THE DEVELOPMENT, CHARACTER AND EFFECTS OF EDUCATION IN A TECHNOCRATIC AGE

BY

ISAAC RAMOLOKO MATHIBE

submitted in fulfilment of the requirements for the degree of

MASTER OF EDUCATION

in the subject

HISTORY OF EDUCATION

at the

UNIVERSITY OF SOUTH AFRICA

SUPERVISOR : Cheryl S Le Roux

NOVEMBER 1998

610-146-1

I declare that **THE DEVELOPMENT, CHARACTER AND EFFECTS OF EDUCATION IN A TECHNOCRATIC AGE** is my own work and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references.

IBM Mathibe _____ 19 October 1998

THE DEVELOPMENT, CHARACTER AND EFFECTS OF EDUCATION IN A TECHNOCRATIC AGE

BY

I. R. MATHIBE

FOR

the degree of

MASTER OF EDUCATION

IN

HISTORY OF EDUCATION

SUPERVISOR: Cheryl S Le Roux

THE DEVELOPMENT, CHARACTER AND EFFECTS OF EDUCATION IN A TECHNOCRATIC AGE

SUMMARY

Rapid industrialization, breakthroughs in science and technological development have ushered in an era regarded as a technocratic age. The advent of a technocratic age has necessitated the acquisition of technologically appropriate knowledge, skills and attitudes, and consequently it has become necessary to establish education systems that fulfil the demands set by technocratic age principles.

Present-day education is typified by technocratic age imperatives which include meritocracy, specialization, vocationalism, professionalism and scientism. Technocratic age education is further characterized by mass education, free and compulsory education and greater bureaucratic control of education. In technocratic age education systems, entrance examinations are used to select learners for advanced education and training. It would appear that this takes place with little regard for the learner's personal worth or meeting the learner's distinctive needs.

Key terms:

Technocratic age; technocrat; technocratic; industrial development; scientism; vocationalism; technologically-appropriate education; technocracy; meritocracy; professionalism; specialization.

CONTENTS

ACRONYMS

ANC	African National Congress
CATE	Colleges of Advanced Technical Education
CBTE	Competence-Based Teacher Education
CCP	Central Communist Party
CEM	Council of Education Ministers
COTEP	Committee on Teacher Education Policy
CRG	Cultural Revolutionary Group
DET	Department of Education and Training
EPDA	Education Profession Development Act
ERS	Education Renewal Strategy
FMM	Four Modernizations Movement
FYP	Five Years Plan
GLP	Great Leap Forward
GNP	Gross National Product
GPCR	Great Proletariat Cultural Revolution
HSRC	Human Sciences Research Council
NEPA	National Education Policy Act
NP	National Party
NQF	National Qualifications Framework
OBE	Outcomes-Based Education
PRC	People's Republic of China
RAU	Rand Afrikaans University
RDP	Reconstruction and Development Programme
RSA	Republic of South Africa
RRP	Retrenchment and Readjustment Period
SACE	South African Council of Educators
SGB	School Governing Body
UNESCO	United Nations Educational, Scientific and Cultural Organization
UOFS	University of Orange Free State
US(A)	United States (of America)
USSR	Union of Soviet Socialist Republics

CHAPTER 1

GENERAL ORIENTATION AND BACKGROUND TO THE STUDY

A powerful tide is surging across much of the world today, creating a new, often bizarre environment in which to play, work, raise children or retire...

(Toffler, A. The Third Wave 1980: 15)

CHAPTER 1

1 BACKGROUND TO THE STUDY

It is generally accepted that society is situated in time and space (Gunter 1990:25) which are in a state of continual transformation. In recent years an era has dawned characterized by rapid industrialization and technological advancement. This era is commonly referred to as a *technocratic age*. With the advent of a technocratic age, industrial production, which had previously gained domination of economic activities over agricultural control, was superseded by remarkable breakthroughs in science and technology (Elmandjra 1986:731).

To meet the demands of the prevailing technocratic age, learners need to be inducted or formally installed in the society of which they are part and guided so that they are able to attribute significance and meaning to that with which they come into contact, in their ever-changing life-world. The assistance which is provided to the learners is actualized through education (Du Plooy, Griessel & Oberholzer 1982:94). It is through education that learners gain knowledge, skills and attitudes which facilitate their habitation of the world and make it their home. According to Griessel, Louw and Swart (1995:21) through education learners should be enabled to realize their innate abilities so that they are able to understand, accept and constitute [as well as to adjust themselves to] the world in which they live. It is the researcher's opinion that since life situations are ever changing and dynamic, education itself, as a situational phenomenon and occurrence, can never be static. Consequently, systematic learning has become a prerequisite for the acquisition of knowledge and competencies needed to attribute meaning to life in a technocratic age (Husén 1979:150).

Through the course of time [and the transition from an agrarian to an industrial age and ultimately to the technological age], the educative role of the family which had been undisputed for many years was faced with a major challenge. According to Engelbrecht, Yssel, Griessel and Verster (1984:78) in a technocratic age parents have become so caught up in and dictated to by the demands of their own careers that a breakdown in face-to-face communication in the family has resulted. The replacement of subsistence economy by wage-earning has required that parents leave their children in the care of others while they go in search of employment. In relation to education, it became necessary to substitute traditional family education with a system of education suited to prevailing societal demands. This signified a new era in education provision, the institution of the phenomenon of formal education.

In a technocratic age, the formalization of education and State involvement in education have become imperative to ensure that the younger generation is adequately equipped to meet the demands of the current era. Education is regarded as an investment in human capital and therefore the education system is expected to be efficient and accountable to both the State and its citizenry. Strategies are adopted and implemented to ensure that the rising generation is prepared to meet the demands of the present and the future.

Having outlined the background to the study, the focus will now rest on motivation for the study.

1.1 Motivation for the study

When the current provision of education is contemplated, it appears that the interests of business dominate. The utilitarian motive for education compels educational institutions to be subservient to the vocational demands of commerce and industry (Higgs & Higgs 1994:44). This utilitarian view of education narrows down the purpose of educational institutions and it can be subsequently questioned whether the unique experiences and needs of learners are catered for in technocratic age education systems.

To ensure the efficiency and productivity of their education systems, technocratic societies introduced formal control in education. According to Woods (1979:22) the mass nature of schooling increased the necessity for firm discipline and standardized national requirements, which undermine local and parental control in education. The standardization of curricula and the setting up of uniform requirements in education demand that learners master the same learning content at the same pace.

The provision of equal educational opportunity is intended to provide technocratic societies with flexible, numerate and literate workers. However, examinations are used to sift the academically unsuccessful from the academically successful, thereby turning schools into meritocratic institutions (Apple 1982:40). It would seem that through education learners are directed to their future economic, social and political positions. Those who play the academic game get the kudos and prizes, while those who do not are pushed [sometimes gently, but always firmly] down the ladder (Hemming 1980:16).

However, the spirit of education as described above is the one generative human force potentially well enough able to combat degenerative human forces (Brameld 1965:8). This implies that education has a role to play in helping societies conquer poverty, ignorance, prejudice, sexism and unemployment, and consequently education holds the key to transformation of societies and to the development of a peaceful and just world (Reimer 1971:100).

In the light of the preceding statement it can be deduced that education in a technocratic age faces various challenges and has specific functions to fulfil. It is these issues, evident in current education, that aroused the interest of the researcher to undertake an investigation into the development, character and effects of education in a technocratic age. It is believed that an in-depth investigation of this issue will significantly enhance the understanding of the character and aims of education in a technocratic age.

1.2 Contribution of the study

The contribution of the study lies in the purpose of the research which is to investigate the development, character and effects of education in a technocratic age. The collection of relevant material, the search for reliable and authentic data and the systematic documentation of data on the interaction of education and technocracy form the crucial activities in this study.

This study has a dual contribution namely, the particular and the general. The particular contribution of the research pertains to developments in the field of education in the Republic of South Africa [RSA] after the 1994 general elections, the period herein also referred to as the democratic era. For the first time all South Africans have mandated the government to plan the development of the education and training system for the benefit of the country as a whole and all its people (White Paper on Education and Training 1995:7). Expectations for a just and equitable society are high and there is a common belief that education has a crucial role to play in this regard. The role of education in the transformation of the South African society is acknowledged for the implementation of the reconstruction and development programme [RDP], for advancing racial tolerance, for propagating equal opportunities for all and achieving national unity. The study should help education-planners and policymakers in the RSA to develop the relevant education system to achieve the foregoing and to be aware of the unique demands imposed on the provision of education in a country which prides itself on its achievements in technology and ensuring it a position in the international arena.

A more general contribution of the research is to be found in the following. Gaining an understanding of education in the RSA can be more meaningful if it is done in relation to other systems of education. Hence the general character of education involves a comparative study of the education system of the RSA with those of the United States of America [USA] and the People's Republic of China [PRC]. The aim of comparison and juxtaposition is to establish similarities and differences in education systems (Vos & Brits 1990:19). Globalization requires that common problems which exist among countries be addressed jointly. This ensures that countries learn from each other's experiences (see 2:4.3.3). This would help policymakers in the RSA to adopt strategies that would address the educational problems of the RSA. In addition, one gains a better understanding of one's problems when one compares them objectively with developments elsewhere.

The research will extend the body of theoretical knowledge regarding the topic, especially from the South African perspective. Policymakers, role players in education, practitioners [teachers] and the communities in which technological skills are valued will be assisted to create education systems which are more relevant and responsive to their particular needs on the basis of data provided by the research. The study of education in a technocratic age in the USA and the PRC will also contribute to the significance and relevance of the research, as both countries have already developed education systems aligned to technocratic requirements.

However, the contributions of this study can only be meaningful if the research problem is known.

2 STATEMENT OF THE RESEARCH PROBLEM

In the preceding discussion, issues that reflect changes in education systems in the face of advancing technology have been outlined. The problem which is researched in this study is: ***How does a technocratic age affect the development and character of education?***

In order that the stated problem can be fully analysed, the following tendencies and related questions should be clarified:

* **Education is oriented towards quality and flexibility**

The change from subsistence economy to mass manufacturing requires education to be instrumental in teaching learners how to cope with new demands (Husén 1974:1). The new demands in education are linked to flexibility and productivity. Consequently, the emphasis of education is on *inter alia* excellence, quality, efficiency, flexibility and effectiveness, since education is undertaken with the purpose of satisfying the needs of a technocratic age labour market. What are the characteristics of education in a technocratic age?

* **Education promotes conformity to set standards**

Education in a technocratic age is undertaken according to set procedures and proper sequences (Bowers 1977:37). For example, curricula and pedagogic practices are used to organize routines in the schools. In a technocratic age education is thus reduced to the implementation of taxonomies and strategies that subordinate knowledge to forms of mechanical reproduction. What are the effects of a technocracy on education?

* **Education encourages the use of measuring instruments that quantify human potential**

Technocratic societies need marketable skills which are relevant for increased industrial production. Consequently, measuring instruments are designed and applied to assess the success of learning processes. These measuring instruments foster objective analysis and predictive rigour, while providing reliable yardsticks for assessing human potential. The school in a technocratic age is *inter alia* viewed as a machine, and the educational expenditure as the input and the output is analysed in terms of the needs of the labour market (Lucas 1972:462). It appears that education in a technocratic age negates the individuality of the learners. What are the prevailing views about education in a technocratic age?

* **Education in a technocratic age is linked to career opportunities**

Technocratic societies presume that one's qualification, in the form of a certificate, is a guarantee for productivity and efficiency in the job situation. Consequently, education in a technocratic age allocates individuals to their proper places within a hierarchial division of labour and distributes dispositions, norms and values that are required by workers for their participation on their particular rung of the occupational ladder (Apple 1982:142). Educational qualifications determine one's opportunities in the labour market. As a result, education is equated with the acquisition of diplomas and degrees and it is on the basis of these qualifications that prospective employees are sorted out

for entry into a technocratic age job market (Dore 1976:5). How does education account for itself in a technocratic age?

The above-mentioned questions will direct the research and consequently the statement of the research problem has a bearing on the nature of the study.

3 NATURE OF THE STUDY

The nature and activities of educational research are determined by the particular perspective from which the phenomenon is viewed. Consequently, historical-educational research is characterized by a predisposition unique to the perspective. Such a perspective determines how the researcher views reality and will thus have a bearing on the collection and documentation of data.

3.1 The nature of research in education

Research is a process which leads to more profound and accurate knowledge as well as insight: it is a route to scientific knowledge. Research in education is aim-directed; it is undertaken to discover new knowledge or to extend existing knowledge for the sake of better educational practice. The critical selection and interpretation of information provide possibilities for its application (Venter & Van Heerden 1989:104).

Research must contribute to the furthering and broadening of science. According to Venter and Van Heerden (1989:105) it should yield reliable, accurate, valid and objective data. In addition, research should acknowledge and use activities inherent in scientific investigation.

3.1.1 *Historical-educational research*

Historical-educational research is undertaken with the view of putting the education phenomenon into proper perspective. Venter (1985:168) is of the opinion that historical-educational investigation refers to the systematic placing of historical-education variables under the searchlight. The general, continual pedagogical fundamental problems are accentuated against the multiplicity of historical detail. This then makes historical-educational research an ordered [systematic and controlled] process of knowledge enrichment (Venter & Van Heerden 1989:106).

Historical-educational research attempts to discover facts about the phenomenon of education. It can be deduced that historical research attempts to establish facts and to arrive at conclusions concerning the past (Ary, Jacobs & Razavieh 1990:453). In his search for the essential in the past and what in it pertains to the present, the education historian works instinctively, because the recreation of the past cannot be purely an intellectual activity (Posthuma 1986:12).

The basis for historical-educational research is provided by educational problems. According to Venter (1985:170) historical-educational research meditates on essential pedagogical problems, whether these problems are concerned with syllabus processes, with the development of schools as educational institutions, with the purpose of education, with educational methods or with reward and punishment. However, historical-educational research can be best realised through metabletic method.

3.1.2 *Metabletic method*

The metabletic method allows the researcher to describe education as it is, without interference. Fundamental changes in education are studied according to six principles of the metabletic method namely, theoretical principles which are the principle of non-disturbance, the principle of reality and the principle of changeability and practical principles which are the principle of simultaneity, the principle of unique occurrence and the principle of emphasis (Venter & Van Heerden 1989:157).

3.1.3 *Activities in the research process*

A scientific inquiry into education in a technocratic age is intended with a view to providing organized and systematic knowledge on the subject, education, in its temporal and spatial contexts. The four interrelated and overarching steps identified as constituting the historical-educational research are proposed by Wiersma (1991:206). These steps are:

* Choosing and delimiting the problem or theme in the educational present
* Investigation of the problem or theme in the educational past
* Collection and critical evaluation of data
* Interpretation of data and writing the report

These then were the steps that guided the research which was conducted from a historical-educational perspective.

3.2 **Collection of data**

Primary and secondary sources have been used for collection of data in the preparation of this dissertation. Each source was carefully selected, studied and investigated with the purpose of drawing out only data which is correct, reliable, valid and applicable. A multi-disciplinary approach was followed in the collection of information as sources from other fields like politics, natural sciences, commerce, art and psychology were also visited, to provide a comprehensive overview of the development and character of education in a technocratic age.

3.2.1 *Primary sources*

In the study of primary sources the researcher has concentrated on the following official records and documents:

3.2.1.1 Reports

Among the reports which were studied with an aim of understanding the rationale for instituting changes in education in South Africa is the *Eiselen Commission Report of 1951*, the *Human Sciences Research Council Report [*also called the *De Lange Commission]* of 1981, the *Human Sciences Research Council Report on Ways of seeing the National Qualifications Framework* of 1995 and the report of the *Committee to Review the Organization, Governance and Funding of Schools* of 1995, popularly known as *the Hunter Commission.*

3.2.2 *Secondary sources*

A computer printout of a list of books and periodical articles relevant to the investigation was provided by the subject librarian at UNISA. A prudent and careful selection of study material was undertaken from the suggested titles. The data found from the sources was scrutinized and thoroughly studied to ensure that only reliable and valid facts were included in the dissertation.

3.2.2.1 Dissertations and Theses

Results of research at masters and doctoral levels in the field of education in a technocratic age were difficult to find. However, dissertations which have a bearing on education and technology/technocracy were consulted.

3.2.2.2 Periodical reports

A number of periodical articles have been studied and much of the data in this dissertation comes from such articles.

3.3 **Technical considerations**

The following technical considerations will be effected in the presentation of data. These technical considerations are intended to facilitate the understanding of how information is documented in the dissertation.

3.3.1 *Cross-references*

When related issues are discussed elsewhere in the dissertation, cross-references will be made. For example, this will be done as 2:2.3, which implies that such related data can be found in chapter 2, section 2.3.

3.4 **Explanation of concepts**

The following concepts are central to the study and require further clarification:

3.4.1 *Development*

The *Dictionary of Education* (1959, s.v. 'development') defines 'development' as change or growth of structure, function or organization constituting an advance in size, differentiation, complexity, capacity or degree of maturity. In the dissertation 'development' will be treated as the expansion and evolution of education systems in order to keep pace with developments in a technocratic age.

3.4.2 *Character*

The *Oxford Advanced Learner's Dictionary of Current English* (1981, s.v. 'character') defines 'character' as "qualities that make a person, groups, nations . . . different from others; all features that make a thing, place, an event . . ." The *Dictionary of Education* (1959, s.v. 'character') defines 'character' as "structural and enduring elements or characteristics which give continuity". 'Character' may be equated to an identity, a quality which creates uniqueness and particularity.

The meaning of 'character' suggested in the dissertation is that of particularity and uniqueness of education systems. This meaning implies that although education is a universal phenomenon, differences abound in education provision, as each country has particular needs to fulfil and particular interests to cater for (see 2:4.1).

3.4.3 *Effects*

The concept 'effects' is defined by the *Longman Dictionary of Contemporary English* (1991, s.v. 'effects') as "results or conditions produced by a cause; something that happens when one thing acts on another". The *Oxford Advanced Learner's Dictionary of Current English* (1981, s.v. 'effects') defines 'effects' as "[in phases of degrees or extent] results, outcomes, impressions produced in the mind of a spectator, hearer and reader".

In the dissertation 'effects' will refer to the results, outcomes and impressions that are produced in people's minds. Such 'effects' will be discussed, indicating how education and technocracy or principles of technocracy impact on one another (see 2:4.3).

3.4.4 *Education*

Van Rensburg, Landman and Bodenstein (1994:366) define 'education' as the purposive and deliberate intervention of the adult in the lives of the children to bring them to independence. The *Longman Dictionary of Contemporary English* (1991, s.v. 'education') defines 'education' as "the process by which a person's mind and character are developed through teaching, especially through formal instruction at school or college". In addition, Le Roux (1995:11) refers to 'education' as the "humanization of a child on a determined course".

The dissertation presents 'education' as a human phenomenon whereby the abilities, skills, attitudes and knowledge of a learner are developed.

3.4.5 *Technocratic age*

The *World Book Dictionary* (1985, s.v. 'technocracy') defines a 'technocracy' as "governmental, social and industrial management by technical experts which became popular in the 1930s whereby it was maintained that management would benefit everyone". *The Longman Dictionary of Contemporary English* (1991, s.v. 'technocrat') defines a 'technocrat' as "a highly trained scientific specialist in charge of the organization of a country, industry ..." *The World Book Dictionary* (1985, s.v. 'technocratic') defines 'technocratic' as "having to do with technocrats or technocracy".

In the dissertation a 'technocratic age' will be regarded as a period in which science and technology dominate human life. Rapid industrialization, scientific and technological advancements, demanded that technical specialists be in charge of administrative and management structures in a 'technocratic age' [as evident in the era which followed World War II]. One should therefore be aware that a 'technocratic age' cannot be separated from the 'technological age', since the two concepts complement each other and, as a result, the two may be used interchangeably in the dissertation.

3.4.6 *Technological age*

The Longman Dictionary of Contemporary English (1991, s.v. 'technology') defines 'technology' as "a branch of knowledge dealing with scientific and industrial methods and their practical use in industry; practical science which uses machinery and methods". The *World Book Dictionary* (1985, s.v. 'technological') defines 'technological' as "having to do with technology". The 'technological age' can be equated to the post-industrial revolution era during which techniques and technologies are *inter alia* used to manipulate activities and production in any art and study.

4 AIMS AND OBJECTIVES OF THE STUDY

Research in the field of education requires that one looks beyond current educational practices and sets longer-term objectives; educational research may thus not have immediate practical outcomes (Le Roux 1995: 12). This study is intended to provide insight and understanding on education in a technocratic age by providing suggestions and recommendations for greater efficiency and

relevance to the wide spectrum of needs to a contemporary society.

4.1 Aims of the investigation

The aim of this research is to gain knowledge regarding the development, character and effects of education in a technocratic age and to advance recommendations after a thorough study has been made, so that improved education practices can be ensured. Throughout the study, education and technocracy will be discussed in time perspective as related issues. This investigation will also provide data on the development, character and effects of education in the USA, the PRC and the RSA.

4.2 Objectives of the study

This dissertation intends to achieve the following objectives:

* To give an analysis of a technocratic age with special reference to education. The rise of scientism, meritocracy, specialization and professionalism as issues related to education in a technocratic age.
* To investigate the effects of a technocratic age in education, indicating how education has conformed to technological developments and demands. This includes bureaucratic control of education by State departments, systematization of learning material, the ethos of accountability, the drive towards the mastery of science and technology and the equalization of educational opportunity.
* To gather information which indicates how society has responded to education in a technocratic age. Philosophic views on the aim of education will be analysed so as to determine the character of education in a technocratic age.
* To give an appraisal of contemporary views on the aim of education. Consideration will be given to the effects of education in a technocratic age.
* To provide guidelines and proposals for those who are responsible for education planning, with due consideration of technological developments. Recommendations for reform will be made with a view to assist education planners with other alternatives for education to be provided in future.

These objectives are central to the study and they will determine the scope of the study.

