	22.6
3	6	11.3
4	3	5.7
5	3	5.7
7	1	1.9
8	1	1.9
9	1	1.9
11	1	1.9
12	1	1.9
14	1	1.9
21	1	1.9
24	1	1.9
Total	50	94.3
Missing System	3	5.7
Total	53	100.0

The table of results indicates that 7.5 % of the schools had no female Technology educators, 26.4 % had one and 1.9 % had 24 educators teaching Technology. 60.3 % of respondents have between 1 and 3 educators teaching Technology. The fact that almost 60% of the educators are females is a positive sign that females are able to adapt and teach Technology.

Missing System: 5.7 % of the respondents did not provide a response. A possible assumption could be that those schools do not have any females teaching Technology.

4.2.11 Departmentally employed Technology educators (12)

Table 25: Frequency distribution according to the department of education employed Technology educators at the school of respondents.

Dep of Ed employed	Frequency	Percent
Yes	46	86.8
No	7	13.2
Total	53	100.0

The table of results indicates that 86.8% of the educators teaching Technology are employed by the Department of Education. This is a good sign that the Department employs more Technology educators who are certified to teach Technology as a learning area.

4.2.12. School governing body employed Technology educators (13)

Table 26: Frequency distribution according to the school governing body employed Technology educators at the school of respondents.

SGB employed	Frequency	Percent
Valid Yes	19	35.8
No	34	64.2
Total	53	100.0

The table above indicates that 64.2% of the schools' governing body did not employ the Technology educator. Only 35.8% of the Technology educators were employed by the schools governing bodies. Possible reasons for this high percentage could be:

- Schools do not have qualified educators to teach Technology.
- There are insufficient educators to teach Technology.
- Increased learner enrolments, exceeding departmental posts and limitations.
- The teacher/s teaching Technology were in excess to the post provisioning norm, and had to be transferred to other schools.

SECTION TWO: THE IMPLEMENTATION, MANAGEMENT & RESPONDENTS' PERCEPTIONS OF TECHNOLOGY AS PART OF THE CURRICULUM

4.2.13 Theme 1: Promoting and fostering the successful implementation of Technology as a learning area.

(1) Legislation and policies pertaining to Revised National Curriculum Statement. (1)

Table 27: Frequency distribution according to the availability in the school of legislation and policies pertaining to RNCS at the school of respondents.

Legislation & Policies		Frequency	Percent
Valid	Yes	49	92.5
	No	4	7.5
	Total	53	100.0

The table of results indicates the number of schools having the necessary legislation and policies to implement Technology. The majority, 92.5 %, had these and only a small minority, 7.5 %, did not have the necessary legislation or policy pertaining to RNCS. One can only assume that the reasons for the school not receiving the necessary documents are:

- Poor communication between the district office and the school.
- The non-attendance of the school staff at in service training workshops where the documents are distributed.

(2) Communication to school governing bodies, parents & educators (3/4)

Table 28: Frequency distribution according to communication to school governing bodies, parents and educators at the school of respondents.

Communication to SGB, parents and educators		Frequency	Percent
	Yes	47	88.7
	No	5	9.4
	Total	52	98.1
Missing	System	1	1.9
Total		53	100.0

The table of results shows that the majority of the schools, (88.7 %) have communicated to the school governing bodies and parents the changes to be made from subjects to learning areas. Some of the methods used to communicate were (Questionnaire item 4 Theme 1):

- Informing all stakeholders via circulars and newsletters.
- Including the cost of implementing Technology in the schools budget.
- Informing stakeholders at grade and parent meetings.
- At parent orientation meetings at the beginning of the year and including the Technology learning area specialist to address all stakeholders.

Only 9.4 % of the schools did not communicate this message. This could be due to:

- The schools not receiving the necessary documentation / legislation timeously.
- An absence of established communication structures between the schools' management team and other stakeholders or the schools' governing bodies, parents and educators could be dysfunctional.

Missing System: Only 1.9 % of the respondents did not provide a response. A possible assumption could be that this question did not have an implication on their school.

(3) Planning for the implementation of Technology (5/6)

(a) Learning programmes as a planning strategy.

Table 29: Frequency distribution according to using learning programmes for planning at the school of respondents.

Learning programs	Frequency	Percent
Valid Yes	50	94.3
No	3	5.7
Total	53	100.0

The table of results shows that 94.3 % of schools use learning programmes, whilst only 5.7 % do not use learning programmes in Technology planning. The reason for not using learning programmes could possibly be:

- a lack of understanding of the policy documents;
- non-possession of the policy documents;
- not attending in-service training workshops due to poor communication.

A learning programme provides the framework for planning, organising and managing classroom practice for each phase. It includes all teachers in a specific grade. At this stage educators network, share ideas and plan how resources are going to be used. It also contributes to the successful implementation of Technology as a learning area.

(b) Work schedules as planning strategy.

Table 30: Frequency distribution according to using work schedules for planning at the school of respondents.

Work Schedules		Frequency	Percent
Valid	Yes	47	88.7
	No	6	11.3
	Total	53	100.0

The table of results shows that 88.7 % of schools use work schedules, whilst 11.3 % do not use work schedules. The reasons for not using work schedules could be:

- a lack of understanding of the policy documents;
- non possession of the policy documents;
- not attending in-service training workshops due to poor communication.

A work schedule is a year long programme that shows how teaching, learning and assessment will be sequenced and placed in a particular grade. It can only be assumed that where work schedule's are not being used, those schools have not changed over to Outcomes Based Education. The absence of a work schedule will have a negative impact on the implementation of Technology as a learning area

(c) Lesson plans as planning strategy

Table 31: Frequency distribution according to using lesson plans for planning at the school of respondents.

Lesson plan		Frequency	Percent
Valid	Yes	50	94.3
	No	2	3.8
	Total	52	98.1
Missing	System	1	1.9
Total		53	100.0

The table of results indicates that 94.3 % of the schools use lesson plans, whilst only 3.8 %, a very small percentage, do not use lesson plans.

