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TOWARDS ECONOMIC DEVELOPMENT: IMPLEMENTATION OF CURRICULUM CHANGES IN TECHNICAL COLLEGES IN GAUTENG

by

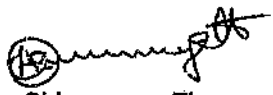
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A research report submitted to the Faculty of Education, University of the Witwatersrand, Johannesburg in partial fulfillment of the requirements for the Degree of Master of Education.

JUNE, 1998

DECLARATION

I declare that this research report is my own unaided work. It has not been submitted before for any other degree or examination.



Anna Chinagorom Ekeanyanwu

Submitted on the 23rd day of June 1998

ACKNOWLEDGEMENTS

I wish to acknowledge the assistance of the following people in the completion of this research report. They are:

(a) The nine interviewees who granted me the permission for the research interviews. They made themselves available for the interviews and were always willing to assist whenever necessary. I am indebted to their steadfastness and commitment to the cause of this research.

(b) My supervisor, Professor Pam Christie, for her guidance and support. She was patient and understanding especially at the most difficult moments. I am intrigued by her remarkable teaching methods.

(c) The many friends and family who assisted in numerous ways, especially babysitting my triplets, to enable me attend my lectures and other school demands.

A TRIBUTE

Some women have husbands
Others have friends
I am different and special
Because I have both in you.

A good and reliable friend
Who encourages me when I am too weak to continue
Who lends a hand when I need it most
Who commends and criticises my work when needs be.

A loving and compassionate husband
Who rocks the babies while I read
Who shares my thoughts and my inspiration
Who shares my dreams and my disappointments
Who wakes me up at night to continue my assignments
Who remembers to ask "how was your meeting with your supervisor today?"

You gave me the will to continue to persevere
You gave me the strength to succeed
Thank you for being there for me every step of the rocky way

Thank you for making my dreams come true
Thank you, Austin, for being my best friend, my husband.

DEDICATION

I dedicate this research report to my mother Francisca Egowure Anyanwu. A strong and inspiring woman who taught me to persevere through all life's tribulations. Though not well educated, she firmly believes that education is a vital component of living. She strived with my father, Adolphus Udumaga Anyanwu, to see that their ten children (five boys and five girls) are well educated. To their credit, we are all university graduates and more today. She is a passionate and humble woman who triumphs in her daily endeavours despite any odds. She became my pillar of strength and support when I gave birth to my triplet babies (Nnaemeka, Onyinyechi and Ikenna) whilst I was pursuing this Master's Degree in Education. In the most difficult moments, she would say to me "Nnem, do not give up any. Your children and your education are all part of your life. You will be happier to have them both". I am, Mama, and I thank you.

ABSTRACT

Technical colleges are pivotal in the integration process of education and training systems in South Africa. Technical colleges aim to train ar J equip individuals with skills and knowledge that will help them function and contribute adequately to the development of the country. In order to do this, the development and implementation of technical colleges' curriculum becomes critical. This study examines factors that influence changes in the curriculum development and implementation in technical colleges in Gauteng area. Two schools of thought, human capital theorists and social democratic proponent's views are reviewed. The human capital theorists argue that education is an investment that should yield economic benefits. They state that the curriculum should be influenced by economic and social factors. The social democratic proponents, for their part, argue that education has the social responsibility of developing individual potential. They state that the curriculum should be broad in order to cater for the diverse needs of the populace. Both the international and local literature has linked the demands for change in the curriculum to the advanced technological modes of production in the workplace. The local debates, though often a response to the international arguments, address a number of national issues such as equity, access, redistribution and economic growth. The research adopted a qualitative methodology. Data were collected through documents analysis and interviews. Six principals from technical colleges and representatives of three organisations: labour, employer and technical education development cooperation formed the research sample. The data were classified into three major themes: the nature of the curriculum, curriculum development processes and implementation of the curriculum. Through these themes, the interviewees identified problems with the curriculum as outdated, irrelevant, inadequately funded and lacking autonomy. They recommended that in order for technical colleges to contribute adequately to economic and social development, there should be constant revision of the curriculum, staff development, fewer government restrictions, adequate provision of infrastructure and formation of partnerships amongst stakeholders.

Key words: vocational education and training
integration of education and training
curriculum implementation
human capital theory

LIST OF ABBREVIATIONS

ANC	African National Congress
BSA	Business South Africa
COSATU	Congress of South African Trade unions
DET	Department of Education and Training
DOF	Department of Finance
DOL	Department of Labour
ESKOM	Electricity Supplies Commission
ETQAs	Education and Training Quality Assurers
GEAR	Growth, Employment and Redistribution
GNU	Government of National Unity
ILO	International Labour Organisation
NDE	National Department of Education
NEPI	National Education Policy Investigation
NTB	National Training Board
NQF	National Qualifications Framework
OBE	Outcomes Based Education
OECD	Organisation for Economic Cooperation and Development
RDP	Reconstruction and Development Programme
RSA	Republic of South Africa
SAQA	South African Qualifications Authority
UNESCO	United Nations Educational Scientific and Cultural Organisation
VEDCO	Vocational Education Development Corporation

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CHAPTER ONE

INTRODUCTION

In a dynamic and developing society like the Republic of South Africa (RSA), various changes affect the education system. The integration of education and training is one of the changes currently being explored. The Department of Education and Training's *White Paper on Education and Training* (1995:15) notes that an integrated approach to education and training linked to the development of a new National Qualification Framework (NQF) will prepare individuals towards lifelong learning that will equip them for changes in the workplace. The Department of Labour's Green Paper on a *Skills Development Strategy for Economic and Employment Growth in South Africa* (1997) stresses the need for an education and training system that is more responsive to the needs of industry and social development in the country. It emphasises that

> Education and training must be linked to identifiable job opportunities or to appropriate small-scale activities that have the prospect of generating sustainable income (1997:13).

Technical colleges are pivotal in the integration process of education and training systems in South Africa. There are one hundred and forty-four technical colleges in South Africa. About thirty-three of them are situated in Gauteng. They offer formal and non-formal learning programmes on a part-time and full-time basis or through distance learning methods. Their qualification ranges from N1-N6 certificates to N-Diploma qualifications. Technical colleges aim to train and equip individuals with skills and knowledge that will help them function and contribute adequately to the development of the country. With high unemployment rates and the current emphasis on skill development, it has become necessary to examine factors influencing curriculum changes, construction and implementation in technical colleges. Also, in order for the NQF to find meaning within the new system of education and training, it is important to find out whether the implementation of

some curriculum changes in technical colleges is in line with the emphasis on individual and economic growth. Christie (1996:7) argues that 'implementation is viewed as integral to what policy is, rather than a step within a sequenced process'. It is my belief that the findings of this research will help in the restructuring of the technical college curriculum to realise the aims of the NQF. These findings will also assist in achieving the objectives of the Department of Labour's *Green Paper on Skills Development Strategy for Economic and Employment Growth*, as well as the Department of Finance's *Growth, Employment and Redistribution Strategy* (GEAR), both of which encourage quality education and training systems that will prepare an efficient workforce for the labour market.

CONTEXT OF THE RESEARCH

Economic advancement is crucial to South Africa. A range of policy documents in South Africa notes that the quality of the workforce is a major contributing factor towards the social and economic development of any country (NEPI,1992a&b; NTB, 1994; ANC, 1994; Green Paper, 1997; GEAR, 1996). The paradigm shift towards an outcomes-based education (OBE) is aimed in part to train individuals who will be productive, flexible and competitive in the labour market. Economic and social demands, like global competitiveness, the need for technological advancement, the high unemployment rate, and the low number of skilled workers partly explain the emphasis on changes within the education system in the country.

The fragmented education system practised during the apartheid era created enormous problems for the social and economic development in the country. The result is that South Africa has one of the poorest human resource development records in comparison to other countries at equivalent stages of development (*The World Competitiveness Yearbook*, 1996:273). Other problems arising from the fragmented education system are the failure to address middle level competency requirements of society, and the poor alignment of learning programmes with social and economic strategies.

In order to address some of the fundamental issues created by the fragmented education system of the past, the ANC *Policy Framework for Education and Training* (1994) makes some suggestions. It advises that the groundwork for education and training policy should be carefully planned to accommodate the diversity of problems, experiences, interests and expectations among the population. It insists that changes within the curriculum should be informed by the social and economic needs of all sectors in the country. Similarly, the emphasis of the Department of Labour's *Green Paper on Skills Development for Economic and Employment Strategy* (1997) is conceived within a broader policy context that relates to macro-economic, industrial, labour market, science and technology policies.

The skill development strategy partly aims to address the poor human resources base that has become a hindrance towards effective economic growth. An upturn in the human resources development in the country may lead to achieving economic goals (like high quality products that can compete in the global market). It is believed that an integrated skills development system that promotes economic and employment growth and social development can be built through an integrated education and training system.

An integrated education and training system therefore aims to respond to the needs of industry and social development in the country by equipping the individual with generic and specific skills for adult life. The assumption underpinning the education and training policies is that it is no longer adequate to train an individual for the sake of acquisition of knowledge alone, without defining what the individual can gain and contribute in economic and social terms from such acquisition of knowledge. According to the Department of Labour's *Green Paper for Skills Development Strategy for Economic and Employment Growth* (1997), for economic and employment growth to take place:

> A new national system of skills development must be established, incorporating new incentives, learning programmes and supporting institutions and personnel, that supports effective articulation of

> education and training with government's economic and development policies, industry-wide and enterprise level skills needs (p:7-8).

However, the integration of education and training is a complex and dynamic process. It is complex because it is imbedded within the social and power relations of a diversified society. South Africa is diversified in the sense that it embodies characteristics of a developed and developing country. This creates conflict with regard to which approach to adopt to solve its multiple economic and social problems. The current debate on Fordist, Post-Fordist and Neo-Fordist modes of production as they relate to education creates enormous tension for the integration of the education and training system. There is a struggle to locate the education and training system within the appropriate mode of production in industry.

The questions that arise from the on-going debate on the labour market are (i) Does South Africa still need the Fordist mode of production that deals with low- and medium-skilled workers operating in a moving assembly line? (ii) Is South Africa ready for a Post-Fordist production mode that is characterised by a high-tech, flexible, multi-skilled labourforce? or (iii) Can South Africa adopt a Neo-Fordist combination of modes that aims to create a niche market for specialised and high-tech products as well as involve mass production of products that will cater for needs of the broader populace? The answers to these questions have different implications for the education and training system.

In terms of its dynamism, an integrated education and training system would be subjected constantly to reflecting the changes taking place within the larger society. In other words, the changes taking place within the education system in South Africa are informed by the need to produce individuals who can adapt to the dynamic nature of the global technology and economy. For instance, one reason guiding the paradigm shift is the need for flexibility and a demand-led training system that would enhance the partnership between the public and private sectors. Igwe (1990) explains that education

> has the growing qualities of a living organism, and among its permanent attributes is that it is constantly changing in emphasis and at the same time, adapting itself to new demands and new circumstances (quoted in Ughamadu, 1992:1).

However, the problem of implementation may cause an enormous obstacle towards an effective integration of the education and training systems. The ANC *Policy Framework for Education and Training* (1994) notes that for a policy to be successful, it has to be implementable. It emphasises that channels for adequate implementation should be made available and accessible to all. This is an enormous task for the new education system because it would be difficult to achieve an integrated education and training system in an environment that is constrained by financial, physical and human resources. Most technical colleges do not have equipped workshops where the practical component of the training can be linked to the theoretical aspects. Such problems hamper the effective assimilation of learning programmes as well as cross-curricular linkages. Further, the racially fragmented education system that affected most technical colleges in South Africa created an immense curriculum gap across them. This gap is the source of the problem of equity that is crucial to the integrated education and training system.

In view of the above obstacles, one of the structures that has been designed to assist the integration of the education and training systems is the NQF that emphasises an outcomes-based education. It aims to align horizontally and vertically the experiences and qualifications of the worker in order to encourage cross-curricular activities that would breach the gap created by the past system. It creates entry and exit points that allow for individual flexibility and development. This would help to widen the access to education services and could address the issue of equity. According to the Department of Labour's *Green Paper on Skills Development Strategy for Economic and Employment Growth,*

> The NQF will support higher quality education and training through setting national standards against which competencies acquired in education and training programmes can be measured. It will also allow workers to gain recognition of their skills against the NQF and increase their mobility within the labour market (1997:14).

Technical Colleges serve as delivery centres for the curriculum of the integrated education and training system. Since implementation is key to effective policy processes, the Department of Education's *Curriculum Framework for General and Further Education and Training* (1995) emphasises that

> ... recognition in the curriculum design and development process must take into account the range of forms of delivery that should and must be made available to learners to allow them to access learning according to their needs and circumstances (p.28).

Over the years, technical colleges have had the derogatory image of offering a lower standard of education than other tertiary institutions. In order for these colleges to play a critical rôle in the new system, there is the need to transform them into centres of excellence. It is crucial to examine how these colleges intend to align with the NQF to raise the standard of education they offer in order to play a pivotal rôle in the economic development of the country.

RATIONALE AND AIMS

Often, issues on the policy agenda reflect the interests of various policy actors. A range of social, economic and political factors influence policy formulation as an on-going process. Such influences may well be in conflict with the design and implementation of various policies, from which the curriculum of technical colleges is by no means exempt. Policies are often not implemented as they are intended to be. Sometimes, this may be due to unrealistic stands taken in policy formulation. It therefore becomes necessary to examine factors that have influenced curriculum formulation for technical colleges. Ineffective implementation could make technical colleges circumvent the objectives of the formal curriculum. This could cause setbacks to the ongoing integration of the education and training system. As the national policy framework for education and training is changing, it is vital to see if the technical colleges are feeling the beneficial impact of these changes or not.

This research examines factors that affect changes in curriculum construction and implementation in technical colleges in Gauteng. It explores what and who influence policies that deal with the development and implementation of technical college curricula. To do this, it investigated views of selected stakeholders on curriculum changes, the curricula formulation process and its implementation in six technical colleges in Gauteng. This is important in assessing the relationship of education to the workplace. Interests of employers were represented through interviews with a selected member organisation of Business South Africa (BSA), the Electricity Supply Commission (ESKOM). An official of the Congress of South African Trade Unions (COSATU) represented employee's views. Another stakeholder interviewed was the director of the Vocational Education and Development Corporation (VEDCO).

Also, principals of six technical colleges were consulted and interviewed on their views about the changes in the formal curriculum and the curriculum-in-use. They are Johannesburg Technical College, Pretoria Technical College, Atteridgeville College for Vocational Education, Thuthumatla Technical College, Highveld Technical College and Vaal Career College. Interviewees were asked about their views on the curriculum formulation process, changes taking place, curriculum implementation and the expected impact on the economic development of the country.

Having provided a contextualisation and brief overview of the challenges facing technical colleges in Gauteng as they implement changes in curriculum, chapter two deals with both local and international debates on the integration of education and training. It also explores literature on curriculum change and development, as well as its implementation in technical colleges. The variety of the literature is aimed to give a holistic view and understanding of the study.

Chapter three sets out the research methodology employed. The nature of the research sample, the methods used for collecting data, issues of validity and reliability, as well as the use of triangulation in the study, are explained.

Chapter four provides a description and analysis of the research findings and links the findings to the literature surveyed in chapter two.

The research draws conclusions in chapter five on the views of various stakeholders on the curriculum changes, formulation processes, its implementation in technical colleges and what this means for economic development in Gauteng. It ends with recommendations that could bring about positive changes in the technical college curriculum.

CHAPTER TWO

REVIEW OF LITERATURE

A current trend related to the transformation of the global economy has been the proposed integration of education and training systems. A number of writers have expressed the view that integration of education and training systems would produce an efficient labourforce that could cope with global economic and technological advancement (Carnoy, 1994; Saunders, 1994; Wilson & Woock, 1995; Brown & Lauder, 1995; Keating, 1995). This means that globally there has been a shift from the concept of education as a process of developing individuals' potential to education as a source of human resource development that will facilitate economic and social development. It is envisaged that this shift will have enormous implications for curriculum development and implementation in South Africa.

The focus of this study is on curriculum changes in technical colleges and how its implementation would prepare the individual to cope in the workplace. In order to examine these changes adequately as well as critically analyse the implementation process, it is vital to survey selected literature that reflects on the various factors that underpin the current paradigm shift within education and training. This literature will explore the local and international context in which the debate on the integration of education and training systems is taking place. Also, it will examine the effects of the social and political dimensions on curriculum implementation. The review will deal with issues of an integrated education and training system under four major themes. An introductory paragraph will set out the development of the argument in each of these themes.

(i) Curriculum changes and development, with a focus on technical colleges.
(ii) Current international debates on integration of education and training systems.
(iii) Integration of education and training in the South African context.
(iv) Curriculum implementation.

2.1 CURRICULUM DEVELOPMENT AND CURRICULUM CHANGES

INTRODUCTION

A review of debates on curriculum development and changes is pertinent to this study since it focuses on the technical college curriculum. The arguments suggest that the curriculum should be designed to address present and future social and economic needs. This means that the curriculum development processes would constantly deal with social, economic and political issues. It therefore suggests that a change in the curriculum could be termed as a response to the dynamics in society.

CURRICULUM DEVELOPMENT

Curriculum has been defined as the teaching and learning activities and experiences provided in schools (NEPI, 1992a; Taylor, 1993; Nkomo, 1993). It is the vehicle towards achieving the objectives of the education system. According to NEPI (1992a) the formal curriculum includes amongst other things: the selection of content to be taught; how it is arranged into subjects; programmes and syllabuses; skills and processes to adopt; modes of teaching and learning; and forms of assessment and evaluation.

The drive to narrow the gap between formal curricula and what exists in the workplace has recently become a much-debated theme during curriculum development. NEPI (1992a) argues that assumptions of what counts as valuable knowledge, basic skills and essential learning experiences are themselves socially influenced and contested. It also stresses that curriculum development and practices are often influenced by the economic and political context. It enumerates some factors influencing the formal curriculum as

> the learning and development of individual students; the nature of knowledge and developments in knowledge itself; the labour process of teachers, their values and interests; the values and interests of

> parents and communities, the changing needs and interests of the broader society, the values, entitlements and requirements of citizenship in a particular society; and the human resources needs of the economy (NEPI, 1992a:2).

Similarly, the National Department of Education (NDE) discussion document on *Curriculum Framework for General and Further Education and Training* (1995) argues that there is a crucial need for curriculum development to take into cognisance the requirements of the world of work, in addition to the diverse needs of all people. This is because it is imperative to maintain a healthy balance between central, provincial and local interests and involvement during the preparation and formulation of policy. It states that

> at all levels of curriculum development (from the national, macro-level to the provincial, meso-level and institution-based micro-level), the nature of particular areas of learning, the needs of target groups of learners and the demands of the changing socio-economic context should inform the formulation of outcomes (1995:8).

Also, it is has been envisaged that the introduction of the NQF will assist in the development of an integrated curriculum for all (NDE, 1997). The NQF aims at promoting horizontal and vertical interaction of education and training and could facilitate cross-curricular activities, such as generic skills and general knowledge. Also, the proposed OBE will base the 'curriculum design, content and delivery on the assessment of the knowledge, skills, attitudes and values needed by both learners and society' (NDE, 1997:17).