5 SCOPE OF THE STUDY

The expansive and extensive nature of data on the research topic made it necessary that the study be demarcated in temporal and spatial terms and also that the contents be organized according to chapters. Information in one chapter may be related to information in another chapter

5.1 Demarcation of the field of study

Past views regarding education have been put in perspective so as to understand education in its contemporary context. In spite of that, the focus of the study is on education since the Second World War to the present namely, the period regarded as a technocratic age. Exemplars were drawn from the USA, the PRC and the RSA, although emphasis was placed on the present situation in the last-named. These exemplars were chosen because of their level of technological development evidenced in their respective societies. The assumption was that the level of technological progress in these countries makes education the instrument through which technology is enhanced and harnessed.

5.2 Organization of content

Research findings are arranged into separate chapters for the sake of logical exposition and presentation of data. However, the chapters are not separate entities as information in one chapter may be linked and related to information in another chapter.

Chapter 1 deals with orientation to issues such as the background to the study, the statement of the research problem, nature of the study, aims, objectives and scope of the study.

Chapter 2 deals with the elucidation of concepts with a bearing on a technocracy, the nature of technocracy and its implications for education. The chapter will also focus on the move towards State control of education.

Chapter 3 focuses on the development, character and effects of education in a technocratic age in the United States of America [USA].

Chapter 4 focuses on the development, character and effects of education in a technocratic age in the People's Republic of China [PRC].

Chapter 5 focuses on the development, character and effects of education in a technocratic age in the Republic of South Africa [RSA].

Chapter 6 provides a summary and synthesis of findings and conclusions, as well as recommendations for the planning of education in a technocratic age.

6 CONCLUSION

It is hoped that the study of education in a technocratic age should contribute constructively to existing knowledge and also that it provides new insights and understanding to those who are involved in education. Education planners and policymakers may find the data contained in this dissertation relevant to situations where transformation in education is in progress. Educators and learners may also find data contained in this dissertation worth reading for their academic advancement and personal enrichment.

The focus thus moves to the elucidation of concepts with a bearing on a technocracy, the nature of a technocracy and its effects on and implications for, education.

CHAPTER 2

ELUCIDATION OF CONCEPTS WITH A BEARING ON EDUCATION IN A TECHNOCRATIC AGE

No social, human or spiritual fact is so important as the fact of technique in the modern world. And yet no subject is so little understood. Let us try to set up some guideposts to situate the technical phenomenon...

(Ellul, J. The technological society 1964:3)

CHAPTER 2

1 INTRODUCTION

The advance of science and technology has led to changes throughout the world. These changes reveal themselves in the pattern of life and social relations. According to Rowney (1989:5) modern society is pervaded by technicians who have operational roles which range from determination of policy issues that are relevant to technocratic organization, to decisions on the allocation of resources and deployment of workers. To achieve their aims, technocratic societies use education to equip school leavers with skills to enable them to effectively carry out their responsibilities in a technocratic age.

Educational ends and outcomes are important for optimal societal functioning in a technocratic age and according to Aronowitz and Giroux (1987:1) schooling has become an adjunct to the labour market. This view emanates from the fact that education serves as a provider of skills necessary for production and quality in labour and consequently vocational guidance and vocational education have proliferated in schools.

In this chapter the author will elucidate the concepts with a bearing on technocracy and how they relate to education. The nature of a technocracy in relation to education will also be discussed because, ironically, issues that are apparently irreconcilable, conflicting and exclusive of each other are simultaneously part and parcel of the characteristics of technocracies' demands on education. Questions that could arise and need to be investigated are:

* how does mass education (see 2:4.2) fit in with a meritocracy (see 2:2.1), specialization (see 2:2.2) and professionalism (see 2:2.4)?
* how does one reconcile mass education with these concepts that imply individualism, stratification and globalization of education (see 2:4.4)?
* how is utilitarianism reconciled with a meritocracy?

The latter part of the chapter focuses on State control in education and technologically appropriate education as characteristics of education in a technocratic age. It shall be indicated that State control in education has required the creation of an efficient management system so as to ensure the productivity of education. Consequently, education systems have management teams comprising highly qualified personnel, the bureaucrats. These bureaucrats are selected on the basis of the amount of knowledge they have amassed as in a meritocracy. Furthermore, these bureaucrats have

specialized knowledge in their fields of work.

2 ELUCIDATION OF CONCEPTS INHERENT TO EDUCATION IN A TECHNOCRATIC AGE

Technological, scientific and industrial developments in the technocratic age have made increasing demands on education. Policymakers and leaders in the field of business consider the content and quality of education to be fundamental to economic growth (Dekker & Van Schalkwyk 1990:247). Consequently, education has to ensure that the labour needs of the country are satisfied. This leads to vocationalism (see 2:2.3) in education. Furthermore, a technocratic age demands that education equips future workers to fit into the labour markets [which is directly linked to professionalism] (see 2:2.4). It is important to note that technocratic societies place a high premium on science. To ensure that science is enhanced and advanced, scientism has proliferated in the provision of education in a technocratic age (see 2:2.5).

In a technocratic age the provision of technologically appropriate knowledge is presumed to be important for the proper management of science and technology. Subsequently, technological and scientific knowledge has become important for sorting out workers and determining work roles. This will be elucidated further in the discussion which follows.

2.1 Meritocracy

The *Oxford Advanced Learner's Dictionary of Current English* (1981, s.v. 'meritocracy') states that 'meritocracy' is "a system of government or control by people of high practical or intellectual ability". According to the *World Book Dictionary* (1987, s.v. 'meritocracy') this concept refers to "(1) a class of people distinguished for their high intellectual abilities or talents, (2) a system of government which stresses the advancement of those who are most talented or have the highest intellect".

It can be deduced that in a meritocratic system intellectual ability is valued and rewarded. The emphasis on intellectual ability leads to social stratification produced by the recognition of differences in human talent and intellect. In addition, categorising people according to their intellectual achievements produces a functional pattern upon which rewards and incentives are determined (Foster 1977:213). Clearly, a system which attaches such significance to intellectual

achievement will call for an education system contributing towards achieving this goal. As a result, the *Webster's New Collegiate Dictionary* (1981, s.v. 'meritocracy') states that 'meritocracy' is " an education system whereby the talented are chosen and moved ahead on the basis of their achievement as in competitive examinations". The implication hereof is that talent or intellect is used as a criterion on which the school selects learners. A 'meritocracy' encourages competition and a quest for the attainment of high marks.

The more technologically sophisticated the society and the greater the spread of education, the more visible the differences in the individuals (Dore 1976:179). This implies that since a high premium is placed on superior ability in a meritocratic system, those of lesser ability face marginalization. According to Bowles and Gintis (1973:74) talent orientation is conducive to meritocratic views that legitimate means of allocating individuals to various levels of the social hierarchy. Technocratic societies use educational qualifications to effect dominance and social, political and economic power. A 'meritocracy' in education is said to lead to the maintenance of a hegemonic form of cultural domination (Shapiro 1984:27).

In a meritocratic system certain excellences are rewarded and nurtured. Closely related to this line of thought is the concept of specialization.

2.2 Specialization

The *Webster's New Collegiate Dictionary* (1981, s.v. 'specialization') defines 'specialization' as "making or becoming specialized, that is, to be designed or fitted for one particular purpose or occupation; structural adaptation to a particular function". According to the *Oxford Advanced Learner's Dictionary of Current English* (1981, s.v. 'specialist') a 'specialist' is a "person who is an expert in a special branch of work or study".

From the definition it can be deduced that through specialization people are trained to adapt and become suited to the wide range of occupations which are to be found in a technocratic age. According to Alcorn (1986:29) specialization is the breaking down of work among a large group of people. The division of labour enables one to specialize in the performance of a job at which one is good. Specialization as such further narrows down the specialization of functions characteristic of a bureaucracy. However, Toffler (1970:105) notes that although specialization increases the number of occupations in a technocratic age, technological innovation reduces the life-expectancy

of any given occupation.

Specialization has become increasingly necessary for industrial, scientific and technological progress in a technocratic age (Bush 1945:101). The whole educational endeavour, starting from junior primary school and stretching to college and university, is aimed at making people specialists in various fields or occupations. Curriculum packages and subject groupings in educational institutions are designed to ensure specialization. Even in a particular school, teachers are specialists in the different subjects they teach.

The quest for specialization in technocratic societies requires that educational institutions identify learners with a particular potential or aptitude and train them for their future careers in accordance with their exhibited competencies. There is thus a clear link between specialization and meritocracy which focuses on promoting special intellectual abilities and talent. However, there is also a link between specialization and vocationalism.

2.3 **Vocationalism**

The *Dictionary of Education* (1959, s.v. 'vocationalism') defines 'vocationalism' as "an indictment of modern education, particularly the professional schools of the university, narrow vocational courses of study which have diluted the pursuit of knowledge for its own sake". According to *Webster's Modern Collegiate Dictionary* (1981, s.v. 'vocationalism') 'vocationlism' refers to "an emphasis on vocational training in education".

The definition suggests that 'vocationalism' relates to the preparation for occupations and professions, with the aim of procuring employment in a work arena characterized by jobs requiring specialization in a particular field. Vocational training tries to give an answer to the individual's strategy of material survival. In addition, technocratic societies need a workforce which has skills that will ensure productivity and efficiency. In a technocratic age 'vocationalism' is necessitated by the fact that new technologies require a highly skilled and institutionally-trained corps of personnel or staff for its various specialized occupations (Faulkner 1965:2). To ensure the production of that skilled workforce, institutions of learning offer courses which prepare learners for the world of work.

The implication of the above for education practice is that learners need to be taught job-related skills. Vocation-orientated societies will call for education systems which qualify people for the performance of specific jobs characteristic of a technocratic age. Van Rensburg (1991:29) notes that all economies are dominated by the 'formal' or 'modern' sector with its requirements of professionals of many kinds, of technicians, of artisans and other categories of skilled personnel. As a result, vocational guidance is provided as part of the curriculum in school, the aim being that learners align themselves with professions and occupations. It would appear that education ensures cultural reproduction and professional socialization (Eisner 1992:612) as learners are encouraged *inter alia* to reconcile their aptitudes, abilities and personalities with careers offered by technocratic age labour markets.

Vocational training requires that one be taught the benefits, expectations and responsibilities which are related to one's chosen career. This suggests that there is a direct link between vocationalism and the concept of professionalism.

2.4 **Professionalism**

Chambers' Twentieth Century Dictionary (1955, s.v. 'professionalism') defines 'professionalism' as: "(1) professional character, spirit or methods; and (2) the standing, practice, or methods of a professional as distinguished from those of an amateur". The *Oxford Advanced Learner's Dictionary of Current English* (1981, s.v. 'professionalism') states that 'professionalism' is "marks or quality of a profession". According to the *Oxford Advanced Learner's Dictionary of Current English* (1981, s.v. 'profession') 'profession' is defined as "occupation, especially one requiring advanced education and special training, e.g. law, architecture, medicine, accounting...".

It can be deduced that 'professionalism' relates to behaviour which is expected from professionally trained people. According to Oxenham (1984:22) professional licencing, as in qualifications, requires that people take paper tests. This is necessitated by the fact that certain norms and standards are to be adhered to by people who desire to enter into a particular profession. The rise of professions encourages more conscious decision-making in society and thereby increasing the value of effective planning of socially agreed goals (Robins & Webster 1989:18).

The training which teachers undergo before joining the teaching profession is *inter alia* aimed at preparing them to deal efficiently with their professional and academic functions. Pedagogy, as

[educative] teaching is referred to, takes the learners as its focus and refers to the way in which teachers are to plan, through the task of working, to serve the learners (Pai & Krueger 1980:33). While dealing with the learners, the teacher has certain responsibilities to fulfil and as a result, 'professionalism' in education requires that a teacher be accountable for what happens in the school situation.

Entry into a profession is determined by the type of knowledge one possesses, and professionals should possess scientific knowledge in their fields of study. As a result, professionalism is linked to scientism as the organization of the various bodies of knowledge into quantifiable units.

2.5 Scientism

The *Oxford Advanced Learner's Dictionary of Current English* (1981, s.v. 'science') states that 'science' is "knowledge obtained through observation and testing of facts". Van Rensburg, Landman and Bodenstein (1994:528) define 'scientism' as a "school of thought in which the intellect and sense organs play a decisive role". In addition, *Random House Webster's Dictionary* (1991: s.v. 'scientism') defines 'scientism' as "(1) the assumptions and methods, typifying science and (2) the belief that the principles and methods of the physical and biological sciences should be applied to other disciplines".

According to Bowers (1982:531) 'scientism' views the social and natural world as systems that can be reorganized and thus be made efficient and controllable. The emphasis of rational thought, which is preceded by either observation or experimentation, is the object of scientism. Consequently, the *Dictionary of Education* (1959, s.v. 'scientism') defines scientism as "a devotion to the methods, mental attitudes and doctrines that are appropriate to science, usually culminating in some type of naturalistic speculation".

Learners become experts as they gather information through research and learn how to use it, as well as how to gather greater quantities of information (Laszlo & Castro 1995:11). Scientism has transformed inherited traditional teaching methodologies, and has also enlarged the understanding of the processes by which learners acquire information and come to understand it (Lucas 1972:56). The rise of scientism in a technocratic age requires that schools teach objective and scientifically refined knowledge.

With those principles inherent to a technocracy outlined, the focus will rest on a discussion of the essence of a technocratic age and the challenges it poses in relation to education and the education situation.

3 THE NATURE OF TECHNOCRACY AND ITS IMPLICATIONS FOR EDUCATION

Human beings do not exist in a vacuum but live in a habitable and manageable world. However, to lead a meaningful life, human beings have to create the type of world which they covet and which is ideally suited to habitation (Fourie, Oberholzer & Verster 1995:47). To exercise control over and to manage the world, human beings use education. The forms of education range from traditional education to more formal and institutionalized education systems that, in some cases, have become elaborate and bureaucratic in their goals, structure and objectives (Apple 1982:52).

In the prevailing technocratic era the advancement in technology makes the acquisition of technology-related knowledge imperative for survival. Collins (1979:10) notes that:

> ... *there are some characters. One of then is called Modern Society, who is more or less the dutiful wife, following where Technology leads her. In some cases she drags her feet; in others she eggs him on. But it does not make much difference one way or the other because they are married, for better or for worse. There is one other character. A kind of a stepchild called the Individual, who should be fitted into the family.*

In a technocratic age education is used for adaptation to and domestication of technology, something which leads to the provision of technologically orientated education. Some technocratic age parents, teachers and administrators groom learners in preparation for academic success (Gillette 1979:281). In a technocratic age qualifications are both sanctions of education acquired and devices for promotion to future education. Furthermore, the possession of knowledge is presumed to be a guarantee to high positions in a technocratic age. According to Dimock (1968:122) this system produces an elite which gravitates towards top positions of power and influence.

In technocratic age societies learners with superior talent [suggesting meritocracy] are trained for highly specialized jobs. Within each speciality, experts tend to hang together with their own kind, forming sub-cultural cells to which they turn for approval and prestige (Toffler 1970:261). Learners who do not qualify for specialized education are trained for vocations (see 2:2.3). Vocationalism in a technocratic age is closely linked to the labour needs of industry. It appears that technocratic

societies are characterized by a relentless pursuit of efficiency, an extensive rational control over human endeavour, an organizational logic which stresses integration, modernization and increased systematization (Nash & Agne 1972:363).

To instil discipline in workers and to ensure that they acquire the work ethics required by a technocratic age workforce, professionalism is effected (see 2:2.4). To become a member of a profession one is required to possess adequate scientific knowledge in the particular field of specialization. Technocratic societies place extreme confidence in the methods of science and such devotion to science has a decided influence on the provision of and attitude towards education (see 2:2.5).

The above-mentioned tenets of technocracy lead to the creation of education systems which are meritocratic and talent oriented.

3.1 **Meritocracy in a technocratic age**

The definition of a meritocracy has been provided in 2:2.1. In meritocratic systems, schools allocate individuals to their proper places within the hierarchial division of labour. In a technocratic age employment opportunities are dependent on educational qualifications. Husén (1979:151) states that instead of being the Great Equaliser, education has become the Great Sorting Machine. Consequently, although a meritocracy emphasizes openness of career possibilities, in reality it is close to a caste-like separation of occupational blocks (Schaeffer 1978:418).

In a technocratic society it is believed that the higher the qualification one possesses, the higher one's productivity will be. It is for the same reason that employers engage the services of employees with the highest and best academic qualifications. Oxenham (1984:11) contends that by making people eligible for selection to the modern sector, schools fuel hopes and expectations which are not readily fulfilled. As a result, many people become involved in education for its utilitarian value namely, better jobs, status and social advancement.

3.1.1 *Influence of a meritocracy on the aim of education*

Emerging meritocratic tendencies and demands for a highly qualified workforce have gained in importance since World War II (Husén 1979:150). This can be seen in the escalation of enrolments at schools which followed the end of the war, the drive for equality of educational opportunity and the institution of free and compulsory education (see 2:4.2.1). Increasingly the school has come to serve as the major avenue to occupational and social roles and scholastic attainments are stressed as guaranteeing access not only to academic, but also to social advancement (Reimer 1971:49).

Meritocratic tendencies have led people to believe that the possession of higher qualifications ensures their mobility in stratified societies of a technocratic age. According to Nash and Agne (1972:368) those who learn most are led to believe that they will be at an advantage in the labour markets. Education is viewed as a means to attaining social and economic power and status. In meritocratic systems education should thus serve to increase opportunities for members of different cultural groups to participate in the mainstream commodity [technocratic culture] (Bowers 1982:529).

In today's information society, it is the unskilled who stand in the unemployment line (Naisbitt & Aburdene 1990:38). Educational attainments determine whether a person is taken up by or left out of the [meritocratic] system. According to Collins (1979:44) manual labourers are recruited through unions and clerks through employment agencies, but professionals through schools and colleges. It would appear that, in education, meritocracy and specialization contradict individualism and equality of opportunity. This will have a bearing on mass education (see 2:4.). Consequently, technocratic societies have adopted vocational training to cater for people who cannot readily enter into occupations demanding intellectual excellence.

Academic attainments are of primary value to meritocratic systems. As Husén (1979:150) maintains, systematic learning is a prerequisite to the acquisition of competencies needed for self-realization and self-support in the modern society. Education is undertaken with the aim of fitting the learner into the existing meritocratic system.

Modern education systems are influenced by the assumption that education is basic to economic development (Fischer & Mandell 1988:52). Consequently, education is undertaken to make as many people as possible available for employment. According to Foster (1977:212) the increased

diffusion and differentiation of formal schooling are generated by technological change. The provision of education and its subsequent diversification, is thus influenced by the need for continual upgrading of skills related to technological changes and to ensure the maximum utilization of talent and potential.

3.1.2 *The influence of a meritocracy on the view of the learners*

All learners have potential that can equip them to reach particular levels of development and achievement (Dreyer 1994:70). Education is therefore provided to learners so that they develop their potential and acquire skills commensurate with their talents and abilities. To reconcile the potential of learners with existing occupations in a technocratic age, educational inputs and outputs have been perfected with the development of standardized tests (Burris & Heydebrand 1981:17).

A meritocratic system encourages competition in learners. Grades and test scores determine who will be admitted to the next level of education, on which track or stream learners will be placed, or whether the graduate will move to the head or tail of the line of job-seekers (Husén 1985:401). It can be deduced that meritocracy advances extrinsic motivation as it ensures the socialization of the learners into the existing stratified social order. Schools may become instrumental in status maintenance by their nature of ensuring employment in better jobs, earning of better salaries and social progress (Foster 1977:228). A pattern will therefore develop whereby intellectual talent and academic qualifications are used to sort out people in the labour market.

3.1.3 *The influence of a meritocracy on the choice of learning content*

Apple (1982:62) contends that learners in higher education are taught subjects which require intellectual open-mindedness, problem-solving, flexibility, skills and dispositions that will enable them to function as managers and professionals as part of a meritocratic social system. A meritocratic system ensures that the levels of curricular, educational and evaluative practice within the classroom be controlled by the forms into which culture is codified. Whether the knowledge one gets from school is useful or exciting, or whether the values and attitudes one acquires there are appropriate has become of secondary importance since schools are places where one gains certificates: O levels and A levels which are passports to particular jobs (Dore 1976:31).

The modifications of the methods of teaching and the nature of the curriculum are products of the changing social situation and as such an effort to meet the needs of a technocratic age society (Dewey 1965:8). Meritocratic systems see the mastery of the learning content as a means to an end; that is, acquiring a desired qualification for entry into a particular occupation.

3.1.4 *The influence of a meritocracy on teaching*

Through teaching, learners are required to learn to follow instructions, be prepared to cooperate and take part in classroom activities. In addition teaching is seen as a means of giving learners knowledge which will empower them to make them employable in a technocratic age labour market. Willis (1988:63) maintains that teaching is basically concerned with the inculcation of knowledge which favours the gifted and talented. To enforce their authority and to discipline learners, teachers use the threat of the future and the competitiveness of the world of work. Consequently, education motivates acquisitive achievement rather than productive self-fulfilment (Dore 1976:182).

Teaching is characterized by standardized and systematic requirements. There are formal and compulsory curricula, compiled by experts (Fourie *et al* 1995:63). A meritocracy requires that teaching be aimed at ensuring uniformity and conformity which contradict individualization.

3.1.5 *The influence of a meritocracy on the learning process*

According to Hemming (1980:16) the academic style of learning is primarily concerned with the accumulation and memorization of facts. The qualities tested in examinations are mainly fluency in writing, good memory, the ability to manipulate acquired processes and the speed of working. In meritocratic systems those who can play the academic game [by reproducing what they have learnt] are increasingly 'placed' on the mental side of the dichotomy of the social division of labour (Apple 1982:50).

The trend towards subject-centred learning, fact-acquiring study and skill-mastery had, if anything, expanded both with the demand for trained personnel and the pressure to pass [objective] examinations for entrance to college (Brameld 1965:90). The learners are therefore exposed to demanding tasks which are intended to prepare them for the work place. The learning process leads to the activity rites of the outside world; it prepares the child for specialized labour or specific vocation (Fourie *et al* 1995:44).

3.1.6 *The influence of a meritocracy on administration/ organization*

Meritocracy supports a premise that education should qualify people to hold particular positions in technocratic age labour markets (see 2:2.1). Consequently, educational institutions have management teams, departments and classes with defined roles to ensure the effective execution of predetermined goals. In a technocratic age schools have become *inter alia* the zone of the formal (Willis 1988:22). Each worker has a particular function to perform in specialized organizations of a technocratic age (see 2:2.2). Education socializes learners into societies which regard stratification as being indisputable, legitimate and justified (Saylor, Alexander & Lewis 1981:175).