The reasons for not using lesson plans could be:

- a lack of understanding of the policy documents;
- non- possession of the policy documents;
- not attending in-service training workshops due to poor communication;
- unqualified educators – educators that do not have a professional teaching diploma.

The lesson plan provides a detailed structure for teaching, learning and assessment activities. In the absence of lesson plans proper implementation of the curriculum cannot take place.

Missing System: Only 1.9 % of the respondents did not provide a response.

A qualitative analysis of responses to (open) item 6 of Questionnaire Theme 1

5.7 % of the respondents provided the following response for not choosing any of the given plans for Technology implementation:

- The school is waiting for the department to conduct orientation in respect of RNCS;
- Technology is integrated with other learning areas;
- The management structures are weak and there is a lack of policies;

(4) Professional development programmes (7)

Table 32: Frequency distribution according to school's continuous development programme to orientate and develop Technology educators.

(a) School development programme

Continuous school development programme		Frequency	Percent
Valid	Yes	30	56.6
	No	23	43.4
	Total	53	100.0

This table of results shows that 56.6 percent of schools have a continuous professional development programme, whilst 43.4 % do not have one in place. One can assume that in the absence of a school professional development programme, educators are receiving some form of support to enhance and develop their capacity to implement Technology effectively within the school curriculum. The absence of such a programme will hamper the management task as regards Technology.

(b) Formalised professional development policy (8/9)

Table 33: Frequency distribution according to the availability of a formalised professional development policy at the school of respondents.

Formalised policy		Frequency	Percent
Valid	Yes	18	34.0
	No	10	18.9
	NA	24	45.3
	Total	52	98.1
Missing	System	1	1.9
Total		53	100.0

The table of results shows that 34 % of schools have a formalised professional development policy whilst 18.9 % do not have one in place. Some respondents gave the following as reasons for the non-existence of a formalised policy:

- Lack of capacity within the staff, the staff does not have the necessary skills, knowledge and support to develop a professional development policy.
- Time constraints – staff are pre-occupied with other school issues and

therefore find it difficult to develop one.

- Waiting for the subject advisors to formalise a policy.

Forty five percent (45.3 %) of the respondents when requested to provide reasons for not having a formalised policy in place, provided a response as not applicable (NA). It can be assumed that the 45.3 % that did not respond, also do not have a formalised professional development policy in place.

Missing System: Only 1.9 % of the respondents did not provide a response.

Professional development policies are an integral part of teaching and learning. For Technology it would provide the blue print for the successful implementation, by providing the guidelines for staff to participate and develop their skills and improve their knowledge.

Professional development also makes managers and educators aware of the latest techniques, trends and knowledge. It equips both managers and educators to deal with and cope with changing trends in education.

Qualitative analysis report on open questions:

Theme 1: Promoting & fostering the successful implementation of Technology as a learning area. (9)

Respondents were asked (questionnaire item 9) to explain briefly the reasons why there is no formalised policy to orientate and develop Technology educators in their schools.

The vast majority of the respondents replied that:

- they lacked the skills and capacity to develop one/ such a policy;
- the Department did not provide sufficient support to the school to develop one;
- the schools did not have any qualified Technology educators to guide them in this regard.

4.2.14 Theme 2: Problems experienced by principals and school management teams in the implementation of Technology as a learning area.

(1) Subject head responsible for Technology. (10)

Table 34: Frequency distribution according to the availability of a subject head responsible for Technology at the school of respondents.

Subject head responsible for Technology		Frequency	Percent
Valid	Yes	25	47.2
	No	28	52.8
	Total	53	100.0

This table of results indicates that 47.2 % of schools have a subject head responsible for Technology. This is a very positive sign that schools see the need to appoint management personnel to a key learning area. One can only assume that for the 52.8 % that do not have a subject head responsible for Technology, adequate steps are being taken to ensure the successful implementation and management of the learning area within the curriculum. The appointment of a subject head would ensure the long-term viability of the learning area, ensuring that there are well trained and equipped staff and an adequate supply of resources and the effective use of the latter.

The non-appointment of a subject head could have a negative impact on the learning area. It could result in each educator doing their planning and lacking proper guidance, resulting in a scramble for resources.

(2) Specialist Technology educator (11)

Table 35: Frequency distribution according to the availability of a school specialist Technology educator at the school of respondent.

Specialist Technology ed		Frequency	Percent
Valid	Yes	12	22.6
	No	41	77.4
	Total	53	100.0

This table of results indicates that the majority 77.4 % of schools do not have a

specialist Technology educator. This must inevitably have a significant impact on the quality of teaching and learning. It is assumed that in the absence of subject heads and specialist Technology educators, schools are building the capacity of their teaching staff by:

- networking with neighbouring schools;
- attending cluster meetings and workshops;
- motivating educators to attend and enrol for certificate courses, and Advanced Certificate Diplomas in Technology Education.

With almost 80 % of schools not having certified Technology educators and only 22.6 % having a specialist educator successful implementation will be problematic, and a cause for real concern.

(3) Re-deployment of educators and the impact on the implementation of Technology as a learning area (12/13)

Table 36: Frequency distribution according to re-deployment of educators and the impact on the implementation of Technology as a learning at the school of respondents.

Re-deployment of educators	Frequency	Percent
Valid Yes	10	18.9
No	43	81.1
Total	53	100.0

The table of results indicates that only 18.9 % of schools have been affected by redeployment of educators and 81.1 % of schools have not been affected by redeployment in this regard. It is evident from the table above that redeployment has not affected the majority of the schools as regards Technology implementation. It can be assumed that the 18.9 % of the schools that were affected by redeployment were educators teaching other learning areas, and in most schools almost all the educators are teaching Technology. The question that arises is how are the 80 % of the schools coping with the implementation of Technology in the absence of certified educators.