Writers like Bot (1992) and Vorhies (1992) identified curriculum innovation as an urgent issue to consider during the integration process: firstly because of the need for more relevant content and, more importantly, because the curriculum needs to be adapted for a more heterogeneous school population. Vorhies emphasises that in order for education to serve the needs of the market, educational services should be made available to all. He is of the view that since integration of the education and training systems could act as a catalyst for general economic and social development, there should be commitment to what learners know and can do at the

end of a learning programme. In order to achieve this, he encouraged the development of a flexible and relevant curriculum.

Following the debate, writers such as Katzao, 1989; King & van den Berg, 1991; and Young, 1993 further argue that in consideration of the social diversities, the curriculum could not be seen to be neutral or removed from patterns of power. This places the formulation of the curriculum in a critical position that is central to various developmental processes in the society. Katzao notes that

> When the ends have not been determined, and the means available are unknown, teachers and developers are faced with a problem that demands resolution. It is under these circumstances that curriculum development and good teaching demand creative, careful and sensitive planning - not only in terms of the task to be accomplished, but also in terms of the learners involved (1989:15).

Another writer, Saunders (1994), suggests a coordinated approach between curriculum and economic interests as a guide to national development. According to her, the development of a work-related curriculum, through technical and vocational education, will result in instances of creative thinking that attempt to heal the splits between knowledge and skills; theory and technology; understanding and experience (p:82). She notes that a work- related curriculum designed in partnership with education and industry would ease the transition to adult and working life. She advises that the objective of such partnership should take into account the labour market and its likely shifts, the local educational system and any upcoming changes, the existing initiatives and networks as well as the 'lobbying power' and commitment of particular individuals.

Though numerous advantages of an integrated education and training curriculum have been identified, there seems to be growing concern that education and training systems will focus on equipping individuals with skills for the workplace at the expense of effective general education. In reaction to these fears, some writers note that there is a growing need to encourage flexibility, adaptability and creativity in the education system (Lynch, 1991; Saunders, 1994). These writers believe that

an in-depth understanding of curriculum content could be gained through an integrated education system that emphasises both theory and practical learning. In criticism of one line of education, Lynch regrets that

> ... our educational system is designed to teach people to do things the one right way as defined by the authority figure. We are taught to recite what we hear or read without critically interacting with the information as it moves in and out of short-term memory. In this exchange, the information leaves no tracks, and independent thinking skills are not developed (1991:64).

The argument portrays that curriculum planning and development have become an elaborate and involving task. These have partly challenged the curriculum construction and development for technical colleges. The implication is that technical colleges should begin to move away from their rôle as a delivering system for a discreet and fragmented curriculum to a place where people cultivate their innate yearning for learning. They should offer both formal and informal education that involves intensive skills training as well as knowledge acquisition. The dilemma **is how can the curriculum be developed to enable technical colleges meet the social and economic demands of a dynamic society?** In order to seek answers to these problems, it is crucial to review briefly some literature on the technical college curriculum.

TECHNICAL COLLEGE CURRICULUM

The fruitless search for an effective curriculum for technical colleges could be attributed to inadequate research in this area of education. The abject lack of literature on technical college curriculum development on which to rely intensifies the seriousness of this research study. It could be in search of such material that prompted Rautenbach to state that

> Technical and vocational education need not only to develop understanding of complex technological processes but also the capacity to cope with technological change.... The function of technical and vocational education is therefore to develop the mixture of skills

needed by the career field for which a person is preparing himself (1992:358).

The literature suggests that there is immense distinction between academic and vocational education (Ross & Kurth, 1985; Chisholm, 1992). These writers regret that the technical college curriculum is neither challenging, innovative nor enriching. They complain that is designed for the benefits of the workplace and demands a change of such curriculum development. Ashmore (1987) posits that technical and vocational education should aim to provide lifelong learning that will assist the individual in their daily interactions. She states that objectives of vocational and technical education should be towards career planning, business understanding, application of skills, community understanding, self-understanding, orientation to change and creativity (Ashmore, 1987:150). According to her, technical and vocational education should be more of an entrepreneurship education that will focus on personal growth and development that will, in turn, yield economic benefits.

CURRICULUM CHANGE

Change is inevitable in a developing and dynamic society. As education and training play a major rôle in the social and economic development of the country, the curriculum needs to change to meet the dynamic needs of the people. Change in the curriculum can be as a result of interaction with a number of political, economic and social issues. Carnoy (1994) refers to education and training policies as key elements in the process of change occurring in the world economy. He emphasises that the association of education with the 'capacity to produce' is inherently correct in terms of five variables: literacy; numeracy; socialisation to 'competence'; the self-confidence to learn new skills; and the ability to adjust to change (p:7).

A number of writers note that educational change is a process of coming to grips with the multiple realities of society (Fullan, 1989; Cohen & Tyson, 1989; Schultz, 1989). They emphasise that policy-makers should recognise the need for change

and have a good understanding of the environment where change will take place. According to them, a better-educated labourforce will create the conditions for investing in new kinds of production and new organisations of production. They state that the current change in the curriculum is in line with the move to produce more educated people who can be trainable into new jobs. Schultz (1989) refers to this shift as 'adjustment to disequilibrium'.

The argument for change in curriculum development is that for people to develop their potential adequately, great care should be taken about what and how they learn (Rautenbach, 1992; Bonstingl, 1992). These writers maintain that changes that should occur in the curriculum and learning process should consciously develop the thinking skills of students through practical learning. For Bonstingl,

> Education is good for the individual, the economy, and society if it creates processes that will encourage continuous improvement of individual abilities, the expansion of one's interests, and the growth of one's character (1992:67).

On his part, Rautenbach (1992) argues that an effective restructuring of the South African education system will remain remote unless the curriculum of technical colleges is revised from the narrow confines and structures of apartheid and quasi-academic education. This means that curriculum restructuring should focus on how students learn and are taught. He notes that changes are taking place as society grows and stressed that it has become necessary for technical colleges to move away from rote learning and engage in practical use of what is learnt. According to him,

> South Africa can solve its development problems only if education and schooling are restructured; firstly by addressing the problems of cognitive development and by developing an understanding of the industrial future of this country; and secondly by introducing a balanced system of schooling in which technical and vocational education as well as quality academic education will play complementary and indispensable rôles (1992:369).

What the formal curriculum means in practice is profoundly affected by the resources and texts which support the teaching and learning process (NEPI, 1992a). The "curriculum-in-use" therefore means different things to different schools because the formal curriculum changes as it interacts with variables in school practices and experiences. In South Africa, some of the reasons for changes in the curriculum are poor outcomes of learning institutions, like technical colleges, in terms of human resources and skill development; the use of outdated equipment; irrelevant curriculum; and course materials. There are also problems with trainers that do not respond to industry skill requirements, and narrow skills training by private training providers based on specific industry demand. It is believed that such a narrow concept of education and training will hinder individual flexibility and will pose a problem in future economic and technological growth.

Also the quest for curriculum change in South Africa arises from the need to train an efficient workforce for the economy. Agreeing that the curriculum is socially constructed, the Discussion Document on *Curriculum Framework for General and Further Education* (1995) expounded the vision that a significant paradigm shift is required in the way people think about learning and the way education and training are organised. The social, political and economic needs that influenced such a paradigm shift can be traced to the curriculum framework that aims:

> to meet the right to relevant, quality basic education and training for all, whilst also paying increased attention to areas such as mathematics, science and technology as ways of preparing the nation for the future (1995:12).

In addition, the Department of Labour *Green Paper on Skills Development Strategy for Economic and Employment Growth* (1997) stressed that changes in the curriculum of technical colleges should aim to enhance individual development and competence in a specified and yet dynamic social or economic context. It states that:

> the primary goal of the skills development strategy must be to raise the competence, motivation and adaptability of the workforce, to

> support increases in productivity in the workplace and rising employability of the working age population (1997:65).

For competence debates in the context of South Africa, Christie (1997) notes that the OBE approach and the NQF would allow for different learning contexts, curricula, assessment, and learning pathways. She notes that there has been general agreement that narrow, behaviourist and fragmented conceptions of competencies are undesirable and expresses fear that emphasis on outcomes may bring rigidity in curriculum, pedagogy and assessment (p:63).

2.2 *CURRENT INTERNATIONAL DEBATES ON INTEGRATION OF EDUCATION AND TRAINING SYSTEMS*

There are two schools of thought in international debates on the integration of education and training systems namely the human capital theorists and the proponents of social democracy. The central claim of the human capital theorists is that an integrated approach to education will help train individuals who will function effectively in the workplace. These theorists are of the view that development of the human resource base is central to the economic growth of a country. In contrast, the advocates of liberal and social democracy argue that educational goals should not be influenced by economic imperatives alone. The central claim of their argument is that an integrated education and training system will help develop the individual potential that is essential for human development. The arguments of both schools of thought will be presented.

HUMAN CAPITAL THEORY

Human capital theorists argue that education is a form of investment that contributes to economic development (Psacharopoulos & Woodhall, 1985). They claim that the economic development of any country is a reflection of the level of education of the working populace. In their view, both the individual and society

stand to gain economically when an effective education system is put in place. They claim that individuals will become more productive when equipped with skills and knowledge relevant to the world of work.

> Education represents both consumption and investment. On one hand, it is valued for its immediate benefits, but on the other, it helps to create income in the future by providing educated workers with skills and knowledge that enable them to increase their productive capacities and thus receive higher earnings (Psacharopoulos & Woodhall, 1985:15).

These theorists point out that the World Bank has realised that education is not only a basic human right, but also a basic component of social and economic development. According to them, the World Bank has over the years, financed projects that equip the individual with skills that would enhance the productive capacity to cope in the workplace.

In line with the above, the World Bank policy paper on *Vocational and Technical Education and Training* (1991) notes that in order for social and economic development to take place, it is a necessary prerequisite for the workforce to possess skills that can adapt to the changes in the economy. It notes that workers use a wide range of general and specific skills that should be reflected in vocational and technical college curricula. The policy document expresses the view that as the complexity and responsibility of job increase, specific skills become less important than higher-order conceptual skills and theoretical knowledge. It advocates an education system that will train individuals with both the theoretical and practical components needed for economic growth.

Along similar lines, a number of researchers argue that human capital investment through education has a multiplier effect on the economic growth of the country. These researchers have shown that education contributes directly to the growth of national income by improving the skills and productive capacities of the labourforce (Hicks, 1980; Wheeler, 1980). In a number of studies, these researchers adopt a 'growth accounting approach' and the 'rate of return on human capital' approach to

measure the contribution of education to economic growth. The growth accounting approach is based on the concept of an aggregate production function. This concept links output (Y) to the input of physical capital (K) and labour (L), while the rate of return on human capital is based on the performance of individuals in terms of the level of education and skills that they acquire (Psacharopoulos & Woodhall, 1985: 17).

The findings of these researchers show that a substantial proportion of the rate of growth of output in both developed and developing countries is due to investment in education. From their findings, the researchers draw the conclusion that education does not only affect economic growth, but also has an immense effect on other general investments that have links to the growth rate. They stress that developments in other sectors will not be realised effectively if they are supported by educational investments.

In line with this argument Bosworth & Simpson (1995) argue that in order to appreciate the central rôle of education and training, it is important to understand both the mechanisms that determine investment in human capital and the way in which education and skills impact upon economic performance. In an analytical study of economic recessions in the United Kingdom, these researchers express the view that economic development will witness an upturn when the education system is designed to challenge economic problems. They argue that the first and crucial step in understanding the level and effectiveness of education and training is to recognise the existence of two interrelated markets, one for training and the other for trained people.

Bosworth & Simpson conclude that imperfections in the markets for trained people can be traced to inadequacies in education and training. According to them, the problem of low productivity in the economy is on the increase due to the distance between the needs of the industry and the curriculum offered in educational institutions. They argue that there is a correlation between the education system and the labour market, adding that such a perception has informed the current

global intention to narrow the gap between education and the workplace. According to these researchers, there is a growing need to encourage flexibility, adaptability and creativity in the education system.

In addition to the on-going debate, some writers posit a link between education, technology and economic development (Hughes, 1987; Thomas, 1995; Unterhalter and Young, 1995). According to them, technological and economic advancement can be attained through an integrated system of education that deals with total individual development and skills training. In exploring the relationship of education and training to technological and economic development, these writers argue that a continued academic-vocational divide will not be in line with global economic reconstruction and technological advancement needed for development.

Also a number of writers identified the changing forms of production in the workplace as a major factor influencing integration of the education and training systems (Piore & Sobel, 1984; Brown & Lauder, 1995). The major debate is whether the Fordist mode of production is being, or should be, replaced by Post-Fordist techniques. The Fordist production mode is characterised by a moving assembly line where workers attend to the products as they move along the conveyer. This mode of production focuses on standardised mass production and denies workers the opportunity for individualised input. On the other hand, the Post-Fordist production mode involves high-tech and multi-skilled forms of production. This requires workers who are flexible, adaptable, innovative and creative. These workers need to be highly trained in order to possess skills and knowledge that can help them compete in the dynamic global market.

Given global technological advancement and how it has been affecting changes in the workplace, there have been enormous tensions surrounding the drive to move from Fordist to Post-Fordist modes of production. A number of writers have diverse views on factors underpinning this shift and how education can be tailored to meet the production modes used in the workplace.

Brown & Lauder (1995) argue that advances in new technology are transforming both the social and the economic world. They note that changes in technology have condensed the world into a global village that is competing for limited time and space within a highly competitive market. The central claim in their argument is that the current shift in the production of goods from a Fordist to Post-Fordist mode is underpinned by the need to utilise effectively and adapt to new technologies that facilitate economic growth. They note that:

> the intensification of global economic competition and the growing concern about the environment will have profound implications for the way capitalist production is organised and for the way human resources are deployed (1995:2).

In their view, the Fordist production mode encourages education systems that restrict human abilities for workers who have to adhere to a particular production hierarchy. They note that this mode of production denies the individual the ability to be flexible, creative and innovative, and cannot be suitable in the new technological era. They stress that there is an increasing need for industrial societies to organise social relations in employment, education and training on the basis of high trust and high ability. Such demand, according to them, has led to social and economic transformation with serious implications for the education and training systems. For them,

> Advances in information technology have contributed to increased levels of productivity and to the development of flexible forms of accumulation offering the opportunity of high-value, low-volume manufacturing in place of the mass production for standardised products (1995, p. 19).

These writers claim that in order to keep pace and be able to compete in the global economic market, industrial societies need to re-evaluate factors, such as education, that contribute to economic growth. They note that the pace of economic development of any country is determined by the quality of the labourforce produced by education and training. In order to have productive workers, they advocate the divisions between academic and vocational education should be ended. For them, the formal systems of education and training should be geared to

meet the challenges that industrial societies are confronting in the face of technological advancement. They state that integration of education and training systems is necessary since

> in these 'new times' the ability to compete in the global market has significant implications for existing patterns of work and education, as well as for the production of goods and the distribution of services (Brown & Lauder, 1995:1).

Another reason advanced by the human capital theorists for the integration of education and training systems is that this will assist in the development of the human resources of a country. Some writers note that an effective education system will form the foundation for a strong human resource base that will produce people who can function in a technological and highly demanding economic society (Wilson, 1991; Carnoy, 1994; Saunders, 1994; Wilson & Woock, 1995; Brown & Lauder, 1995). The central claim of their argument is that a skilled and efficient human resource is one of the most crucial inputs of a modern economy.

Wilson (1991) embarked on a comparative study to examine the growth and reform of technical-vocational education and training in Indonesia and Malaysia. According to him, one measure of the external efficiency of the education system is its compatibility with employment opportunities. In support of human capital theorists, Wilson argues that an education and training system can enhance the economy of a nation by building an effective workforce. His findings reveal that the adoption of an effective technical-vocational education system by both countries led to immense economic development and has increased the demand for graduates of technical colleges.

The notion of competence is also crucial to the debate on the integration of education and training systems. It has been argued that a competent workforce is essential for economic growth. Competence is defined in terms of four interrelated components as:

> the ability to perform a set of specific tasks - the ability to use tasks in an appropriate way to achieve the overall job function - the ability to respond to breakdowns in routines, emergencies, etc. - the ability to adapt one's work performance to natural constrains imposed by particular working environments (Bartram 1990:55-56).

Some writers argue that a competent workforce can be attributed to an effective education and training system (Bartram, 1990; Carr, 1993; Hyland, 1994; Keating, 1995). These writers posit that skills training on the basis of a sound general education will provide a strong foundation for a competent and effective labour force. They note that an effective fusion of education and training will assist in the development of individual potential.

In addition, research undertaken by a number of international agencies, shows that competence is enhanced when the individual is exposed to both generic knowledge and specific skills (ILO, 1981; UNESCO, 1990). These agencies described competence as the ability of the individual to exhibit outcomes. They note from their studies that inculcation of general education and skill training increases individuals' flexibility, creativity, mobility and motivation at work. According to these organisatons, understanding of the subject matter is usually better when theory is put into practice.

The arguments presented by the human capital theorists suggest that there would be immense economic growth, human resources development and effective production and services through integration of education and training systems. However, the liberal and social democratic proponents have criticised some of the above arguments.

SOCIAL DEMOCRATIC PROPONENTS

The liberal and social democratic proponents have criticised educational goals that are mainly influenced by economic factors (Eggelston, 1994; Hyland, 1994; Winch, 1996; Apple, 1996). These writers argue that education should focus on addressing social problems like equity and access as well as involve the total development of

individual potential. According to them, the shift towards an integrated education and training system should not be tailored to a specific economic demand. They stress that such a step will frustrate the need to make education accessible to all. It will also direct the provision of education towards training the individual solely for the purpose of employment. These writers encourage a broader perspective of educational goals that will be able to develop individuals' abilities in order for them to operate in life situations.

In terms of access, Eggleston (1994) argues that widening access to education is of major importance in achieving equality of opportunity. He stresses that it is vital to create wider participation especially in higher education for groups who have been traditionally excluded or neglected. He refers to access to and participation in education and learning as crucial elements for realising policy objectives in most countries. He notes as a source of encouragement and point of reference that

> almost universally, policies are aimed at increasing participation and access in general, as the realisation that a highly trained, adaptable, articulate and computer literate labour force is an essential concomitant of economic success in the post-technological world to which governments strive to belong and to survive within (p:25).

He stresses that widening access to education may produce two types of equality within the system, namely 'strong' and 'weak' equality. According to him, 'weak equality' simply opens access and participation to all comers without facilitating wider participation from previously under-represented groups of students. 'Strong equality' involves educating members of disadvantaged groups to aspire to and compete for opportunity in order to achieve a new and more positive self-image (p:28).

Eggelston regrets that enhancing access and participation are subject to economic and cultural constraints that regularly inhibit, if not deny, access. He notes that expansion of access and participation in learning could result in major expenditure of the national income. He reiterates that irrespective of the financial implications, it is a worthwhile venture to increase access to social services like education.

In his own criticism, Apple (1996) expresses regret at the notion that a good education is one that is directly tied to economic needs. He condemns the drive for the so-called 'efficient' education system that fails to take into account the political and social policies that underpin the provision of education. He emphasises that the drive to reorganise education institutions to have a sense of economic needs cannot be a way of solving economic problems like unemployment, global competitiveness and profit maximisation.

For him, the increasing critique of the education system as anti-entrepreneurial, wasteful and divorced from the needs of society has intensified due to severe international competitiveness, technological advancement and maximisation of profit. He argues that economic expansion can take place when an enabling environment is created and does not necessarily rely on vocalisation of the curriculum. According to him, there is the need now to address such social and political factors as crime, gender, and racial elements that constantly threaten society.