According to Husén (1974:29) the social relations of the school correspond with those of working life by being hierarchical and highly meritocratic. As part of the formal education system, schools are organized in a hierarchial form. The education bureaucracy runs from the teacher at a local school to the national minister of education.

3.1.7 *Summary*

The effective functioning of technocratic systems is determined by the nature of the internal administrative structures and efficiency of the general organization of institutions. In meritocratic societies, education would appear to perpetuate the domination of the uneducated by the educated. This is caused by the fact that formal education is used as the only criterion of selection between job-seekers and also because educational attainments determine the social status of a person. Subsequently, schools are reproductive institutions in the sense that they certify a workforce in a meritocratic system. Education is used to socialize learners into societies which see stratification as indisputable, legitimate and justified.

Under these conditions higher qualifications bestow power and status on one. As a result, an increasing number of people register with educational institutions in order to acquire qualifications that would facilitate their entry into technocratic structures.

3.2 **Specialization in a technocratic age**

The definition of specialization has been provided in 2:2.2. Specialization, just like meritocracy, vocationalism and scientism, is aimed at maximizing efficiency and productivity in a technocratic age. According to Toffler (1970:105) specialization increases the number of occupations, while technological and industrial developments require people who are trained for new occupations that have arisen due to the advent of the technocratic age. As a result, education is put under pressure to provide the required workforce to a highly specialized technocratic age labour market.

In a technocratic age there is an ever-increasing demand for specialization, specific skills and comprehensive and diversified knowledge. Vandenberg (1985:419) states that due to the technicization of life human beings depend on experts in almost all domains of life. Specialists [or experts] who possess relevant scientific knowledge for their particular fields of specialization are increasingly required to enhance technological and scientific development. Scientific-technical knowledge, as offered for specialization, leads to manipulation of the world in accordance with the principles of scientific technology (Bowers 1977:55). In technocratic societies specialists would enjoy greater status than people who are not specialists. Furthermore, this would produce stratified societies dominated by technical experts.

3.2.1 *Influence of specialization on the aim of education*

Morgan (1984:265) identifies the following four basic assumptions for the technocratic model of education which emphasizes the role of experts [specialists]:

* education is inherently rational and universal and can be standardized;
* the most efficient mode of learning is through instruction by experts in the given subject matter [and presumably according to effective educational techniques];
* learning proceeds in a building-block manner and it can be ordered in progressive steps; and
* educational institutions can evaluate learning outcomes by quantified comparative measures.

These views have resulted in educational practice being highly specialized and scientific in character. The rationalization of the world and the growth of technological production and social processes that are connected to it, have led to the development and consolidation of a structure of

society which mirrors rationalization (Woods 1979:140). In terms of this requirement education should be provided by specialists in order to produce specialists. Marchello (1987:556) contends that education must be adapted to the realities of a technocratic age. To teachers this assertion implies the use of universally accepted teaching methods and standardized curriculum packages. It is apparent that specialization reinforces the professionalism of teachers, since teachers are required to conform to strategies which are presumed to be efficient by experts.

The educational process is important for providing future experts with the knowledge which will qualify them in their intended specialist fields. As a result, specialization requires that education expose learners to subjects that would make them flexible in a specialized workforce of a technocratic age.

Education is a means towards the acquisition of a qualification and specialization. In a technocratic age education is required to produce people able to meet the demand for modern expertise [engineers, factory managers, architects, doctors, accountants and teachers] (Dore 1976:2). Education is *inter alia* expected to satisfy the labour needs of societies which prize specialization. When the different types of schools [technical, academic, commercial, art and vocational] are taken into consideration, it becomes clear that each school, with its complicated structure, fulfils a particular specialization function with regard to various social, economic, vocational and other demands in a technocratic age (Fourie *et al* 1995:43).

3.2.2 *The influence of specialization on the view of the learners*

Learners are viewed as potential resources on which technocratic societies invest. Consequently, schooling is regarded as the input and the output is the product of trained workforce that can be aggregated into the *Gross National Product* [GNP] (Lucas 1972:463). Learners are viewed as individuals with the potential to, through appropriate education, fulfil a specialized function within society. It appears that in specialization learners are commodities of, and assets to, society.

In a technocratic age education is a form of banking and learners are depositories (Freire 1970:4). Learners are required to assimilate knowledge which prepares them for the world of work. As a result, the school introduces and trains learners into membership within the micro-community by saturating them with the spirit of service (Dewey 1965:29).

3.2.3 *The influence of specialization on the choice of learning content*

The need for marketable and saleable skills sets the pace for what happens in educational institutions. As a result, the average university of today thinks of itself as an appendage to the world of business, industry and the various professions (Lucas 1972:105). Likewise, the learning content which is selected and taught in schools relates to the needs of the world of work. According to Brameld (1965:3) training in physics, mathematics and other disciplines necessary for technological and military power takes priority over all other educational activities. It can be deduced that the choice of learning content in specialization is linked to scientism.

If knowledge is to be regarded as a great engine, a mighty accelerator, then education should be regarded as its fuel (Toffler 1970:37). To a technocratic society this implies that learning content must be diversified to ensure greater specialization in relation to the needs of the world of work. According to Marchello (1987:555) the learning content should ensure quality and flexibility in the current and future workforce.

3.2.4 *The influence of specialization on teaching*

Teaching should be efficient and systematic. According to Bowers (1977:55) teaching must be orderly and effective as required by competency-based education. Teaching emphasizes the acquisition of skills which are indispensable to the world of work. There is a new emphasis on scientific and technological education and a restructuring of the relation between education and training (Robins & Webster 1989:110). This implies that the whole teaching practice should merge and integrate education and training.

Willis (1988:163) contends that the dominant form of learning and teaching for life stresses the real differentiation of job opportunities and their capacity to satisfy the range of human aspirations and hopes, in a horizontal as well as a vertical direction. Schools teach a variety of subjects to introduce the learners to a wide range of specializations in technocratic systems. Through the teaching activities, the potential resources [in the form of learners] are utilized, so as to satisfy the labour needs which are brought about by the many specialized jobs resulting from technological advancements (Fourie *et al* 1995:138).

3.2.5 *The influence of specialization on the learning process*

Curricula are used to organize routines in class. However, Morgan (1984:265) maintains that intellectual development cannot be packaged in a standardized manner. This view emanates from the fact that specialization advances a highly organized system for learning. Specialists [experts] in the field of education design strategies which teachers implement in schools. These standard and standardized procedures are intended to ensure learning success, as well as the production of dedicated and disciplined scholars (Fourie *et al* 1995:46).

An educated society remains highly pluralistic, with many fluid hierarchies based on a large number of fairly independent value criteria (Reimer 1971:138). Such 'pluralism' is evident in the different fields of specialization. This implies that learners should be made aware of the diversity of careers in a technocratic age.

3.2.6 *The influence of specialization on administration/organization*

The separation and specialization of functions necessitates that important educational decisions be taken by experts [specialists]. This management-accounting approach answers the need for specific and quantitative information about all the aspects of the educational process in which the operation of the school is analysed in terms of functional efficiency, through cost-benefit ratio studies and integrated programme planning and budgeting (Lucas 1972:462).

Specialization ensures the centralization of power since decision-making capacity is in the hands of the experts. As a result, Morgan (1984:266) mentions that much of the centralization in educational policymaking has come in the form of intervention by government in educational operation, State requirements for standardized curricula, teacher certification and mandated special programmes for needy learners. The other implication of specialization is the protection of institutionalized power. Aronowitz and Giroux (1987:69) contend that the school functions as an agency of social and cultural reproduction [in which teachers 'teach' and learners learn]. Subsequently, the whole education process is intended for the effective socialization of the learners into the existing technocratic system.

3.2.7 *Summary*

Specialization leads to the division of knowledge into subjects, thereby producing a distorted view of reality and militating against a holistic view to learning. The narrowing of reality into subjects makes it difficult for learners to see the unity and mutual relationship of subjects which are taught in school.

The division of roles in the school situation is intended to satisfy the quest for productivity and efficiency of the education system. Those who take science and technologically orientated subjects are accorded better status and advancement opportunities by technocratic societies. In the stratified schooling system of a technocratic age, learners who achieve academically are channelled out for specialized education, while those who do not are churned out for vocational training.

3.3 **Vocationalism in a technocratic age**

Vocationalism has been defined in 2:2.3. The spirit of career education reflects the view of education as both vocational and moral preparation for functional differentiation in a complex labour system (Stanley 1980:287). Learners are therefore exposed to an education system which channels them into their future careers. In this context, education is viewed as the transmission of knowledge and skills in an organized, unified and meaningful way (Power 1982:102).

3.3.1 *The influence of vocationalism on the aim of education*

Vocationalism presumes that education is preparation for life and hence it should be relevant to spatio-temporal demands. As a result, the school is seen to operate as a centre of information and as an integrating force for the community (Ekins 1992:184). In this situation, learning and work reinforce each other. Vocationalism demands that a positive attitude towards work be instilled in the learners (Fourie *et al* 1995:52).

According to Pai and Krueger (1980:27) the individual should acquire a wide range of intellectual, vocational, moral and aesthetic knowledge. Vocationalism functions thus to enrich the lives of individuals. However, in a technocratic age the needs of society at large and especially of industry dominate in the provision of vocational education (Aronowitz & Giroux 1987:75). The choice of a career is viewed as acceptance of the obligations and responsibilities which one has to fulfill in

a technocratic society.

3.3.2 *The influence of vocationalism on the view of the learners*

In a technocratic age learners are seen as part of a group defined by objective data (Hamm 1981:156). The implication hereof is that learners, as potential human resources to be exploited for industrial and technological advancement, should be taught skills, attitudes and dispositions that would make them effective and productive in a technocratic age workforce. Vocationalism encourages the shaping of learners into 'identical sets of replaceable units' to fit into institutionalized roles (Lucas 1972:463). The education which prepares people for vocations relegates the individual needs of the learners as being subservient to the needs of society.

According to Arfken and Lansford (1988:149) learners are to be taught to understand tasks and how to do them. Vocationalism makes education to be the principal focus of the labour reproduction process. As a technocratic principle, an educational structure allows for the canalization of learners in order to ensure their effective participation in technocratic age systems.

3.3.3 *The influence of vocationalism on the choice of learning content*

In a technocratic age values are given the same objective status as work roles, skills and occupational choices (Bowers 1977:45). Reality is classified into categories and each discipline is viewed as a unique conceptual structure. Education is influenced by the introduction of learning content which is disposed to the acquisition of attitudes related to the world of work and value learning (Power 1982:104). As a result, the learning content is always related to the needs of a nation, a society and a community (see 2:4.1.1).

The vocabulary of the learning content covers *inter alia* terms like reliable, personality, thorough, loyal, punctual, self-reliant and skill advancement (Bowers 1977:50). The learning content is a means of instilling work values and providing skills to learners. It nurtures and encourages the productivity of learners as required by the principles of technocracy (Arfken & Lansford 1988:149).

3.3.4 *The influence of vocationalism on teaching*

Vocationalism advances the notion that teaching be undertaken to provide learners with knowledge, training and character that will fit them into the world of work (Robins & Webster 1989:262). As a result, an integrated approach to education and training is advanced in teaching. The teacher has to relate education to the world of industry, commerce and technocratic service in order to integrate a learner into a technocratic society. According to Griessel *et al* (1995:197) teaching ensures the acquisition of skills, knowledge, attitudes, values and norms considered necessary to obtain a grip on contemporary technocratic age reality.

In a technocratic age, teaching prepares learners for a future in which they will utilize their skills and knowledge to the maximum. Through teaching, learners are socialized and humanized in a determined course prescribed by technocratic societies.

3.3.5 *The influence of vocationalism on the learning process*

Learning is aimed at preparation for jobs, and consequently learners are motivated to seek out additional learning and educational experiences outside the classroom (Maehr 1976:443). Vocationalism requires that learning coincide with the world of work and that it not be confined to the classroom. Emphasis is placed on the acquisition of basic learning skills which may give learners abilities, skills, attitudes and confidence to work independently, which will be extended into their future careers (Fourie *et al* 1995:48).

A technocratic age is characterized by rapidly changing material conditions and social relations as well as values, and consequently one has to improve one's competencies continuously. To address the changing needs of technocratic age societies, education is a never-ending process represented by a continuum of learning and living (Laszlo & Castro 1995:9). Learning is therefore viewed as a continuing activity which does not occur only in schools, but also in the work place. Consequently, lifelong learning is a necessity in a technocratic age as it enables workers to broaden their vocational training (Husén 1979:169).

3.3.6 *The influence of vocationalism on administration/organization*

According to Lee (1960:229) governments accept responsibility for providing education in response to the demands of a technocratic age. Education is primarily concerned with the proper application of rules and procedures related to the world of work. As a result, experts who participate in curriculum design, textbook adoption, school building planning and school board practice should have a thorough knowledge of the community they serve in order to satisfy its economic needs (Lee 1960:234).

Technocratic societies regard education as a commodity in which they can invest. As a result, the administration and organization of public schools should ensure the efficiency and productivity of the schooling system.

3.3.7 *Summary*

Vocationalism necessitates the diversification of curricula. Curriculum diversification corresponds with the founding of new jobs in a technocratic age. The development of human potential by the schools, as in vocationalism, makes them generate a differentially socialized workforce.

Modern society has been caught up in the process of rapid technological development, nurturing of new expectations and requirements and skilled labour demand. Consequently, a technocratic age labour market requires that education ensure the supply of a flexible and efficient workforce to sustain technological advancement. Vocationalism in a technocratic age demands that the aim of education be the mastery of the skills and the understanding of data basic to human existence in a technocratic age.

3.4 **Professionalism in a technocratic age**

The definition of professionalism has been provided in 2:2.4. In a technocratic age, schools generate a differentially socialized workforce for a hierarchial and bureaucratic occupational structure (Shapiro 1984:34). The educational endeavour is aimed at learners acquiring dispositions concomitant with the world of work. Applied in the education situation, the principles of professionalism ensure training, instruction, initiation and induction into the existing technocratic age system (Stenhouse 1988:80).

3.4.1 *The influence of professionalism on the aim of education*

Professionalism ensures that workers are accountable and efficient in their jobs, thereby increasing the need that they obtain qualifications that would enable them to perform associated tasks. In a technocratic age, the casual jack-of-all-trades peasant has been replaced with a specialist and a worker who does one task (Toffler 1980:62). For each level of work within technocratic age organizations, certain professional qualities are needed. The schooling system is thus viewed as the major mechanism for distributing values inherent to all kinds of particular professions demanded by technocratic principles (Reimer 1971:27).

The purpose of education, viewed from the perspective of professionalism, is integration into the world. According to Dawson (1987:29) formal academic qualifications are required for admission to a wide range of occupations. Schooling in a technocratic age is necessary for the acquisition of skills and proficiencies related to qualification into professions.

3.4.2 *The influence of professionalism on the view of the learners*

Toffler (1970:360) says that the whole idea of assembling masses of learners [raw materials] to be processed by teachers [workers] in a centrally located school [factory] is a stroke of industrial genius in a technocratic age. This suggests that learners are viewed as trainable. Techniques are used to articulate the learners' behaviour to social requirements, work places and human wants in a technocratic age (Bowers 1977:43). As a result, learners are introduced to the fact that as professionals they will be expected to perform their tasks efficiently and according to set time-frames.

Measures that are enforced to ensure professionalism include reward for diligence, obedience and hard work. Learners are required to adapt in the process of being inducted and integrated into the technocratic order. According to Husén (1974:1) education is instrumental in teaching learners to cope with professional demands of a technocratic age.

3.4.3 *The influence of professionalism on the choice of learning content*

Educational institutions have been brought closer to the needs of industry and the business community. According to Kearns (1988:566) the agenda for schools must be driven by market forces and accountability. The choice of learning content may thus be influenced by the economic needs of a country. As a result, the idea of a university has become a target of autonomy versus service, of pure research versus applied research and of excellence versus quality (Higgs & Higgs 1994:42). The adaptation of education to labour market requirements demands that educational institutions teach learning content which is needed for economic survival.

Scientifically-refined content is taught in schools. This is intended to eliminate all traces of subjectivity and to ensure objectivity. In preparation for their future careers and professional life, learners are required to master the learning content that is taught. These learning contents, which are culled from the every-day experiential human world, are presented in school as subjects such as biology, geography and mathematics (Fourie *et al* 1995:147). The mastery of the subject and its terminology are in a way related to entry into a profession. However, Chanan and Gilchrist (1974:25) are of the opinion that until learners are allowed self-expression, it is not possible to know the learners and to understand their potential.

3.4.4 *The influence of professionalism on teaching*

Teachers in a technocratic age have a duty to ensure the success of the education process. According to Nash and Agne (1972:368) when teachers are cautioned to act like professionals, they are reminded that the principal trend to be perpetuated is the integration of the young into the existing system. The socialization process is therefore reinforced by selflessness, obedience and cooperation characteristic of professionalism. Teachers are executives of the education policy; they are guides to learners in thoughts, work and learning (Armytage 1965:329). As a result, education exposes the learners to the respect of the norms, values, rules and discipline espoused in technocratic societies.

According to Griessel *et al* (1995:4-5) teaching is a triatic undertaking among teachers, learners and the subject matter. The interaction of teachers and learners is made possible by the subject which should be taught by teachers and learnt by learners. In this situation, the teachers have to exemplify what they teach by acting in the interest of the learners. In addition, Kearns (1988:568) contends

that a restructured, free-market public education system that gives teachers choice and autonomy cannot be successful unless teachers are true professionals: masters of an academic knowledge base and trained to apply diverse methods in the classroom.

3.4.5 *The influence of professionalism on the learning process*

Formal education is closely woven into the career-web of the individual in societies where the occupational structure and the requirements for effective job performance continuously change as technology changes (Husén 1990:7). Learning is intended to make one employable in a profession. According to Toffler (1970:36) young people passing through the educational machinery merge into an adult society where structures of jobs resemble that of the school itself.

Professionalism requires that learning content be presented in a way that ensures that learning is effective. According to Dewey (1965:33) there is a fixed quantity of ready-made results and accomplishments to be acquired by all learners. As a result, learning content is arranged in prepacked curricula so that learners assimilate it easily. Such curriculum programmes are presumed to provide the correct route between commencement and termination of learning and they are divided into a series of small steps (Dreckmeyr 1989:22). Teachers, in their professional capacity, assume the chief responsibility for the success of the learning process.

3.4.6 *The influence of professionalism on administration/organization*

Professionalism requires that the job be done by professionals. For professionals to act accordingly they should respect their [professional] code of conduct which requires them to be loyal and obedient to the profession. Bersson (1982:36) states that the dominant ideology or values of any society shape the ways in which the majority of people think, experience and act. The professional demand for accountability lessens the professional's freedom of choice.

Within a school situation there are administrative and academic functions to be performed. Stratification, which relates to the execution of professional responsibilities, requires that each worker within the education bureaucracy does the work efficiently and professionally. As a result, teachers have to fulfil the roles of technicians, managers and efficient clerks (Smyth 1983:281).

3.4.7 *Summary*

As professionals, teachers are viewed as organizers of learning opportunities for individual learners (Husén 1979:168). This requires that teachers in a technocratic age ensure the success of learning events. According to Willis (1988:141), just as doctors diagnose bodily health, teachers diagnose and minister to mental and personality health in the sense of fitness for job and life. The teacher's task is *inter alia* to guide the learning process and to check its outcomes.

Professionalism has increased the value of formal qualifications. Standards, prices and conditions of entry should be satisfied before one enters into a profession (Toffler 1980:64). This suggests that professionalism influences the shaping of identities of people who intend entering a profession. Education is thus undertaken with the aim of socializing learners into professions (see 2:2.4).

3.5 **Scientism in a technocratic age**

The definition of scientism was provided in 2:2.5. It is generally found that in the modern school scientifically acquired and refined knowledge is taught in an organized, planned and particular scientific way. In addition great emphasis is placed on professional expertise, reliance on scientific methodologies and instrumental rationality (McKay, Gore & Kirk 1990:53). Even the measuring instruments used for assessment in education are scientifically grounded.

3.5.1 *The influence of scientism on the aim of education*

The acquisition of scientifically-refined knowledge is viewed as a means of eliminating ignorance, prejudice, conservatism and everything which is likely to hamper development in a technocratic age. Education has as its aim the integration of learners into their environment. The school has to be a situation in which learners can learn and control their environment (Griessel *et al* 1995:181).

Scientism views proper education as comprising the acquisition of accurate knowledge gained during the process of learning through scientific methods conducted by learners under the teacher's guidance. It is presumed that scientism may implement ways in which learners select, interpret, synthesize and store relevant information (Bush 1945:8). As a result, education is undertaken with the aim of developing learners' intellect and senses in order to make them adaptable in a technocratic age environment. This is done at the expense of the learners' other domains. However,

one needs to be aware that intellectual attainments are easy to assess through the use of quantitative measuring instruments which scientism favours.

3.5.2 *The influence of scientism on the view of the learners*

The common view propounded by scientism is that the social and natural worlds are the same and that they can be reorganized and controlled to the same degree and by the same principles (Bowers 1982:531). It appears that scientism reduces learners to a body comprising intellect, potential and temperament which can be analysed, controlled and programmed according to scientific methods and procedures. The individuality of the learners is negated by strict adherence to the principle of scientism.

A reductionist view of the learners by scientism makes them "units" which consist of an intellect to be optimally utilized according to set procedures. Consequently there is a neglect of high-level conceptual processes and affective learning since human beings are reduced to rational beings (Lucas 1972:461).

3.5.3 *The influence of scientism on the choice of learning content*

According to Fraser, Loubser and Van Rooy (1990:117) learning content represents aspects of reality with which one makes contact during the course of one's life. Useful knowledge is seen as being that of the natural sciences and consequently the humanities are viewed as being of lesser importance and relegated to a subservient position. This view is characteristic of scientism and as a result, technocratic societies are polarized between the proponents of humanities and "advocates" of the sciences and technology (Lucas 1972:101).