Qualitative analysis report on open questions:

Theme 2: Problems experienced by principals and school management teams in the implementation of Technology as a learning area. (13)

Respondents were asked (questionnaire item 13.1 – 13.4) to explain how human, physical, financial resources and educator and learner support material impacted on the implementation of Technology as a learning area. Responses could be summarised as follows:

- **Human resources:** The vast majority of the respondents replied that they did not have the specialised human resources necessary to implement Technology and that all the educators consequently taught it at their schools.
- **Physical resources:** The majority of the respondents replied that they did not have a specialist room to teach Technology. A minority of the respondents replied that they had a room with very limited resources.
- **Financial resources:** The majority of the respondents indicated that they had no funding for Technology. The reason provided was that insufficient school funds were available. A very small minority stated that they received very limited funding, which was inadequate to meet the requirements of the Technology curriculum.
- **Educator and learner support materials (including tools and consumables):** Half the respondents replied that they lacked educator and learner support materials, including tools and consumables, resulting in schools having to improvise. The educator often had to borrow tools. Some indicated that they had very limited educator and learner support material while a very small group had sufficient such material.

Under these circumstances it is doubtful whether Technology education could reach a qualitatively high level. Management of this learning area must thus obviously be impacted on negatively.

4.2.15 Theme 3: Effectiveness of the consultation process with respect to managing the Technology curriculum.

(1) Attendance of workshops & seminars (14)

Table 37: Frequency distribution according to attendance of workshops & seminars.

Attendance at workshop & seminars		Frequency	Percent
Valid	Yes	31	58.5
	No	22	41.5
	Total	53	100.0

This table of results indicates that 58.5 % of the respondents attended empowerment workshops, whilst 41.5 % did not attend such workshops. One needs to ask how they are managing to deal with changes in the workplace that demands new knowledge all the time.

One can assume that the reasons for not attending the workshops are:

- insufficient notice of the meetings;
- lack of commitment;
- poor communication between the district office and the school.

This is not a healthy situation when you have such a high percentage of educators not attending empowerment workshops, when attendance is supposed to be compulsory. Management of Technology must inevitably be affected by such a situation.

(2) Management and understanding of Technology requirements (15)

Table 38: Frequency distribution according to management and understanding of Technology requirements at the schools of respondents.

Understanding of Technology		Frequency	Percent
Valid	Yes	28	52.8
	No	24	45.3
	Total	52	98.1
Missing	System	1	1.9
Total		53	100.0

The table of results above shows that 52.8 % of the people responsible for managing Technology have a clear understanding of the requirements. This would contribute positively towards the implementation of the learning area. The fact that 45.3 % of the respondents do not have a clear understanding of the requirements is cause for concern. The possible reasons for this scenario could be:

- schools not appointing a subject head;
- schools not having a specialist Technology educator;
- schools not having a continuous professional development programme;
- educators not attending cluster /in service training workshops;
- poor communication between the district office and the school.

It has a significant impact on the quality of teaching and learning in schools, when people responsible for implementing policy do not have a clear understanding of the requirements.

Missing System: 1.9 % of the respondents did not furnish a response.

(3) Educators' ability to manage assessment of the Technology learning area (16)

Table 39: Frequency distribution according to educators' ability to manage assessment of the Technology learning area at the school of respondents.

Managing assessment		Frequency	Percent
Valid	Yes	39	73.6
	No	11	20.8
	Total	50	94.3
Missing	System	3	5.7
Total		53	100.0

This table of results provides an insight into the number of respondents able to manage Technology assessment. The fact that 73.6 % are able to manage assessment is a positive sign. Assessment forms the backbone of Technology resource tasks. The fact that 20.8 % are experiencing problems with assessment could be attributed to the following:

- Educators teaching Technology for the first time and therefore lacking the

necessary skills and know how to effectively assess.

- Educators not attending cluster in service training workshops.
- Poorly motivated educators.
- Lack of resources to appropriately facilitate assessment.

Assessment in Technology serves as a central element of the learning process and as a mechanism for ensuring that a certain pre-determined level of achievement has occurred. This is also an indication that some schools are having problems with the implementation of Technology.

Missing System: 5.7 % of the respondents did not furnish a response.

(4) Monitoring and evaluation of the implementation of Technology (17 – 21)

Table 40: Frequency distribution of the monitoring and evaluation of the implementation of Technology at the school of respondents.

Monitoring evaluation and implementation		Frequency	Percent
Valid	Yes	37	69.8
	No	14	26.4
	Total	51	96.2
Missing System		2	3.8
	Total	53	100.0

This table of results shows that 69.8 % of the respondents evaluate and monitor the implementation of Technology. This is an excellent sign that almost 70 % of the schools are managing the implementation of Technology. It is the 26.4 % that do not evaluate and monitor the implementation of Technology that needs to be supported.

Possible reasons for this process not being monitored and evaluated are:

- Lack of capacity and skills.
- Poor communication between the district office school and the educators.
- Poorly trained educators.
- Inability to manage the process of implementing Technology.

Evaluation and monitoring are key features that are used to measure and manage both

the teaching and learning process as well as the implementation process to identify strengths and weaknesses.

Missing system: 3.8 % of the respondents did not furnish a response.

Qualitative analysis report on open questions:

Theme 3: Effectiveness of the process of consultation with respect to the management of the Technology curriculum (17 - 18).

Under this theme the respondents had to comment on inter alia how the democratic consultation process promoted or hindered the implementation of Technology as a learning area. The majority of the respondents, 83 % responded positively by stating that the consultation process was very effective. Only a small minority (15 %) of the respondents responded negatively, they claimed that it had no effect.

Some of the responses were:

- There was wide consultation and participation.
- There were more ideas and suggestions.
- There was teamwork and better understanding.

The above three responses are indicative of the promotion of the management of Technology and therefore not hindering the process.

- Consultation promotes transformation.

Under this response, the respondents claimed that as stakeholders they were now able to contribute positively through the process of consultation towards the management of Technology.

Theme 3: Monitoring and evaluation of the implementation of Technology as a learning area (19/20).

Responses to the open question 20 revealed the following:

- The educators' work and record books are monitored by the HODs.
- Learning area committees monitor the learning programmes, work schedules and lesson plans.