He further argues that emphasis on high-skill training for economic growth is not a reflection of future trends in employment opportunities. According to him, the era of technological advancement will put a number of highly skilled workers out of jobs, thus making a mockery of the emphasis on vocalisation of the curriculum. He notes that service jobs such as caterers, nurses, waitresses, cashiers and sales persons will be more in demand than will highly skilled workers in future. For him, the drive towards producing high-tech education systems is a myth that will satisfy only a small part of the population. He warns that the result of such education systems will be production of one-sided economic growth that may create a highly capitalist society. He expresses fears that a highly capitalist society would incubate such social problems as inequalities, unemployment and crime that would stifle individual growth.

In line with this criticism, Winch (1996) argues that education should not be so narrow as to serve a specific purpose. He stresses the need for a broader view of

education that embodies such traditional values as individual development, knowledge acquisition and moral values in addition to fostering economic growth and social cohesion. He notes that the aims of education are contested by various social actors and expresses optimism that a consensus can be reached when the concept of education is re-articulated.

In addition to the above, there has been dispute in the belief that education is responsible for changing the economic growth of a country. The findings of a research study carried out by the *Organisation for Economic Cooperation and Development* (OECD, 1989) reveal that despite the attempt to impart individuals with skills, the unemployment rate seems not to decline. According to this report, the provision of education is subject to social questions and issues that can affect its services. It notes that

> decisions concerning the structure and content of education and training programmes are never simply technologically determined, but always involve a choice between alternative policies (quoted in Brown & Lauder, 1995: 6).

Following this point, Jamieson (1984) argues that although education can facilitate technological and economic development, the individual should not be restricted within a specific skill. He argues that since social and political factors influence economic growth, education should not be singled out as the cause of economic depression in any country. He expresses regret that politicians and economists find a scapegoat in the education system and use the opportunity to market and promote their own educational goals and economic policies.

In his contribution, Hyland (1994) challenges the notion of competence as a basis for integration of education and training systems. He is pessimistic that when education is narrowed to focus on economic growth, the emphasis on quality or competence could be compromised. He argues that since education is championed to satisfy economic demands, the issue of competence raises a number of questions like 'competence for whom?' and 'for what purpose?' In addition, he argues that if the curriculum is tailored to serve a specific industrial purpose, it

would deny individuals the opportunity to be flexible and innovative. He criticises the view that competence will improve in the workplace due to emphasis on skill training. For him, it would be difficult to predict and measure the competence levels of workers due to the education and training received in contrast to the motivation from the workplace in terms of promotion and salary increases.

Hyland traces the emphasis on competence to 'social efficiency' theory, which stresses the ability of the individual to satisfy national social and economic needs. He argues that this is a conservative ideology that stresses the importance of relating training to the specific needs of industries. He notes that the recent campaign for the reformation of the curriculum along utilitarian lines in most developed countries is in line with 'social efficiency' that challenges the society to fit each individual to a workstation. Hyland that it will be difficult to determine how unemployment will be reduced through skill development, adding that there is an enormous problem in changing the attitudes and perceptions of employers towards vocational education.

In terms of education as a response to the changing forms of production, some writers identified problems with the Post-Fordist mode of production being championed by the human capital theorist. These writers note that the Post-Fordist mode has a highly specialised concept that trains the individual in a particular skill thereby making it difficult for him/her to adapt to the changing nature of the workplace (Watts, 1985; Futter, 1992; Jaakkola *et al.* 1995). These writers stress that the education and training systems should not be concerned mainly with the economic, technological and social needs of the society, but should concentrate on the total development of the person. They posit that education is more than an instrument to achieve a better working life. Watts (1985) insists that education has a close relationship with the world of work, but is not merely about preparing the individuals for employment. In defining academic education, he argues that education is at best concerned with the

> development of the individual's full range of abilities and aptitudes; the cultivation of spiritual and moral values; the nurturing of imagination

and sensibility; and the transmission and reinterpretation of culture' (p:10).

The notion that technological advancement will require highly-skilled workers has been challenged (Spenner, 1985; Kann *et al.* 1991; Donaldson, 1992). These authors argue that general education should be able to inculcate basic skills to equip the individual for the workplace and note that vocationalisation of the academic curriculum will not necessarily address the problem of unemployment. Another writer, Spenner (1985), emphasises the need to invest in higher quality academic education rather than specific vocational education. He explained that in some cases the creation of new jobs requires different and not necessarily higher skills. He argues that even when higher level skills are needed, lower level skills are required at the same time.

Similarly, a number of writers argue that some countries have not reached the stage of development that requires the kind of high-skilled labour needed in Post-Fordist production modes (Bacchus, 1991; Kann *et al.* 1991). They argue that developing countries need low- and medium-skilled workers that will deal with the problem of unemployment as well as be geared towards the redistribution process. According to them, high-skilled labour is too specialised and involves high-tech machinery with which most individuals cannot cope. They also note that the use of high-tech machinery can increase unemployment since most industries would prefer employing a few multi-skilled workers.

In his argument, Jaakkola *et al.* (1995) note that integrated education will develop students' skills for lifelong learning used in inventing new knowledge, solving problems and developing themselves in the interaction and dialogical processes within the environment. It is about creating pedagogic worlds in which students have to be real learners using earlier knowledge as the fuel for creative thinking and knowledge construction.

Lending credence to education as a source of knowledge acquisition, Futter (1992), cited in Bonstingl (1992) emphasises that:

> We must give [students] certain key intellectual skills - analytical thinking, critical thinking, the ability to make judgements, to reason quantitatively, to balance opposed points of view. We must focus more on how to learn, how to think (p:76).

CONCLUSION

The International literature reviewed suggests that the integration of education and training is related to the major process of revamping the economy. Though some writers acknowledge that social and political factors contribute to economic problems, others believe that economic problems will continue if the education system is not effectively integrated and interwoven with technological and economic growth. There is a general belief that an individual trained in both general knowledge and skills will be creative, flexible and innovative in a challenging and dynamic society such as ours. More specifically, the various arguments on the reasons for integration of the education and training systems reiterate the need to re-examine the formal education curriculum content and modes of teaching in relation to the various modes of industrial production.

2.3 INTEGRATION OF EDUCATION AND TRAINING SYSTEMS: THE SOUTH AFRICAN DEBATE

The South African education system is going through a transformation process along with political transformation. There is a drive to integrate education and training under a National Qualifications Framework (NQF) which is aimed at creating both vertical and horizontal mobility, and multiple entry and exit points within the system. The proposed integration of education and training in South Africa can be defined partly as a reaction to the ongoing global debates on the need to close the gap between vocational training and general education referred to in the previous section. This paradigm shift is also aimed at redressing social imbalances and economic problems associated with past educational policies (Chisholm, 1992; McGregor, 1992; ANC, 1994; NTB, 1994). Social imbalances

include educational inequalities and denial of access to the majority of the population, while economic problems include issues of redistribution and growth. The literature reviewed in this section centres on the following sub-themes:

(i) Policy proposals
(ii) Local debates
(iii) Forms of production

(i) POLICY PROPOSALS

Bantu Education, as practised by the apartheid regime, denied the provision of quality education to the majority of South African people. The result is that most individuals have not been equipped with adequate knowledge and skills to enable them contribute effectively to economic development. A number of policy statements acknowledge that the past systematic exclusion of the majority of the populace from structured education and training programmes accounts for the poor economic and human resource development in the country (National Department of Education's (NDE), *White Paper*, 1995; Department of Labour's (DOL), *Green Paper*, 1997; Department of Finance's, *GEAR*, 1997). They stressed the need for capacity building and empowerment that would enable the individual to contribute to effective growth of the country. Human resource development is viewed

> as a process in which the citizens of a nation acquire the knowledge and skills necessary both to specific occupational tasks and to other social, cultural, intellectual and political s that are part and parcel of a vibrant democratic society (NEPI, 1993:167).

In anticipation of a new democratic government, the ANC Discussion Document on *Policy Framework on Education and Training* (1994) pointed widened to access and participation in education as crucial to the success of democratic governance as well as for economic growth. This policy proposal, put out before the ANC fully assumed power, stressed the need for changes in education that would afford individuals the opportunities to develop their potential. It argued that empowerment and capacity building could only come about when all individuals were given access

to quality education. It insisted that human resource development would be a unified part of a broader economic restructuring depending on individual knowledge, skill growth, global competitiveness and technological advancement. In order to achieve this, the document proposed unlimited access to education and training for all South African citizens. It stressed

> the need for equity and redress, the need to continually upgrade skill levels in line with the rapidly changing and dynamic nature of the world economy and universal knowledge base; to recognise the validity and interdependence of all forms of knowledge and the value of prior learning and experience (1994:15).

Following the expectations enumerated in the ANC (1994) proposal, the *White Paper on Reconstruction and Development Programme* (RDP, 1994) anticipated that widened access to education and training is the way to rebuild the country. The policy proposal set out to empower the citizens as a means of redressing social and economic problems. This step championed the restructuring process through the integration of the education and training systems with the NQF as its vehicle. The focus of the restructuring process is to introduce greater flexibility of structures that will enhance mobility between learning contexts, and build quality on 'the scaffolding' of a National Qualification Framework (NQF). The NQF is a system that recognises and co-ordinates knowledge, skills and experiences acquired through formal and informal training. The NDE *White Paper on Education and Training* (1995) as one of the early education policies of the Government of National Unity (GNU) states that

> an integrated approach to education and training, linked to the development of a new National Qualifications Framework (NQF) based on a system of credits for learning outcomes achieved, will encourage creative work on the design of curricula and the recognition of learning attainments wherever education and training are offered (1995:15).

The position taken by the NDE *White Paper on Education and Training* (1995) buttressed the need for widening access to education and training. It notes that the disparity between education and the world of work can be addressed through an

integrated system of education that aims to equip individuals with the skills and knowledge required for the workplace. It states that 'appropriate education and training can empower people to participate effectively in all the processes of democratic society, economic activity, cultural expression and community life' (1995:17).

It is important to note that though integration of education and training are in process, the Departments of Education and Labour remain separated. The ANC (1994) Discussion Document on *Policy Framework on Education and Training* has anticipated that the two departments will be merged into one ministry. Presently, the Department of National Education deals with education and general knowledge, while the Department of Labour focuses on training and skill development. This division explains why there is a *Green Paper on Skills Development Strategy for Economic and Employment Growth* by the Department of Labour and a *White Paper on Education and Training* by the National Department of Education. It is also crucial to note that the policies of these two departments are interrelated and do not separate out neatly.

The DOL's *Green Paper on Skills Development Strategy for Economic and Employment Growth* posits that there is the need for the workforce to be competent in the workplace. It noted that the working environment is characterised by the increasing use of information, more complex technologies and a general rise in the skill requirements of jobs. It notes that the demand of a more complex and changing economy demands the services of a well-trained and equipped workforce. According to the Green Paper,

> Skilled people are a fundamentally necessary part of any economic and employment growth strategy, and that re-establishing the linkages between learning and working is a condition for growth (1997: Foreword).

Though a number of the policies outlines the need to address social imbalances and individual growth, the DOF's *Growth, Economic and Reconstruction Strategy*

(GEAR, 1997) differs from them. It is a macro-economic, human capitalist policy tailored to the economic benefits of investment in education. The GEAR document explains that a viable economy with an efficient human resources base would increase productivity. This will foster an accelerated redistribution effect in terms of creating employment, producing high quality products, expanding the export market and becoming globally competitive.

> Accelerated economic growth associated with stronger employment creation is the key to continued progress towards an equitable distribution of income and improved standard of living for all (1997: Appendix 1).

The GEAR policy believes that widened access to an integrated education and training system will make economic dreams realisable as more people will be equipped with skills to make them employable. The document claims that anticipated economic growth could take place if noticeable improvement in education, skills, labour effort and management were attained. It stressed that enhancing the level and effectiveness of training across all employment sectors is central to the economic growth strategy.

> Training underpins productivity improvement by enhancing human capability - across all labour market segments and product lines - to exploit technological flexibility and add value on competitive terms (GEAR, 1997: 8.4)

1.4) *LOCAL DEBATES*

International indicators have shown that investment in human resource development in South Africa is inadequate. The *World Competitiveness Yearbook* (1996) placed South Africa last out of forty-six developing countries in terms of human resources development performance and other labour market indicators. This poor record has been attributed to poor performance in the field of education and training. This situation partly explains the current shift in the curricula and organisation of formal learning in the education and training systems. It is believed that through an integrated system, the quality of the workforce will be enhanced.

A number of writers have argued that the recent paradigm shifts in South Africa's education system are geared towards equality, redistribution and human resource development (Chisholm, 1992; Christie, 1994; 1995). Christie notes that ANC policy framework foreground education as a basic human right for all. She regrets that the racial divisions that led to the disparities in education and training in terms of access, content, and equity created a system characterised by relatively low-participation, a high-selection and comparatively poor quality for the majority of students. Christie argues that the syndrome of low skill and low participation that characterises the South African market can be addressed only when the education and training systems are considered integral in relation to each other. It is important to note that new policies are needed to redress this, in terms of both equity and human resource development. She agrees with Brown & Lauder (1995) that 'It is more important to focus on the ways in which skills are linked to economic development trajectories than to concentrate on questions of skill formation' (p:60). According to Christie,

> Given the generally low levels of education and training among the South African workforce, there is an argument for policies for investment in education and training as part of more general development strategies (1997:60).

Christie (1997) commends the introduction of the NQF as a major shift in the education system, being tailored to assist in the drive towards both equity and human resource development. She argues that the NQF is aimed at widening access to education and training that will be linked to human resource development policies. She notes that the global shifts towards skilled intensive production bring with them the need for a more qualified workforce, that can be trained through an integrated education and training system. She argues that there is an assumption that education plays a rôle in the discrepancy between shortages of certain types of skilled labour as well as increases in unemployment. She points out that one way of addressing the perceived mismatch between education and work would be a move towards bringing competencies and generic skills into the curriculum.

Writers like Chisholm (1992) argue that the reconstruction of social conditions for the urban working class and rural poor can be achieved through intensive learning programmes that embody skills training and cognitive development. She argues that education and training are the pillars that can help build a strong, stable and skilled working class, capable of transforming the conditions of production needed for economic advancement of the country. For Chisholm, education will remain academic if it does not provide the individual with the means to a livelihood. She attributes the problem of unemployment and low productivity to the 'academic' nature of Bantu Education. According to her, an individual with this kind of orientation certainly cannot make effective contributions to development.

> ...education is academic in so far as it is not grounded in real-life experience and students do not encounter it actively and experimentally in ways in which prepare them to play a in reconstructing a democratic society. Indeed, many innovations in school curricula and pedagogy have proceeded from the view that content should be made meaningful through being related to students' interests (1992:2).

Chisholm challenged the assumptions that schoolwork could be fitted directly to work needs because: (i) there is little evidence to prove that there can be a functional fit between education and the economy; (ii) the causes of unemployment cannot be attributed to the educational system alone; (iii) education does not create jobs but an economy does; and (iv) poor success of attempts in other contexts, to change pupils' attitudes and aspirations by introducing prevocational studies into the school curriculum, have been recorded (1992:12).

In contrast, Kraak (1992) emphasises the need to examine the linkages between the economy; vocational, education and training institutions; the labour market; and the rôle of state and employer organisations in human resource and economic development. He argues that the reason for the poor quality of the workforce is the inability to link education and training to the skill needed in commerce and industry. He employs the concept of 'mismatch' to describe disillusionment with the system of education that has failed to meet the changing human resources needs of the economy.

(iii) FORMS OF PRODUCTION

The point that South Africa, as a developing country, needs to develop a highly skilled labourforce required in a technologically advancing era cannot be over-emphasised. Some writers argue that the South African education system should embrace general educational knowledge and basic vocational skills that will facilitate the individual's transition into the workplace in the face of advanced technological developments (Donaldson, 1992; Kraak, 1992; Christie, 1994; Chisholm, 1995).

The central claims of the debate on forms of production as a major factor underpinning the current drive towards integration of the education and training systems are that: (i) the emerging gaps between education, training and the workplace have affected economic development; (ii) the skills of workers are not commensurate with technological and economic advancement irrespective of their basic educational knowledge; (iii) there is an inadequate number of skilled workers in industry to enhance productivity; and (iv) there is a global need to establish a correlation between industry and the education and training sectors to enhance development (Chisholm, 1995:10).

Generally, it has been noted that many countries have encountered the threat of exclusion from the new information revolution unless they are able to restructure their economies and expand education and training programmes with a focus on general education and high quality skill formation (Carnoy, 1994). The argument is whether South Africa, in adapting to the new information revolution should stay with the Fordist mode of production that is characterised by a low-skill but high-participation process, or move to the Post-Fordist that is, a high-tech, multi-skilled and low-participation production mode.

Some writers argue that South Africa is in need of a high-skill labourforce for industrialisation purposes (Chisholm, 1992; Taylor, 1993; Elliot, 1994; Christie, 1995). They argue that growth, redistribution, efficiency and equity are important

components for development to take place in post-apartheid South Africa. Christie argues that the global shift towards more skilled intensive production emphasises the need for a more qualified labourforce. She notes that such demand entails a sound knowledge base in general education that is transferable, rather than job-specific skills; versatility and flexibility; orientation towards problem-solving; encourages technological competencies; and enhances abilities to work in teams. According to Christie, Post-Fordism or not, economic development in South African requires better educated workers who are conversant with the mathematics and science required by technological developments and responsive to the changing patterns of work (1995:7).

Kraak argues against adopting one particular mode of production for a society that faces the challenges of satisfying various needs of different people. He points out that the inherited legacy of highly uneven capitalist development in South Africa presents huge implications for social policy, one of which is the problem of economic dualism. According to him, while some parts of the country have not reached the Fordist stage of development, others are at the Post-Fordist stage. He notes that

> many of the arguments for export-led competitiveness do not hold true for large parts of the country, which are rural and underdeveloped, and which serve as home to millions of the unemployed. These spatial inequalities pose a major responsibility for policy makers, who need to devise sustainable strategies which differentiate across diverse social and industrial settings, but which have the common aim of reducing social inequality (1995:186).

Kraak notes that the advantage of the Fordist production mode is that it helps in reducing unemployment by employing much unskilled labour, adding that its mass production system helps to sustain the economy due to its high demands. At the same time, he is critical of this mode of production because of its emphasis on low-skill training and employment that could deter effective technological advancement in a competitive global market.

Kraak views Post-Fordism as 'a concept which describes the radically changed conditions for competing on contemporary global markets' (Kraak, 1992:2). He notes that Post-Fordist methods of production for export-oriented industries need a larger corps of skilled workers that possess broad knowledge of computers, manufacture, quality control and management skills. Kraak acknowledges that a Post-Fordist production mode could help in advancing a competitive market through a highly-skilled labourforce that specialises in high-tech products. However, he fears that unemployment would increase if low-skilled workers were replaced with high-tech machines. According to him, great emphasis on such a mode of production should not be encouraged in a developing society that needs to build on its workforce. He therefore advises that in order to meet with technological advancement, a mode of production should be adopted that would create avenues to satisfy niche markets as well as cater for the needs of the masses.

Kraak attempts to create this balance by suggesting a Neo-Fordist production mode that would cater for both specialised markets and for mass production. Such a mode, Kraak believes would provide the needs of high-tech products by creating a niche market that would compete in global markets and satisfy the needs of the immediate economy by mass production. This means that few people would be trained in highly specialised skills to help in the production of specialised products, while the low-skilled workers would engage in mass production for the populace.