Scientism elevates natural sciences, mathematics, zoology, astronomy, botany and geography to the status of the most important subjects in the school curriculum. This is caused by the scientistic view that presumes that the knowledge of the natural sciences will enable human beings to understand the cosmos. The learning content should be within the parameters of scientism, it should ensure efficiency and measurability (Bowers 1977:51) and, by the same token, it should determine the course and outcomes of learning.

3.5.4 *The influence of scientism on teaching*

Some symptoms of the influence of scientism on teaching is the focus on teaching objectives and emphasis on empirical performance (Lucas 1972:463). The insistence on analytic methods and emphasis on empirical performance in teaching, precludes the individuality and subjectivity of teachers and learners. As a result, the evaluation of the effectiveness and success of teaching is presumed to be valid and reliable only when scientifically refined and accepted measuring instruments are used.

Bowers (1977:38) contends that scientism dictates that teaching be organized according to principles of rational efficiency, assessed according to measurable outcomes and legitimated with the meta-language of the machine. Teaching places a high premium on orderliness and predictability. Specified objectives, task analysis of the steps required to reach objectives, the implementation of these steps and the evaluation of outcomes against the objectives is very important in teaching (Bowers 1977:42).

According to Brameld (1965:91) the pendulum continues to swing further and further away from learner-centred learning and closer and closer towards organized subject-matter programmes, efficiently taught by methodologies that resemble the technologies that they are designed to serve. Scientism requires that teachers adopt teaching strategies which are the outcome of scientific research.

Technology has led to the mechanization of teaching and, according to Hamm (1988:157), teachers should have knowledge about the science of teaching and using multimedia to facilitate their teaching tasks. In addition, teachers should apply teaching techniques which promote experimentation, project method and learning through discovery. Saylor *et al* (1981:61) state that teachers are trained to use material to the extent that materials facilitate adaptation to individual differences of learners, teachers and classrooms.

3.5.5 *The influence of scientism on the learning process*

Scientism advances the notion that the learning process depends on experiences of the learners. Through the everyday process of symbolic interaction with teachers, curriculum materials and school routines, the learners build up a world of meanings, definitions, typification and

interpretational rules that enable them to participate in a technocratic society's symbolic universe (Bowers 1977:33). The implication hereof is that the learning process is facilitated by the interaction of the learners with their environment which is made up of the natural and human worlds.

The learning process is facilitated by the pedagogical ordering of the subject matter from the concrete to the abstract. From the preceding it can be deduced that learning is a rational activity and it progresses in a linear approach. As a scientistic norm, learning should be a measurable process which is not unique to each individual, but a general sequential process related to the cybernetic view of learning. It appears that learning occurs when learners acquire a particular quantity of facts which they can use scientifically. Consequently, learning is ritualized and curiosity is devalued since no one is allowed to stray from the syllabus and pre-stated objectives (Dore 1976:61).

3.5.6 *The influence of scientism on the view of administration/organization*

The effective and professional management of education requires that people who hold administrative positions be accountable. Aronowitz and Giroux (1987:28) maintain that schools in a technocratic age are reduced to flow charts by separating teachers and administrators. This view emanates from the fact that within each school people fulfill different roles and functions.

People do not interact on the basis of their cultural and mental maps, but on the basis of roles and patterns outlined and prescribed by experts (Vandenberg 1985:417). For example, teachers are considered authorities with superior knowledge, as well as masters and experts of the unknown in the school situation. Consequently, the interaction of teachers and learners in the school situation is dependent on the quantity of scientific knowledge teachers possess. It is apparent that scientism encourages top-down decision-making.

3.5.7 *Summary*

Scientism emphasizes reliance on the methods of the natural sciences. The acquisition of objective knowledge is made possible by observation, experimentation and verification. Knowledge which has been amassed through methods other than the scientific is rejected as subjective, unreliable and value-laden. It would appear that scientific knowledge is utilized to develop the rational potential of learners in order to facilitate their integration into technocratic societies.

Technocratic age societies presume that scientism creates the path man should follow to gain a grip on the world. The goals of education in a technocratic age are apparently to contribute to the discovery, transmission and understanding of the scientific world. As a result, people who possess scientific-technological knowledge are accorded special status by technocratic societies.

4 CONTROL OF EDUCATION BY THE STATE

The life-world is not merely a person's specific spatial environment. It includes all facets of life, all relationships, careers, the social and legal order, moral and religious norms (Du Plooy *et al* 1982:13). The implication hereof is that one's situatedness influences the education with which one will be provided with. According to Vos and Brits (1990:39) an education system can only be understood and explained with due regard to the particular ground motive [communal spirit and corporate will] that guides and determines the individualizing effect of cultural factors. Consequently, State control of education is based on the ground motive of a particular nation.

According to Van Schalkwyk (1988:44) the State is responsible for carrying out its responsibilities for the general good of the citizens. To fulfil this responsibility, legislation gives the State the authority to control education. The State sees it as its responsibility to nurture and conserve its human resources, just as it does with its natural resources, so as to perpetuate the vital virtues and skills which characterize it. The State provides legislation to facilitate and control the provision of education. To ensure the efficiency and productivity of the education system, the State sets up an education bureaucracy to draw up policies and to ensure that plans are implemented. Subsequently, heavily standardized requirements are introduced in education in a technocratic age.

Normally, education is managed and administered by one or more State departments and as a non-state activity [in the interest of society] it must be carried out within the parameters of State policy,

civil service, State finance and control (Van Schalkwyk 1988:147). At no point should education be contra-State. In a technocratic age educational law promulgated by the State obliges the community to provide and implement education within specified parameters. The State transfers and promotes culture to ensure that its citizens are literate in the ways of the particular society's manner of functioning by enhancing the community's level of development.

The degree of technological development achieved by the State will determine the degree to which the State will control education. This implies that in high-technology countries the control of education by the State will be more complex and highly technical than in less developed countries. The State actualizes educational control through providing education within an education system.

4.1 The education system

Formal education is organized, administered and provided for by national education systems. Education systems are cultural phenomena with a past, present and future (Venter 1985:85). This suggests that an education system exists in time and space. The transfer of culture, in the form of education, relates to particular ground motives and circumstances of the particular State. Culture is dynamic and it changes continuously. It can be assumed that changes brought about by technological developments and the onset of a technocratic age have made it imperative that education systems change so as to adapt to changing challenges and conditions. Greater centralization and bureaucratic control in education systems have thus become part and parcel of education in a technocratic age (Bowers 1977: 36-37).

Even if education systems are particular, they all share [similar] universal characteristics which make it possible that changes are effected without disrupting the whole educational phenomenon. According to Dekker and Van Schalkwyk (1990:11-16) universal characteristics or components of education systems are:

* objectives of education;
* administration and control of education;
* structure of education;
* social structures with an interest in education;
* support services; and
* financing.

4.1.1 *Objectives of education*

Every education system is developed to satisfy the particular needs of particular societies. In a technocratic age these objectives relate to the satisfaction of industrial and technological need. Dekker and Van Schalkwyk (1990:11) state that a community's educational objectives represent the direction in which it wishes to proceed and the destination it wishes to reach with its learners. This suggests that technocracy, requiring more and greater specialization in the carrying out of duties, will require from an education system that which is needed to fulfil these demands. Subsequently, the need to promote science and technology necessitates that education systems be oriented towards technology and science education (Dekker & Van Schalkwyk 1995:10).

4.1.2 *Administration and control of education*

According to Dekker and Van Schalkwyk (1990:12) the administration and control of education are actually facets of management which involve matters such as policy-making, planning, organization, coordination, decision-making and financing. Concern with efficiency ensures that the provision of education within a particular State is done by highly qualified personnel [in a bureaucracy]. This suggests that people who have specialized knowledge [specialists/experts] by virtue of the qualifications they have attained [indicating a meritocracy] are in control of and manage technocratic systems [indicating specialization and professionalism]. The function of educational management is the implementation of measures necessary for the effective functioning of all activities connected with education as demanded by the principles of technocracy (Dekker & Van Schalkwyk 1995:18).

4.1.3 *The structure of education*

Education combines the various types of learning and teaching by establishing relationships to each other (Dekker & Van Schalkwyk 1990:13). Diversification of education in a technocratic age relates to the expansion of knowledge and the diverse needs of a technocratic society, as well as the view that individual differences of learners should be catered for in education. A link between education and training is ensured by academic and vocational training. As a result, Dekker and Van Schalkwyk (1995:16) contend that an educational structure allows for the canalization of learners through the structure.

4.1.4 *Social structures with an interest in education*

According to Dekker and Van Schalkwyk (1990:14) social structures or groups which are closely involved in education are parents, the State, industry [employers] and the church [religious community]. In a technocratic age education is a partnership among different interest groups with vested interests in education. Technocratic communities are highly organized and no single 'organized' activity may be carried out in isolation (Dekker & Van Schalkwyk 1995:22). The significance of this relationship is that each group needs education to fulfil its own needs.

4.1.5 *Support services to education*

Support services are specialized services created by the educational authorities to support teachers and learners (Dekker and Van Schalkwyk 1990:15). Auxiliary services are provided by specialists from other fields to teacher and learners. These services are intended for the total development of the learners and include fields such as psychological services, library services and curriculum development services. The need for support service is noted by Dekker and Van Schalkwyk (1995:20) when stating that such services are essential if provision is to be made for the divergent abilities and interests of all learners, as well as for the fulfilment of the country's workforce needs.

4.1.6 *Financing of education*

According to Dekker and Van Schalkwyk (1990:16) State intervention in education is necessary in matters such as demographic affairs, economic possibilities and constraints, workforce requirements, employment possibilities, national ideals and requirements. In return for the State's funding of education, the State requires the personnel in the education system to be accountable and responsible for education outcomes which are in line with State education objectives and to act professionally. This technocratic view sees education as an investment for which quantitative requirements are set. Consequently, technocratic societies are of the opinion that it is in the interest of civilization that each citizen receives educative teaching (Dekker & Van Schalkwyk 1995:23). States are required to provide financial assistance to disadvantaged learners.

4.1.7 *Summary*

Education systems are not static; they change as societies experience change. The emphasis on efficiency, productivity, scientism, specialization and professionalism influenced education to be proportionally adapted to such technocratic values. The need for the efficient management of technocratic institutions has also increased meritocratic tendencies in education systems.

In the environment of mass production and mass consumption, characteristic of a technocratic age, mass education is seen as the most appropriate way of ensuring basic literacy and numeracy to the masses. At this point in time mass education, which is encouraged in most education systems, will be discussed.

4.2 Mass education

The *Dictionary of Education* (1959, s.v. 'mass education') defines mass education as:

> ... *universal schooling of all learners, under public support; the process of educating learners or adults in large groups; once applied to the Lancastrian system of regimenting hundreds of learners in classes; presented in a popular way to a large, unorganized group.*

It can be deduced that mass education is intended to extend educational opportunities to all persons irrespective of class, ethnic or racial identification (see 2:4.4.2). Dewey (1965:32) maintains that the classroom in a technocratic age is intended for handling large numbers of learners. While mass education leads to overlarge classes and enrolment explosions in schools, it also makes it necessary that the scope of curricula and school programmes be broadened to satisfy the needs of the various types of learners. However, mass education is contradicted by meritocracy, specialization and vocationalism.

To ensure that education is made available to all people, technocratic societies adopt a system of free and compulsory education.

4.2.1 *Free and compulsory education*

Bergh and Berkhout (1994:52) maintain that mass education has come into force as a result of the new demands set by the *Industrial Revolution*. States took it upon themselves to ensure that people were educated for their own good and for the good of their countries. According to the *Human Sciences Research Council* [HSRC] (1981a:13) apart from the demand of the individual for free and compulsory education at primary and secondary level, the business community [both commercial and industrial] stridently clamoured for education to provide for the labour needs of growing economies.

The economic importance of basic literacy and numeracy cannot be disputed, as a literate workforce which is capable of reading, *inter alia*, instructions from schedules and timetables prepared by employers is essential for economic success (Laszlo & Castro 1995:9). It appears that free and compulsory education is necessitated by an economic drive as much as by a humanitarian motive. Closely linked to free and compulsory education is the concept of equality of educational opportunity.

4.2.2 *Equality of educational opportunity*

The *United Nations Educational, Scientific and Cultural Organization* [UNESCO] (1960:3) indicates that equality of educational opportunity is a basic human right and birthright of every person. In line with these requirements many countries hold on to the view that no learner should be denied the right to decent education. To that effect it is a universal principle that no learner be discriminated against on the basis of race, colour, sex, language, religion, political or other opinion, national or social origin, economic condition, or birth (UNESCO 1960:3).

Equality of education opportunity gained momentum as a result of technological development. According to the HSRC (1981a:13) the post-World War II era [the period regarded as a technocratic age in the dissertation] (see 1:3.4.5), saw the dawn of the extension of educational opportunities to those who were excluded in the past. Finn (1964:18) states that as society becomes more technologically-orientated and controlled, the question of education of and for, all citizens is raised. This view relates to the introduction of mass education which was intended to extend opportunity for technologically appropriate education to all learners.

4.3 Technologically relevant education

The technical phenomenon is the main preoccupation of our time and in every field people seek to find the most effective methods for production (Ellul 1964:21). The view forwarded relates to the rationalization of education so as to make it productive and effective. According to Berger, Berger and Kellner (1974:24-26) technological production has structured consciousness to think in terms of mechanisticity, reproductivity, measurability, componentiality, problem-solving inventiveness and self-automization. Education in a technocratic age aligns itself to the above factors. Specialized time, space, content, staff and methodologies are indispensable for the socialization and training of learners for entrance into technocratic societies (Gillette 1979:292).

In order to distribute technologically appropriate education, schools link their activities to the needs of society at large, in particular the needs of industry. School education is therefore product and vocation oriented, science and technology oriented and global in character.

4.4 Global education

Global education emphasizes the concept of interdependence and the need to set contemporary issues in a global context (Hicks 1991:625). Although education systems are particular, they cannot exist in isolation. Vos and Brits (1990:13) state that the purpose of internationalism can be enhanced by understanding and appreciating foreign education systems. Common problems exist in education and among peoples of the world.

Global education includes the building of national, regional and international networks, as well as the launching of an international multi-disciplinary research on the learning process involving industrialized and developing countries (Elmandjra 1986:736). Exchange programmes in education are common in education in a technocratic age. In support of the foregoing, Hicks (1991:625) points out that *Environmental Education* is currently in vogue and has the support of global organizations jointly concerned about issues such as the depletion of rain forests and global warming.

4.5 *Summary*

Scientific and technological advancement requires that education adapts to changes. This advancement increases the need for a skilled and flexible workforce and the school is required to teach learners with a view of preparing them for the world of work. Vocational education has in this way proliferated in education.

Personal success in a technocratic age is related to the type of education one has received. People with science or technology-related knowledge are assured of opportunities both in the job market and economic fields. Consequently, schools are dominated by science and technology-orientated curricula. The other phenomenon in education is that of globalization (see 2:4.4). Learners are no longer taught only to be become competitive in their countries of origin, they are also taught to be aware of universal problems and challenges and they are equipped to be citizens of the universe.

5 CONCLUSION

The knowledge explosion which accompanies technological advancement makes the creation of new occupations possible. This raises the need for education to qualify personnel to fill posts in these occupations. As a result, in a technocratic age meritocracy has ensued. In addition education serves as a means of socializing learners into the existing technocratic system. To ensure the perpetuation of a technocratic culture, the principles of scientism and professionalism are adhered to. The control of education by the State is intended for the proper management of the education system in order to monitor and to extend its efficiency and productivity.

Since the concepts with a bearing on a technocracy have been elucidated, the focus will be on the development, character and effects of a technocracy on education in the United States of America.

CHAPTER 3

THE DEVELOPMENT, CHARACTER AND EFFECTS OF EDUCATION IN THE UNITED STATES OF AMERICA IN A TECHNOCRATIC AGE

By leaning too far in the direction of excellence, the country is in danger of creating a special kind of elitism out of meritocracy; by leaning too much in the direction of equality, it easily loses sight of real human differences and ignores outstanding potential...

(Tannenbaum, A. J. A backward and forward glance at the gifted 1972:18-19)

CHAPTER 3

1 INTRODUCTION

American education advances a notion that systematic learning, provided by formal schooling, is a prerequisite to obtaining competencies needed for participation in a modern technocratic society. What this suggests is that the American school is perceived to be a means and extension into the future of a working community itself (King 1979:279). Consequently, education in a technocratic age is viewed as the main vehicle through which better jobs, social status and individual success are achieved (see 3:3.1).

Just as the invention of the printing press led to the need for new jobs for the production of ink, paper, presses for metal and paper and alloys for casting, a technocratic society requires people who have skills to utilize and process technical and scientific information (Alcorn 1986:39). The appointment of the *Commission on Human Resources and Advanced Training* in 1949 marked the realization that investment in human capital of the country was a necessity, as much of America's strength was derived from her educational attainments (Husén 1974:40). The Commission's report indicated that the survival of the United States of America [USA] as she entered a technocratic age depended upon it making the most effective use of the nation's intellectual resources (see 3:2.2).

The *Fourteenth Amendment* of the Federal Constitution guarantees the rights of all American citizens. This, in a technocratic age, demands that school curricula be diversified to cater for people with different abilities. However, this fact accounts for the competition associated with attempts to gain entry into the upper levels of education, a domain inclined to be reserved for the more talented and generally more privileged members of society (Husén 1979:151). Furthermore, a technologically complex society like America's requires that the more intellectually demanding jobs be occupied by the nation's most talented members (see 3:3.6), while jobs requiring manual labour are held by the less gifted and less educated (Dore 1976:176). This suggests that American education will shift between two opposing ends namely, traditional education and progressive education.

The American education system is oriented towards talent utilization. Talent utilization in essence discriminates against the less talented. The dominant principle in the classroom could be described as an *esprit-de-moi*, the egocentric competitive drive, which could account for the rise of drop-out rates (Hemming 1980:90). However, one should not lose sight of the fact that a technocratic society

like that of America requires learning systems which make the best use of advanced technologies which society has to offer. According to Elmandjra (1986:736) technology such as informatics, robotics and telecommunication sciences needs to be utilized and, inevitably, this field is best understood and most efficiently used by those who have the ability to master the intricacies of this technology.

For the purpose of this study American education will be discussed in terms of three representative aspects namely, its development, character and the effect technocracy has had and has, on the American education system.

2 DEVELOPMENT OF EDUCATION IN A TECHNOCRATIC AGE IN THE USA

Technological and industrial developments have necessitated the shifting and diversification of an educational locus to educational loci, thereby extending education beyond earlier boundaries, increasing the number of learners and linking curricula with contemporary reality (Gillette 1979:282). As a result, the focus of education has been broadened to include recent technological advancements in an attempt to fulfil human needs and adapt to, and to provide for, the demands of contemporary reality. This adaptation to changing trends is alluded to by Toffler (1970:242) who notes that between 1950 and 1963, the number of different soaps and detergents on the American shelf increased from 65 to 200 and frozen foods from 121 to 350. The increase in production suggested by Toffler is indicative of diversification in consumption and hence in the education of the public.

The test of a sound education system is the degree to which it responds to society's changing needs (Faulkner 1965:119) and this required that American education be responsive to social readjustment in the aftermath of World War II (see 3:2.1) and produce quality learners (see 3:2.2). As a result, traditional education and progressive education became crucial issues to be debated and juxtaposed in American education.

2.1 The two main education streams: traditional education and progressive education

The modernization process in America was influenced by two main schools of thought in relation to education namely, traditional education and progressive education. As a result, American education became either pro-traditionalist or pro-progressive education. The intensity of the struggle

between traditional and progressive education increased between 1945 and 1955. Traditional education advanced the cause of knowledge-centred and subject-centred curriculum, teacher-centred instruction, discipline and authority and defended the emphasis on academic standards in the name of excellence. On the other hand, progressive education advanced the cause for learner-centred learning and the relativism of academic standards in education in the name of equity, freedom and individualism (Sadovnik, Cookson & Semel 1994:81).

According to Fisher and Mandell (1988:51) traditional education supported a highly meritocratic, formalized and controlled education system which produced proficient learners who could ensure progress in the fields of science and technology. Adaptation to a technocratic age requires the use of intellectual resources. For traditional educationalists this meant the use and canalization of talent. Husén (1979:155) notes that a highly rationalized and efficiency orientated society [as found in a technocracy] demands workers with a high level of job skills and a specially trained workforce with the required technological and managerial ability.

While traditional educationalists were concerned with excellence and talent, Bierlein (1993:8) notes that progressive educationalists focussed on sociological principles working, through education, to alleviate urban slum conditions caused by urbanization and industrialization. Lessons in hygiene, nutrition and child care were for example, central to the education system proposed by the progressivists. It is also of note that progressive education gained ground at the end of World War II in 1945, which *inter alia* led to the introduction of life-adjustment programmes in schools to help people cope with their altered social conditions. By focussing on the learner's day-to-day experiences and reflecting on the diversity of life, progressive education led to the entrenchment of the comprehensive high school [where both academic and practical life and workplace skills are taught] in American education (Sadovnik *et al* 1994:80).

Life-adjustment education advanced by progressive education, systematically avoided intellectual rigour or subject content, thereby weakening the traditional functions of schooling by placing a higher premium on social and life values. According to Bierlein (1993:8) progressive education swung the pendulum more strongly to the non-academic side of education, above the acquisition of academic knowledge required for advancement in a technocratic age. The mediocrity and poor quality of American progressive education became evident when the Soviet Union launched *Sputnik* on October 4, 1957 (Eisner 1992:610). It dawned on the American public that while they followed progressive education, the Soviet Union had not only managed to launch mass education, but had

also increased her number of high-level scientists and engineers. As a result, the Soviets had "won" the *Space Race*.

The American education system needed to be re-evaluated to ensure that the USA remained competitive in the international arena. To achieve this, a new education dispensation was adapted which was to a large degree based on the proposals of the traditional educationalists and which tilted towards meritocracy.

2.2 Meritocracy: the advancement or maximization of potential

According to Coetzer and Van Zyl (1989:115) the exaggerated emphasis on equality of educational opportunities and its accompanying assumption that all learners should receive identical education led to a state of mediocrity in American education. Consequently, America suffered a defeat at the hands of the Soviets with their launching of *Sputnik* in 1957. In reaction to the Soviet's success in the *Space Race*, the American public realized that meritocracy with its associated specialized education which aimed at the maximization of talent and potential was a necessity if America was to retain her super-power status. The fear of continued domination by the Soviets created a strong national insistence on new curriculum programmes which would benefit the talented and gifted learners (Coetzer and Van Zyl 1989:124). In turn American society would benefit from the arrangement and under such circumstances, it was believed, America could retain her dominance in world affairs.