- Supervision of year plans.
- The implementation of IQMS.
- Report back meetings by HODs.
- Class visits.
- Evaluation of learners' work.

Theme 3: Findings emanating from monitoring and evaluating the implementation of Technology as a learning area (21).

Responses to the open question 21 revealed the following:

- There is a lack of resources and support material.
- Time is limited.
- The educators are enthusiastic which rubs off onto the learners.
- Lack of specialised material and resources.
- There is a need for proper in-service training programmes.
- There was a lack of motivation and commitment.
- Learners have a problem providing resource consumables.
- Class sizes are too large.
- Educators are improvising.

4.2.16. Theme 4: Respondents perceptions towards Technology being included as a learning area.

(1) The standard of in-service training (22)

Table 41: Frequency distribution of respondents' views on the standard of in-service training needed to achieve successful implementation of Technology.

Standard of in-service training		Frequency	Percent
Valid	Yes/ Satisfied	6	11.3
	No/ Dissatisfied	45	84.9
	Total	51	96.2
Missing	System	2	3.8
Total		53	100.0

This table of results indicates that 11.3 % of respondents were satisfied with the

standard of training. The fact that the majority (84.9 %) of the respondents were dissatisfied with the standard of in -service training offered by the Department must be viewed seriously. This is the place where everything that is supposed to be undertaken in the classroom environment is given complete attention. One can assume that the reasons for such high percentage of dissatisfaction could be:

- The venue for training is possibly too small.
- Shortage of resource materials to distribute to educators.
- Poor quality of facilitators.
- Insufficient time allocation for the duration of the training.
- Educators' queries not adequately addressed at the workshops.
- A lack of basic practical and hands-on skills to empower the educator.
- Unprepared facilitators.
- Timing of the workshops

Missing System: 3.8 % of the respondents did not furnish a response.

(2) Technology and benefits for learners (24)

Table 42: Frequency distribution of evaluation of Technology and benefits for learners at the school of respondents.

Technology and benefit for learners	Frequency	Percent
Valid Yes	52	98.1
No	1	1.9
Total	53	100.0

The table of results indicates that only 1.9 % believed that Technology is not beneficial for learners.

The majority, (98.1 %) of respondents believe that Technology is beneficial to learners. One can assume the reasons for the positive rating are:

- Respondents have observed learners gainfully engaged in Technology activities.
- Improvement of learner results in Maths and Science because of active participation in Technology.
- Educators overcoming the initial fears and reaping the benefits of the success

of the learners.

- Visible improvements in the integration process of Technology with other learning areas.

There is clear indication that, despite the many problems the schools have experienced, principals have seen the success / impact that Technology has had on the educators and learners.

Qualitative analysis report on open questions:

Theme 4: Respondents' perceptions towards Technology being included as a learning area within the curriculum (22-25)

The majority of the respondents were very positive about Technology being included as a learning area, whilst a small minority viewed its inclusion negatively.

Some of the responses regarding the benefits of Technology are that it:

- provides opportunities for learners to demonstrate their skills;
- enhances creative thinking;
- assists educators in developing teaching aids;
- supports integration across learning areas;
- helps learners solve problems and increases their vocabulary;

It is evident from the responses that the critical and developmental outcomes that were discussed in chapter two are being addressed in the Technology learning area.

4.2.17 Theme 5: Strategies in place at respondents' schools to dovetail Technology as a learning area into the Revised National Curriculum Statement.

(1) Technology coordinator (26)

Table 43: Frequency distribution of the availability of a school Technology co-ordinator at the school of respondents.

Schools' Technology coordinator		Frequency	Percent
Valid	Yes	32	60.4
	No	20	37.7
	Total	52	98.1
Missing	System	1	1.9
	Total	53	100.0

The table of results indicates that 60.4 % of the schools have a Technology co-ordinator. This is a positive sign for the implementation process. However, concern is noted at the 37.7 % of schools that do not have a Technology co-ordinator. One can assume that the reasons for the latter probably might be:

- A small staff who are overburdened with a number of other important duties.
- Ineffective management structures
- No specialist educator to provide on site support.
- An absence of a school Technology learning area policy to provide guidelines for capacity building.

Learning area co-ordinators play a crucial role in ensuring the promotion, management, development and implementation of the Technology learning area

(2) Teaching time for Technology (27)

Table 44: Frequency distribution of teaching time allocation according to provincial norms for Technology at the schools of respondents.

Allocating of teaching time		Frequency	Percent
Valid	Yes	50	94.3
	No	3	5.7
	Total	53	100.0

The table of results indicates that 94.3 % of the schools allocate teaching time for Technology according to provincial norms. This impacts positively on the teaching and learning situation at schools, whilst only 5.7 % did not comply with this requirement. It is not an indication that Technology is not being implemented at those schools. One can assume the possible reason for the teaching time not being allocated according to provincial norms are:

- Timetabling is still being done according to subjects and not learning areas
- Teaching time that is supposed to be used for Technology is distributed to computer studies which many schools may view as being Technology.
- Respondents are not familiar with the requirements of the RNCS.

According to the Educations Labour Relations Council, Policy Handbook for Educators (2003:A-33) the teaching time for Technology is set as 2 hours and 40 minutes. This should not be changed under any circumstances as it will impact negatively on the implementation of the Technology learning area.

(3) Budget for Technology (28)

Table 45: Frequency distribution regarding the existence of a school budget for Technology at the schools of respondents.

Technology budget	Frequency	Percent
Valid Yes	17	32.1
No	36	67.9
Total	53	100.0

The table of results indicates that only 32.1 % of schools allocate a budget for Technology whilst 67.9 % of the schools did not allocate a budget. It could possibly be assumed the schools that do not allocate a budget for Technology experience the following problems:

- Schools, including schools situated in disadvantaged areas have a problem with parents not paying school fees, resulting in a shortage of funds.
- Schools lack a learning area policy. Learning area policies provide guidelines for how schools implement and fund the learning area.