It is important to note that adopting a dual strategy approach, as conceived by Kraak, would entail a high level of technological capacity, research and expertise that would satisfy the needs of export-oriented industries. Also a broad package of social policies would need to be designed to develop the potential of majority of the population (NEPI, 1993:169).

CONCLUSION

This section highlights that a major trend in the South African debate is the drive to channel the education system to produce an efficient workforce that will facilitate

economic and technological development. It also argues that social issues, like access and equity, will be facilitated when individuals are equipped with skills that will help them gain employment. According to arguments raised in this section, it is believed that the development of peoples' potentials will further develop the human resource base of the country. However, the writers differ on the process to adopt in effecting changes in the educational system. Though an integrated system of education has been supported by a number of writers, the extent of vocationalisation of the curriculum remains a bone of contention.

2.4 POLICY IMPLEMENTATION

The Department of Education and Training's (DET) *Curriculum Framework for General and Further Education and Training* (1995) expresses fear that ineffective application of the aims of outcomes-based education 'could emasculate the profound meaning and power of effective education and not do justice to the full humanity of the learner' (p:29). In order to avoid this it emphasises that

> at all levels of curriculum development (from the national, macro-level to the provincial, meso-level and institution-based micro-level), the nature of particular areas of learning, the needs of target groups of learners and the demands of the changing socio-economic context should inform the formulation of outcomes (1995:8).

The *Curriculum Framework for General and Further Education and Training* (1995) further stresses the need for a participative and consultative policy process to aid curriculum implementation in South Africa. The document recommends that

> A healthy partnership between state authorities and parents is absolutely essential for the establishment of a culture of life long learning. At the same time, teachers should be equal partners in curriculum and materials development while employers and other stakeholders have a major responsibility in helping to determine how learners should be prepared for adult life, including the world of work (1995:14).

The fear of ineffective implementation of curriculum policies as expressed above is not particular to the *Curriculum Framework for General and Further Education and Training*. This is because the major problem of curriculum development and change is at the point of delivering. A number of writers on curriculum development have supported the need to close the gap between the implementation and the development processes (Igwe, 1990; Ughamadu, 1992). These writers note that it will be difficult to achieve the objectives of the curriculum without proper measures being taken for its implementation. Some of these measures are adequate provision of teaching materials, consideration of social and political demands, as well as individual needs.

These writers suggest that since curriculum development is a continuous and dynamic process, it is important to encourage various stakeholders to participate in the implementation process. According to them, when numerous stakeholders participate in this process, curriculum development would be seen to be more responsive to community needs. They note that the idea of cooperative planning of curriculum is based on the realisation that all segments of a given society benefit from education and the educational system. Ughamadu stressed that the purpose for

> planning and developing a curriculum is to have an instrument of education for a society, which can foster ideals and values and subsequently lead to the maximum attainment of its social, economic and other needs and aspirations (1992:24).

The failures of policy objectives have often been blamed on the implementation processes. These have led several writers to explore the implementation process in various ways. Harman (1984) notes that experiences in many countries over the last two decades have shown that outcomes differ from those intended in grand sounding education policies when converted into particular programmes. Sabatier (1986) notes that research on implementation has been partly motivated by perceived failures of great social programmes. He notes that studies in this area started about two decades ago largely by American authors like Pressman & Wildavsky (1973), Murphy (1973) and Bardach (1974). According to him, these

early studies analysed only a single case that drew pessimistic conclusions about the ability of governments to implement their programmes effectively.

Sabatier notes that the second generation of studies into implementation, carried out by Western European writers, was more analytical and comparative in perspective. He argues that these writers (Van Meter & Van Horn, 1975; Sabatier & Mazmanian, 1979; 1980) tried to explain variation in implementation success across programmes and governmental units by reference to specific variables and conceptual frameworks. Though the American and European writers differ in their approach, both groups maintained a 'top-down' perspective to policy implementation.

The 'top-down' model of implementation, otherwise known as 'forward mapping', deals with issues raised in policy statements. It starts with policy decisions and examines the extent to which legally mandated objectives were achieved over time and why (Sabatier, 1986). In forward mapping, the policy decisions made by government officials are evaluated through the actions of implementators and target groups. The top-down model can be seen as a yardstick to measure policy delivery through an examination of the extent to which objectives were attained over a period of time and how consistent their impacts were to the policy objectives.

Various criticisms of the top-down approach led to a new model of implementation, known as 'bottom-up' in the late 1970s and early 1980s. The focus of this model is on the analysis of the multitude of actors who interact at the operational level on a particular policy issue (Sabatier, 1986). The bottom-up approach shifts emphasis from the usual policy stages of formulation, implementation and reformation and starts with practical elements, like strategies pursued by various actors in pursuit of their objectives. Proponents of the bottom-up model note that stages of policy formulation and implementation can be perfect but objectives can be affected by the implementers' interpretations and the resources available to implement them (Berman & McLaughlin 1976; Elmore, 1979). They note that local actors often

deflect centrally mandated programmes to meet their purpose. This can be part of the reason why policies are better achieved in some areas than others.

The argument shows that irrespective of the social and economic forces on curriculum changes, there is a problem of slippage as a result of the implementation processes. This slippage could derail the objectives of the curriculum and make it difficult for the goals to be achieved. This is why there is high rate of unachieved policy objectives in most areas. In examining the implementation of curriculum changes in technical colleges, it will be interesting to establish whether the 'top-down' or 'bottom-up' approach was adopted. This will help to determine the outcome of the current formal curriculum and its implementation. Such findings will further inform the policy processes guiding curriculum development in technical colleges.

CONCLUSION

This chapter argued that the global drive towards integrated education and training systems resulted from both economic and social concerns. It shows that this paradigm shift has immense implications for the curriculum development processes. It portrays the implementation process as the key to effective policy development and argues that both curriculum changes and implementation face an upheaval task to achieve its objectives due to social and economic influences. In chapter four, I will analyse the data collected for this study in order to evaluate the effectiveness of the implementation processes of the curriculum in technical colleges.

CHAPTER THREE
RESEARCH METHODOLOGY

INTRODUCTION

Research methodology refers to the way the research problem is formulated, viewed, approached, analysed and evaluated. Various research methods for example qualitative, quantitative, descriptive or experimental, can be used to gain understanding of the research problem. Understanding the research purpose is critical to the selection of the appropriate methods that will be used to collect and analyse data to offer solutions to problems raised in the study.

THEORETICAL FRAMEWORK

The methodological approach adopted in this research is a qualitative one. Qualitative research is often used to explore human and social behaviour in relation to a particular setting, such as school, community, institution or culture. Bell notes that 'researchers adopting a qualitative perspective are more concerned to understand individuals' perceptions of the world. They seek insight rather than statistical analysis' (1993:5). This is because qualitative research aims to produce a vivid and detailed account of human experience within a social context. This is necessary in order to understand the implications and motives behind certain human actions in a particular event.

Proponents of qualitative research argue that human behaviour is always bound to the political, social, economic or religious context in which it occurs. They explain that an understanding of social realities will give insight into the meanings constructed by individuals as they interact within a particular social setting (Ary *et al.*1990:445). According to McCutcheon, qualitative inquirers seek

> to interpret human actions, institutions, events, customs and the like, and in so doing construct a "reading" or portrayal of what is being studied. The ultimate goal of this kind of inquiry is to portray the complex pattern of what is being studied in sufficient depth and detail so that one who has not experienced it can understand it (1981:5).

I have tried to achieve this within the scope of this research.

Qualitative research differs from quantitative research, which entails the testing of hypotheses based on observations in order to reach logical conclusions. Quantitative research has a guiding principle that puts emphasis 'on a scientific explanation that includes the discovery of laws governing the behavior of the physical world on one hand and laws governing human behavior on the other hand' (Ary, *et al.*1990:444). This differs from the principle guiding qualitative research that argues that social reality cannot be reduced to variables in the same way as physical reality. Ary *et al.* notes that qualitative methodology bases its inquiry on the assumption that

> the subject-matter of the social or human sciences is fundamentally different from the subject matter of the physical or natural sciences and therefore requires a different goal for inquiry and a different set of methods for investigation (1990:445).

However, in order to produce proficient qualitative research, Ary *et.al.* suggest certain skills that are necessary: (i) fieldwork experience in negotiating access to site; (ii) developing a researcher; (iii) establishing and maintaining trust with participants in the study; (iv) conducting and recording interviews and observations; (v) managing data and performing data analysis (1990:455). This study uses multiple research methods, namely document analysis and interviews. This is important in order to gain an understanding of the changes within the technical colleges' curriculum and its implementation.

TRIANGULATION

Triangulation is the use of a multi-method approach in collecting data for a particular research study. The use of triangulation helps the researcher to see the research problems from various perspectives (Cohen & Manion, 1989). This approach is intended to assist in gathering information that will help the researcher have a balanced account of the research study. Bell states that triangulation involves:

> cross-checking the existence of certain phenomena and the veracity of individual accounts by gathering data from a number of informants and a number of sources and subsequently comparing and contrasting one account with another in order to produce as full and balanced a study as possible (1993:64).

The concept of triangulation is based on the assumption that various research methods will help minimise bias that can be detected in single data sources and methods. In addition, triangulation will help identify and neutralise any prejudice that can arise from some data sources or the investigator (Creswell, 1994). Creswell states that through the use of triangulation, data collected through different research methods can be used inter-supportively to construct a broader perspective and understanding. These processes, he notes, will help in making instruments for a research investigation to be seen as reliable and valid as well as prevent problems of ambiguity. Cohen & Manion (1989) argue that the teaching and learning process is so complex that it cannot be understood through a single method of inquiry. To achieve triangulation, I studied documents on the technical college curriculum intensively and then used them as a guide in interviews. Interviewing different sets of people also assisted in giving multiple perspectives. The interviews helped in providing explanations to some of the issues raised in the documents. Thus, document study and interviews were used inter-supportively.

Some writers argue that triangulation as a research approach can pose conflicts for researchers in terms of data analysis (Rossman & Wilson, 1985). They note that data collected through this strategy often prove difficult to analyse and they advise that paradigms and methods should not be mixed in a particular research study. In

this study, however, different methods proved to be complementary rather than contradictory.

VALIDITY

The issue of validity in qualitative research has been a major concern over the years. Bosk posits the vital question of qualitative research as follows: 'all field work done by a single field worker invites the question... why should we believe it?' (1979:193). It becomes crucial for the researcher to try to eliminate threats to validity and reliability in the procedures of data collection and analysis used for the research. Brinberg and McGrath (cited in Maxwell, 1992) note that

> Validity is not a commodity that can be purchased with techniques... Rather, validity is like integrity, character and quality, to be assessed relative to purposes and circumstances (1985:13).

Validity addresses the issue of whether a method measures or describes what it is supposed to measure or describe. A great deal of emphasis is placed on understanding the context of research in order to avoid the problem of misinterpretation.

Maxwell (1992) stresses that understanding is a fundamental concept in qualitative research. He argues that if qualitative studies cannot consistently produce valid results, it then means that policy, programmes and projections based on such studies cannot be relied on. Maxwell adopts a realist approach to the concept of validity as being relative to purpose and circumstance. He notes that 'validity is not inherent to a particular research method but pertains to the data, accounts or conclusions reached by using that method in a particular context for a particular purpose' (1992:284). He identifies five categories of validity in qualitative research: descriptive, interpretative, theoretical, generalisability and evaluative.

For him, descriptive validity is concerned with the factual accuracy of the research account. It is the ability of the researcher to describe vividly and accurately physical objects, events and behaviours exhibited within the research setting and encourages the researcher not to distort information gathered during the study. Interpretative validity focuses on the meanings that are derived from the research setting. It deals with what the objects, events and situations mean to the respondents as they interact and engage in them, and the researcher's ability to interpret these correctly. Theoretical validity differs from the above as it addresses the theoretical constructions that the researcher brings to and develops in the course of the study in order to provide explanations. It deals with the researcher's ability to explain what s/he finds without allowing preconceived theories to suppress the research findings. The fourth type of validity raised by Maxwell, namely generalisability, refers to the extent to which the researcher can extend the account of a particular circumstance to other persons, events and time that are not the same as those studied. Finally, evaluative validity involves the application of an evaluative framework to the objects of study. It can be classified as a category of understanding that is critical to issues of validity. For purposes of validity in this study, all these validity processes were considered.

In order to ensure validity and cross-check data collected, I adopted two research methods, namely, document analysis and semi-structured interviews. Various writers believe that when more than one method is used in the pursuit of a given objective, it offers a check on validity (Bell, 1993; Cohen and Manion, 1989). The use of triangulation therefore provides the opportunity to minimise threats to validity. The collection of data through such multiple sources as document analysis and interviews afforded me the opportunity to gather detailed information and ensured against bias.

For purposes of descriptive validity, I used a tape recorder during the interviews. I later transcribed the tapes to obtain an accurate account of the interviewees' responses. In terms of interpretative validity, I repeated questions and constantly paraphrased the interviewees' accounts. This helped to minimise misinterpretation

and distortion of information. As a check on theoretical validity, the range of literature I consulted helped me gain a broader perspective of the research problem. Literature was helpful during the interviews, as I was able to relate the interviewees' accounts to a number of issues raised in the literature.

RELIABILITY

Reliability is the extent to which a test or procedure produces similar results under constant conditions on all occasions (Bell, 1993:64). It is concerned with the accuracy of the measuring instrument. In order for the research instruments to be seen as reliable, they should be able to measure what the researcher has set out to measure. The research instruments should be designed to investigate properly the research problems in a precise and clear manner. They should be devoid of ambiguity and enable the same result to be achieved when used again in the same context. In designing questions for interviews, I was sure that they were appropriate and would be able to gather similar information when used again in a number of interviews under similar conditions.

Finally, I feel it is vital to identify the differences between reliability and validity. Bell (1993:65) notes that if an item is unreliable, it will lack validity, but a reliable item does not necessarily become valid as it may produce the same result but at all times skip what it is supposed to measure or describe. Hence, reliability deals with consistency while validity focuses on actuality of events.

RESEARCH SAMPLE

This research study set out to examine curriculum changes and implementation in technical colleges. It aims to find views of various stakeholders on the curriculum to ascertain its effect on economic development. To obtain information about the types of curriculum on offer, two sets of selection processes were adopted. Firstly, I

selected the institutions/organisations/unions in which to conduct the interviews. Secondly, I selected the person/s from each institution/organisation to interview.

For the institutions, six technical colleges were chosen for the study. Five of the colleges were selected from the list of technical colleges obtained from the Department of Education. They are: (i) Atteridgeville College for Vocational Education, (ii) Thuto-Matlhale College for Vocational Education, (iii) Pretoria Technical College, (iv) Highveld Technical College, and (v) Johannesburg Technical College. These colleges were selected because of their different locations within the Gauteng province as well as their diversity in curriculum. The sixth college, a private technical college, namely Vaal Career Technical College, is located in the Free State, few kilometres away from Gauteng. It was selected because of its rôle in the transformation of technical colleges.

It is important to note that there are three kinds of technical colleges, the state controlled colleges, the state-aided colleges and the private colleges. State-controlled colleges are dependent on the government for their overall activities. State-aided colleges have partial autonomy on how to operate. The selection of different colleges was intended to promote a broad understanding of the state of technical colleges, the reasons for curriculum changes and how they were implemented. At these colleges, the principals were selected for the interviews. This is because I feel that they would be well informed on issues relating to the curriculum.

To gather the views of representatives of employers, I consulted the list of Business South Africa (BSA), members and selected Electricity Supply Commission (ESKOM). This is because ESKOM employs a large number of technical college graduates. Since ESKOM works closely with students from technical colleges, it is important to know its view on curriculum changes, implementation and the workplace. For the interview, I selected the person in charge of training and personnel management.

To gather views of worker organisations, I selected Congress of South Africa Trade Union (COSATU), the largest union for an employer because it is vital to know how the training the members receive helps them to function in their workplace. I selected the person in charge of skills and training for the interview.

Vocational Education and Development Corporation (VEDCO), a non-profit organisation set up to champion the transformation and development process of technical colleges, was also selected to give its views. As a body that deals with problems of technical colleges as well as seeks for solution, I believed that their contribution would be relevant to this study. I selected the head of the organisation to interview in order to find the organisation's views on the policy process for curriculum construction and implementation. As VEDCO has great influence in the activities of technical colleges, it was important to know how much it is involved in the current changes within the curriculum and what these changes will mean for technical colleges.

RESEARCH METHODS

Bell argues that the 'approach adopted and the methods of data collection selected will depend on the nature of the inquiry and the type of information required' (1993:6). For this research, two techniques were used: (i) detailed document analysis and (ii) semi-structured interviews.

(i) DETAILED DOCUMENT ANALYSIS

This entailed an analytical study of the formal curriculum of each technical college. It includes a review of the changes in the curriculum. In gathering documents from colleges, I collected information on types of courses offered, content and objective of courses, timing, design and financing, instructional methods, for whom the courses were designed, and the performance rate of participants.

Other documents collected were from BSA, COSATU, and VEDCO. These documents were analysed in order to understand their expressed interests and examine how technical colleges were meeting them. The analysis is presented in chapter four.

Creswell (1994) notes that documents represent data that is thoughtful since the informants have given attention to compiling them. Documents are an unobtrusive source of information, and they are written evidence that may be convenient to the researcher in terms of saving time and expense of transcribing. Duffy (1993) notes that though collection of documents can be frustrating, document analysis of educational files and records can prove to be an extremely valuable source of data.

However, document analysis may have disadvantages when relevant documentation is protected information and not generally available to the public. This means that the researcher needs to invest time in extricating them from their hideouts/archives (Creswell, 1994). This was not the case in this research as the formal curriculum is a public asset of the college. Also I did not encounter any problem in collecting documents from other stakeholders, probably because the research aimed at finding ways to improve the quality of employees for their sector. While reading the document, the guiding questions I had in mind were:

(i) What curriculum changes have taken place and how do they differ from the past curriculum?
(ii) Why did changes emerge in the curriculum framework, policy and content?
(iii) What further changes have been proposed?
(iv) How will the curriculum changes prepare students for the workplace?
(v) What channels are in place for implementation in terms of financial, physical and human resources?

INTERVIEWS

The use of interviews was necessary in this research to complement issues raised in the study of documents and to achieve triangulation. Bell notes that 'a skilful interviewer can follow up ideas, probe responses and investigate motives and feelings, which the questionnaire can never do' (1993:91). Since interviews involve face-to-face interaction, they enable the researcher to guide the line of questions that may reveal information necessary to the research study. Cohen & Manion (1989) define the research interview as:

> a two-person conversation initiated by the interviewer for the specific purpose of obtaining research-relevant information, and focused by him on content specified by research objectives of systematic description, prediction or explanation (p:307).

Semi-structured interviews were used. This gave me the flexibility to ask questions and follow-up on issues that I deemed necessary as well as to validate the responses. Kerlinger (1973) notes that although the research purposes govern the questions asked in an interview, their content, sequence and words are entirely in the hands of the interviewer.

For the interviews, I made telephone calls to set up appointments with the interviewees. It took four weeks to conduct the interviews once various logistical problems had been overcome. The interviews took place in the respondents' offices at scheduled times. For purposes of validity and reliability, I recorded the interviews with a mini tape recorder with the consent of the interviewee (each interview lasted between sixty to ninety minutes). I transcribed the details of the interviews as soon as I left their offices to avoid distortion of information and to afford myself the opportunity to clarify any ambiguity while it was still fresh in the mind of the interviewee.