A national commitment to improve educational standards undertaken in the USA after 1957 led to the institution of the *US Education Mission to the USSR*. The aim of this commission was to study the education system of the Soviet Union. Some of the findings of the Commission recorded by Coetzer and Van Zyl (1989:125) point to the fact that Russia had placed emphasis on intellectual development. Before learners could complete their school career at a Russian high school they had to have studied physics, biology and a foreign language for five years, to have devoted their attention to astronomy for a year and to have had a grounding in mathematics for as long as ten years. Comparing the USSR's system of education with that of the USA under the influence of progressive education, it was evident that the American education system was inferior and mediocre: it promoted neither academic excellence nor academic comprehensiveness (Fisher & Mandell 1988:51).

To adapt to the changing conditions, American education needed restructuring and the *National Defence Act* of 1958 was to play a crucial role in piloting this change.

2.2.1 *The National Defence Act of 1958: competency as a goal*

The *National Defence Act* of 1958 was spurred on by the Soviet Union's progress in science and technology (Husén 1974:4). The efficiency of the Russian education system, as described by the *US Education Mission to the USSR* (see 3:2.2), indicated to the Federal Government that American education should aim to achieve certain competencies in learners. According to Sadovnik *et al* (1994:8) from 1957 through to the middle of the 1960s, American education showed a distinct shift towards academic excellence. Curriculum planners redesigned curricula in ways that could lead to the return of academic standards. The *National Defence Act* of 1958 provided funds for establishing curricula in the sciences and mathematics in a bid to provide quality education in the USA (Eisner 1992:610). Funds for research aimed at raising the standard of education in America were also provided for by the *National Defence Act.*

To enhance the general improvement of American education, Congress provided funds [through the *National Defence Act*] for research regarding the education of gifted and talented learners. The promotion and development of talent was provided for by the *Marland Report* tabled before Congress in 1971. The report proposed special programmes for the education of gifted and talented learners. This became necessity in a technocratic age as the development of new technology required that comparability and adaptability in a workforce be developed (Kolde 1991:453).

2.2.2 *The Marland Report: nurture of superior talent and intellect*

Coetzer and Van Zyl (1989:129) indicate that *Section 806 of Public Law 91 - 230* of 13 April 1970 was passed by Congress for investigation into gifted learners' education in the USA as a whole under the leadership of the Commissioner of Education, S.P. Marland. This suggests that it had dawned on the policymakers that for America to survive in a technocratic age, the utilization of brain power, superior intellect and talent was a necessity. Having compiled his findings, Marland (1972a:x) reported to Congress that there was inadequate provision for the education of gifted learners in America, something which prompted federal authorities to make funds available specially for the provision of facilities for the education of the gifted and talented learners.

2.2.3 *The Gifted and Talented Learners' Act of 1978: education of the elite?*

The acceptance of gifted learners' education as an integral part of the American education system was intended to lend support to those who were gifted and those who dealt with the education of the gifted. A further objective was to develop the potential of the gifted and talented for the betterment of American society as a whole. To support initiatives for the education of the gifted, the Federal Government passed *Section 404 of Public Law 93 - 390* in 1975 which made grants and contracts to State and local agencies, institutions of higher education and other groups for exemplary programmes and projects to meet the educational needs of the gifted and talented learners and youth (Passow 1979:443). Investment in human capital was seen by American policy-makers as a means by which the education system could produce brilliant scientists who, in turn, would be capable of contributing towards improving the international status of the nation.

According to Coetzer and Van Zyl (1989:130) the *Gifted Learners's Act* of 1978 gave the Commissioner of Education the right to make finance available to government educational institutions which would enable these institutions to plan and develop instructional programmes for the gifted. The aim of the Federal Government, through the office of the Commissioner of Education, was to ensure that educational institutions were supported and empowered to satisfy the educational needs of gifted and talented learners at pre-school, primary and secondary levels and to ensure in-service training of teachers on the education of the gifted and talented.

As the American education system became progressively talent-orientated in the late 1950s, some sectors of the American population argued that the overemphasis on talent was counter to the provision of equality of educational opportunities. Bowles and Gintis (1973:4) note that talent-orientated education is conducive to a general technocratic and meritocratic view, which legitimates the allocation of people to various levels of the social hierarchy, but the pressure for equality of educational opportunity led to a realignment of American education.

2.3 **Equality of educational opportunities: the move to promote education for all**

The progressive education movement of the 1960s provided an intellectual assault on traditional education, with its elitist value of intellectual pursuit and its failure to meet the emotional and psychological needs of learners. However, this movement towards equality of educational opportunity was not altogether new as the idea had been introduced many years previously. The

movement was reaffirmed by the *Educational Policies Commission* of 1944 which stipulated that youth needed to develop saleable skills and the understandings and attitudes that make workers intelligent and productive participants in economic life. It can be deduced that the *Educational Policies Commission* viewed the function of education in a technocratic age as being preparation for jobs and the acquisition of a work ethics. After World War II, in 1945, the issue of access to education became increasingly important in the USA, a fact attested to by the passing of the *GI Bill of Rights*.

2.3.1 *The GI Bill of Rights: education as a "holding operation"*

Sadovnik *et al* (1994:82) contend that the *GI Bill of Rights*[1] passed in 1944, offered 16 million servicemen and women the opportunity to pursue higher education. While the GI Bill of Rights provided a just reward for national service, it provided a means to avoid mass unemployment in the post-World War II economy. It also ensured that those who were previously denied the chance to attend college were provided with opportunities to enter higher education. Education and schooling in America expanded to counter unemployment which turned education into a "holding operation". Husén (1979:151) notes that equal educational opportunities brought in new groups of people aspiring for the rewards that had been traditionally associated with further education. Just as opportunity was extended to all, formal education increasingly became an important criterion for job selection.

2.3.2 *Desegregation of schooling*

In the late 1940s, the relationship between race and education and the question of school segregation were at the forefront of political, educational and moral conflicts (Sadovnik *et al* 1994:83). The American ideals of equality of opportunity and justice for all have over the years been contradicted by the unjust treatment of Afro-Americans and other minorities by legislation which gave preferential treatment to a particular racial group, e.g., *the separate but equal policies*. The *equal protection clause* of the *Fourteenth Amendment* of the American Constitution served as the foundation of many policy debates and it was used by groups which were discriminated against to challenge the then existing order in American education. Sadovnik *et al* (1984:84) record that the

1 The GI Bill of Rights is also called the Servicemen 's Readjustment Act of 1944. Public Laws 346 and 16 introduced the GI Bill of Rights and the Vocational Rehabilitation Programme for disabled veterans.

advocates of civil rights won their major victory on May 17, 1954 when the Supreme Court ruled that State-imposed segregation in schools was unconstitutional in the *Brown vs. Topeka Education Board* case.

Notwithstanding the fact that *de jure* segregation [by law] was outlawed by the *Brown vs. Topeka Education Board* ruling, equal access to education was militated against by *de facto* segregation [due to settlement and neighbourhoods]. The 'busing' system which was undertaken to transport learners from 'neighbourhoods' to 'inner-city' schools could not function successfully if the economic conditions of the disadvantaged were not addressed. This is noted by Husén (1979:179) who contends that some people are more equal than others: they have better educational opportunities.

2.3.3 *Financial assistance to economically disadvantaged learners*

Unequal educational outcomes are presumed to be caused by the socio-economic position of a person. To ameliorate poverty and to ensure equality of educational opportunity, Presidents John F. Kennedy and Lyndon B. Johnson implemented social reform programmes which made funds available to help needy learners (Sadovnik *et al* 1994:85). One such programme, the *Head Start*, unveiled in the middle of the 1960s, represented the Federal Government's commitment to ensure that underprivileged learners were given the same educational opportunity as their more affluent peers. The *Office of learner Development* was created in the US Office to coordinate *Head Start* and other federally supported childcare education programmes. Jennings (1993:27) states that in the 1960s the *Elementary and Secondary Education Act, the Higher Education Act, the Library Services and Construction Act and the Manpower Development and Training Acts* were initiated to provide equality of educational opportunity in elementary, secondary and post secondary education.

Although the provision of equality of educational opportunity is commensurate with the *Fourteenth Amendment* of the American Constitution, the American authorities realized that they had to invest in the education of all citizens to train workers for specific tasks and to match workers to jobs so as to create a labour market that is fluid, flexible and diverse (Apple 1982:43). In a technocratic age, it is vital that the repertoire of basic literacy and numeracy skills in the school add to the mastering of concepts needed in coping with science, mathematics, administration and literature in the changing of social conditions, by opening up new vistas and 'cognitive maps' that can help learners orient themselves to a technocratic age. Education, as aimed at ensuring equality of

educational opportunity, led the Federal Government to pass the *Education Amendment Act* in 1972 (Wynn, De Young & Wynn 1977:305). Under the *Education Amendment Act* Congress approved aid for learners in most public and private post-secondary institutions in the form of *Basic Educational Opportunity Grants*.

It is through federal policy that funds are made available for the training of a workforce and that economic productivity is safeguarded in a technocratic age. In addition, large-scale spending on education is viewed as ensuring equal educational opportunity (Vos & Brits 1990: 162).

2.4 Summary

American education should be assessed against the background of progressive principles which contribute to the creation of unity from diversity, the promotion of democratic ideals, and practices intended to improve social conditions and encourage national education. Education should be competent enough to enable the majority of people to become flexible and independent in a technocratic age. Subsequently, priority is given to building a system which contributes to the welfare of the nation.

American schools are seen as providers of opportunities for social mobility, as places to nurture and develop the 'hearts and heads' of learners, as antidotes for prejudice and as solutions to a diversity of social problems. In other words, the purpose of education is not merely to make citizens, or workers or fathers or mothers, but ultimately to make human beings who will live life to the fullest. Increased enrolment at secondary and post-secondary levels of education, soaring educational costs and the mounting importance of education to individuals, the business sector as well as the national economy in the face of advancing technocracy, brought the Federal Government as an active partner into the education scene. In this paradigm, it is expected that the Federal Government will demand professionalism, efficiency and productivity in the education system. The education system will also become more bureaucratic in nature.

3 THE CHARACTER OF EDUCATION IN A TECHNOCRATIC AGE IN THE USA

American education is intended to provide learners with opportunities for intellectual, aesthetic and ethical development, as well as the acquisition of skills to facilitate their participation and integration into a plural society (Lee 1960:81-83). The expansive area to be covered by the education system is necessitated by social and economic adaptation to a technocratic age. According to Kearns (1988:566) learning outcomes of the school should be reconciled to workforce requirements of industry since the new agenda for school reform is driven by market forces, generally unfamiliar ground for educators.

To satisfy the market requirements alluded to above, American education introduced diversification in the curriculum (see 3:3.5). The diversification of curricula was related to the founding of new jobs, in particular white-collar occupations in retail trade, administration, communication, education and other fields of specialization (Toffler 1970:40).

3.1 *Objectives of American education: education for work*

With the onset of a technocratic age, schools were required to educate learners to have a fund of information on and an understanding of technocracy. According to Husén (1979:150) American education was required to address the relationship between school and work, dealing mainly with transfer from school to the labour market. This includes the teaching of concepts related to technocracy, skills to acquire and transmit technocratic information and information on guidance regarding choice of career, as well as training and possible placement in vocations. As a result, programmes like the *Right to Read* and *Follow Through* were provided to help learners improve reading skills and to develop cognitively (Wynn *et al* 1997:146).

Linking school and work and making learners active participants in economic life, requires American education to develop the talents of learners to the fullest (A Nation at Risk 1981:13). This implies that, in line with the *Fourteenth Amendment* which provides for equal educational opportunities, education should provide for diversity in order to cater for different individuals at school. However, technocratic demands require that individual needs be reconciled with national needs. *America 2000: An Education Strategy* was launched during the period of President George Bush's term of office (Education Digest 1991:3-7). The objectives of American education, as recorded in *America 2000*, were identified as having:

* to ensure that every learner who starts school is ready to learn;
* to put the American learner of mathematics and science in the forefront in the world (see 3:3.4); and
* to ensure that all adults are literate and possess the skills to compete in the world economy.

Adaptation to a technocratic age required that American education teach learners attitudes, skills and flexibility that would help them to fit into a changing job market. According to Newt Davidson Collective (1973:54) the education system became a "breeding ground" for a new labour force of highly skilled scientists, technicians, managers and workers. Education is important for a workforce required by American industry. To achieve its goals and to fulfil its functions efficiently, the American education system needs an efficient control and administrative structure.

3.2 *Bureaucracy: the hub of education administration and control*

The quest for accountability and the evaluation of what the school achieves with the resources that taxpayers put at its disposal provide the rationale for bureaucracy in the American education system (Husén 1979:165). Bureaucracy proliferated in American education to bring institutions in line with the exigencies of industrialization and technological developments.

In American education legislation is passed and approved by the Federal Government, State departments and local education authorities [LEAS]. According to Stanley (1980:273) school policies are intended to effect the social organization of schooling in terms of administrative structure and regulations. Some of the measures employed for the normal running of education are teacher roles, patterns of social integration and policies on attendance and certification. In the USA, each of the fifty States makes statutory provision for the organization and coordination of educational efforts.

The economic crisis and the ensuing labour unrest in the aftermath of the Depression of the 1930s intensified and consolidated bureaucracy in American education (Burris & Heydebrand 1981:16). Both the public and private sector clamoured for an improvement of the efficiency of the education system in line with technocratic demands. Lee (1960:121) reasons that the industrialized economy of the USA could not be operated without infinite skills, technical facilities and scientific understanding. To meet a workforce needs of the country, the Federal Government instituted the

Federal Office for Education [USOE] with bureaux for schools, vocational and adult education (Dekker & Van Schalkwyk 1990:394). The USOE provides technical assistance for educators and is responsible for the publication of the journal *American Education*. The chief executive of education, the Commissioner of Education, is appointed by the President with the consent of the Senate. According to Wynn *et al* (1977:360) the *National Centre for Educational Statistics* [NCES] serves as the chief bookkeeper of the nation's educational provision by collecting, interpreting and disseminating statistical data on schools. In addition, the *National Institute of Education* [NIE] administers federal grants for research and provides technical resources to teachers.

In the execution of their jobs, teachers hold bureaucratic positions. This requires that they act as professionals.

3.3 *Professionalism: a progressive education system requires a competent teacher body*

Since 1987 the *National Board of Professional Teaching Standards* [NBPTS] has been dealing with professionalization of education (Dekker & Van Schalkwyk 1995:593). The NBPTS develops policy, processes and products which can be used by teachers to improve and build their profession. To manage this task and to carry it out effectively, teacher training should improve the competency of teachers (Cremin 1990:30). As a result, provision is made for increasing the responsibility of teachers regarding the nature and quality of educational experiences offered to learners, their parents, the community and society at large. In addition, teacher professionalism deals with certification and test requirements, liability, meritorious compensation and personnel development (Lunenburg & Ornstein 1991:290-291).

Teachers play an important role in preparing American youth for a technocratic age and, due to the call for accountability and professionalism in the teaching profession, it is required that the quality of education be improved (De Novellis & Lewis 1974:12-16). Trainee teachers are therefore taught to master the subject matter and to be familiar with an understanding of the factors that influence learning, and are required to have a deep insight into the nature of learners. Furthermore trainee teachers are also required to study general pedagogics aimed at moulding learners, social and natural sciences as a prerequisite for adaptation to a technocratic age, and general teaching methods to facilitate and enhance effective teaching (Dekker & Van Schalkwyk 1990:407). From these statements, it can be deduced that American education advances the notion of competency-based teacher education [CBTE].

The *Education Professions Development Act* [EPDA] of 1967 was passed to provide for federally supported programmes for the development of professionals (Wynn *et al* 1997: 369). In American education, a teacher who is well adjusted to teaching is presumed to be an efficient specialist by being an expert administrator of advanced technology and an upholder of the universality of science. A high premium is placed on the qualifications of teachers which in turn determines the nature of teacher training. American States require a bachelor's degree for teaching elementary grades and while 47 States regard a bachelor's degree as a minimum for teaching in secondary schools. Three states require a master's degree (Vos & Brits 1990:164). In addition, the *National Council for Accreditation of Teacher Education* [NCATE] does not accredit teachers' certificates of less than four years' training (NASSP Bulletin 1992:42).

Teachers are required to keep abreast with new developments in education and teaching and in particular in their specialization fields. This is accomplished by attending in-service training, summer camps and conferences, which are used as criteria to be satisfied to ensure the renewal of the tri-annual teaching licences (Dekker & Van Schalkwyk 1990:407). An additional requirement in keeping with technocratic age standards is the ability of teachers to use computers in education (Wilson 1995:5). The introduction of computers in education was to promote and advance scientism in education (see 3:4.1.1).

3.4 *Scientism: the advance of technology and its influence on technocratic education*

Science education gained momentum after the creation of the *National Science Foundation* in 1950 (Wynn *et al* 1977:249). The aim was to develop and encourage basic research and science education. According to Toffler (1970:120) instead of being trapped in some unchanging, personality-smashing niche, technocracy liberates man but simultaneously sets a stranger free in a free-form of kinetic organizations. Major changes occurred in America in 1978 due to the infusion of technology into industry, thereby ushering in a period of high technology which increased the value of scientific and technological knowledge. The *US National Science Board* reported in March 1986 that education in science, engineering and mathematics was crucial to the economic vitality and security of the country (Marchello 1987:560). In addition, the *National Aeronautics and Space Administration* [NASA] performs certain educational services to deepen the understanding of educational, social, economic and political implications of space exploration.

American education encourages the understanding and application of scientific methods, which requires that American learners be exposed to processes like observing, classifying, interpreting and experimenting with material from the various sciences. The American education system acknowledges the fact that it is no longer the frontiers of science which are at issue, but the frontiers of humanity (Ellul 1964:9). This implies that human adaptation in a technocratic age depends largely on the use of science and technology. As a result, since 1983 the *Five New Basics* [four years of English, three years of mathematics, three years of science, three years of social studies and six months of computer studies] have dominated curricula in American secondary schools (Dekker & Van Schalkwyk 1990:595). Instruction in science is being extended and enriched. For example, the *Educational Development Centre* at Newton, Massachusetts, has produced a widely used programme, *Elementary Science Study* [which is a series of learning units that stresses investigation, placing learners in the role of experimenting scientists] (Wynn *et al* 1977:150).

3.5 *Diversification in education: acknowledgement of the individual's needs*

The schooling system in the USA is comprised of early-childhood [pre-school] education, elementary [primary school] education, secondary education and higher education. Each level of education has particular needs to perform to society as a technocratic age demands.

3.5.1 *Early-childhood education: preparation for participation in the American dream*

Early-childhood education is provided in nursery schools and kindergartens, and is intended to equip learners with meaningful experiences so as to develop them socially, physically, intellectually and emotionally. The *Economic Opportunity Act* of 1965 created nursery-level programmes commonly called the *Head Start* (Wynn et al 1977:125). *Head Start* ensured that learners from disadvantaged communities had access to early-childhood education. The compatibility between pre-kindergarten and kindergarten education was recognized by the introduction of *Follow Through,* supported by the Federal Government through the *Economic Opportunity Act* .

Kindergartens impart fundamental skills, reading and writing, to learners. Furthermore, kindergartens expose learners to experimenting, problem-solving and the acquisition of information from their environment (Dekker & Van Schalkwyk 1995:512). A common trend in a technocratic age is to integrate kindergartens as part of the elementary schooling system. Consequently, early-

childhood education equips learners for elementary education.

3.5.2 *Elementary education: the acquisition of reading and scientific skills*

Elementary education concentrates on developing the command of the fundamental processes of learning. The *Association for the Supervision of Curriculum Development* proposed that elementary education in the USA leads to the development of the understanding of the social and scientific worlds (Dekker & Van Schalkwyk 1995:565). However, the basic activity in primary grades is reading. The *Right to Read* programme stimulated interest in reading in elementary schools. The major types of reading proposed by the *Right to Read* were :

* Developmental reading which was designed to improve reading skills;
* Functional reading which was aimed at improving the ability to find information; and
* Recreational reading which was developed to improve reading for enjoyment (Wynn *et al* 1977:146).

In addition to reading, elementary education promoted social science, natural sciences, mathematics and creative arts. The *National Society for School Evaluation* developed guidelines for evaluating elementary education, which was used for channelling learners into secondary education (Wynn *et al* 1977:151).

3.5.3 *Secondary education: the utilization of talent and potential*

According to Wynn *et al* (1977:158) *Project Talent* was mounted in 1960 with the aim of researching the relevance of American education to the talents and abilities of learners. The study's findings were that the potential of learners was not fully developed and also that most of the high school graduates had inadequate plans for the future. It can be deduced that there was a need to re-direct American education to meet the needs of the learners in preparation for entry into a technocratic age labour market. Subsequently, the emphasis on the individual necessitated differentiation in education in the USA (Dekker & Van Schalkwyk 1995:566).

The *National Commission on the Reform of Secondary Education* of 1972 stated that secondary education should enable learners to understand the American economy and to participate actively in economic activities (Wynn *et al* 1977:162). American education was *inter alia* aimed at the acquisition of knowledge, skills and attitudes necessary for occupational competence. Career education in vocational and technical secondary schools was introduced to meet the needs of the

country's industry for a technically trained labour force. After graduating out of secondary schooling, learners could pursue higher education in community colleges, technological institutes or universities.

3.5.4 *Community colleges: human resource development for a technocratic age labour market*

Vocational education relates to the assumption that the basic function of modern education is to provide learners with appropriate job skills and knowledge (Fisher & Mandell 1988:52). The *National Defence Act* of 1958 and the *Vocational Education Act* of 1963 stimulated the provision of vocational education. In the USA, vocation-orientated education is offered particularly in community colleges. In 1991 the *Carnegie Commission on Higher Education* recommended that each State have a plan for developing community colleges (Wynn *et al* 1977:185).