- Schools allocate all budget funds available to other seemingly more important issues.

The teaching and learning of Technology requires resources. The absence of an allocated budget will have a negative impact on the implementation of Technology.

(4) Development of a learning area policy for Technology. (29)

Table 46: Frequency distribution regarding the existence of a developed learning area policy at the schools of respondents.

Learning area policy		Frequency	Percent
Valid	Yes	19	35.8
	No	34	64.2
	Total	53	100.0

The table of results indicates that 35.8 % of the schools have developed a learning area policy for the management and implementation of Technology whilst the majority, 64.2 % of schools do not have one. One can assume that the majority of the schools lack the capacity or necessary skills to develop a learning area policy, or alternatively do not see the need for one. This can impact negatively on the implementation of Technology and the teaching and learning process.

Qualitative analysis report on open questions: (30 & 31)

Theme 5: Strategies in place to dovetail Technology as a learning area in line with the Revised National Curriculum Statement.

The responses to the open statement (30) regarding the nature of the Technology learning area policy were:

- The policy is designed to advance the learning of Technology from the basic resources available to learners.
- The policy addresses the aspects of work schedules, learning programmes, lesson plans, assessment strategies and the number of assessments to be done during the year.

- The policy covers teaching time for Technology, classroom control, workloads of educators and learning area committee meetings, the allocation of the budget and safety precautions to be observed.
- The school is developing a working manual for all grades so that there is no overlapping of work.

As regards other strategies in place in respondents' schools to ensure that Technology as a learning area is in line with RNCS in some responses to Q31 indicated that schools:

- drew up a Technology policy;
- motivated educators to attend workshops;
- network with other schools;
- have Technology open days;
- have inter class / grade competitions;
- allocate a budget.

All of the above responses are a positive indication that schools' management teams are attempting to implement Technology in line with RNCS.

The number of missing systems (responses not furnished by respondents) which constitutes less than 2 % of the total will in no way impact on the results.

4.3 SUMMARY

In this chapter, the researcher aimed to provide a sequence to the range of responses provided by the principals in their answers to the questions in the questionnaires. The data collected were organised in frequency tables to simplify statistical analysis. The responses were briefly analysed and responses to open ended questions were qualitatively analysed.

In the following chapter the study will be summarized, findings formulated and certain recommendations will be made in the light of the findings.

CHAPTER 5

SUMMARY OF FINDINGS AND RECOMMENDATIONS

5.1 INTRODUCTION

In this chapter, a summary of Managing the Curriculum with specific reference to Technology as a Learning Area from the previous chapters will be discussed. The findings from the relevant literature study and the empirical research are presented. This will be followed by certain recommendations.

5.2 SUMMARY

5.2.1 Statement of the problem

In essence this study investigated the management of Technology as a curricular component in schools. It deals with forces determining either, the successful implementation and effective management of Technology or impacting obstructively thereupon.

5.2.2 Implementing and Managing Technology as a learning area.

It has emerged from the literature study and the empirical research that managing the curriculum and implementing Technology as a learning area are key areas in the curricular dispensation. According to the official booklet entitled, “Managing and Leading Schools” (DoE, 2000(a):01), managers and leaders (school principals and management teams) will in future be judged on the quality of education their schools deliver. This will include Technology as a learning area.

Some of the aspects which may assist the school principal in making the right judgement and in contributing to effective management and implementation of Technology as a learning area would be:

- Knowledge and understanding of how to promote and foster successful implementation of Technology as a learning area.
- Knowledge of resource requirements to support the implementation of Technology as a learning area.

- An understanding of current policies and systems for effective consultation and communication with respect to the managing of Technology within the school curriculum.
- An understanding and knowledge of change to positively enhance perceptions towards Technology being included as a learning area in the curriculum.
- Possessing the necessary knowledge, skills and understanding in selecting and adopting relevant school-based strategies to dovetail Technology as a learning area into the curriculum.

The study has revealed that the management and leadership actions of principals contribute either positively or negatively to the establishment of Technology as a learning area and its long-term benefits as a field of knowledge and expertise.

5.3.1 Findings from literature study

Literature study has revealed that certain factors may impact positively or negatively on management and implementation of Technology as a learning area. Knowledge and understanding of these aspects will provide a guide to the development of solutions to problems of managing the curriculum.

- The lack of knowledge and clear understanding of curriculum management will impact negatively on the management and implementation of Technology as a learning area (2.1).
- An adoption of one or more of the management styles may contribute towards effective management and implementation of Technology education (2.2).
- Knowledge and understanding of management theories will provide the principal with a range of options for the development of solutions to everyday practical problems (2.3).
- The key objective of curriculum management involves establishing an agenda for teaching and learning which goes beyond the mere transmission of knowledge and skills and includes monitoring, evaluating and providing

support to learners, educators and all stakeholders in education and training (2.4).

- Quality education depends on, and is supported by, sound management practices. It is, therefore, crucial that the principal as curriculum manager, together with all the other stakeholders decide on how to plan and manage the curriculum (2.5).
- When learning programmes are to be designed and implemented, they need to be done within the framework that includes the aims, principles and procedures of an education system. These components are contained in the framework of most countries that have a common national curriculum (2.6).
- Globalisation and the advent of new technologies require the education system to produce graduates with relevant knowledge, critical and higher-order skills and proper attitudes and values. Proficiency in mathematics, science and technology are a prerequisite for economic success, which in turn contributes to social advancement (2.7).
- The hidden curriculum is an important aspect of every school curriculum. Its existence cannot be ignored as it can impact negatively on the implementation of Technology as a learning area (2.8).
- The principal is the chief executive officer and the education department's representative, tasked with the obligation of implementing the curriculum at the school level. According to Naicker & Waddy (2003:15) the principal is required to guide and motivate the school management team and educators with regard to managing and implementing the school curriculum (2.9).
- The changes in curriculum design from content-based teaching to outcomes-based teaching poses many challengers. The principal is tasked with the responsibility to implement the new curriculum design, together with a new learning area, Technology. Sufficient knowledge of the different curriculum

models would assist the principal to make informed choices as to how to manage the curriculum effectively (2.10).