Principals of the six technical colleges were asked for information on the formal curriculum, the changes that had occurred, the implementation process and how they thought the curriculum prepared the students for the workplace. After these

interviews, I interviewed the selected member of Business South Africa (BSA) to find out their views on labour market needs and how the colleges' formal curriculum and its implementation are addressing them. Next I interviewed the head of VEDCO to find the organisation's view on changes in the technical college curriculum. Finally, a member of COSATU was interviewed on the union's view of the formal curriculum, workplace needs and what these mean to the employees. I later called on some of the respondents to clarify issues raised by others in the subsequent interviews.

The questions asked during the interviews covered a number of themes:

(i) What courses were offered in the colleges?
(ii) What changes have taken place in the curriculum and why?
(iii) What is the curriculum implementation process?
(iv) How is the integration of education and training taking place?
(v) What is the rôle of technical colleges in the economic development of the province?
(vi) What is the relationship between the formal curriculum, and the employment interests of BSA and COSATU?

CONCLUSION

In this chapter, I have explained how the research samples were selected, the research methods adopted as well as the procedures used to collect the research data. The analysis and findings of these data and how they relate to the range of literature used for this study will be presented in chapter four.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 INTRODUCTION

This chapter deals with the presentation, analysis and interpretation of the research data gathered for this study. Firstly, I examined the various documents collected from both technical colleges and the organisations selected for the research. Secondly, I perused the interview transcripts from all the research respondents to identify the themes. Thirdly, I identified the major themes and the guiding principles for curriculum development that emerged from the research data. Fourthly, I analysed these themes, linked, compared and related them to the literature reviewed in chapter two. It is important to note that both the local and international literature were helpful during the analysis and interpretation of the data. I also explored how the identified themes and the guiding principles could provide answers to the main research questions. They are:

(i) How does the technical college's formal curriculum equip the individual for the workplace?

(ii) How can the integration of the education and training systems assist in the human resource development of Gauteng?

(iii) How can technical colleges, through their learning programmes, contribute to economic development in the province?

4.2 ANALYSIS AND INTERPRETATION OF RESEARCH DATA

The similarities and differences in terms of documentation and responses from the interview sections formed the major themes for analysis. The respondents identified the problems, effects and solutions of each theme. It is vital to acknowledge that, although the various research respondents identified these themes, they differed significantly in their reasons for identifying a particular theme. They also differed in

the factors, problems and solutions linked to the themes. These issues will be dealt with in detail in this section.

4.2.1 PRESENTATION OF DATA

Document Data

Several documents were collected from the six technical colleges and the employer organisation (ESKOM), the labour organisation (COSATU) and the technical college development organisation (VEDCO) selected for this research. The documents from the technical colleges consisted of the curriculum of each college. They included the formal and non-formal courses, the duration of the courses, entry requirements for students and the qualification given at the end of the course.

The second set of documents dealt with the views of ESKOM, COSATU and VEDCO on the formal curriculum of technical colleges. All the documents from the organisations stated that technical colleges should focus on how to equip the individual adequately with lifelong attributes and skills. This would empower them to contribute effectively to national growth. In order to achieve these goals, the documents stressed that it has become vital for the curriculum to be relevant, responsive, pragmatic, affordable and internationally acceptable.

A number of principles were also identified through the documentation to guide the development and implementation of the technical college curriculum. The guiding principles cover the social and economic needs of the country in addition to the need for personal growth and development. These principles were mostly identified from documents collected from ESKOM, COSATU and VEDCO.

Interview Data

Six principals from technical colleges and a representative from each of the three organisations were interviewed. For purposes of anonymity, the two Principals from the state-controlled colleges will be referred to as Principal A and B. The three principals from the state-aided colleg will be referred to as Principal C, D and E respectively. The private college's principal will be referred to as Principal F. The organisations will be referred to by their actual names, which are ESKOM, COSATU and VEDCO. All the interviewees were asked their views on the technical college curriculum; the integration process; the implementation of the curriculum; the changes taking place within the curriculum; the curriculum development processes; workplace needs; human resources development, and economic rôles.

The core issues identified from the documents and interviews centred on the **nature** and **values** of the curriculum of technical colleges. What is in contest is: What should be the nature and values of the curriculum for technical colleges? First, should it be an **open** or a **closed** curriculum? Should it be **integrated** or **not** in terms of the practical and theoretical components, as well as cross-curricular learning activities? Should the curriculum be **designed** and **implemented** based on the **needs of the workplace** or **not**? What **values** should such a curriculum **uphold** or **address**? Should it be more **economically-oriented** or **knowledge-based**? Should the curriculum focus on **human resource development** of the country or **on personal growth and development**?

Through the responses provided by the interviewees, three major themes were identified:

(4.2.2) Nature of the curriculum
(4.2.3) Curriculum development processes
(4.2.4) Implementation of the curriculum

4.2.2 NATURE OF THE CURRICULUM

Technical colleges offer a wide range of programmes and subjects, both formal and non-formal, in seven fields of study. They are Engineering Studies, Business Studies, Arts, Social Services, Utility Services, Agriculture, Languages and Communication. These courses are offered in a range of different ways: part-time, full-time, distance education or as bridging programmes. A number of issues mentioned above that were raised concerning the present curriculum of technical colleges will be dealt with.

Open versus closed curriculum

Two types of curriculum were identified in the study: "open" and "closed". An "open" curriculum encourages multiple entry and exit points within learning periods. It is intended to equip the individual with skills and knowledge within the trimester course period. The student obtains a certificate at the end of each level (N1-N3 levels) if s/he passed the trade subject and two other subjects. A "closed" curriculum is tailored to achieve a specific purpose, within a time frame, using a specified course content. In this situation, students can only obtain an N3 certificate at the end of the three years' learning programme with a pass in related trade subjects, two optional subjects, in addition to passing Communication and Cognitive Development courses. The following examples of the Engineering Studies curriculum show the open model of both the state-aided/controlled colleges (Table 1) and the closed curriculum of the private college (Table 2). Both tables give insight into the curriculum content and implementation in technical colleges.

TABLE 1

MECHANICAL ENGINEERING COURSES OF TECHNICAL COLLEGES (N1 - N3 PRE-TERTIARY)

Minimum Tertiary Requirements	Year of Study	Courses	Theory	Practical Courses	Duration	Qualification
A Std 8 qualification with a pass in maths and physical science	N1	Mathematics N1 Related trade theory N1 Engineering sciences N1 Engineering drawing N1 Industrial orientation	√ √ √ √ √	Note that practical courses are offered on the related trades in some Technical Colleges: * fitting and machinery * motor mechanics * welding/sheet metal * electrical (heavy current) * panel beating (motor body) * electronics	1 trimester	N1 certificate
A minimum of N1 or Std 8 technical pass with the relevant subjects	N2	Mathematics N2 Related trade theory N2 Engineering science N2 Engineering drawing N2	√ √ √ √		1 trimester	N2 certificate
A minimum of N2 pass with relevant subjects or technical Std 9	N3	Mathematics N3 Engineering science N3 Engineering drawing N3 Mechanical technology N3	√ √ √ √		1 trimester	N3 certificate

Note: * While it will take a student 3 years continuous study to get an N3 certificate in the private Technical College, it will take a student 2 years of continuous study to complete the N1 - N6 course for an N6 certificate in other/public Technical Colleges.

* Students who have attained N4 - N6 with related subjects may continue their studies at a Technikon.

- A minimum of 12 subjects is required for the National N-Diploma.
- From 1997, Standard 7 = Grade 9

Source: Formal Technical College Instructional Programmes in the RSA; Report 191 (95/11).

TABLE 2

ENGINEERING COURSES OF A PRIVATE TECHNICAL COLLEGE (VAAL CAREER COLLEGE) FOR LEVELS N1 - N3 PRE-TERTIARY

Minimum Tertiary Requirements	Year of Study	Courses		Theory	Practical Courses	Duration	Qualifications
A Std 7 certificate with a pass in English, Maths and Science	1	Communications Cognitive development Industrial orientation Engineering drawing Engineering science Mathematics Technology (incorporating electrical and mechanical trades)	All these courses are compulsory for 1st years	√ √ √ √ √	√ √ √ √ √	1 year	
	2	Communications Cognitive development Industrial orientation Engineering science Mathematics Plus two optional courses of: Fitting and machinery and Engineering drawing OR Electrical trade theory and Industrial electronics	Compulsory for all 2nd years Optional courses according to area of specialisation	√ √ √ √ √	√ √ √ √ √	1 year	
	3	Communications Cognitive Development 3 Engineering Drawing Holistical Orientation Engineering Science Mathematics	For all 3rd years	√ √ √ √	√ √ √ √	1 year	National N-Certificate (N2-N3) + College certificate accredited by supporting industries
		Final year consolidation project Together with 2 optional courses Mechanotechnology and Engineering Drawing OR Electrical Trade Theory and Industrial Electronics	Compulsory 3rd year Optional courses according to area of specialisation				

Source: Vaal Career College Curriculum, 1997.

Documentation from the technical colleges indicates that the state controlled/aided technical colleges that operate an open curriculum engaged more in theoretical learning than practical training. Table 1 shows that all courses from N1 to N3 levels were based mainly on theoretical components. Emphasis on practical learning is placed only on the trade subjects, instead of on all the learning programmes. Secondly, it shows an absence of integration in terms of cross-curricular activities. Engineering students are not provided an opportunity to learn other courses outside their trade components. For instance, these students do not learn Communication Skills, Cognitive Development or Industrial Relations. Thirdly, the courses are offered on a short trimester duration basis that does not allow the practice of newly learnt skills.

The situation is quite different in the private technical college that operates a closed curriculum. According to Table 2, students from N1 to N3 levels engage in both theoretical and practical components. They are encouraged to participate in cross-curricular learning activities. For instance, all students through the three-year learning period learn Communication Skills, Cognitive Development and Industrial Orientation in addition to their trade subjects. It is crucial to note that the closed curriculum concept is in contrast to the NQF approach that encourages flexible entry and exit points. I will revisit this issue later in this chapter.

Engineering versus Business Studies

All the respondents stated categorically that there were a number of inadequacies in the formal curriculum of the state aided/controlled technical colleges. They explained that there were differences between Engineering and Business Studies. It appeared that Business Studies was more in line with the needs of society than Engineering Studies. In the words of Principal A

> Though most programmes in Business Studies have been revised and are beginning to address the needs of the business sector, the

> Engineering Studies are still outdated and not suitable for industrial and technological needs and this need to be revised.

All of the principals were delighted that the curriculum was beginning to change in certain fields like Business Studies. Principals A, B, E and F expressed delight that the curriculum in the business sector is being linked to trends in the market, for instance, secretarial students learn about Computer Filing systems; Faxing and Telephonic Skills; while accounting students learn Computer Auditing and Book-keeping. They emphasised that all other fields of study need to be revised in line with the situation in society.

All the interviewees regretted that Engineering Studies, in particular, were not in line with the trends in the industry. Most technical colleges did not offer the practical components that are crucial to acquisition of technological skills due to lack of equipment and workshops. Some technical colleges offering practical training were doing so with obsolete equipment (that was outdated in industry). Below are views of some of the respondents.

> **Principal B**
>
> The curriculum needs to change in a number of areas. The Engineering curriculum is very backward and should be updated. It needs to have entrepreneurship and communication components. Information technology is also a part of industry. Students need to acquire communication skills both orally and verbally. In addition, computer literacy should be compulsory for all students because most equipment in industry is now computerised.

> **Principal E**
>
> In terms of the content of the curriculum, there are a number of problems especially in Engineering Studies. The courses on offer are irrelevant to the industries that need the services of the students when they graduate. So far, we are behind the present level of technology. In fact, many technical colleges do not have workshops for their practical component in each field of the Engineering studies.

The respondents enumerated a number of reasons the curriculum should be constantly revised and updated:

(1) To become relevant to societal needs.
(2) To create room for flexibility, creativity and innovation.
(3) To encourage competitiveness.
(4) To enhance quality.
(5) To promote international recognition and acceptance.

Broad Generic Skills

Interviewees were asked if they thought that the curriculum was capable of producing a holistic individual for the workplace. In response, ESKOM, COSATU and VEDCO noted that the curriculum could not be seen as integrated, holistic or progressive. For them, the curriculum was narrowly tailored and failed to take into consideration the personal development of the individual. They noted that practical training and skill acquisition were not well focused on in these colleges and stressed that the curriculum should offer both generic and specialised skills.

A critical analysis of the formal curriculum in Table1 shows that broad generic skills did not cut across all fields of study. For instance, the Engineering students in state aided/controlled colleges were not taught Communication or Computer Skills and were not given a broad knowledge of the Engineering field. It could be argued that this narrow and inflexible curriculum denied them opportunities to adapt to life situations. For instance, their lack of language skills is partly the reason for not being admitted into Technikons. The situation was different in the private technical college, where all students learnt Cognitive Development and Communication Skills as well as being involved in practical training to help them look at problems in a holistic manner.

All the interviewees agreed that there was the need to give life skills to all individuals irrespective of area of trade/specialisation. They explained that the introduction of generic and specialised skills could be achieved through the

introduction of a cross-curricular learning programme. This would entail a creative, relevant and flexible curriculum that would enable individuals to cut across the system, and move from one band of the NQF to another, both vertically and horizontally. Some of the broad generic skills suggested were communication, literacy, numeracy, and health and safety.

Specialisation

In terms of specialisation of skills, Table 2 shows that in the private college, students at the start were given a general idea of technology and engineering courses in the first year before they chose an area of specialisation. In the second and third year, students were encouraged to choose an area of specialisation. It was intended that through this approach students at this college would gain adequate knowledge of the engineering field as well as a general idea of related fields and the industrial world. This is not the case in the state aided/controlled colleges as shown in Table 1. Students at the state aided/controlled colleges chose their area of specialisation as soon as they enrolled in the programme.

The major issues raised here are: **How can a student specialise in a trade in only three months of study?** Secondly, **how can a student claim to possess a skill without the practical training of such a trade?** Thirdly, **how can a student specialise when the practical and theoretical components are not linked and integrated in the curriculum?** Fourthly, **to what extent should the inadequacies in the workplace be attributed to the ineffective specialisation programme?**

Specialisation has posed enormous problems for most technical colleges. The majority of principals in the technical colleges in this study believed that they would be able to offer effective specialised programmes if the curriculum were properly integrated. A number of problems attributed to ineffective specialisation programmes include: short duration of the courses; inadequate provision of infrastructure and lack of integration of the learning programmes.

Despite these shortcomings, it was the view of the majority of the respondents that specialisation of trade, if done properly, would empower the individual to make an effective contribution to social and economic growth Four principals were of the opinion that specialisation in a particular trade would mean a more productive, efficient and focused workforce. In the words of the private technical college principal:

> The problem with most technical colleges is that the students start with specialisation in the first year and this makes it difficult for them to understand. It is necessary to give students a broad understanding of the field of study before encouraging them to specialise.

In support of the above, ESKOM, COSATU and VEDCO stated that specialisation was relevant if it was appropriate and accessible. They stressed that the curriculum should be more progressive to allow for effective specialisation. On the contrary, two principals expressed the view that specialisation would make the curriculum narrow and rigid. All the principals agreed, however, that specialisation was an issue to be addressed in technical colleges. The NDE's *White Paper on Education and Training* (1995) encourages an education programme that would equip the individual with skills and knowledge to operate in society. This means that the individual's knowledge and experience should be vast in the specialised area and related trade. It stated that:

> appropriate education and training can empower people to participate effectively in all the processes of democratic society, economic activity, cultural expression and community life (1995:17).

Integration of the education and training systems

One major step in the restructuring and transformation of technical colleges is the integration of the education and training systems. The majority of respondents made references to integration as a means of offering effective and productive learning programmes. Through the research data a number of problems, solutions, advantages and disadvantages of the integration process were also identified.

The curriculum models presented in Tables 1 and 2 illustrate that the formal curriculum in both the state aided/controlled technical colleges was not properly integrated because it lacked the ability to provide adequate practical training as well as cross-curricular programmes. For instance, it did not make provisions for the development of generic skills like Communication, Human Relations and Health and Safety for their engineering students. It should be noted that these generic skills form part of the curriculum for the Business Studies and Utility and Hospitality Industry students. Some of the principals explained that such fragmented programmes were creating problems of linkage and integration. Also, the principals of the state-aided college explained that presently, it is difficult to provide students with practical and theoretical learning activities within the short duration of their courses. They stated that cross-curricular learning programmes, if designed, would only be possible if the periods of the learning programmes were extended.

The private technical college principal who offers a long duration, integrated and closed curriculum explained that linking the courses was a difficult task that should have been taken care of during the construction of the national curriculum. He feared that the integration of the education and training systems would not succeed in the absence of an integrated curriculum. He noted that there was a crucial need to link theoretical and practical aspects of the curriculum as well as to connect subjects across different fields of study. According to him, students would understand a concept better and apply it to different categories when they had a broad learning strategy. He reiterated that the introduction of Cognitive Development into the learning programme was important in technical colleges to equip the students with skills such as orientation, categorisation, understanding, and comprehension. Others are analysis, comparison, differentiation and interpretation. These skills, he noted, would assist them to apply a holistic approach to problem solving especially in the workplace. For instance, the comprehension passages that students studied in the Communication Studies in this college were built around the events in the workplace. Through this comprehension passage, students learn more of their trade subjects while developing their cognitive skills. An

excerpt from a comprehension passage used in the Communication Skills Course for engineering students at the Private technical College is given in Appendix A.

APPENDIX A

ENERGY (Tenses)



Energy is the name given to the ability to work. Work and energy are measured in the same units. Many people confuse the three terms energy, power and force. Force is a push or a pull on an object. The amount of work needed to do something, is determined by how strong the force is that is used, and how far it has to move. Power measures the rate at which the work is done.

All human life depends on energy, and this energy is found in many different forms on earth, such as potential, kinetic, thermal, electrical, chemical and nuclear energy, to name a few. All forms of energy are associated with motion.

If a spring is compressed, then it possesses potential energy (often called stored energy). When such a compressed spring is released and allowed to use its force against another object and to keep moving until it reaches its original length (the length before it was compressed), potential energy is converted into work. Potential energy represents work that has already been done.

Kinetic energy is the energy of movement. If a spinning wheel or any other moving object can be stopped, useful work can be done. A pulley and a rope attached to a wheel can, for example, be used to lift a weight.

A steel ball held in the air contains potential energy. If it is dropped, the force of gravity pulls it down, and the potential energy changes to kinetic energy. If the ball falls on to something soft, like fabric or putty, then the kinetic energy is converted to heat energy.

If it falls on something hard and elastic, however, such as a hard metal surface, it will bounce up again and use up all its kinetic energy to regain its potential energy once more.

The world we live in is alive with energy. Energy from the sun warms us every day, and there is even enormous energy beneath the crust of the earth. Without energy, matter could not exist, and modern scientists say that there is no difference between them : matter exists only when energy is present in certain forms. Matter can be changed into energy, and energy can be changed into matter - in an atomic explosion, for example, matter changes to energy.



Question 1

Underline the correct word in each sentence.

1.1 This passage is written in the (past / present / future) tense.

1.2 Power (never / usually / does) measures the rate and which work is done.

[2]

Question 2

In paragraph two, we read that if a spring is compressed, then stored or potential energy is present in it.