According to Lee (1960:163) the assumption that one has a life to lead as well as a living to make, influenced education to provide the balanced experience which would help to make life meaningful. This provides the rationale for community colleges which offer terminal curricula leading to technical and semi-professional occupations. In addition, community colleges provide curricula to prepare those learners who plan to pursue higher education in business, science, engineering and other areas of specialization (Vos & Brits 1990:61). It is evident that the dual purpose of community colleges is the preparation of learners to enter directly into the labour force, as well as preparation of others to pursue specialized training in universities.

Community colleges are strategies of adaptation to a technocratic age, since they emphasize the immediate community's needs and aim to improve the quality of life and facilitate survival (Olsen & Clark 1979:15). For example, in an agrarian community relevant curricula for a community college may include farming and marketing. As a result, curricula of community colleges are closely linked to community and public needs and education is a vital focus of community life. It can be deduced that community colleges provide opportunities for balanced development, continuity, depth of learning, wise selection of content and varied experience and economy of time (Stratemeyer, Forkner, McKim & Passow 1957:121-140).

While community colleges respond and teach what communities need for survival, universities and colleges follow specialized curricula, which aim at providing America with a highly efficient workforce. Consequently, not only are practitioners developed, but the need for academics is also

addressed.

3.6 *Specialization: commodity education and pattern production*

The *Carnegie Commission on Higher Education* of 1973 maintained that the purpose of higher education is to provide a logistical base for a pool of specialized talent to industry and government (Wynn *et al* 1977:185). It would appear that educated talent has become a commodity in growing demand where technology is the prerequisite for high standards and economic growth. High academic achievement is presumed to be related to economic efficiency and productivity. In the light of the above, *Project Talent* was mounted to ensure that the full potential of the learners was developed for participation in economic activities available in a technocratic age.

A technocratic age society like America's needs people with skills and knowledge. According to Wynn *et al* (1977:192) the *National Science Board* views graduate schools as a critical national resource that provides knowledge of wide applicability. Furthermore, the founding of new jobs, new materials and new services necessitates the transformation of educational purposes, thereby leading to the introduction of the tracking system in the education system (Bruckerhoff 1988:6). As a result, universities became specialized centres of competence in areas such as science, mathematics, telecommunications and performing arts.

The *National Defence Act* of 1958 was largely a response to the Soviet success in the *Space Race*. To produce high-quality learners, qualified to enter specialized professions, the education system is linked to practices in the world of work. In addition, educational institutions are geared to produce people whose skills are relevant in a technocratic age.

3.7 *Summary*

The fact that American schools are regarded as instruments of social and individual improvement has fuelled dreams of vocational training for all. To realize this ideal, diversification has been introduced in the education system the aim being to cater for the needs and interests of the individual. This is compatible with the principle of equality of educational opportunity and the aim of developing every learner's potential to the maximum.

The vocationalism of American education in a technocratic age is complemented by the needs for specialization and the rise of new professions. For the American education system to be successful in achieving its aims, a professionalized and accountable teacher corps, which strives towards maintaining high academic standards, needs to be established. In this context, traditional educationalists' values like talent-orientation, quality and meritocracy in educationand an appropriate Federal Government's role in education, have a crucial role to play to ensure the attainment of the preceding. Education plays a crucial role in providing technocratic societies with an efficient, skilled and specialized labour force.

The quest for quality and excellence in education led to the extension of bureaucratic control in education. Technocracy will therefore directly influence the provision of education in American society.

4 EFFECT OF THE PRINCIPLES OF TECHNOCRACY ON AMERICAN EDUCATION

A technocratic system requires excellence and quality in education. In American education these values, excellence and quality, were effected through policies like learner accreditation, State standards, increased credits for graduation and the principle of no pass-no play (Bierlein 1993:42). To balance the requirement for excellence, the American education system makes room for the provision of equal education opportunities as required by the *Fourteenth Amendment* of the Federal Constitution. For the education system to cater for excellence and equality of educational opportunities, American education is characterized by specialization and vocationalism based on diversification (Oxenham 1984:147).

It cannot be disputed that individuals have differing intellectual abilities and talents. As a result, a technocratic age society, although considerably orientated towards giftedness and talent, does also require the contribution of those who are viewed as being "academically unsuccessful". In addition, it remains the primary aim of education to cater for the needs and interests of the learners (Ellul 1964:345). Notwithstanding the fact that the individual is important in education, national interests do influence the provision of education.

4.1 *Technologically appropriate education: adaptation to a technocratic age*

In order to adapt to demands of technocracy the American education system supports educational programmes which are relevant to contemporary technocratic reality. Consequently, colleges are reinstating mathematics, science and language requirements which were dropped during the permissive era of the 1960s (Vos & Brits 1990:160). By advancing meritocracy and talent-orientation, the American education system is attempting to select learners who have outstanding abilities to enhance and maintain technological and industrial development. According to Dimock (1968:123) the pre-eminence of scientific and technological knowledge has made formal education indispensable in a technocratic age (see 3:3.4).

American education has to keep up with scientific and technological developments in order to claim legitimacy to a technocratic age. This requires that educational technology, in the form of computers and other teaching and learning aids and cooperative learning be implemented in classrooms (Bushnell 1964:56; Cuban 1990:3). The introduction of computers into the American classroom is seen as a vehicle for the integration of education and the world of work as well as a measure towards increasing the efficiency of the education system. In 1967 the *Educational Products Information Exchange Institute* was instituted to help educators make selections among the vast and growing array of educational products (Wynn *et al* 1977:280). In addition, the introduction of computers in education is viewed as a positive step towards addressing problems of overcrowding in classrooms as well as the imparting of complex subject matter.

4.1.1 *Computerization in education: technology invades the classroom?*

According to Laszlo and Castro (1995:7) in a changing world the advent of computer-aided learning environments has augmented the domain of educational experience. Learning amassed from these environments can launch the human potential into a generation of repertoires of learning experiences and responses that foster inquisitiveness and readiness to deal with challenge, such as those posed by a society characterized by increasing technocratic principles. In this context a teacher becomes a transmitter of knowledge as well as a skilled deployer of diverse teaching instruments (Eurich 1964:91). The circulation of new products, new information and new opportunities increases the value of the computer as an important amenity in American education.

Feller (1995:49) contends that universities support computer-based learning processes. Learners have access to Internet-based e-mail and online conferencing. Technology, in particular computers, allows learners to make interconnections among things that they are learning. Technology also provides alternative methods to learning (Prickett, Higgins & Boone 1994:59). It can consequently be deduced that computer-based instruction supports the efficiency and productivity associated with technocracy which is to be instilled through education. In addition, computer-based instruction caters for the two aspects, the individual and the national, as the learner interacts with the source of information which provides continuous reinforcement to learning (Bushnell 1964:59).

The computer augments and lends support to teachers in the classroom. However, Husén (1990:8) notes that computer-assisted learning remains an exclusive amenity of affluent societies and individuals who have the abilities to manipulate them. Parmley (1995:28) also notes that teachers and learners, in some settings, have access to computers but lack the necessary technical assistance to use them effectively. To help teachers use computers effectively technical assistance is provided by the *Educational Products Information Exchange Institute* (see 3:4.1). Teachers are trained to understand computer-aided tutoring methods and factor analysis, and they also receive support in assimilating computers into the curriculum (Bushnell 1964:72).

The rationalization of education, with the requirement that teachers attend to standardization and efficiency, has made computerization crucial in the American education system (Smyth 1987:17). Another addition to American education is satellite television. *Applications Technology Satellite* was launched in 1974 and it brings educational television to the Rocky Mountain States, Arizona, New Mexico and Alaska (Wynn *et al* 1977:273).

4.1.2 *Standardization of formal education: efficiency and productivity in education*

Toffler (1970:249) notes that the quest for universal citizenship has led to fixed city-wide standards and curricula, and choosing of texts and personnel to implement educational programmes. What is implied is control through set standards. The standardization of formal education ensures uniformity in education as well as bringing education in line with national requirements and standards. According to Morgan (1984:266) standardized and performance-based measures are introduced to ensure quality in education.

Standardization ensures that values are given the same status as work roles, skills and occupational choices (Bowers 1977:45). This increases the need for quantitative measures to assess academic success. The examination in this regard becomes the linchpin of the entire educational structure. As a result, educational programmes are streamlined to suit examinations. Just as it is the teachers' job to teach, it is the learner's job to learn, no promotions without performance (Kearns 1988:568).

The satisfaction of State standards is viewed as a guarantee of educational and academic success in the American education system. Standardization and formalization of education were made imperative by mass education.

4.2 Mass education: education to produce skilled workers

After World War II enrolment in schools increased and consequently a shortage of teachers was experienced (Vos & Brits 1990:163). Subsequently, the double-shift use of schools [the platoon system] and grants, as well as subsidies to self-help schools, were provided to deal with the increase in class sizes (Dore 1976:4). In its attempt to address the problems of illiteracy and innumeracy [intolerable conditions in a technocratic age], America produced a mass education schooling system. The system appeared to be inefficient, and as a result the American public viewed private schools as being more effective learning environments than public schools, as private schools were reputed to be more accountable, less prone to violence and social dysfunctionand more academically productive (Sadovnik *et al* 1994:527). Cognizance was however taken of the fact that the larger the enrolment, the more difficult the social control in the school. Even large private schools experienced social control problems.

The schooling system was also characterized by superficial personal contact characteristic of big organizations. Mass education in the American education system led to the creation of problems of personal identification and discipline. One of the techniques in the American education system that effects and regulates mass education is compulsory education legislation. According to Griessel *et al* (1995:193) the 'mass youth' is the combined outcome of mechanized technology, growing industrialization, mass communication and organization. Subsequently, it can be deducted that the mass education of a technocratic age reinforces massification. Alternative schools were founded in reaction to mass education. Wynn *et al* (1977: 168) describe these schools as offering learners an opportunity to plan their experiences by creating a more flexible learning environment. Within these environments a wide range of educational needs and styles are accommodated and the focus is on

the personal problems of individual learners. Learners tend to find the formality and bureaucracy associated with formal schooling repulsiveand they are attracted by the alternative schools which are individualized, informal and participatory (Dekker & Van Schalkwyk 1990:404).

Mass education also turned education into an arena of competition. According to Husén (1979:15) as the education system expanded, competition for entry into its upper stages became stronger. Competition for places in higher education suggests that the gifted and talented learners will succeed and their "less" gifted counterparts will be channelled to vocational training. This may lead to the dropping out or withdrawal from school by the "academically unsuccessful" (Oxenham 1984:147).

4.3 **The increase in drop-out rates: alienation or disillusionment?**

Calabrese (1988:325) notes that drop-out rates stand at: Blacks one out of four, Hispanics one out of three and Whites one out of seven. The drop-out rate for Whites is however increasing. There are many factors associated with the increase in drop-out rates.

4.3.1 *Talent-orientation: quantification of human potential?*

The efficiency of the education system is measured by the performance of learners in examinations. According to Furgoson (1993:100) when learners want to do real things the school gives them abstract work, blank spaces to fill in with right answers and multiple choices to see if they are able to choose the right answers. Intellectual outcomes can easily be measured in quantitative terms as required by technocratic societies. Related to Furgoson's view is the opinion of Freire (1970:4), who states that instead of communicating, the teacher issues *communiques* and makes deposits which the learners patiently receive, memorize and repeat. Subsequently, an impression is created that those who are not intellectually endowed, even if they are talented in other areas, have no place in the education system. In such an education system the rebel-innovator diverges more and more, perhaps to become anti-social or drop-out , while the timid learner who wishes to please is shaped into an even more conformist position (Furgoson 1993:119). As a result the education system produces learners who are subservient to a technocratic age society.

4.3.2 *Socio-economic status: economic privilege is educational privilege?*

Although funds are provided to help economically disadvantaged learners, it does not necessarily mean that their poverty has been completely ameliorated. The working-class learners must overcome their inbuilt disadvantage of possessing the wrong class culture (Willis 1988:128). It appears that economic privilege would reinforce educational opportunity and *vice versa*.

Once elementary school is passed there is no longer equality of educational opportunity (Reimer 1971:41). Learners from working-class families are more inclined to drop-out than learners from higher social classes, irrespective of racial group. As a result, it can be deduced that learners coming from literate homes and with access to better schools, have always been able to climb the examination ladder into the coveted modern sector occupations (Oxenham 1984:177).

4.4 **Summary**

The American education system is characterized by meritocracy and talent orientation. This particular bias in the education system necessitates that school placements reflect learners performance and ability. Consequently, learners whose abilities do not guarantee the required degree of performance are in danger of dropping out.

It is generally accepted that the talented and gifted comprise 3% of the population while 97% of the population is made up of people with "lesser abilities". The marginalization of the "less intelligent" coincides with the acceleration of the gifted and talented. In the American education system vocational education is viewed as a means to ensure the provision of a workforce which is efficient and productive, in which the 97% of the population fall. It also gives those fortunate enough to excel, the 3% who are talented and gifted, the opportunity to acquire greater status and better salaries by preparing them for specialized occupations.

5 Conclusion

The American education system is characterized by the struggle between the proponents of equality of educational opportunity and the proponents of excellence and quality, who advocate an educational system that is talent-orientated. This struggle emanates from two realities facing the American nation: the *Fourteenth Amendment* of the Federal Constitution which guarantees equality of opportunity to all citizens of America and a technocratic age which requires an efficient workforce.

The realization that the survival and the security of America depends on the maximum utilization of talent and superior intellectual ability of American learners became imperative after the launching of the *Sputnik*. Consequently, the Federal Government provided more funds for research, science and technology education, the provision of equality of educational opportunities and the general improvement in curricula.

The modernization of American education, with its emphasis on science and technology, followed similar lines to the modernization which was taking place in the Chinese education system. In the next chapter, the influence of technocracy in the education system of the People's Republic of China will be discussed.

CHAPTER 4

THE DEVELOPMENT, CHARACTER AND EFFECTS OF EDUCATION IN A TECHNOCRATIC AGE IN THE PEOPLE'S REPUBLIC OF CHINA

A book cannot walk, and you can open and close a book at will; this is the easiest thing in the world to do, a great deal easier than it is for the cook to prepare a meal, and much easier than to slaughter a pig...

(Mao Zedong in Chen, J. Chinese education since 1949 1981:88)

1 INTRODUCTION

The establishment of the People's Republic of China [PRC] in October 1949 was intended to destroy the old social order of feudalism, capitalism, landlords and imperialism and to set in its stead a new social order of the working class, a socialist State of the proletariat (Tsang 1968:217). The new Socialist Government advocated a new education system which differed in content, spirit, methods and control from that of the old National Government. Modernization and bringing in the new social order, which could bring the PRC on par with other world countries, were influenced by the fact that the development of education of the PRC followed a zigzag path. This was caused by political views [as influenced by the party line] which oscillated between 'the right and the left', between the moderate and extreme positions (Chen 1981:2).

The fact that Chinese education followed a 'zigzag' path is an indication of its attempts to address the need for modernization in a technocratic age. Problems facing the new Communist government included the need for industrial and technological development, consolidating socialism in the PRC, providing education to the illiterate masses and increasing specialization (Chen 1981:12-14). The adoption of the Soviet model of education in 1953 (see 3:2.2), a decision apparently based on manifested success of the 1940s Soviet education system, was an attempt to make the PRC part of the greater educational universe. Education in the PRC developed over clearly divided periods which followed one another sequentially namely, the *Five Years Plan* [FYP] (see 4:2.1), the *Great Leap Forward* [GLF] (see 4:2.2), the *Retrenchment and Readjustment Period* [RRP] (see 4:2.3), the *Great Proletarian Cultural Revolution* [GPCR] (see 4:2.4) and the *Four Modernizations Movement* [FMM] (see 4:2.5) (Hawkins 1983:15).

The importance of producing a skilled and disciplined workforce was complemented by the utilization of talent to produce specialists and experts who directed scientific and technological development in the PRC. Yet a consequence of talent-orientation is the creation of inequalities in education provision (see 4:4.4). The utilization of talent is undertaken to effect technological development and ultimately also differentiation within society itself.

The discussion on education in the PRC will be done in terms of three aspects: the development, character and effects of education in a technocratic age.

2 DEVELOPMENT OF EDUCATION IN THE PEOPLE's REPUBLIC OF CHINA

In September 1949 the Communists convened the *Chinese People's Political Consultative Conference* which in turn elected the *Central People's Government Council,* under the chairmanship of Mao Zedong. According to Armytage (1965:329) *Articles 42 and 43* of the *Common Programme of the Chinese People's Consultative Committee,* which promoted 'love of the fatherland, love of the people, love of labour, love of science and care of public property', were adopted. When the PRC was officially proclaimed in October 1949, Mao Zedong was thus head of State and the *Common Programme* served as the Constitution until the formal constitution was adopted in 1954.

Alluding to the constant changes in Chinese education Hawkins (1983:8) states that although all *Central Community Party* [CCP] leaders in the PRC since 1949 emphasized modernization [as required by technocracy], they have disagreed on how to modernize most efficiently. As such, Chinese education was forced to change continuously as the leadership of the CCP changed.

The ideal of a national education system, providing education to the masses while simultaneously giving prominence to the sciences, was to be reaffirmed through a variety of policy declarations of intent and concrete strategies (see 4:2.1-4:2.5). In the light of the above, Shen (1994:2) states that Ma Xulum, the Minister of Education in the PRC in 1949, declared that education should be national, scientific and mass-orientated. The initial steps to implement a system of national education for the masses was to redress the imbalances of the past. To increase the literacy and numeracy levels of citizens, part-time education for peasants and workers as well as worker-peasant accelerated middle schools were established in 1950 (Qu 1991:40-49). The creation of the Ministry of Higher Education in 1952 served as precursor to the *Five Years Plan.*

2.1 *The Five Years Plan* [FYP] (1953-1957)

The FYP announced in 1953 was a development strategy borrowed primarily from the Soviet Union (Hawkins 1983:15). In accordance with technocratic demands, the PRC needed to develop heavy industries: power, machine-building and chemical industries. Consequently, the need for adaptation in a technocratic age influenced the *Second National Conference on Education* in June 1953, to propose a shift from the previous emphasis on quantity and popularization, to greater emphasis being placed on quality and selectivity (Shen 1994:15). Specialized colleges which were established after 1952 were *inter alia* based on specialized faculties and schools in accordance with industrial and

trade requirements demanded by competition in a technocratic age.

Within these changes, Löfstedt (1980:79) indicates that the *Directive Concerning the Reorganization of Primary and Secondary Education* of November 1953 put more emphasis on the urban sector for more efficiency, fewer extra-curricular activities and more classroom-orientated pedagogy. This change of view was intended to make Chinese education more competitive and on a par with universal standards in a technocratic age. The quest for quality and efficiency in the PRC corresponded with industrial and technological demands for modern science and technology. This could only be achieved at the cost of reducing the numbers of learners and slowing the rate at which teachers were being trained to instruct them (Epstein 1991:21). During the FYP selectivity was ensured through the comprehensive university, 'Red' schools, and mass education which will be discussed later in the chapter.

2.1.1 *The comprehensive university*

The development of heavy industry and competition with the rest of the world demanded the production of highly qualified professionals by the Chinese education system. As a result, intellectuals in the PRC demanded specialization in education. It was on the assumption that excellence and specialization would enhance China's international status that a comprehensive university was founded in 1953. The comprehensive university was accorded higher status in the Chinese education system, since it was to train the elite (Armytage 1965:330). This tilted the provision of education towards the direction of meritocracy. During the FYP education in the PRC was status-orientated, as it was intended to protect and exert the privileges of the intellectuals who were then the new elite. The comprehensive university was complemented by the 'Red' schools.

2.1.2 *'Red' schools*

Intellectuals were the most influential group in the PRC during the FYP and they were regarded as the Reds. Special schools were established to promote the interests of the intellectuals ['Reds'] and to advance the quest for intellectual expertise. Criteria for admission to 'Red' schools were learners' family origin and position of their parents in the Army and Government (Niu 1992:26). Schools for the privileged 'Reds' were characterized by better organization: there was a school office, office of the party committee, the middle school department, the elementary school department and the bureau of school affairs, teachers were better qualified and the learner-teacher ratio was much lower than

in ordinary [mass education] schools (Niu 1992:26-27). It is imperative to mention that these schools were better resourced [with facilities] than other schools and the quality of education was better.

Learners from 'Red' schools benefited from the *Sino-Soviet treaty* of alliance signed in 1950 which charted the direction of Chinese political, social and economic reform initiatives. According to Löfstedt (1980:80) Chinese learners from 'Red' schools went to study in Soviet universities in 1954, while 7 100 workers were sent to be understudies in Soviet factories. Belonging to the 'Red' class ensured that one gained admission to the best institutions, gained privileges to study aboard and gained entry to the elite positions. 'Red' schools created a new bureaucracy for the PRC's programmes of modernization in a technocratic age.

The curriculum of 'Red' schools differed from that of other schools. To indicate curricular differences, Niu (1992:27) records that a course in foreign languages was taught from the beginning of Grade Four in 'Red' schools while in ordinary urban schools a foreign language was not taught until Grade Seven. Selective access to educational institutions thus resulted in inequality of educational opportunity. In June 1955, the *Academica Sinica*[2] set up new departments of physics, mathematics, chemistry, biology, geology and geography, technical sciences and of philosophy and social science, to further enhance the education of the 'Red' class (Löfstedt 1980:84).

While schools of the 'Reds' encouraged meritocracy and expertise, schools for the masses encouraged the balancing of manual and mental skills.

2.1.3 *Schools for the masses*

Schools for the masses were, in particular, located in the rural areas. There were two programmes that provided for the education of the masses: the first programme noted by Niu (1992:29) was offered in the 'half-and-half' agricultural schools, whereby learners spent a half-day in study and the other half in subsistence labour. The other programme was a part-time primary school, commonly regarded as the simplified primary school, which offered a number of lessons in a day. In most cases teachers in schools for the masses were not trained.

It is in the context of mass education that Mao Zedong presented directives for educational reforms

2 Academica Sinica is a comprehensive scientific and technical research institute in China.

in the document *Sixty Articles on Work Methods* in January 1958 (Löfstedt 1980:97). Schools in the PRC introduced half-work, half-study schools and a period regarded as the *Great Leap Forward* [GLF] was introduced.