- The principal fills a key role to any change, which takes place at school, whether as an initiator or supporter. The introduction of new education policies including Curriculum 2005-RNCS and Technology as a learning area, demands that the principal respond positively by developing effective relationships whilst managing the process of change. This includes re-defining the school structures and priorities and re-deploying resources (2.13).

5.3.2 Findings from empirical study

The empirical investigation has revealed that management of the Revised National Curriculum Statement and the implementation of Technology has issued in the following:

- **Management and implementation of Technology as a learning area.**

The study has indicated that schools possess the necessary policy documents to implement and manage Technology, although they lack the human, physical and financial resources. The school principals encourage the educators to improvise and network with other schools. They also encourage the educators to attend empowerment workshops.

- **Extent of resourcing of Technology as a learning area.**

The study has revealed that schools do not have adequate resources. The majority of the principals indicated that schools were affected by scarcity of human resources, physical resources, financial resources and educator and learner support materials. Schools do not have specialised Technology educators to implement Technology. As a result all educators are virtual teachers of Technology. The majority of the schools does not have specialist rooms to teach Technology. The principals also indicated that they have no funding for Technology. A small percentage that got funding stated that it was inadequate to meet the requirements

of the Technology curriculum. Many schools lack materials, including tools and consumables, resulting in schools' having to improvise. All of this impacts negatively on the management and implementation of Technology as a learning area.

- **Extent of consultation regarding the implementation and management of Technology as a learning area.**

The study has indicated that principals are positive about the process of consultation. The consultation process has been very effective and educators show a good deal of enthusiasm. There is sharing of ideas and suggestions as well as functional teamwork and understanding amongst educators. The principals stated that they are now able to contribute positively by engaging in discussions and decision making. They also communicate with stakeholders via circulars and newsletters. Only a small fraction of the principals stated that the consultation process had no effect.

- **Challenges facing principals in the implementation of Technology as a learning area.**

The study has revealed that school principals are confronted with the challenge of transforming teaching and learning from the old to the new model. They are tasked with the leading role of being mentors, providers of resources and implementers of Technology curriculum, whilst not being adequately prepared for this role. Lack of training adds to inadequacy of human, financial and physical resources. Principals are also required to provide solutions to the problems, while contending with inadequate professional support from the Department of Education's support services.

- **Measures which have been devised by the school to dovetail Technology as a learning area.**

The study has revealed that all schools have devised some measure to dovetail Technology as a learning area. Some schools organise open days, and networked with other schools to share ideas. They also organise inter class/ grade competitions and motivate educators to attend workshops. Schools also encourage educators to attend cluster meetings and workshops so as to empower themselves with current issues and new ideas. Many schools draw up a Technology policy, including allocation of a small budget.

5.4 RECOMMENDATIONS

5.4.1 Training of school principals

Education and training are key elements to the development of skills, knowledge and achievement of success. The implementation of Technology as a learning area cannot be successful unless it has the support of both the Department of Education and school principals. It is necessary to develop the management capacity of the school principals, since they are the key agents of change, responsible for the successful implementation of Technology as a learning area.

According to Pretorius & Lemmer (1998:03) engagement in on - going professional development would equip the principal with new knowledge and skills, not only to manage and influence the implementation of the curriculum, which includes Technology as a learning area, but also to improve their own teaching and development as professionals.

As Technology is a new addition to the curriculum. There is little knowledge and understanding of the barriers to the implementation of Technology as a learning area. A planned programme of in-service education and training would contribute to the professional development of the school principal in the following ways:

- Newly appointed principals could be paired with peers (seasoned principals) to create a network as a schools principals' forum (cluster) which involves

schools in close geographical proximity working with each other, sharing access to information and collaborating to influence the implementation of Technology.

- The principal could be equipped with skills and knowledge to understand the need for changes in the school curriculum, including a clear understanding of the requirements of Technology (cf. 4.2.15 - (2)).
- Principals could arrange in-house programmes of in-service training within their schools, to acquire a common and shared understanding with their staff. (cf.4.2.17-(3))
- Through interaction with other role players, the principal could be assisted to manage issues of human resources, financial resources, and physical resources, including providing a fair share thereof for Technology.

School Principals can no longer expect to bring about curriculum changes from within the constraints of their offices. They are required to be leaders in the process.

The Education Management Unit together with the District Curriculum Unit must work closely to ensure that principals are involved in management development workshops in line with their mandate to implement Technology as a learning area. Under certain circumstances joint workshops could be held with educators. When the principal and the educator attend the same in-service and pre-service training (or continuous professional development) workshop they start to speak the same language. They develop a collegial framework, working on an implementation plan for their school, whilst sharing ideas, thoughts and knowledge with others.

- It is also, recommended that school principals be encouraged to take a fresh look at the classroom environment as supervisors as well as learners. This should be regarded as part of a broader process of continuous professional development

5.4.2 Resources for the teaching of Technology

Given the legacy of the past, legislation and the development of policies alone cannot guarantee success. Technology is a key learning area within the school curriculum and schools have a responsibility to prepare learners to choose careers for life in a technological society. It should be clear from the findings that almost six years after the curriculum has been initiated, Technology is still struggling because of a lack of human, physical and financial resources and technical support.

Specialised knowledge, skills and training are prerequisites for the successful implementation of Curriculum 2005 - RNCS and Technology as a learning area. It is therefore crucial that a coherent policy be developed for adequate resourcing of Technology. Successful implementation of this policy will depend to some degree on human resource development as well.

Physical resources provide the means which are required to support the implementation of Technology. A lack of classrooms, multipurpose rooms and specialist rooms restrict and hinder management and implementation at both advantaged schools and disadvantaged schools. The disadvantaged schools would continue to be disadvantaged and therefore would not be able to deliver a quality curriculum given the fact that they lack resources for other purposes the schools. A further situation arises as to where educators can safely secure the resources, such as basic hand-tools, and electrical appliances, which are required to implement Technology. Teaching Technology in a non - specialist room leads to overcrowding, cluttering and unsafe work habits, including the violation of the occupational health and safety requirements. The use of specialist rooms on the other hand creates a conducive environment for the management and implementation of Technology as a learning area.