Complete the following in a similar manner :

Example :
If you can stop a spinning wheel, then useful work can be done.

2.1 If you help me, then _____

2.2 If the price of petrol is increased, _____.

2.3 If you drop a brick in a full bucket of water, _____.

2.4 If Orland Pirates win the league, _____.

[4]

Question 3

We can also express a condition in other ways :

Even if you give it two coats of paint, it will still be ugly.
Although you gave it two coats of paint, it is still ugly.

Make sentences with the following, using even and although :

3.1 Passed the test. Failed the exam. (Although)

_____

3.2 Leave tonight. Late for the flight to Japan. (Even)

_____

SOURCE: Vaal Career College Curriculum, 1997.

In their own responses, Principals C and D (that were not offering practical components) complained that it was difficult for students to comprehend the learning programmes. They noted that the structural learning emphasised in the NQF involved theoretical learning with practical experience that would be beneficial to students. They expressed hope that the introduction of the NQF would give them the opportunity to complement theoretical knowledge with practical skills. They stressed that acquisition of practical skills would assist students to become self-employed.

> **Principal D**
>
> It is difficult for the private students [who are not attached to industries] to understand a lot of the concepts that we bring to them theoretically. If we have workshops where we can practically show them how these concepts work, it will enhance their understanding of the subject matter and help them relate to other concepts. An integrated approach will broaden the student's frame of reference.

ESKOM and COSATU respectively, did not differ in their support for an integrated education and training system. They stated that integration should not be limited to structures in the Departments of Labour and Education, but should be reflected in the curriculum of technical colleges as well. In his words the labour representative regretted that:

> If you have a closer look at technical college curriculum, there is no flexibility. Creativity is also not encouraged for individual learners. The curriculum looks at the learner as a blank space that the educator can implant their knowledge into.

For VEDCO, integration of education and training would remain meaningless as long as technical colleges were not equipped for practical training. The representative stressed that there was need for other fields of study (outside the Engineering Studies curriculum) to be provided with practical learning as well. She insisted that technical colleges should be provided with computer workshops for secretarial students, utility workshops for hospitality industry students and day care facilities for educare students amongst others. She noted that all sectors contributed individually to national and personal growth and should be assisted to do so. She

encouraged technical colleges to have regular interaction with commence and industry to assist the technical colleges to establish infrastructures for effective implementation of an integrated learning programme.

From a different perspective, Principal A expressed the view that inadequate finances, lack of infrastructure, and a non-integrated curriculum could be traced to the fundamental problem of having fragmented Departments of Education and Labour. He complained that the two departments championing the integration process had not yet been integrated. He believed that the situation created a gap in the pursuit of an integrated education and training system. According to Principal A,

> There is a fundamental problem by the appointment of a minister of labour and another minister for education. The government may have their reasons but the message sent across is that it has created two systems. I would prefer to see one integrated education and training system originating from one ministry.

The labour organisation supported the above principal's view. The representative noted that providers would provide differently and wrongly if they were not able to link up and talk to each other. He gave the opinion that an integrated process could not be achieved when the Departments of Education and Training were still separated. In his view, the integration of these two departments would be a unified background for an effective integration process that would be of mutual benefit. In reference, the ANC (1994) *Policy Framework on Education and Training* anticipated that the Departments of Education and Training would be merged during the integration process.

Other problems hindering the integration process were identified. All principals agreed that the integration process would be more effective if industries could enter into partnerships with technical colleges. They noted that there was enormous under-utilisation of training facilities in most industries. They explained that it would be beneficial to both parties if technical colleges could access these facilities for training their students. They stressed that industries should desist from training workers and assign such tasks to technical colleges. According to them, industries

would cut costs if they loaned their training facilities to technical colleges to train effective and skilled human resources relevant to the needs of the workplace.

International and local literature revealed that the integration of education and training is partly aimed at addressing the social and economic imbalances in society (Chisholm, 1992; Brown & Lauder, 1995; Keating, 1995). The literature posits that an integrated approach to education and training systems would produce an efficient labour force that could cope with global economic and technological advancement. The findings of this research study support the literature on this point. The on-going analysis from data collected shows that the respondents believed that an integrated education and training system would make workers more relevant, competitive and efficient in a dynamic and challenging working environment.

Duration of courses

Other views of the interviewees on the formal curriculum dealt with the duration of the courses offered in technical colleges. The duration of the learning programmes was identified by most respondents as responsible for the fragmented and ineffective nature of the curriculum. The majority of the respondents complained that the trimester period allocated for all the courses at each level of the programme made it difficult for them to cover both the practical and theoretical components of the curriculum adequately.

> **Principal B**
>
> I think the duration of learning programmes as stipulated in the curriculum should change. It should not be based on the three months period because you cannot add enough skills to the students within twelve weeks. Statistics have shown that students remain to do follow-up courses after their initial programme. I would rather see the curriculum stipulate a one-year course period.

The state aided/controlled college principals stated that they would run a more effective programme if the duration of the courses was longer. They stated that

there would be progression and integration if the courses were run on a yearly basis. In support of the state colleges, the Principal of the private college, Principal F, that is already operating a closed three-year curriculum explained that his college's approach is more outcomes-based and has made it possible for them to produce effective and productive individuals. He stated that their students were equipped with adequate knowledge and skills for a dynamic workplace. In his words:

> Most technical colleges enroll students every block and this cannot work well for an integrated, holistic curriculum. Short course duration denies the students professional training, linkages and innovation. In order for students to be more prepared, capable and contribute effectively to the world of work, they need to benefit from a complete learning programme.

Qualification

The qualifications given on completion of the programmes designed in the curriculum were also examined. Though technical colleges offer a wide range of certificates, some of them were not nationally recognised and accepted. The recognised national certificates are:

(1) National Certificate - for people that have completed the programmes in any of the N1-N6 levels.
(2) National Integrated Certificate - for people below N1 levels.
(3) National Diplomas - for people who have completed programmes between N4 - N6 levels.

Both ESKOM and COSATU stated that technical colleges should not be allowed to issue certificates to students on the basis of theoretical knowledge only. They noted that such certificates would be worthless when students could not demonstrate practically the skills they had learnt. They insisted that there should be standard

criteria for selection into technical colleges, based on the skills potentials of the individual and not only on paper qualifications.

> **COSATU**
>
> Technical colleges are producing people with a certificate of attendance and that creates a high problem for economic development.

For ESKOM, the certificates awarded should be based on the student's ability to exhibit both practical and theoretical components of skills at the end of a programme. The ESKOM representative stressed that since technical colleges were referred to as institutions for skills training and development, it was vital that their certificates should attest to these goals.

> **ESKOM**
>
> The certificates should only be recognised when the student has passed both the written examinations and the practical training. We cannot continue to train people parading with certificates but cannot be competent when exposed to the practical side of the said qualification.

Non-Formal learning programmes

In expressing their views on the formal curriculum, all the state aided/controlled college principals disclosed that they offered a number of non-formal programmes. The principals explained that these programmes helped them to augment the inadequacies of the formal curriculum. They noted that since the formal curriculum was rigid and not constantly revised, they needed to offer non-formal programmes to cater for the immediate needs of the learners, the community and industry.

Individual colleges divided the non-formal programmes into two sets covering skills acquisition and personal growth and development. Some of the courses designed to equip individuals with entrepreneurial skills were Pottery, Cookery, Photography and Bricklaying. Others for individual and personal growth were Communication

Skills, Industrial Relations and Banking Procedures. These programmes were recognised by the colleges and accredited by some industries in partnership with them. The programmes were run on a short-term basis from two weeks to three months.

Some of the principals noted that the introduction of non-formal programmes had helped them bridge the gap between industrial needs and what they offered. For example, Principal A disclosed that his college offered subjects like Industrial Relations in order to prepare students to operate in working situations. Other skills offered were Banking Procedures and Human Relations. In their words:

> **Principal B**
>
> We do have informal courses, which are designed to meet the immediate needs of the community that we serve. This involves mostly practical training that will equip these individuals with the required skills.

> **Principal D**
>
> Many technical colleges are involved in informal programmes. This forms a very large component of our learning programmes. It involves a lot of community programme like pottery, cookery and photography. The non-formal curriculum is determined by the needs of the community.

However, principals of both the state aided/controlled colleges noted that non-formal programmes faced a number of problems. They had limited recognition; they had to meet their own operating costs; and there were government restrictions in terms of expansion and acceptance. These principals demanded that both the non-formal programmes should be nationally recognised, accepted and certificated.

In his view, the ESKOM representative noted that the formal curriculum lacked programmes that were being supplemented through the non-formal programmes. He condemned the formal curriculum for being certificate-orientated instead of concentrating on equipping people with skills that could make them self-reliant. In line with his point, the DOL's *Green Paper on Skill Development Strategy* (1997)

stated that the curriculum should aim to enhance learnership and entrepreneurship skills that were being provided by non-formal individual skills and development in a dynamic social and economic context.

In contrast, COSATU representative felt that the non-formal programmes would further fragment the formal curriculum and narrows it to serve the interests of specific groups. He suggested that the non-formal curriculum should be incorporated into the formal curriculum in order to be adequately linked and integrated.

Economic versus Social Issues

Technical colleges play major rôles in the economic and social development of most developed and developing countries. They train the low-skilled, multi-skilled and high-skilled workers that engage in the production of goods and services in industries. In South Africa, technical colleges have had a derogatory image, as a "second class" type of education (VEDCO, Undated). Prior to the assumption of the democratic government in 1994, technical colleges concentrated on training low-skilled workers for industry. In the face of advanced technology and economic growth, low-skilled workers do not make much impact in terms of productivity and efficiency.

During interviews, the respondents were asked if technical colleges were contributing to the economic development of the province. Respondents from technical colleges agreed that technical colleges were yet to contribute adequately to economic and industrial growth in this country. The six principals were dissatisfied with the national formal curriculum because it failed to address economic and social needs.

> **Principal C**
>
> In terms of content of the curriculum, there are a number of problems especially in the Engineering Studies. The courses on offer are kind of

> irrelevant to a number of industries that needs the services of these students when they graduate. So far, technical colleges are behind the present level of technology. In fact, many technical colleges do not have workshop for their practical component.

Principal E stressed that technical skills should be closely linked to economic needs. She stated that the economy would perform better in terms of production of goods and services when the right people were in the workforce. She warned that as long as technical colleges were seen as a second class education and run like secondary schools, they would not be able to participate in economic growth. She advised technical colleges to re-evaluate their strategies and focus on practical training. In order to do this, she urged them to seek funding from industry as well as to offer programmes that will be relevant to the needs of the industries.

The representatives of ESKOM, COSATU and VEDCO echoed the views of the above principals that the curriculum has not been tailored to address economic and social problems. In order to contribute effectively to economic growth, ESKOM emphasised that there should be a change in attitude towards technical colleges and a paradigm shift from theoretical to practical knowledge. According to the ESKOM representative,

> We must start the slogan of 'skills revolution' and not 'knowledge revolution' in this country. Skill revolution empowers students to be economically and socially self-sufficient. ...If you train and encourage people to be self-employed, the economy will continue to grow.

The COSATU and VEDCO representatives blamed technical colleges' low contribution to economic growth to the adoption of a Fordist approach to production. They criticised the Fordist production mode for being too hierarchical and not empowering. They noted that hierarchies as practised in the Fordist production mode create problems, block progress and hinder productivity, creativity and competitiveness. According to them, South Africa needed to widen access and empower its citizens in all aspects of life and could not afford to adopt a Fordist production mode that created a bottleneck for innovation and ingenuity. The findings here show that South Africa seemed ready to move into a Post-Fordist era

production mode. This means that South Africa is in need of a highly, multi-skilled workforce instead of the low-skilled workers. These findings contrasted Kraak's (1992) and Donaldson's (1992) position that a highly, multi-skilled workforce is premature in the South African context.

However, all the interviewees were of the view that technical colleges would be capable of contributing immensely to economic growth once they are given the necessary assistance. They noted that for advanced economic growth, it is crucial for economic and social factors to partly influence curriculum development. The private technical college principal stated that for technical colleges to play a rôle in economic growth there was the need to equip them well to train productive and flexible individuals.

It should be recalled that both local and international literature argues that the curriculum should be tailored to satisfy societal needs and have mechanisms to adapt to the dynamic life environment. It is also crucial to note that literature on globalisation and education identified relevance, integration and flexibility as major determinants in curriculum development. For instance, the NDE's *Curriculum Framework for General and Further Education* aims:

> to meet the right to relevant, quality basic education and training for all, whilst also paying increased attention to areas such as mathematics, science and technology as ways of preparing the nation for the future (1995:12).

It would be interesting to compare the findings of this study to the related literature. In human capital theory, education has been viewed as an investment that contributes to economic development (Psacharopoulos & Woodhall, 1985; Hughes, 1987; Kraak, 1992; Christie, 1995; Thomas, 1995; Unterhalter & Young, 1995). In view of this stand, the findings of this research report, in terms of economic contribution of technical education in Gauteng, showed that education is yet to be classified as a good investment. The findings revealed that technical colleges would be able to make a substantial economic contribution once the enormous problems identified are addressed.

In terms of social issues, a number of policy documents in South Africa placed great emphasis on widening of access as a way to redress equity and justice (NDE's RDP, 1994; DET's White Paper, 1995). Earlier, the ANC Discussion Document (1994) emphasised that individuals cannot be empowered if they are not granted access to education and training. Various theorists propose that access, affordability, relevance, progression and integration should be the bedrock of the curriculum construction and development processes (Goodson, 1988; Young, 1993; Rautenbach, 1992). For Rautenbach:

> Technical and vocational education need not only to develop understanding of complex technological processes but also the capacity to cope with technological changes (1992:359).

The state aided/controlled college principals viewed provision of non-formal programmes as a means of addressing social injustices of access and equity. For instance, College A runs a mobile day-care centre in a bus named "Play Bus", a mobile computer programme called "Wise Bus", as well as enhancing the entrepreneurial skills of the community members through a business centre called "BUSICO". This centre can be described as a transition from school to the workplace. It is where graduates of the college and community members are taught to operate their own business through practical training. Under Act 90 of 1979, the state-controlled technical colleges cannot offer practical training or form partnerships with industry to assist them. Presently, Principal A, a state aided college is carrying out a pilot study of an integrated curriculum in Engineering Studies. Through this pilot study, the college is able to provide practical training to their students. The principal noted that provision of both theoretical knowledge and practical training is of tremendous benefit to both the student and the industry. Having seen the impact of practical training, he hoped that the college would be allowed and assisted financially to continue to provide this aspect of learning to students at the end of the pilot project. In addition to the pilot study, the college provides entrepreneurial skills to the students and community through "BUSICO".

The businesses and services provided in this centre ranged from brick laying, mechanics and hairdressing to tailoring, pre-school care and cookery. In this centre, upon graduation, some students were allocated spaces for a period of one year to start their own business in their respective trade areas. Here they attended to their clients who were part of the community, learnt how to keep their books, paid a token fee to the college as rent, dealt with operating costs and learnt how to relate to customers. The college officials constantly supervised them. At the end of the one-year period, they moved into the community to start their own business while some of them were employed in industry.

Equipping for the workplace

The human resource base is central to economic and social upliftment. Some earlier research studies showed that education contributes directly to national growth by improving the skills and productive capacities of the labourforce (Hicks, 1980, Marris, 1982). The development of a competent human resource base is amongst the factors underpinning the current debates on the integration of education and training in South Africa. The danger is that if technical colleges produce low-skilled workers due to inadequate equipment and an outdated curriculum, they are not likely to contribute effectively to human resource development.

The analysis of the research data revealed that technical colleges were finding it difficult to supply the workplace with the needed human resources, particularly in the industrial sector. The six principals stated that technical colleges had failed to meet the requirements of the workplace in the industrial factor due to the rigid and outdated nature of the curriculum, the use of obsolete equipment, inadequate funding and under-qualified teachers.

Principal D

> The need to introduce the practical component is to make our students become more efficient in their workplace. We will be building a strong foundation when students are exposed to work on equipment during their learning programmes. We are meeting some of the workplace needs particularly in the field of business studies because the curriculum was changed two years ago.

Principal B noted that the onus was on technical colleges to train the broad basic human resource that would champion the economic revolution in the country, such as technicians, electricians, builders, and engineers. He stated that in order for technical colleges to supply commerce and industry up to the required 60% of the workforce, they needed to train the right type of people ranging from lower level to middle management level. He referred to the "Asian Tiger" countries as being committed to technical colleges because they (technical colleges) provided the needed human resources for capital intensive projects. Representatives of ESKOM, COSATU and VEDCO noted that when workers were not adequately trained, it became difficult for them to adapt and function in a dynamic working environment.

Some writers like Christie (1994) and Kraak (1992) note that the low-skills and low-participation that dominate the South African market are partly due to the inability to link education and training to the skills needed in the workplace. Christie stresses that South Africa is in need of competent and educated workers that are conversant with the mathematics and science needed in a technological environment. Other writers stressed that a skilled and efficient workforce is essential to developments in modern economy (Wilson & Woock, 1995 and Brown & Lauder, 1995).

One of the concerns of this study is to explore how the technical college curriculum prepares the individual for the workplace. The majority of the principals agreed with both the local and international perspective, that the quality of the workforce should be raised through training. The respondents noted that the existing curriculum for Business Studies, on average, equipped the individual to tackle the challenges of a dynamic work situation. In contrast, the Engineering Science and Technology curriculum continued to pose major problems for industries moving into a Post-

Fordist era. Apart from being irrelevant to the needs of industries, the curriculum seemed to be static. Worse still is that most technical colleges did not have adequate workshops for practical training, while some continued to operate with obsolete equipment. The question is: **How could a technical college graduate from such a training background be effectively employed in a highly technological working environment? What would be the fate of the economic situation that is dependent on such a human resource base?**

4.2.3 CURRICULUM DEVELOPMENT PROCESS

All the respondents attributed the problems of technical colleges' learning programmes to the fundamental issues of the curriculum development processes. The first issue was that the curriculum was not constantly revised and updated. Both the principals and organisations noted with regret that the delays encountered in terms of revision of the curriculum were responsible for its lack of relevance to societal and industrial needs.

> **Principal A**
>
> We know that curriculum review, revision, and formulation are always done on a five to ten year period. This is rather too long for technical colleges. It means that no matter what we teach, we cannot keep track with the pace of changes taking place in industries.

Secondly, all the respondents insisted that the curriculum development team should constantly monitor social and economic denominators in order to apply relevant changes. They regretted that curriculum development is done in isolation of societal changes and needs. This situation, according to them, has created a number of problems for the curriculum in terms of relevance, flexibility, access, affordability and sustainability.

The third point is that the curriculum development process was not inclusive and lacked adequate participation and consultation. All the respondents stressed that there was need for the curriculum development process to be more dynamic and

participatory. They noted that the curriculum would be broader, more relevant and more flexible if different views and interests were considered. COSATU, currently participating in the curriculum development process, stressed that they would like to see more active participation of other stakeholders. As an organised labour organisation, the representative stated that they made a vital contribution to the curriculum process. According to him,

> Curriculum formulation and implementation cannot be the prerogative of one sector but of all stakeholders, government, business and civil society. Workers should also determine what goes into the curriculum, together with the education and the business sector. The workers inform the curriculum experts of what goes on in the workplace.