2.2 *The Great Leap Forward* [GLF] (1958-1959)

According to Löfstedt (1980:95) the GLF came as a result of the 'anti-rightist' campaign that had developed in 1957. The campaign developed into a nation-wide movement which was intended to eradicate all traces of capitalism in Chinese education and society. Mao Zedong's educational reforms saw the introduction of productive labour in the practice of education and this was to provide a workforce necessary for the industrial and technological development of China as the principles of technocracy demand.

2.2.1 *Education and production*

The principle that education must be combined with productive labour arose from the Marxist concept of all-round development (Löfstedt 1980:98). The merging of educational practice and productive labour was intended to:

* produce a skilled labour force for a growing Chinese economy to meet the requirements of technocratic development; and
* to destroy the myth that mental labour was more important than manual labour.

Furthermore, the introduction of productive labour in the school curriculum also made schools self-sufficient and financially independent from the State.

To make education productive, the school curriculum of 1958 allowed learners to spend time doing socially useful jobs. Some of the activities in which learners participated are listed by Tsang (1968:170-171) as:

* cleaning parks, roads, governmental compounds, their neighbourhood and schools;
* going to factories [two or three afternoons per week] to do voluntary labour;
* going to bus or tram stops to give water to drivers and conductors; and
* planning and working in social programmes.

To ensure that these measures were adhered to, learners kept workbooks in which records of their

studies and labour were kept.

The rationale for productive labour is manifold, as pointed out by Löfstedt (1980:98) who states that education and production were to:

* eliminate differences which existed between manual and mental labour;
* integrate theory and practice which could make learning more effective; and
* decrease public spending on education by making schools self-reliant.

While education and production was public national policy, 'Red' and Expert institutions were exonerated from this system since they had to provide the country with experts required for the modernization process.

2.2.2 *'Red' and Expert institutions*

'Red' and Expert institutions of the GLF were created in the same mould as those of the FYP period. While education and production was basically intended to provide the PRC with a skilled workforce for industrial and technological development, 'Red' and Expert institutions were intended to produce specialists and professionals and thus also bureaucrats to fulfil management functions and to facilitate development as technocratic demands. The three kinds of 'Red' and Expert institutions identified by Löfstedt (1980:99) are the full-time comprehensive schools, work-study Red-Expert universities and spare-time universities.

Entrance to 'Red' and Expert institutions depended on political affiliation. To ensure the success of the quest of quality and specialist training, China signed *the Agreement* on 4 July 1958 with the Soviet Union to facilitate the mutual exchange of scientific and technical information, as well as mutual commandeering of specialists for studying productive experience and achievement in science and technology (Armytage 1965:331). *The Agreement* did not only enable PRC to obtain Soviet expertise in scientific and technological fields, but also paved the way for graduates of 'Red' and Expert institutions to study at Soviet universities.

During the GLF the education system expanded rapidly. However, Shen (1994:4) contends that as a result of this expansion, many institutions ended up being inadequately staffed. In addition, intellectual pursuits were swept aside in favour of the principle of half-work, half-study. In reaction to criticisms levelled against his educational policies, Mao resigned his chairmanship of the State

in 1960 (Löfstedt 1980:105). The resignation of Mao ushered in the *Retrenchment and Readjustment Period.*

2.3 *Retrenchment and Readjustment Period* [RRP] (1960-1965)

The resignation of Mao Zedong from the government of the PRC led to the repudiation of the *Sino-Soviet Agreement.* As a result, Soviet experts were withdrawn from China in 1960, Soviet aid to China was discontinued and exports from the Soviet Union were reduced (Löfstedt 1980:105). This led the PRC government to call on leading educators and Party officials to draw up plans that could improve the quality of education. Academic excellence and expertise were crucial for the survival of the PRC and, as noted by Seybolt (1973:49), enrolment by selection from the highest scores to lowest scores in national entrance examinations was adopted. Once more, schools in the PRC assumed the role of socialization and selection of the next generation's professional strata.

To achieve the aims of education reform and modernization, education was provided by Key institutions, work-study institutions and spare-time education.

2.3.1 *Key institutions*

Key institutions were full-time institutions which catered for the needs of bright and gifted learners, but Niu (1992:48) points out that family background and political activities also served as criteria for admission (see 4:2.1.2). Unlike the 'Red' and Expert institutions of the 1950s, the admission of middle-class learners to Key institutions was determined by academic performance. The return to talent in education led to the reinstatement of meritocracy in the Chinese education system.

Although political education and work-related skills were part of the school programme, they were kept to the minimum. Furthermore, Chen (1981:68) states that the curriculum of Key institutions encouraged continuity from elementary school to middle school to higher education. Since they were to produce the future bureaucracy and specialists for the PRC, Key institutions were well-resourced and financed. It is in this light that Unger (1982:18) mentions that when determining where new school facilities were to be built, the Education Department employed the Party's political criterion, the classline and discriminated against downtrodden districts. Key institutions were elite institutions in which talented learners and highly qualified teachers attempted to maintain high standards of academic scholarship.

Technocratic values like meritocracy, specialization, efficiency and productivity led to the re-establishment of the Ministry of Higher Education in 1964, after its abolition in 1958 (Chen 1981:68). Just as specialized and expert education was undertaken in Key institutions, vocational and skills training was undertaken in work-study schools.

2.3.2 *Work-study institutions*

Work-study institutions were a continuation of part-study and part-work policy introduced by Mao Zedong during the GLF (see 4:2.2). The most publicized work-study institutions are listed by Chen (1981:69) as the work-study agricultural middle schools, the work-study technical middle schools and the work-study universities. The main function of the work-study institution was to produce a literate workforce to meet the requirements of the industrial and technological development of the country, and this is alluded to by Löfstedt (1980:118) who notes that the conference convened by the Ministry of Education in 1965 decided that:

* primary education was to be popularized;
* more agricultural middle schools were to be run on an experimental basis; and
* experimental part-farming part-study junior technical schools were to be run.

Work-study institutions saved the State a good deal of money. Some of them were run by factories or enterprises, either jointly or individually, some had regular links with factories, some were factory-school in one, some had their own small factories or farms and some arranged for learners to do whatever work was available, since they had no facilities where manual labour could be done (Löfstedt 1980:118). Learners in these institutions acquired work ethics and skills which could be utilized in increasing agricultural and industrial production in the PRC.

To consolidate and extend the attempts of the PRC's education system to eradicate illiteracy, to ensure political-ideological indoctrination and to facilitate the acquisition of technical skills in the workers, spare-time education was encouraged.

2.3.3 *Spare-time education*

Löfstedt (1980:73) notes that spare-time education was provided in communes, industrial and business enterprises, full-time schools and universities. As a result of technological development,

spare-time education evolved from its initial aim of extending educational opportunity to those who had been denied education opportunity. Spare-time education was extended to train workers who could perform administrative and management functions in the technocratic age. Some of the courses offered in spare-time university education were: agriculture, engineering, economics, medicine, iron and steel technology, metal fabrication, powder metallurgy and animal husbandry (Chen 1981:74).

Spare-time education, short-term institutes and classes ranging from worker-peasant schools to political-indoctrination sessions, extended educational opportunity to sectors of the population normally beyond the reach of the regular schools (Chen 1981:83). Nevertheless, opposition to the restructured education of the RRP discredited academic excellence. Mao Zedong, one of the most vocal opponents of the system, claimed that excessive academic burdens would affect the health of learners and he even made calls for the reduction of classroom studies (Löfstedt 1980:120). Due to pressure from the radicals in the CCP, the educational policies of the moderates collapsed and the period called the *Great Proletariat Cultural Revolution* set in.

2.4 *The Great Proletariat Cultural Revolution* [GPCR] (1966-1976)

During the period of the GPCR, productive labour would be an important part of education. Mao Zedong, in his speech on 7 May 1966, stated that in addition to book learning, learners should learn other things; for example, industrial production and military affairs (Shen 1994:5). The GPCR ushered in a period intended to subvert middle-class values and intellectualism in education.

2.4.1 *Educational reforms during the GPCR*

The rejection of an education system providing for intellectual moulding, as advocated by the moderates during the RRP, paved the way for the introduction of education which combined mental and manual skills. From March 1967 primary and middle schools began to reopen after their closure in 1966 (You 1991:2). The education cycle was, however, reduced to five years' primary school, two years' junior middle school and two years' senior middle school, the intention being to make it possible for learners to join the labour force at an earlier age. Another change noted by You (1991:2-3) was related to the abolition of entrance examinations to middle and higher institutions and the granting of workers, peasants and soldiers with a minimum of two years' experience priority in admission to higher education. Mao's reforms were intended to ensure equality of educational opportunity for the people in the PRC. In addition, these changes were intended to supplant

academic excellence and were introduced with a view to opening the doors of learning to those who were loyal to the revolution. To show the degree to which standards were lowered during the GPCR, radicals aimed to gear the new schooling in science and mathematics exclusively to low-level/basic technical familiarity, such as instruction in how lathes operate and the principle of levers (Unger 1982:140). During the GPCR there was no provision made for the development of expertise and scientific excellence which could advance China's international status.

By abolishing the Ministry of Education, Mao Zedong extended his control over education. This was done to break the power of the existing education bureaucracy comprised of professional academics and Party leaders who supported them (Pepper 1991:26). The *Cultural Revolutionary Group* [CRG], comprised of representatives of cadres, soldiers and the masses, became the governing body in primary, secondary and higher education. By bringing education under the control of political activists who had little understanding of educational matters and the concomitant lowering of educational standards, China was plunged into serious educational problems.

2.4.2 *Result of education reform during the GPCR*

According to Unger (1982:142) the reopened schools of 1968-69 were to teach concepts that were relevant to industrial and agricultural work by downplaying systematic teaching. The emphasis on industrial work may encourage the competency of learners and their acquisition of practical skills, but on the other hand the acquisition of theoretical knowledge could have enhanced the learners' motivation to learn. Bartels and Eppley (1995:32) state that it was difficult, if not impossible, for China to produce experts such as nuclear physicists or space programmes, since the education provided, although it could prove valuable for pre-tertiary level, was unsuited to university education which demands and encourages academic excellence and systematic learning.

The negation of academic achievement is counter-productive. You (1991:3) indicates that the lack of motivation and discipline in schools during the GPCR can be attributed to the fact that certification for studies undertaken during this period was not recognized. By countering technocratic values of meritocracy, specialization and intellectualism, Mao Zedong created a situation for indifference, despondency and non-committal among teachers and learners alike. Unger (1982:142) also maintains that school graduates were to be assigned directly to jobs and the work units would hold the right to determine which of the personnel deserved university or technical school training. For learners who knew that they would be placed in the rural areas there

was no motivation to learn, and in addition the fact that selection for higher education was done by the work units created opportunities for abuse of the system; e.g., for favouritism of people aligned to the CCP.

Anti-intellectualism in the PRC created a situation where significant status was attached to proletarian occupations which were perceived to be more important than the 'vulnerable' and harassed life of the intellectuals. Workers were all assured of a secure income which stayed the same whether or not they became skilled. Unger (1982:173) contends that there was no need to improve one's education because learning was not rewarded. Becoming educated had the further disadvantage of making one vulnerable to attack since the academically successful were accused of being counter-revolutionary. A very small percentage of learners directly entered teacher training colleges, the few functioning universities and foreign language institutes, and consequently an acute shortage of teachers, translators and other professionals [experts and specialists] ensued.

The shortening of schooling to a universalized eight or nine years and the greater emphasis on labour within the realm of education provision marked a period of utilitarianism in China. However, instead of improving, the productivity and efficiency of the education system declined and China lagged behind other nations in technological and industrial development since specialized training was not encouraged. Bartels and Eppley (1995:32) note that by the mid-1970s it was evident that anti-intellectualism had harmed China's society and economy and change was inevitable. Those who wanted the progress of China to be based on expertise were regaining their power. In October 1976, the *Gang of Four*[3] was disbanded, bringing in the era of the *Four Modernizations Movement.*

2.5 *The Four Modernizations Movement* [FMM] (1977 to the present)

During the FMM period, China entered an era of productivity and efficiency of the education system. The new leadership in the PRC saw the utilization of talent and the diversification of education as the only means to bring about modernization. Specialization and talent-orientation proliferated in Chinese education during the FMM.

Hawkins (1983:15) maintains that economic dislocation, plus the political turmoil caused by the

[3] The Gang of Four included Mao Zedong's third wife, Jiang Qing, Wang Hongwen, Zhan Chunquiao and Yao Wenyan. It was the most radical political elite in the CCP (The New Encyclopedia Britannica 1990:10).

death of many of China's top leadership [Mao Zedong, Zhou Enlai, Zhu De], brought about the advent of a new political administration and economic policy called the *Four Modernizations Movement.* A *Ten Years Plan* [TYP] was designed to expedite the development of agriculture, industry, national defence and science and technology. Modernization in the PRC was to be arrived at through the rationalization of economic sectors and education was brought into closer articulation with economic goals and objectives. The extensive and expansive search for talent to improve the economy resulted in the reinstatement of entrance examinations by 1978. The new education programmes were more elitist and more talent-orientated than any that had existed in the fifties and sixties (Unger 1982:207).

The drive for quality and talent which came in the post-Mao period is suggested by You (1991:3), who indicates that 'Key' institutions were re-established, four-year bachelor degree programmes were introduced and there was a renewal in the sciences and technology. As a result of these reforms meritocracy proliferated in Chinese education. According to Epstein (1991:125) each specialization had a teaching plan, nationally standardized and fixed by the responsible bureau within the first and second departments of higher education in the *State Education Commission.* The first department had bureaus for humanities, finance and economics, politics and law, foreign languages and sciences in comprehensive universities; and the second department had bureaux overseeing engineering, agriculture and forestry and medicine and pharmacy. The need for specialized education corresponding to the needs of society in a technocratic age were catered for in the new education dispensation in the PRC.

The need for education for economic, technological and industrial development was recognized and therefore discipline and order in education as well as the enhancement of teachers' status, were encouraged. Hu and Seifman (1987:4) indicated that Liu Xiyao called for carrying out the revolution in education, developing education in accordance with the needs of the national economy, modernizing teaching content and materials and raising the quality of education. Consequently,the present system of education shows a great inclination towards excellence and meritocracy. The *Decision To Reform the Education System* drawn up by the *Central Committee of the Communist Party of China* published in 1985 had far-reaching implications in the PRC. It was declared that the construction of socialism depended on talent utilization. Consequently, education was required to serve the construction of socialist modernization, which centred on economic construction.

2.6 Summary

The creation of a socialist State in China was accompanied by an effort to be responsive to the demands of the principles of technocracy. Consequently, the Chinese education system underwent changes which were dominated by the ideological struggle between radicals and moderates within the CCP.

The earlier aim of mass education in China [as indicated in popularization in the early 1950s and during the GPCR of 1966] was challenged by the quest for talent, quality and expertise. Consequently, the education system in the PRC was characterized by 'Red' and Expert institutions, as well as Key institutions, which put emphasis on academic excellence and intellectual formation. In addition, Chinese education changed from emphasis being placed on producing successors to the revolution cause to producing specialists who could advance the cause of Chinese domination in world competition.

3 THE CHARACTER OF EDUCATION IN THE PEOPLE's REPUBLIC OF CHINA

Education in the post-1977 era has followed a two-track system, with government schools concentrated in large urban areas and community-run schools mainly in the rural areas. Schools in urban areas were intended to provide the country with specialists and professionals so that a bureaucracy of experts could be established, while schools in the rural areas were to train a literate, disciplined as well as skilled workforce which could promote vocationalism. The process of adapting the Chinese education to technocratic requirements for economic and social productivity occurred amidst the reconciliation of opposing beliefs within the psyche of the nation that produced a uniquely syncretistic ground motive influenced by Communism and Confucianism (Dekker & Van Schalkwyk 1990:214). *Ipso facto*, the provision of education is influenced by the tradition of constancy provided by a proud and ancient heritage [which advances social stratification as in feudalism] and change effected by the Communist Revolution [which brought centralization without working towards an egalitarian system].

The overriding aim of education in the post-Mao period is noted by Niu (1992:78) as serving the needs of the modernization programme. The necessity for modernization in the PRC corresponds to adaptation in a technocratic age since there was a dire need for specialized knowledge, scientific education, technological and even technical skills and professionals. How modernization could be

implemented is revealed in the objective of education.

3.1 **Objectives of education: a specialized workforce**

According to Löfstedt (1980:68) the aim of education in the PRC of the 1950s, which has been carried into the 1990s, was to produce a literate and numerate workforce so as to serve economic reconstruction. The attempts to eradicate illiteracy during the early days of the PRC led to directives which provided supplementary education for peasants and workers. Cleverley (1985:139) records that Mao Zedong indicated that education had to enable learners to develop morally, intellectually and physically, in order serve economic and political interests of the PRC.

Article 13 of the *1978 Constitution* of the PRC indicates that the State devotes major efforts to developing education in order to raise the cultural and scientific level of the whole country (Löfstedt 1980:145). This suggests that education is undertaken to promote extension of scientific knowledge in China. In line with technocratic strategies, economic reconstruction, social development and technological progress, all depend on the intellectual development of the Chinese nation, an increased number of trained personnel [bureaucrats] and further growth based on economic development (Swanson & Zhian 1987: 374).

Raising the quality of China's human resources is necessary to provide a closer fit between the output of the education system and the envisaged technological development in the expanding economy of a technocratic age. According to Hu and Seifman (1987:3) the speeding up of economic reconstruction, developing science, education and culture as well as strengthening the unity of the Chinese, are some of the aims of the education system. In addition, the education system in the PRC has to keep pace with the requirements of national economic development and globalization in a technocratic age (Dekker & Van Schalkwyk 1995:300).

The administration of education in the PRC is under a combination of centralized and decentralized authority. This is influenced by the need to achieve the goals of modernization and to ensure that citizens enjoy the right to education.

3.2 Administration and control of education: maintaining the bureaucratic order

Modernization in China has necessitated that the *National Education Commission* be the highest organ of administration of education. The functions of the *National Education Commission* as noted by Löfstedt (1980:60) are to:

* execute government policy;
* report to the government on education developments;
* seek governmental approval on policy matters; and
* formulate and issue regulations and directives governing the work of education at all levels.

Administrative functions of the *National Education Commission* ensure that the process of modernization be effected through education. Education at provincial level is conducted by bureaux with higher education, general education, professional education, planning and finance, adult education, pre-school education and physical education; all of which fall under the structure of education intended for modernization in the PRC (Dekker & Van Schalkwyk 1995:293).

3.3 The structure of education in the PRC: preparation for future roles

The school system in the PRC comprises pre-school, primary school, secondary school, higher and adult education. Promotion from one schooling level to another is dependent on strict entrance examinations. According to Dekker and Van Schalkwyk (1990:218) learners start school at the age of seven, although some start at the age of six.

3.3.1 *Pre-school education: the beginning of competition*

Technological development included female labour which increased the necessity of kindergartens. Kindergartens offer a useful preparation for school and learners who have attended a good kindergarten will attain a place in a Key primary school more easily (Epstein 1991:51).

Talent-orientation and the meritocratic system characteristic of a technocratic age have a profound influence in pre-school education in the PRC and, as noted by Epstein (1991:51), despite the high fees charged at the best kindergartens, places are difficult to secure. The seriousness which prevails regarding pre-school education is indicated by the entrance examinations designed to test

coordination, verbal development, counting and the recognition of shapes. Meritocracy in pre-school education encourages learners to learn to compete for positions, and parents reinforce the system by coaching learners for examinations.
Unlike primary education, pre-school education is not widespread. The pre-school prepares learners intellectually to benefit from primary school education.

3.3.2 *Primary school education: introduction to a workforce*

Although primary school education is in principle free and compulsory, parents pay a small fee and bear the cost of books (Dekker & Van Schalkwyk 1990:218). Primary school education is aimed at providing for the physical, intellectual and moral development of the learners. World Bank (1985:10) lists the aims of primary school education in the PRC as:

* appropriate mastery of speech, reading and writing;
* preparation for secondary school education; and
* the eventual entry into a workforce.

The universalization of primary school education is linked to technocratic requirements for a literate and numerate workforce. In the PRC primary school, education also serves the purpose of socialist education (Dekker & Van Schalkwyk 1995:297).

The meritocracy and talent-orientation begun in pre-school is perpetuated in primary school education, as admission to lower middle school is based on the learners' scores in the highly selective entrance examinations.

3.3.3 *Secondary school education: diversification and specialization*

In the PRC secondary schools are called middle schools. Stevenson, Chen and Lee (1994:106) maintain that limited opportunities for advanced education produce intense competition among Chinese learners. Government policy to improve the quality of primary and secondary education without extending higher education will increase this competitiveness.

Depending on the learners' abilities and aptitudes, they can choose either academic or vocational middle schools for attendance. This streaming of learners according to their future careers as based on aptitudes and abilities is part of the modernization process in a technocratic age to enable the

country to produce a workforce it desires and requires for industrial and technological progress.

3.3.3.1 Academic Middle Schools: preparation for specialization

Academic middle schools prepare learners for higher education and eventual entry into the job-market as specialists. It is in the light of talent-orientation that Key-schools were established. Unger (1982:219) notes that as an embodiment of academic education, Key schools cater for the needs of bright and talented learners who need special treatment (see 4:2.3.1). Teachers in Key schools follow an examination-orientated syllabus. To prepare learners for examinations, measures like after-school tutoring and school-sponsored weekend cramming sessions are undertaken. Education in Key schools is more rigorous and it gives learners the best shot at university entrance (Bartels & Eppley 1995:35).

Technocratic values of quality, efficiency, talent-orientation and meritocracy, specialization and professionalism have necessitated the establishment of Key schools in the PRC to ensure the success of the modernization process. Parallel to academic orientated Key schools in the PRC are vocational middle schools which emphasize the acquisition of skills required in industries.

3.3.3.2 Vocational Middle Schools: preparation for trades and vocations

Vocational middle schools are set up to cater for the educational needs of learners who will enter a workforce on completion of middle school education (You 1991:4). While vocational schools equip future workers with skills appropriate for entry into a technocratic age labour market, they also serve the political goal of maintaining a balance and equality between mental and manual labour (see 4:2.2.1). In urban areas vocational middle schools offer courses like publishing and restaurant management, while in the rural areas courses which are offered include household and agricultural management (Bartles & Eppley 1995:35). Although similarities abound between vocational middle schools in the PRC and the community colleges in the USA, the two countries differ considerably in political goals and systems.