Financial resource allocation contributes immensely to the successful management and implementation of Technology as a learning area. Whilst Technology has to compete with other established learning areas for a share of a very limited budget, it is also necessary to providing funding (basic hand tools, electrical appliances and artifacts) for Technology to sustain its implementation. Without financial resource

allocation meaningful implementation of Technology cannot take place. After all Technology is both- needs and budget-driven.

Technical support to the schools is also an important contributing factor for the implementation of Technology as a learning area. The study has revealed that the department of education does not provide sufficient support to schools (cf. 9 - p. 93). Subject Advisers should play a role in providing technical support to principals and schools by way of school visits. They should provide mentorship and curriculum guidance with respect to the requirements of Technology such as the identification of rooms that could be used as specialist venues.

Schools need to be provided with the necessary resources for the teaching of Technology so that the learning area does not suffer. For productive educational change and meaningful implementation to occur the following resources need to be provided:

- Human resources must first be identified and retrained so that the programme can be initiated in a positive manner, given the fact that the majority of the schools lack the skills and capacity to develop a learning area policy (cf.9 - p. 93), and the department of education does not provide sufficient support to schools to develop one.
- Both principals and educators need to be passionate about the implementation of Technology. It is therefore recommended that principals identify, appoint and support educators who will ensure and promote implementation of Technology as a learning area within the school. Not all educators will have the capacity to teach Technology, because of the specialised knowledge and skills required for its implementation.
- Schools should be provided with the necessary start-up funding so that schools can acquire the very basic of resources to support implementation of Technology as a learning area. A set of norms should be developed for standardisation of infrastructural requirements at each school. It should be borne in mind that the implementation of Technology as a learning area is

highly dependant on the availability of human, financial, technical and physical resources.

The Department of Education should appoint specialist Technology subject advisors to support both principals and educators in the implementation process. The specialist Technology advisors would also be able to identify problem areas in schools and provide these schools with the necessary assistance. This may include identifying human resource needs and providing intensive in-service training, providing basic and common tools and equipment and identifying a single venue as part of the physical resource centre. To this extent all schools could start at the same level to implement Technology. In this way there would be no advantaged or disadvantaged schools, all schools are seen as been equal. Effective implementation of Technology also requires time management, collegial interaction and networking.

5.4.3 Need for a centre of excellence to support teaching of Technology

A co-ordinated long term in-service programme is important for the successful implementation of Technology and for professional development of the principals and educators. It is recommended that the Department of Education together with its strategic partners, teacher unions, education and training service providers, book publishing companies and non governmental organisations harness their resources and work jointly in providing the necessary training of Technology educators. This could be done at a centre of excellence established for the purpose. The task of the centre should be to provide in-service education for Technology.

The facilitators posted at the centre should possess the necessary specialist skills for the implementation of Technology as a learning area. They should be able to provide on-site support and supervision for both principals and educators, as part of the schools continuous development programme. They should also be able to identify requisite materials for the implementation of Technology at schools.

5.4.4 Need for action research

The introduction of Technology as a learning area has placed high demands for specialised skills and knowledge from school principals, without whom it would not be possible to implement the necessary changes. The National Department of Education acknowledges that it cannot meet all the capacity building needs in the system and will need to make use of diverse institutions and non-governmental organisations to provide management development (DoE, 1996(b):24). Action research on management development needs would provide valuable information not covered in this study.

The Department of Education should initiate action research, amongst other things, to explore the possibility of establishing a centre of excellence for support and expertise to enhance implementation of Technology. This research should be carried out under the auspices of the relevant sub-directorate for mathematics, science and technology.

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APPENDIX A

Date: 30/08/2005

Dear Principal

**Questionnaire: Revised National Curriculum Statement (RNCS):
Implementation of Technology as a learning area at your school**

Permission to conduct research:

I am currently registered as a M.Ed student at the University of Zululand. My research is concerned with the implementation of Technology at schools. Your school has been randomly selected to provide information about your experiences pertaining to the implementation of Technology as a Learning Area at your school.

Kindly complete the attached questionnaire.

Confidentiality

All information will be regarded as confidential and no personal details or responses of any educator/ respondent will be mentioned in the findings nor will any of the results be related to any particular principal or school.

Your co-operation will be highly appreciated.

Thank you


R. Rambrij (Researcher)

How to complete the questionnaire:

Please answer these questions in the order they are numbered. If a question has a category block, simply place a tick in the applicable space.

SECTION ONE
General Information

1. Gender of respondent:
Male Female
2. Age of respondent in completed years as at 2005-01-01:
25-35 35-45 45-55 55-65
3. Qualifications of respondent:
 - 3.1 Academic Qualification(s) (e.g. Matriculation, BA, M.Ed. etc.) _____
 - 3.2 Professional Qualification(s) (e.g. HDE, FDE, PTC etc) _____
4. Area of specialization (e.g. Mathematics) _____
5. Phase specialization:
Foundation phase Intermediate phase Senior phase
6. Number of years appointed as principal _____
7. Total number of completed years in the teaching profession
5-10 years 10-20 years 20-30 years 30-40 years Above 40 years
8. The school is situated in:
Urban area Peri-urban area Rural area
9. Number of educators on the staff, including management:
1- 5 5-10 10-15 15-20 20 - 25 25 -30
10. Number of educators qualified to teach Technology Education: _____
11. Number of educators teaching Technology Education at the school: _____
Males Females
12. Are the technology educators employed by the Department of Education?
 Yes No
13. Does the school governing body employ the technology educator?
 Yes No

Theme 2: Problems experienced by principals and school management teams in the implementation of Technology as a learning area.