The VEDCO representative explained that as a development organisation, they facilitated the curriculum development process through financial support to technical colleges, organising inter-linking programmes, marketing the curriculum for international recognition and acceptance, introducing and financing new entreprenureship programmes in technical colleges, and organising and funding seminars. She stressed that reconstruction of the curriculum and its implementation would be dynamic and effective when all stakeholders began to be more responsive. In her opinion:

> Business has a vital rôle in the curriculum process. It should assist in the actual rewrite of the curriculum. In addition, it should partly fund the re-training of teachers to enable them to cope with the new demands of the outcomes based education as well as to manage the systems and information technology.

The majority of the principals stressed that technical colleges would continue to have problems unless the curriculum development process become inclusive and involved even those at grassroots level. Principal C emphasised that no one person or institution should formulate a curriculum. She stressed that curriculum development should be the combined effort of commerce, industry, government and academics. In addition, Principal E insisted that:

> There should be more grassroots involvement in the curriculum development process. Presently, it is coordinated by the national

> department and we have excellent people in the colleges that are well informed, and have firsthand experience on the learning programmes that should contribute to the process.

The research data portrayed a 'top-down' approach to the curriculum development process. The top-down approach is a situation where policies are made without adequate consideration of grassroots factors. Some writers envisaged that such policy process might create problems of implementation (Lipsky, 1971; Elmore, 1979; McLaughlin, 1987).

However, the numerous problems identified as obstructing the implementation process could also be addressed during the curriculum reconstruction process. Both Ughamadu (1992) and the DET's *Curriculum Framework for General and Further Education and Training* (1995) recommended that wide consultation and participation should be adopted during the curriculum development process in order to minimise implementation problems.

Stakeholders' Rôle

The Fourth draft of the BSA's (1997) Position Paper on Curriculum suggested that all stakeholders would be accountable if they were made to participate and had joint ownership of the curriculum. It noted that joint ownership of the curriculum process would widen access, encourage flexibility as well as help minimise the fundamental problems of implementation. It stressed that broad consultation and participation would produce a curriculum that would cater for the social, political and economic needs of the Republic of South Africa (RSA). The BSA paper on views of the curriculum stated that:

> It is essential that the curriculum provide for sufficient flexibility to enable the various interest groups to devise optimum benefits from it. This can only be achieved if it is ensured that the curriculum development processes are open to the participation of all stakeholders (BSA, 1997:4).

According to the paper, if various groups were made to be accountable for the curriculum development process, they would rise to their responsibilities and contribute effectively to the successful implementation of the learning programmes. Some of the interested groups that it identified were learners, educators, academics, government, parents, committees, professional bodies, organised labour and the business fraternity.

The employer and labour organisations explained that each group had a specific focus on the curriculum that needed to be incorporated. They stressed that in order to satisfy these demands, it was necessary for the curriculum development process to have the following features:

(i) Broad participation and ownership in order to have joint responsibility.
(ii) Accountability in order to allow for public scrutiny and participation.
(iii) Flexibility in order to take into consideration the diversity of society and cater for the vital interests of all groups.

There is support for the view on broad consultative processes in the broader literature. For example, Ughamadu (1992) stresses the need for all segments of the society to be involved in the curriculum formulation and implementation process. He reiterates that adequate and wider participation of all stakeholders will help in:

> Planning and developing a curriculum.... For a society which can foster ideals and values and subsequently lead to the maximum attainment of its social, economic and other needs and aspirations (p:24).

Other writers also stressed that broad participation during the curriculum development process is crucial to narrow the gap between the curricula and societal needs. For Katzao (1989)

> Curriculum development and good teaching demand creative, careful and sensitive planning - not only in terms of the task to be accomplished, but also in terms of the learner involved (p:15).

In the view of ESKOM representative, technical colleges received inadequate attention from the National Department of Education (NDE) because they formed a small part of the provincial educational structure. The ESKOM representative noted that technical colleges were beginning to have success stories in South Africa because the business sector had ignored the NDE and dealt directly with the colleges themselves. He criticised the bureaucracies of the NDE as detrimental to the development of technical colleges. He described the inefficient management of the NDE in terms of curriculum construction and revision as a hindrance to national growth and development.

Suffice it to say that the organisations, which also are major stakeholders in education and training, regretted that the curriculum is centred on the educator instead of the learner. They noted that the curriculum policy pronouncements were not realised because integration at the point of delivery was not emphasised. They complained that the learner was not within the spotlight and urged the curriculum development team to reverse this. In order to do so, they identified numerous principles that should guide the construction and implementation of the curriculum in technical colleges. These were access, integration, affordability, relevance, partnership and accountability. Others include skill development, entrepreneurship, community involvement as well as international recognition and acceptance.

In evaluating the enumerated principles critically, it is striking to note that the business sector, the labour organisation and the vocational education development organisation, that have different aims and objectives, identified similar values that should guide the development of the curriculum for technical colleges. For instance, all three organisations identified access, integration, relevance and flexibility as the core principles that should guide the technical college curriculum. Table 3 shows the major principles identified by these documents to guide the curriculum development process.

TABLE 3

FACTORS TO GUIDE CURRICULUM DEVELOPMENT PROCESSES OF TECHNICAL COLLEGES

BSA	COSATU	VEDCO
Curriculum Development Process Participation and joint ownership Accountability Flexibility **Curriculum Content** (a) Flexible and Responsive (to changing economic and social trends) (b) Pragmatic and easily implementable (c) Relevance to current and future needs of the beneficiaries (d) Access (e) International acceptance (f) Affordability and sustainability (g) Quality (a quality culture must pervade the curriculum and its delivery) (h) Integrated approach (i) Curriculum specifics	**Curriculum Content and Process** (a) Access (b) Integration (c) Portability (d) Flexibility (e) Relevance (f) Coherence (g) Credibility (h) Legitimacy (i) Articulation (j) Progression	**Curriculum Content & Process** (a) Accessibility (b) Relevance (c) Affordability (d) Specialisation (e) Community-based (f) Wide variety of fields in study (g) Skills development (h) Entrepreneurship and Small Business Development Programmes (i) Programmes to be related to economic and social needs (j) Implementation should be flexible and adaptive

Source: BSA, 1997; COSATU Policy, 1996; VEDCO, Undated.

When asked what should influence the construction of the curriculum, the majority of the respondents stated that technological, economic and social matters should influence it. Most respondents agreed that the curriculum would not be valuable if it were devoid of the social, economic and political dimensions. They noted that since the curriculum is not neutral to social and economic factors, it could not afford to be static. In lieu of the above, the VEDCO representative stated that 'the economic trends should be far more demand than supply driven'. She noted that the type of people trained and the industries that are trained for should be considered during curriculum construction. This, according to her, is because it has direct impact on the economic growth of the country. She explained that well trained workers would be efficient, productive and adaptable in the workplace.

However fears were raised that close relationship between industries and technical colleges would lead to the hijack of the curriculum to suit industrial needs. Principals A, C, D, E and F felt that it would not be possible for industry to narrow the curriculum because different stakeholders sit at the curriculum development process.

> **Principal D**
>
> Industries can never hijack the curriculum for their selfish interest. The national curriculum is guided by standard criteria that have to be adhered. As we adapt to the needs of the business/industrial sector, it has to be within the parameters set by the national curriculum.

However, Principal B did not see anything wrong if the industries tailored the curriculum to serve their purposes. In his words

> Technical colleges are training for the industries and industries should have say on what the curriculum should look like and not the state. The state employs politicians but industries employ skilled workers.

Teachers in technical colleges

VEDCO stressed that in order to become relevant and efficient, technical colleges should embark on a transformation process. Such a process would include the total re-training of teachers. According to their representative, poor governance and management of technical colleges formed a large part of the development problem. It was necessary for the governing and management bodies to become accessible, participative, visible, and accountable as well as encourage community orientation and involvement. She noted that the means to effective change of the curriculum would be through the educators and trainers. Also the ESKOM official noted that trainers were responsible for the implementation of the curriculum and would ultimately determine its success. He encouraged the curriculum development process to encourage trainers to become joint partners and owners of the curriculum.

In their views, the employer (ESKOM) and the labour (COSATU) organisations respectively agreed that high quality staffs were necessary to yield productive and flexible human resource. The COSATU representative condemned a situation where retired and unqualified teachers were allowed to teach in technical colleges. He noted that technical colleges were expected to produce people that could be competitive in global economy. He encouraged them to improve on the quality of governance and education in the colleges. The business sector, through their representative, advised that there should be a restructuring of the governing bodies and teaching corps in technical colleges to boost efficiency. It is noteworthy that VEDCO believed that it was partly the responsibility of the business sector to train these teachers and make teacher training curricular relevant to their needs.

Some of the principals also emphasised the need for staff training and development programmes. According to them when the staff are well trained they would be motivated, committed and creative in their jobs.

Principal C

I would like technical college curriculum to change in a way to help us train as many people as possible to become entrepreneurs and contribute to economic development. This will help lessen the unemployment problems we are now facing.

Principal E

We need to train, educate and change the minds of trainers so that they can begin to look beyond the immediate needs of society.

The majority of the principals explained that teachers should not be expected to be pragmatic because they were not trained on the current use of equipment in industry. They attributed teachers' failure in risk-taking, creativity and innovation largely to insufficient staff development programmes. They noted that in order to have pragmatic teachers, the government should equip each technical college with recent technological equipment and train the teachers on how to use such facilities.

Principal B noted that the failure of the NQF to address adequately the training and re-training of teachers would create a problem for the integration process. He noted that at the moment, a number of people in the educational system had never been trained in the new integrated system approach. He stressed that the integrated system would definitely collapse if the present calibre of teachers were expected to provide instruction. Principal B emphasised that unless the threats of underqualified staff were addressed, it would take a long time to implement the NQF. He therefore urged the state and the business sector to assist in the retraining of teachers in order for them to do their work well.

Principal B

The problem with the NQF is that it fails to address the training of the trainers. This is the biggest threat to the success of outcomes based education. Teachers must learn the outcomes based assessment processes, how to train students differently, to get away from the chalk and talk method of training to building a student's profile, and facilitate training.

However, it is striking to note that while the other principals blamed the state for undue restrictions and complained about financial constraints and irrelevant curriculum, the private college principal criticised most teachers in technical colleges for lack of innovation and ingenuity. He noted that the curriculum could become relevant and implemented easily if teachers could be a little bit creative. He complained that the mindset of most teachers is too rigid and could not adapt to societal changes. He regretted that teachers had an overwhelming sense of insecurity that made it impossible for them to be pragmatic. He believed that his college was more productive because they employed teachers that could make the national curriculum satisfy societal needs. In his words:

> Teachers should not be spoon-fed. Teachers should not be teacher-centred but learner-centred. Teachers should be more like facilitators.

Other principals differed from this view. They noted that teachers needed to be constantly trained on new technology, as well as motivated through promotion and salary increases. They explained that because technical colleges were not allowed to employ the type of teachers they needed, they were saddled with traditional schoolteachers appointed by the Department of Education. These principals stressed that technical colleges needed to employ people from industry to teach their students. This is because they were the most qualified and in tune with technological skills and industrial demands.

Autonomy

Two sets of state technical colleges were identified. They are the state-aided colleges, which are mostly the white colleges and the state-controlled colleges that are predominantly black colleges. Principal B explained that the thirteen black technical colleges in Gauteng are still classified as state-controlled colleges. This has made it difficult for them to expand or revitalise their learning strategies because it has been difficult to expand outside the state allocated budget. He noted that due to lack of autonomy, these colleges could not invest or pursue significant projects. These limitations, he noted, made the colleges stagnant and inefficient. On

the contrary, the state-aided colleges have the leverage to canvass for funding, initiate viable projects, and enter into partnerships that would help them grow. These opportunities, he noted, have made these colleges become more relevant towards meeting the needs of the society. These differences, according to some principals, have created problems of diversity and sectional interests in the educational system.

Four of the six principals pointed out that most technical colleges would be more effective, productive and dynamic if it was not for enormous and various restrictions imposed on them by the state. They regretted that technical colleges could not expand in a dynamic way because government budget and bureaucratic constraints restricted their activities. Such constraints included appointment of teachers, rigid curriculum, linked to school systems, financial controls and lack of autonomy. Principal B, from a state-controlled college, sets out his frustrations:

> The fact that we are still linked to a very strict department school base approach is a big hindrance to our goals. The fact is that we need a little bit of autonomy to be able to manage our budget rather than being restricted by the department. The bureaucratic hurdles of the department, the delays in appointing staff, promotion problems and poor salary packages are posing a lot of hindrances to technical college progress.

In contrast, Principal D, whose college was declared a state-aided college few months ago, was full of optimism. He explained that the college was already negotiating with some industries for financial assistance in equipping their workshops. He was excited that their students would soon benefit from practical training that make them more productive at the workplace.

Principals A, B, C and F believed strongly that government restrictions on technical colleges were the major factor delaying their contribution towards economic growth. They stressed that once all technical colleges became state-aided instead of state-controlled, they would be able to source funds to equip their workshops and give students the necessary training that will advance economic growth. Principal B regretted that

> The thirty-three technical colleges in the province on the average have failed to contribute to adequate economic growth. Technical colleges need autonomy in order to boost in efficiency. Once an integrated approach is achieved amongst technical colleges, we can significantly contribute to the development of the province economically.

Principals D and E noted that one way of financial provision was for government to grant technical colleges the autonomy to search for funds and resources. They noted that strict regulations from the state have made it impossible for technical colleges to grow, diversify or equip themselves. In their view, less government control would encourage technical colleges and industry to form partnerships that would be of mutual benefit.

In the midst of all these points, Principal D made an important observation. He stressed that for the curriculum to be effectively implemented there was the need for the students to be dedicated and willing to learn. He stressed that no matter how the workshops were equipped and how qualified and motivated the teachers were, it would be difficult, if not impossible, for the curriculum to be effectively implemented when students continued to lack the culture of learning. The problem to be addressed, therefore, was how to make students begin to acquire the culture of learning. Some of the ways suggested by Principal A and ESKOM are:

(i) Awareness campaigns through the media.
(ii) Motivation through sponsorship and awards.
(iii) Changing the image of technical colleges as a provider of a second-class education to that of a provider of an up-to-date, technically oriented education.
(iv) Increased employment opportunities in industry.
(v) Recognition of technical college certificates by Technikons and Universities for further study.

Some writers on policy implementation have stated that outcomes differ from grand sounding education policies (Elmore, 1979; Sabatier, 1986). The research study shows that the situation is different in South African technical colleges because

there has never been a grandiose policy for this sector. The dilemma is that structures created to ensure transformation are surrounded with enormous logistic, political and social problems.

4.2.4 IMPLEMENTATION OF THE CURRICULUM

The implementation process is the key determinant of a curriculum as an effective policy instrument. This is the stage where all the major factors that influenced the curriculum development are tested. The majority of interviewees raised a number of factors about the implementation of the technical college curriculum. They ranged from out-dated curriculum content, lack of infrastructure and poor human resources to insufficient funds and government restrictions and control.

During the interviews with the technical college principals, I requested to see the workshops where the practical components of the curriculum were provided. The Principals of the private college, the state-controlled college conducting a pilot study and one state-aided college were delighted to show me the workshops. Principal D, whose college had been approved as a state-aided college, showed me the space reserved for the workshops pending the availability of the needed infrastructure. Principal E acknowledged that they did practical training but regretted that the equipment was obsolete. Principal C explained that they did not offer practical components because they offer Business and Utility Studies and not Engineering Studies. She however noted that:

> Practical skills should be a crucial area for effective curriculum implementation. When training people for the world of work, we should be able to integrate the theoretical with the practical components. Unfortunately, this is not happening in most technical colleges.

Half of the principals noted that because the curriculum is not updated with the current trends in industries, it was difficult to make it relevant irrespective of the implementation process. When asked to identify the problems that were hindering

the effective implementation of the technical college curriculum, Principal D summarised them as follows:

> Firstly, financial, secondly, lack of staff development. Thirdly, with the expansion of more learning programmes, we need more facilities. Fourthly, the curriculum is not in tune with the social and economic needs.

In terms of human resource development, Principal E stated that an integrated curriculum comprising theoretical, academic and practical components would assist in the training of a productive labourforce. In order to achieve this, she urged the Departments of Labour and Education to form inter-ministerial working groups to structure how to raise finances to equip technical colleges. Here are some from state-controlled, state-aided and the private college.

> **Principal A**
>
> The students need a holistic view of the field of work and not just a narrow theory which otherwise is very restrictive. This is the danger in the national curriculum, which encourages rote learning. A situation where students know a formula but fails to understand how such a formula works is distasteful.

> **Principal E**
>
> We cannot begin to integrate curriculum in the absence of workshops, equipment, and infrastructure as well as with teachers that are not up to date with changes in technology and industries.

> **Principal F**
>
> Frankly, teaching any engineering subject theoretically without the necessary practical skills is a complete waste of time. Most technical colleges ar fraudulent with the engineering courses they offer because they are reading from the book. It is just like learning in a secondary school.

FINANCES

It is vital to note that the objective of technical colleges is to train and equip individuals with life long skills. Yet most technical colleges sampled were in distress

in terms of physical and financial resources. The majorities of the respondents condemned curriculum development policies because of their financial constraints. Both the private college and Principal C stressed that effective integration would remain an illusion as long as there was no adequate financial backing to curriculum policies. They regretted the fact that technical colleges were not meeting the demands of industries for .'illed workers, partly because of the present inadequacies of the formal curriculum but mostly due to financial constraints. They noted that practical training, especially in engineering fields, is capital intensive and most colleges are inadequately equipped.

Principal C

> The fact is that most technical colleges can effectively train students skill-wise if they are well equipped. Unfortunately, the reality is that most policy decisions taken are guided by financial limitations.

The majority of the principals also noted that in order for the technical college curriculum to address societal needs, policy-makers have to change the way decisions are made. They emphasised that policies should be backed by finance. These principals complained that lack of workshops, the use of obsolete equipment and constrained financial budgets were imposing implementation problems for them.

Principal A

> The biggest problem facing technical colleges is cost. Practical training is cost intensive and there are so many technical colleges that it becomes impractical for the government to equip every one of them. There should be a shift of focus from an academic curriculum to a more technical curriculum. This shift will involve a lot of finances and policy-makers should be aware of that and make room for financial provisions.

Change in the curriculum

All the principals identified areas that they want to see changed. These ranged from duration of courses, expansion of courses, specialisation, and staff development to

less government restrictions and autonomy for technical colleges. All the principals suggested that there should be a change of attitude amongst various stakeholders. They stressed that there was the need to form partnerships with the business sector in order to be more productive. They emphasised that the business sector should play a major in the curriculum development process because they were more in tune with the economic and social changes. They stated that since individuals would work in industry after training, social and economic factors should influence the construction of the curriculum. They also insisted that officials from industry and teachers from technical colleges should contribute and participate in the curriculum processes and implementation.

> **Principal C**
>
> We need to have a curriculum that has to adapt to the environment or special needs of the country ... South Africa must plan its curriculum to be ahead of the economic trends.

The three organisations supported the technical colleges in clamoring for change. During the interview, the ESKOM representative responded that it would like to see the curriculum change towards more balanced theory and application. In order to have an effective change process, BSA emphasised that 'needs should be prioritised, phased-in and synchronised within a clear overall proactive strategy, linked to realistic time frames (a period of 6 to 10 years is considered realistic)' (BSA, 1997:10). The BSA (1997) position paper on the curriculum also stated that:

> Business supports the idea of flexibility of content in the school curriculum. ... It also realises that there is a need to focus provision around that content which is directly relevant to self-actualisation, community development and economic empowerment namely: language and languages, mathematics, science and technology and enterprise skills (p:7).

It is ironical to note that while the principals supported an economically oriented curriculum, the organisations were more in favour of a balanced curriculum including social and economic elements. COSATU stressed that the curriculum should address both the manual and cognitive development of the individual.

According to him, construction of the curriculum should not be driven solely by market forces, but by national interests and the need for personal development.

However, the views of the principals, that the curriculum should be influenced by economic matters, are in contrast with social democratic theorists. The social democratic theorists stress the need for broad educational goals. They criticise ducation that is influenced mainly by economic matters. Social Democratic theorists argue that education should address social responsibilities like equity and access, as well as encourage the development of individual potential (Winch, 1996; Apple, 1996).

However, a degree of pessimism was expressed over the occurrence of curriculum changes. Principal E noted that it would be difficult to see changes if the curriculum did not possess the mechanisms to change. She noted that though the pressures of the society would initiate change, it was important that the curriculum changed in line with positive trends in other sectors. She expressed regret that technical colleges were concentrating on training low- skilled workers that would not be relevant to the high technology in industry. According to her, the labour market was very dynamic and needed people with entrepreneurial skills as well as those that can be self-employed. She noted that the labour market needed people with high-skills and management capabilities. In order for this to take place, she advised that the curriculum be holistic and be able to incorporate the generic skills in all fields of study.

The related literature cited in earlier chapter notes that change is inevitable in a dynamic and developing society. Both the international and local debates stated that the economic, social and political dimensions of the society should be reflected in curriculum. The findings of this study show that most technical colleges were clamoring for change. This is contrary to some theorists who stated that change is often resisted by society (Fullan, 1989). The findings, however, give backing to the literature which stated that given technological expansion, the need for economic growth and the changing social values and political philosophies, the curriculum

cannot afford to be static (Goodson, 1988; Carnoy, 1994). This helps explain why most colleges are eager to transform their curriculum to make it relevant to the needs of society.

The rôle of NQF

It is important to comment that the introduction of the National Qualification Framework (NQF) has been recognised by all respondents as the vehicle that could make technical colleges affordable, accessible, progressive, nationally recognised and internationally acceptable. Business South Africa stated that the curriculum should provide for equal opportunity for entry to appropriate levels of education and training in a manner that facilitates progression regardless of the learning path (1997:7). While enumerating the goals of technical colleges, VEDCO described technical colleges as 'about people training people; educating people; equipping people and working with people' (Undated: 1).

The ESKOM representative was of the view that the NQF would encourage a total opening up of thinking towards how to train, employ and utilise individual potential. He noted that through the NQF, industry would move away from a "production-line" person who could not think, to an individual with values who could contribute to the process no matter how little. The same view was expressed by the development organisation, VEDCO.

However, there seems to be a contradiction in terms of what the principals want when it comes to the NQF and their objectives as training institutions. The majority of the principals applauded the NQF for expanding the horizon through which their certificates and learning programmes would be recognised and accepted across bands. They said that through the NQF individuals would learn to develop their potential. They noted that NQF would encourage learnership skills that were necessary for self-employment and which would boost economic growth. According to Principal B

> Most training is going to be on individual levels. Most industries are no longer employing people, so we need a self-reliance mindset of training for economic development and I think the NQF is geared towards that.

The majority of the principals also noted that through the structures created by the NQF, the formal and non-formal curriculum would gain national recognition when it met the standards and criteria of the South African Qualifications Authority (SAQA). The principals of both state aided/controlled technical colleges noted that the NQF would promote life long learning outside the learning institutions. They explained that technical college non-formal programmes would become acceptable and relevant through the standards authorised by the NQF. The respondents stressed that the NQF standards should be continuously generated in order to be meaningful, up to date and relevant to industrial and societal needs. In their words:

> **Principal C**
>
> The NQF emphasises an integrated approach to learning. In other words, there is no way I can teach a student something that is not relevant in their career paths because I have standards guiding me.

> **Principal E**
>
> Through the NQF, access, mobility, equity and redress are encouraged. Our students will be more prepared for their s in industry. They can compete at other levels and have the opportunity to improve in their career path by attending the technikon or university.

However, the employer and labour organisations identified a number of problems that could hinder the success of the NQF as a vehicle for effective integration. One problem was that the NQF limited the integration process to specific areas like the entry and exit points across different bands; recognition and acceptance of courses; and standardisation of the certificates. The majority of the respondents noted that such integration was superficial and failed to address the fundamental problems of integrating the theoretical and practical components of the learning programmes. According to them, the integration of the curriculum at the levels specified by the NQF would not ensure the grassroots integration of the learning programmes.

There was therefore the need to integrate the learning programmes in line with the certificates and standards created.

In addition, the majority of the principals complained of the frequent entry and exit points that the NQF encouraged. The five principals that were operating the trimester periods complained that the short duration of learning programmes forestalled progression and integration while encouraging flexibility and affordability. They noted that they would offer more effective specialised programmes if the learning periods were longer. It seems that it would be out of order if the technical college curriculum lacked the necessary structures that would encourage widening of access and flexibility of the learning programmes. It is important to reflect that flexible entry and exit points are championed by the NQF but the majority of the principals in this study viewed them as a hindrance to effective integration and specialisation process. This highlights the dilemma that would be faced during the implementation of integrated education and training systems through the structures created by the NQF. The problem, then, is how the NQF could be able to encourage specialised training as well as cater for flexible and affordable learning programmes.

Partnership

Before concluding this chapter, it is necessary to relate the various themes to the issue of the existing relationships amongst stakeholders. The relationship amongst technical colleges and industry has been identified by the respondents as a contributing factor to problems of implementation, integration of education and training and economic growth. The majority of the respondents noted that the relationship amongst stakeholders was not satisfactory. Some of the principals stated that there should be far more industry involvement in the affairs of technical colleges. According to them, industries should contribute to curriculum development, employment placement, and bursary schemes, funding in all the areas of technical colleges.

At present, the data revealed that most technical colleges are offering programmes without following the changes and trends in the industrial sector. The industries, on the other hand, are busy training individuals to suit their particular needs. According to some interviewees, this situation has created problem for individual growth, flexibility and adaptability. It is important to note that the three technical colleges that engage in practical training are in partnership with some industries.

The majority of the respondents regretted that education and training were perceived as the responsibility of the state and should be subsidised. They noted that technical colleges would not meet with industrial demands if they depended on the state. This is because training is capital intensive and the state is facing over-strained budgets. They urged stakeholders to form partnerships to assist technical colleges to become competent and productive.

Both technical colleges and industry agreed that forming partnerships would help them build a strong workforce that would contribute positively to economic growth. They noted that partnerships should be formed on these levels:

(i) Partnership amongst technical colleges.
(ii) Partnership between technical colleges and industries.
(iii) Partnership amongst technical colleges, industries and the state.

It is important to draw out that the three principals that were (on average) implementing an integrated curriculum (theoretical and practical components) explained that it was because of their relationship with some industries. According to them:

Principal A

We have an established relationship with three industries that assist in our student placement programmes, for their practical components.

Though partnerships have been identified as a step forward, most principals agreed that forming these partnerships was problematic. They noted that there is discrepancy between the views of business and technical college on how education should be provided. According to Principal B

> The problem is that industry thinks education is too slow and cannot wait for it, while education thinks that they are the experts and should prescribe to industries.

Another problem is that some state-controlled colleges could not form partnerships with industry due to government restrictions. According to Principal D, his college of 40 years existence only started forming partnerships with some industries six months ago when they became a state-aided college. Consequently, other colleges that are not state-aided would not be able to benefit from the advantages of partnerships with industry.

Some respondents stated that though there was the need for industries and colleges to form partnerships, industries should not be allowed to influence the curriculum in such a way that it would forestall individual growth. Principal A disclosed that it is the policy decision of their college to equip students with other necessary life skills. He is confident that the NQF, SAQA and ETQAs would ensure that providers do not train for industries only. He sounded a note of warning that:

> We will have to satisfy the needs of the industry but we should not forget that we are also developing people. We cannot afford to develop people to be bags full of skills just to make industry happy.

Clustering was also identified by half of the respondents from technical colleges as a way to form solid partnerships amongst technical colleges. Some principals stated that it was important for colleges within the same vicinity to link and complement each other. They stated that colleges would be more productive when they shared their resources. Principals B, C and F explained that clustering would assist technical colleges to specialise in particular fields of study and run an integrated learning programme. They believed that through clustering, technical colleges could

exchange ideas and make use of limited resource in a more rewarding/meaningful way.

On the contrary, Principals A, D and E expressed fear that clustering and specialisation could pose threats to affordability, widening of access and the NQF. Principal F felt that clustering would involve a number of logistic problems and described it as a cumbersome process that could lead to political frictions. The problems that were envisaged with the clustering systems are:

(i) Most technical colleges do not want to lose their identity.
(ii) There is the problem of affordability and denial of access to some communities.
(iii) There are a number of logistic problems to be addressed.

CONCLUSION

Analysis has shown that the formal curriculum of technical college is surrounded by a number of problems, from inadequate curriculum content and short duration of courses to lack of integration at delivery point. These problems have been attributed to the nature of the curriculum development process that is not constantly revised. The section noted that changes in the curriculum would enable a productive and efficient workforce. In order for the changes to take place the respondents suggested less government control of technical colleges, increased staff development and training, a "bottom up" approach to curriculum formulation and implementation and grassroots integration of education and training programmes. The findings of the research may be related to the broader literature. It is interesting to note that a number of factors that were neither envisaged nor revealed by the literature also became evident. The problems facing technical colleges in South African have continued to grow in the face of economic and technological advancement. There is urgent need, therefore, to address the problems and inadequacies pointed out through this research.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

OVERVIEW

The research report set out with a number of notions. Firstly, that technical colleges play a significant in the economic development of the country. Secondly, that when individual potentials are developed through knowledge and skills training in technical colleges, they will contribute to formulate a solid human resource base. Thirdly, that when technical colleges equip individuals with entrepreneurial skills, they are likely to become self-reliant and help reduce the high unemployment statistics. Fourthly, that the NQF would form the basis for an integrated, holistic, flexible and relevant curriculum for technical colleges. In order to investigate these concepts systematically in practice, the research sought views from technical colleges, business and developmental sectors and the labour organisation. It anticipated that divergent views and solutions would emerge from these sectors. It is important to note that respondents, although from different settings, do not differ greatly in their views on the issues raised in this study.

SUMMARY OF FINDINGS

The findings from the documents and responses from interviewees on the concepts that informed the research report are as follows:

In terms of contribution to economic development:

(i) The majority of technical colleges play a significant rôle in the growth of the business sector as against industrial growth.

(ii) The minority of technical colleges engage in entrepreneurial skills and development.

(iii) All the technical colleges agreed that they had failed to champion adequately the economic growth in the country.

The research findings revealed that technical colleges are not contributing fully to industrial and economic growth because of:

(i) Outdated Engineering Studies curriculum.
(ii) Inadequate infrastructure for practical training.
(iii) Use of under-qualified teachers.
(iv) Lack of partnership amongst stakeholders in order to pursue a common goal.

In terms of building a solid human resource base for the country, the research data revealed that:

(i) The curriculum lacked broad generic skills to produce a well-trained worker.
(ii) The technical college contribution to the human resource base is mainly the low-skilled workers as artisans.
(iii) The economy cannot prosper based on the services of the current category of workers trained in technical colleges.

In terms of equipping individuals with relevant skills for the workplace, respondents from labour organisation and technical colleges stressed the need for:

(i) Individual growth and development.
(ii) Acquisition of entrepreneurial skills for self-reliance.
(iii) Community-based learning programmes.

A number of divergent views emerged in terms of the NQF as a vehicle for an integrated curriculum for technical colleges:

(i) That integration of education and training systems through the structures created by NQF is mainly superficial.

(ii) That the NQF will be helpful in areas of standardisation of the qualification, widening of access and redressing social injustices

(iii) That the NQF mobility across horizontal and vertical lines would create problems for specilisation and an effective integration process.

CONCLUSION

This research report examined the nature of the curriculum and its implementation in a selection of technical colleges, and how the curriculum contributes to economic growth. Two schools of thought, human capital theorists and social democratic proponents were identified during the review of literature. Chapter two presented their different views on education and training as a catalyst for economic growth. Some of the findings from the study suggest that technical colleges can be adequately entrenched into economic growth and development in South Africa when the curriculum is constantly revised, financially supported and implemented by qualified teachers.

RECOMMENDATIONS

For technical colleges to contribute effectively to economic growth there is the need for a paradigm shift within the different structures in the education and training category. One such structure is the curriculum development and implementation process. Eight recommendations are, therefore, proposed.

(i) The curriculum development process should comprise the business sector, developmental organisations, labour representatives and technical college experts. They should devise ways to align the curriculum with the social and economic changes in the country. This means that ideally the curriculum should be revised every three to five years.

(ii) Policies should be adequately backed by finances. Practical training should be encouraged and financed. In order for this to be realised, technical colleges should learn to be innovative and market themselves strategically.

(iii) The Departments of Education and Labour should be merged under one Ministry if the integration of education and training is to be facilitated.

(iv) There should be less government control and restriction on technical college activities. Technical colleges should be given autonomy to operate as corporate bodies. The curriculum, assessment and examination of learners should, however, be supervised by the state.

(v) Technical colleges should liaise more with each other. They should engage in exchange programmes and services for maximum efficiency and productivity.

(vi) There should be the formation of partnerships between technical colleges and other stakeholders. Stakeholders, like the business sector, should be seen to engage in sponsoring programmes especially in Engineering and Computer Studies.

(vii) There should be massive retraining of teachers in the "state of art" technology in industry.

(viii) There should be further investigation into the numerous issues that have been identified in this research report, as derailing the implementation of appropriate technical college curricula and their contribution to economic growth. Of particular attention is the lack of culture of learning and the economic affordability of learning. Sadly, these two specific aspects are not within the ambit of this report.

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APPENDIX A

ENERGY (Tenses)



Energy is the name given to the ability to work. Work and energy are measured in the same units. Many people confuse the three terms energy, power and force. Force is a push or a pull on an object. The amount of work needed to do something, is determined by how strong the force is that is used, and how far it has to move. Power measures the rate at which the work is done.

All human life depends on energy, and this energy is found in many different forms on earth, such as potential, kinetic, thermal, electrical, chemical and nuclear energy, to name a few. All forms of energy are associated with motion.

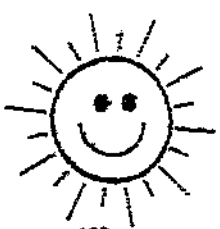
If a spring is compressed, then it possesses potential energy (often called stored energy). When such a compressed spring is released and allowed to use its force against another object and to keep moving until it reaches its original length (the length before it was compressed), potential energy is converted into work. Potential energy represents work that has already been done.

Kinetic energy is the energy of movement. If a spinning wheel or any other moving object can be stopped, useful work can be done. A pulley and a rope attached to a wheel can, for example, be used to lift a weight.

A steel ball held in the air contains potential energy. If it is dropped, the force of gravity pulls it down, and the potential energy changes to kinetic energy. If the ball falls on to something soft, like fabric or putty, then the kinetic energy is converted to heat energy.

If it falls on something hard and elastic, however, such as a hard metal surface, it will bounce up again and use up all its kinetic energy to regain its potential energy once more.

The world we live in is alive with energy. Energy from the sun warms us every day, and there is even enormous energy beneath the crust of the earth. Without energy, matter could not exist, and modern scientists say that there is no difference between them : matter exists only when energy is present in certain forms. Matter can be changed into energy, and energy can be changed into matter - in an atomic explosion, for example, matter changes to energy.



Question 1

Underline the correct word in each sentence.

1.1 This passage is written in the (past / present / future) tense.

1.2 Power (never / usually / does) measures the rate and which work is done.

[2]

Question 2

In paragraph two, we read that if a spring is compressed, then stored or potential energy is present in it.

Complete the following in a similar manner :

Example :

If you can stop a spinning wheel, then useful work can be done.

2.1 If you help me, then _____

2.2 If the price of petrol is increased, _____.

2.3 If you drop a brick in a full bucket of water, _____.

2.4 If Orlando Pirates win the league, _____.

[4]

Question 3

We can also express a condition in other ways :

Even if you give it two coats of paint, it will still be ugly.
Although you gave it two coats of paint, it is still ugly.

Make sentences with the following, using even and although :

3.1 Passed the test. Failed the exam. (Although)

_____

3.2 Leave tonight. Late for the flight to Japan. (Even)

_____

APPENDIX B
GUIDING QUESTIONS FOR THE INTERVIEWS

Below is the list of the guiding questions used during my interviews. It is important to note that these questions were drawn up to extract information peculiar to each sector.

Principals

(i) What courses does your college curriculum offer?

(ii) What are the subjects contents, at what level are they offered, and what do they intend to achieve?

(iii) What changes have taken place and how do they differ from the past curriculum?

(iv) What necessitated the emerging changes in the curriculum framework, policy and content?

(v) What do these changes mean to students and industry?

(vi) Do you think that the curriculum outcome will satisfy labour market needs?

(vii) How will these changes prepare students for the workplace?

(viii) What channels are in place for implementation in terms of financial, physical and human resources?

(ix) What is your understanding of the National Qualification Framework and what changes would it entail for them?

(x) How would the teaching methods used by the teachers help the college realise the goals of the formal curriculum?

(xi) What are the problems encountered in the implementation of the formal curriculum and how can they be addressed?

Business South Africa

(i) What does the private sector play in the formulation and implementation processes of technical colleges' curriculum?
(ii) What do you think is the relationship between the formal curriculum of technical colleges and the employment interests of the labour market?
(iii) How far does the syllabus represent the interest of employers?
(iv) To what extent do the colleges provide the industry with their employment needs?
(v) What do you think technical colleges should be playing in the development of the economy?
(vi) What changes do you think have taken place?
(vii) What changes would you like to see?
(viii) What resources are in place or required for effective change?
(ix) What channels would facilitate effective implementation of the curriculum?
(x) What are the envisaged and encountered problems?
(xi) What is your view on the proposed integration of education and training systems?

Congress of South Africa Trade Unions

(i) What are the needs of the workplace?
(ii) What is the relationship between the formal curriculum and the employment interests of the labour market?
(iii) How far does the technical college curriculum equip the individual for the workplace?
(iv) What s do trade unions play in policy formulation that affects curriculum development for technical colleges?
(v) What changes would you like to see?
(vi) What channels would facilitate the implementation process?
(vii) What are the envisaged and encountered problems?

(viii) What resources are in place or required for effective change?

(ix) What should the labour unions play in curriculum formulation and implementation process in technical colleges?

(x) What is your view on the proposed integration of education and training systems?

Vocational Educational and Development Co-operation (VEDCO)

(i) What informs the construction of technical college curriculum and how is its implementation monitored?

(ii) What do technical colleges play in the economic development of the country?

(iii) To what extent do the needs of employers affect the curriculum content of technical colleges and what does this mean for policy formulation?

(iv) Given that the need for life long learning has been constantly stressed, how can technical college's move towards realising this goal?

(v) What steps could the government take to narrow the slippage between policy formulation and implementation for technical colleges to benefit from the National Qualification Framework (NQF)?

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Name of thesis: Towards economic development- implementation of curriculum changes in technical coHeges in Gauteng.

PUBLISHER:
University of the Witwatersrand, Johannesburg
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