10. Does your school have a subject head that is responsible for Technology?
Yes No

11. Does the school have a specialist Technology educator?
Yes No

12. Has the re-deployment of educators impacted on the implementation of Technology as a learning area in your school?
Yes No

12.1. If you answered 'yes' please explain how.

13. How has the following impacted on the implementation of Technology as a learning area at your school? Please explain in detail.

13.1 Human resources:(e.g. existence or non existence of specialist Technology educators in your school)

13.2 Physical resources:(e.g. classrooms and specialist rooms)

13.3 Financial resources:

13.4 Educator and learner support materials (including tools and consumables)
Please explain in detail.

Theme 3: How effective is the process of consultation with respect to the managing of the Technology curriculum.

14. Have you attended any workshops, seminars, training, to empower you so as to enable you to cascade to educators the information on Technology as a learning area, and implement changes that are necessary in the Technology curriculum.

Yes No

15. Are all members of your staff responsible for managing Technology as a learning area at the same level of understanding of the requirements for implementing the Technology curriculum?

Yes No

16. Are the educators able to manage the assessment process that is linked to Technology as a learning area?

Yes No

Please explain the assessment process used.

17. In what way does the democratic consultation process hinder the implementation of Technology within the C2005- Revised National Curriculum Statement?

18. In what way does the democratic process promote the implementation of Technology within the C2005-Revised National Curriculum Statement?

19. Do you monitor and evaluate the implementation of Technology as a learning area in your school? Yes No

20. If you answered 'yes' state how the monitoring and evaluation is done. Please explain in detail.

21. If you have monitored and evaluated the implementation of Technology as a learning area, what findings have you come across? Please discuss each finding in detail.

Theme 4: What are your perceptions towards Technology being included as a learning area within the curriculum.

22. Are you satisfied with the level of in-service training needed to achieve successful implementation of Technology? Yes No

23. In what way is the information that is received at curriculum development workshops shared with other educators so as to empower them with necessary skills and knowledge?

24.1 Do you believe that Technology is beneficial for the learners? Yes No

24.2 Please explain your responses in detail.

25. What effects has Technology had on other learning areas?
Please explain in detail.

Theme 5: What strategies have been put in place by the school to dovetail Technology as a learning area into the Revised National Curriculum Statement?

26. Does your school have a Technology co-ordinator? Yes No

27. Is teaching-time for Technology allocated according to provincial norms?
Yes No

28. Does the school have a budget allocated for Technology? Yes No

29. Has the school developed a learning area policy to improve the management and implementation of Technology? Yes No

30. If yes, please explain in detail the nature of the policy.

31. Please list and discuss other strategies that your school has developed to ensure that Technology as a learning area is in line with the Revised National Curriculum Statement.

Thank you very much for participating in this survey.

APPENDIX B

37 Canary Street
Kharwastan
4092

27 October 2004

The Chief Director
Provincial Department of Education
Kwa Zulu Natal
Dokkies

Tel: 031 - 2744926
Fax: 031 - 2744922

For Attention: Dr. B. H. Mthabela
Sir,

Re: Request for Permission to conduct Educational Research in the Umlazi District

I am currently studying towards a Masters Degree in Educational Management at the University of Zululand, Umlazi Campus and would like to seek your permission so as to conduct the research in the Umlazi District during the second school term of 2005.

The topic that is being researched is, The Management of Curriculum 2005 and the Implementation of Technology as a Learning Area. The finding of the research will be made available to the relevant stakeholders including you, Sir.

It would be appreciated if you could grant me permission to access schools in the Umlazi District to conduct the research. Principals and educators will be requested to complete questionnaires, which will not interfere with the normal functioning of the school.

I THANK YOU
Yours faithfully



Mr. R. Rambrij
Student No: 032871

APPENDIX B

37 Canary Street
Kharwastan
4092

27 October 2004

The Chief Director
Provincial Department of Education
Kwa Zulu Natal
Dokkies

Tel: 031 – 2744926
Fax: 031 – 2744922

For Attention: Dr. B. H. Mthabela
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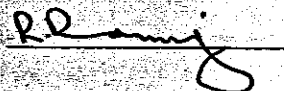
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PROVINCE OF KWAZULU-NATAL
ISIFUNDAZWE SAKWAZULU-NATAL
PROVINSIE KWAZULU-NATAL



DEPARTMENT OF EDUCATION AND CULTURE
UMNYANGO WEMFUNDO NAMASIKO
DEPARTEMENT VAN ONDERWYS EN KULTUUR

xxii

ADDRESS: EX-DURBAN COLLEGE OF EDUCATION
IKHELI: CNR. NICHOLSON ROAD AND QUEEN
ADRES: MARY AVENUE
UMBULO

PRIVATE BAG:
ISIKI-WAMA
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ENQUIRIES:
IMIBUZO: P.T. ZUNGU
NAVRAE:

REFERENCE:
INKOMBA:
VERWYSING:

Permission: Research

DATE:
USUKU: 20 February 2005
DATUM:

TO: R. Rambrij

RE: PERMISSION TO CONDUCT RESEARCH

Please be informed that you have been granted permission to conduct research with the following terms and conditions:

- That as a researcher, you **must** present a copy of the written approval from the Department to the Head of the Institution concerned before any research may be undertaken at a departmental institution bearing in mind that the institution is **not obliged to participate** if the research is not a departmental project.
- Research should not be conducted during official contact time, as **education programmes should not be interrupted**, except in exceptional cases with special approval of the KZNDE.
- The research is not to be conducted during the fourth school term, except in cases where the KZNDE deem it necessary to undertake research at schools during that period.
- Should you wish to extend the period of research after approval has been granted, an application for extension must be directed to the Director: Research, Strategy Development and EMIS.
- The research will be limited to the schools or institutions for which approval has been granted.
- A copy of the completed report, dissertation or thesis must be provided to the: RSDE Directorate
- Lastly, you must sign the attached declaration that, you are aware of the procedures and will abide by the same.

I. H. MTHABELA
RESEARCH, STRATEGY, POLICY DEVELOPMENT AND ECMIS