Bringing up workers with a socialist consciousness and combining education with productive labour in vocational middle schools, have led to the establishment of school-run factories. According to Hsueh (1975:489) school-run factories, like the one run by the Number 31 middle school in Beijing, include an automobile electric-circuit system shop, a machine shop and a magnetic amplifier shop.

Consequently, it can be deduced that vocational schools are not intended to produce people for higher education since emphasis is put on the acquisition of work ethics, skills and practical knowledge which are important for industrial production in a technocratic age. Curricula of vocational middle schools are not geared to the study material tested in national entrance examinations since their aim is to train a competent workforce (Lo 1984:50).

There are two possibilities noted by Chen (1981:181) for Chinese learners namely:

* preparing themselves for examinations and, if they pass, to study hard in universities that admit them; and
* if they fail, be ready to 'subordinate' themselves to the interests of the State and go to work where they are needed and at the same time widen their scientific and cultural knowledge through spare-time studies.

Performing well in national entrance examinations guarantees entry into higher education. It can be deduced that examinations are used to sift learners for higher education.

3.3.4 *Higher education: the acquisition of specialized training.*

Technocracy requires the maintenance of high academic standards of scholarship determined by entrance examinations. The task of higher education is to prepare specialists in various fields to carry out socialist reconstruction and to develop science, technology and culture (Mingyuan 1984:144). Higher education is linked to strict entrance examinations which are used for selecting learners to specialized training in higher education. Higher education in the PRC is divided into two subject areas: humanities and science and technology. Central to admission for both fields of specialization are adequate scores in Chinese, science, technology and mathematics.

Dekker and Van Schalkwyk (1990:223) state that higher education is in the form of a pyramid with Key universities and colleges at the top [conducting teaching and research]; the second level is occupied by universities and colleges which are primarily concerned with teaching; below them are two or three years colleges and at the base are vocational universities, part-time colleges, employers' and workers' colleges. These institutions attract learners of varying abilities, thereby attempting to provide a complete service to the modernization process. To ensure the success of higher education in the PRC, medical universities are controlled by the Ministry of Health and other institutions are under the administration of provincial education departments. Institutions of higher

learning pay attention to the training of middle school teachers to raise their professional level (Education and Science 1983:111).

Teacher training falls within the higher education band. For a country in a technocratic age, the training that the teachers undergo is presumed to determine their competency and professional output.

3.3.5 *Teacher training: production of a professional teacher corps.*

Dekker and Van Schalkwyk (1990:225) indicate that teacher training is undertaken on three levels as based on the importance of school phase. Institutions of higher education offer a four-year qualification for teaching in middle school, normal teacher training schools offer a three-year qualification for elementary [primary] school teachers and kindergarten training schools enrol lower middle school graduates and train them to be kindergarten teachers for one to two years.

The aim of teacher education is to prepare and educate people who are 'Red' and Expert. The need to raise the political and social status of teachers is intended to increase their efficiency and productivity. This is caused by the fact that the professional competence of teachers is seen as a vehicle to the modernization of China. Teachers are spreaders of scientific and cultural knowledge (Faquan 1980:67) and consequently, quality training should be given to teachers.

To increase the levels of teachers' efficiency as the crucial component for the success of the *Four Modernizations Movement* requires improvement in academic study, selective education and teaching skills. In-service teacher education is undertaken to upgrade and train under-qualified teachers. Some provinces have a contingent of full-time and part-time in-service training personnel (Dekker & Van Schalkwyk 1990:225). Technocratic requirements that teachers be skilled and be masters of learning content raise the need for in-service training in China due to the expansion of primary education. The most common ways of in-service training in the PRC are carried out through training courses in various subjects, discussion groups for lesson preparation, seminars, correspondence courses and TV broadcast courses (Hayhoe 1984:167).

Teacher training has to be of high quality since teachers serve the general objectives of the advancement of science and technology which are crucial for the modernization of China. To ensure that the education system advances the modernization of China, the education of the gifted and talented learners is given special attention.

3.4 Programmes provided for the education of the talented and gifted: meritocracy and talent-orientation

The talent-orientation of the Chinese education system has necessitated that gifted and talented learners be given additional support to enhance their performance and development. According to Stevenson *et al* (1994:107) the needs of the gifted and talented learners are catered for through in-school programmes [which run parallel to the regular school programmes] and out-of-school programmes [which are provided in either special schools or during evenings and weekends at the learners' regular schools].

3.4.1 *In-school programmes for the gifted and talented*

Programmes which are intended to help gifted and talented learners are identified by Stevenson *et al* (1994:109-111) as:

* Youth classes at universities whereby learners are taught a special curriculum with the aim of integrating high school and college material;
* Gifted programmes in public schools were begun with five-and six-year olds in 1984 and were extended to middle schools in 1985; and
* Programmes for the gifted in mathematics and science in which high schools affiliated with universities and established classes for gifted learners in mathematics, physics and chemistry in 1988.

All the above-listed programmes are intended to increase the chances of the learners to perform well in national entrance examinations and to provide the country with people who can be prepared for the different fields of specialization in a technocratic age (Dekker & Van Schalkwyk 1995:281). A particular emphasis on mathematics, physics and chemistry by in-school programmes for the gifted and talented learners is intended for the success of the *Four Modernizations Movement*. Parallel to in-school programmes are out-of-school programmes for the education of the gifted and talented learners.

3.4.2 *Out-of-school programmes for the gifted and talented*

Out-of-school programmes are enrichment programmes offered by independent parties to learners with the aim of supplementing and complementing the work of the school. Stevenson *et al* (1994:170-109) describe these programmes as:

* *Olympic schools* which originated from the *International Mathematics Olympiad*; and hence these schools concentrate on the teaching of mathematics [to illustrate the value of these schools, of the six Chinese participants in the 1990 Olympiad contest, five won gold medals and one a silver medal];
* special schools for learners talented in athletics which in 1990 numbered 3 685; [more than 80% of Chinese medals in several *Asian Games* were won by graduates of these schools]; and
* youth palaces which offer short-term courses in dancing, theatre and photography.

The achievements of China in mathematics and athletics indicate the success of programmes which support gifted learner education and development. These programmes provide intensive coaching programmes which encourage competitiveness characteristic of a technocratic age (Cleverley 1985:111). Central to the provision of education is the overriding aim of socialist modernization with science and technology being prime. Funding of education should thus be commensurate with the State's commitment to modernization.

3.5 **Financing: reproduction of inequality and maintenance of the *status quo*.**

According to the report of the World Bank (1985:45) public and private spending on education continues to be small in China. In relative terms and when compared with funding levels in other countries, China is estimated to spend slightly more that 3% of its GNP on education. State funding of education in the PRC favours those in urban areas at the expense of rural areas. The amount of money spent on education has implications for the provision of education since:

* parents will be required to pay for the education of their learners [even if education is said to be free and compulsory]; and
* teachers' salaries will be low.

Swanson and Zhian (1987:375) maintain that the national government has made no financial contribution to primary and secondary education since 1980 and funds were provided by local

government [local communities in rural areas] in the form of school fees. The payment of school funds depends on the economic status of the local community and therefore the decentralization of funding will depend on the community's ability to pay. By introducing market-orientated reforms in education, China has even introduced the system of 'fee-paying' learners in higher education (Qiping & White 1994:217; Hawkins 1983:161).

Funding policies of the government in the PRC creates imbalances and inequalities as learners from wealthy urban areas have better educational opportunities to advance than their disadvantaged peers from the rural areas. Consequently, drop-out rates in rural areas are higher than in urban areas.

3.6 Summary

The role of intellectuals, scientists and experts is important for the process of modernization in the PRC and consequently the education system is meritocratic and talent-orientated. The technocratic ethos of quality, efficiency and productivity have necessitated the re-introduction of national entrance examinations in the Chinese education system and therefore the Chinese authorities use Key institutions to produce personnel required to ensure the success of the modernization process and vocational middle schools to produce a disciplined and skilled workforce.

Learners who perform well in examinations are prepared for specialized jobs, while learners who do not perform so well are prepared for trades in industries, agriculture and factories. Such stratification, based on the selection function of the educational institutions, corresponds to the practice that social rank in the PRC was determined by academic qualifications rather than wealth.

The character of education in the PRC, as outlined above, is influenced by the demands to modernize and to meet the requirements of a technocratic age. In the section that follows, the effect of education in the PRC in a technocratic age will be examined.

4 THE EFFECTS OF EDUCATION IN THE PRC IN A TECHNOCRATIC AGE

Hayhoe (1984:26) states that two paramount issues that have faced Chinese education in this century are the need for a new Chinese ideology which could support modern educational institutions, and the difficulty of adapting attractive features of Western educational patterns to the Chinese context. The establishment of the PRC in 1949 brought hope to those who wanted a socialist order based on egalitarianism and democracy, but brought fear and at times death to those who saw academic excellence and intellectualism as survival measures [in particular during the *Great Proletarian Cultural Revolution*]. While in the pre-1949 era dominance was dictated by the feudal system, in the post-1949 era dominance was dictated by political background and affiliation. The new education system that was founded in the post-1976 era also became talent-orientated [as technocracy requires] and thus the new order became dominated by the intellectual elite (Dekker & Van Schalkwyk 1995:309).

The era of the *Four Modernizations Movement* stressed quality education, high-achievement classes and entrance examinations, thereby raising pressure for success in learners (Hawkins 1983:89; Chen 1981:161). In addition, the teaching of technologically appropriate education which could ensure the modernization process in a technocratic age led to the globalization of education in the PRC (Chen 1981:185-186). It is worth mentioning that inequalities prevail in Chinese education as shown by ontological inequality, inequality of circumstances and inequality based on gender. These inequalities lead to an increase in drop-out rates. Concern with production in China as linked to technocratic values contributes to prejudice towards female employment. To indicate the sexist nature of Chinese society and education, Rai (1994:122) indicates that employers are concerned by the fact that females become pregnant and take maternity leave and that it could be expected that they would demand day-care centres at their workplaces. Under such circumstances, females would be denied equal educational opportunities.

The provision of technologically appropriate education is a strategy the PRC uses to adapt to a technocratic age.

4.1 Technologically appropriate education: adaptation to a technocratic age

The success of the *Four Modernizations Movement* is based on the move to promote science and technology education. Price (1979:305) records that in March 1978 the *National Science Conference* was held and Deng Xiaoping, then Vice-chairman of the Communist Party, spoke of scientists and technicians as the brain workers who serve socialism as part of a working class. The education system was increasingly pressured to ensure the teaching and mastery of science and technology. The renewed emphasis upon scientific and technological investigation was due in part to the perception that science is politically value free and neutral, as well as logically ordered (Hawkins 1983:91).

The drive towards science and technology education necessitated the selection and training of those with outstanding talent. According to Chen (1981:162) the modernization of science and technology has as a direct consequence the expansion of the ranks of professional scientists and technicians whose task it is to guide the mass forces, just as the field armies and the regional forces lead the militia. The national drive for science and technology led to the globalization of the Chinese education system, since science and technology cannot be domesticated.

4.2 Globalization of Chinese education: world citizenship as the aim

The PRC has entered a phase in which education can no longer be treated as an isolated matter. According to Burris (1991:275) medical universities in China started doing well and were successful after they began using foreign staff. The exchange of knowledge between the PRC and other nations has also seen an increasing number of Chinese learners going abroad to further their studies. Educational and cultural exchange between China and the United States was given an impetus by the visit to China by an American science and technology delegation led by Dr. Frank Press, science and technology adviser to President Carter and Director of the *Office of Science and Technology Policy*, in July 1978 (Chen 1981:186).

Because of their interest in science and technology, the Chinese adopted a global view towards education. Education and Science (1983:164) records that China has signed agreements on scientific and technological co-operation and agreements on economic and industrial co-operation with countries in the Far East, Africa, Central Europe and South America. To enhance its technological and scientific advancement, the PRC co-operates with scientific and technological organizations of

the *United Nations* [UN] like the *United Nations Scientific and Educational Organization* [UNESCO], the *World Health Organization* [WHO] and the *International Labour Organization* [ILO]. In addition, the *Chinese Academy of Sciences* sent delegates and observation groups to foreign countries and participants to international conferences (Education and Science 1983:165).

The recent worldwide explosion in the use of telecommunications in the academic field has resulted in a concerted effort to acquire powerful microcomputers (Garland & Yang 1994:50). With the introduction of computers, Chinese education has been placed in the global arena. In addition, the perspectives of teachers and school administrators regarding the approach to instruction has also been altered due to the introduction and increased use of computers in education.

To compete with other countries in the global arena, the PRC needs people with skills and specialized knowledge. Consequently, school examinations are used as a sieve to identify talent and ability which is to be developed.

4.3 Selectivity of the national entrance examinations: anxiety and stress creation?

The new leadership after the fall of the *Gang of Four* (see 4:4.1.2) demanded an education system which emphasized expertise with the aim of rendering the *Four Modernizations Movement* successful. This led to the re-introduction of the national entrance examinations after they were abolished in 1966 when the GPCR broke out (see 4:2.4.1). According to Chen (1981:209) the pressure to pass examinations leads to unhealthy cramming and neglect of material that would not be included in examinations. The education system produces an elite of good memorisers and neglects the learners who do not do well in examinations. To indicate the effect of the selective function of entrance examinations, Chen (1981:209) states that cheating is rife and those who have the right connections or family influence benefit from the system.

The prestige which is associated with doing very well in national entrance examinations is always accompanied by stress, frustration and tension which are caused by fear of failure. In the same light, Chen (1981:211) indicates that the overemphasis of national entrance examinations has led to the over-development of the senior middle schools and the consequent neglect of vocational and technical education in the PRC. In addition, the meritocratic tendencies of the education system create and increase the level of anxiety and stress in learners. The emphasis on talent leads to suicide threats, suicide, vandalism and violence that make the presence of security forces necessary

on school premises (Hawkins 1983:89).

It can be deduced that the Chinese education system encourages inequality in education since examinations are used to sort out learners for their future occupations.

4.4 Inequality of educational opportunity

The fact that in China it is generally accepted that people are not born equal creates inequalities in the provision of education. This view, as shared by Mao Zedong, accounts for the maintenance of a hierarchical order in education since it is generally accepted that different destinies await different people (Niu 1992:65).

4.4.1 *Ontological inequality*

Educational inequality bears some resemblance to the Chinese feudal society. Learners from 'Red' families were given access to quality education (see 4:2.2.2). According to Niu (1992:73) family background was emphasized in higher education because the CCP knew that education would help individuals to attain a higher social position in Chinese society. This coincides with the tradition in Chinese feudal society, whereby social rank in China was determined more by qualification for office than wealth (Cleverly 1985:16). Qualifications were bestowed by education. This to the Chinese leadership meant that learners from the 'Red' families were to be given the best opportunities to receive education so as to occupy the positions which were occupied by their parents.

Ontological inequality was in this way intended to educate and train 'successors' to the revolutionary cause. The era of the *Four Modernizations Movement* led to the change of educational policy from one of cultivating 'successors' for the proletarian cause, to one of producing qualified personnel [specialists and experts] who could revitalise agriculture, industry, national defence and, of importance, science and technology. As a result, inequality of circumstances crept into Chinese education.

4.4.2 *Inequality of circumstances*

The fall of the *Gang of Four* (see 4:2.4.2) in 1976 ushered in a period during which concern with the improvement of education in the PRC became dominant. In line with technocratic requirements attempts were made to: raise the cultural and educational level of the citizens, provide a competent and sufficiently qualified workforce for industrial development and develop the economy that would be competitive in international markets. The key to modernization was the discovery, selection and training of those who had outstanding talents. Consequently, Key institutions were established to cater for the needs of gifted and talented learners and national examinations were used to effect strict selection procedures to choose those who entered higher education (Dekker & Van Schalkwyk 1995:299).

Disparities prevail in the funding of schools for different kinds of learners, with Key institutions being better financed than schools in rural areas (see 4:3.5). It is noted that in the PRC rural education is placed lowest on their priority list, even though it is obvious that the rural school system did not provide adequate training in how to read and write (Unger 1982:209). Teachers in rural areas are paid lower salaries, they live and work in poor conditions and even if they are unqualified they have fewer opportunities for in-service training.

Access to quality education in modern China depends on the intellectual attributes of a person, as well as the region in which one lives. Linked to exclusion on the basis of locality, educational provision is also related to gender inequality.

4.4.3 *Gender inequality*

Honig and Hershatter (1989:243) maintain that although the majority of Chinese women are active in a workforce, they still occupy positions on the lower rungs of the ladder and are clustered in jobs characteristically regarded as 'women's work', from textile and clerical workers to primary school teachers. This state of affairs is caused by the fact that although women have the constitutional guarantee in political, economic, cultural, social and domestic spheres, in reality women are not afforded equal educational opportunities. Feudal practices and continued patriarchy are some of the contributory factors cited for gender inequality in Chinese education. Lin (1993:34) records that in 1987 the ratio of enrolment in Chongjian indicated that while the majority of boys attended school, the majority of girls did not attend school.

Two issues which were hotly debated in the Chinese press in 1988 are cited by Rai (1994:121) as the increasing drop-out rates among school girls, especially in rural areas, and the difficulty faced by women college graduates in finding employment under the partially opened job market. The scarcity of resources in the rural areas and the imbalance in State funding of rural education made parents sacrifise the education of girls, more so as promotional opportunities in the workplace were limited even if women had the required qualifications. The other reason that Rai (1994:123) advances for the neglect of formal education for females is that the daughter is regarded as a 'temporary' member of the family, as a guest who will depart to another village upon marriage.

Concern with profits, cultural and social prejudices make it difficult for females to compete fairly with their male counterparts in educational and employment fields. Hooper (1991:357) is of the opinion that some secondary institutions even set quotas on the proportion of females to get enrolled; a case in point is the female quota for admission to Shanghai's technical schools which in 1984 was 28,5% of the total enrolment. Inequality in the provision of educational opportunities is but one of the reasons for the high drop-out rates in Chinese schools. The fact that Chinese education is highly meritocratic accounts for the increasing drop-out rates in the Chinese education system.

4.5 **Drop-out rates in Chinese education**

Some of the factors contributing to drop-out rates which are noted by Lin (1993:34) are long distances from schools and lack of boarding facilities for learners in rural areas. Other factors that increase the drop-out rates are the social practices of denying females equal educational opportunities, imbalances in the funding of urban and rural education [where learners are not motivated by their poor learning conditions] and the numerous tough examinations used for promotion which act as a demotivating factor.

Hawkins (1983:89) states that the extension of years of schooling can perpetuate drop-out tendencies, especially as the system is designed to encourage a sense of internalized failure. As a result, many learners drop-out of the system, rather than waiting to fail in a system which uses stringent examinations for entrance to higher education and better jobs.

4.6 Summary

The post-Mao period has seen the re-introduction of national entrance examinations. The new education system in the PRC is not a direct replica of the pre-Cultural Revolution model in the sense that the new system is talent-orientated and elitist in character, with the aim of advancing the *Four Modernizations Movement*. However, the development of talent was accomplished through the neglect of learners' emotional domains. This may be the major cause of suicide tendencies in the performance-orientated Chinese education system.

While the leadership of the CCP claims to be working towards universal primary education, inequality of circumstances as shown by disparities in education budgets between urban and rural schools indicates that equality of educational opportunity has never been the aim of the education system in China. Furthermore, the influences of feudalism and patriarchy create a situation where the education of females is not given the same value as the education of males.

5 CONCLUSION

Since 1949 there have been attempts in the PRC to bring about changes which would lead to the modernization of the country in relation to technological, scientific and industrial developments in the world. The continuous changes in the education system, as brought about by the shift in the CCP leadership's views on modernization, indicate that there was a need for the most effective model of education to address the needs of the formerly feudal China, which was in transition since 1949. While Mao Zedong thought that productive labour could be successfully integrated into education, his opponents and moderate intellectuals thought that modernization could be achieved only through academic excellence. The *Four Modernizations Movement* thus ushered in a period in which meritocracy, in the form of talent orientation and high academic standards, became of prime importance in education.

Having looked at the development, character and effects of education in the PRC in a technocratic age, a study of the education system in the RSA can be undertaken. In the next chapter the reaction of the South African education system to technocracy will be discussed.

CHAPTER 5

THE DEVELOPMENT, CHARACTER AND EFFECTS OF EDUCATION IN A TECHNOCRATIC AGE IN THE REPUBLIC OF SOUTH AFRICA

There remains before us the building of a new land, a home for people who are Black, White, Brown, from the ruins of the old narrow groups...

(Luthuli, A. Let my people go 1962:231)

1 INTRODUCTION

The industrial development which was experienced after World War II, the period herein referred to as a technocratic age, resulted in the Republic of South Africa [RSA] entering the twentieth century as a growing industrial State (HSRC 1981a:19). This required that a workforce be developed in accordance with the modernization trend and its needs. However, Malherbe (1977:193) notes that White fear of competition in skilled trades was definitely a retarding factor in the provision made for the vocational and technical education of Blacks.

According to the HSRC (1981a:19) so long as the Black workers were migrants offering their labour to industry and commerce for prescribed periods before returning to what was their residential base, the social order was tenable on the basis of the forces of history. The education system promoted, maintained and consolidated the social, economic and political order where race decided whether one should be prepared and educated for skilled or unskilled labour. As a result, education in the RSA acted as a means for the reproduction of capitalist class relationships (Christie & Collins 1982:61). The education system reinforced the policy of apartheid and advanced the notion of job reservation, whereby certain jobs were reserved for people of a particular race.

A technocratic society needs a suitably trained or easily trainable workforce. According to Buckland (1984:375) the *De Lange Commission of enquiry* of 1981 (see 5:2.4) was instituted to ensure that schooling was transformed from its original basis into a powerful force effecting and supporting the trend of modernization. Meritocracy and talent-orientation (see 5:2.4.2) and scientism (see 5:2), which are technocratic values, were highlighted in the *De Lange Commission*. The need for a technically competent labour force that could revive the fortunes of South African industrial capitalism motivated changes in the South African education system (Nasson 1990:49).

The provision of education in the RSA will be discussed under development, character and effects of technocracy in education.

2 THE DEVELOPMENT OF EDUCATION IN THE RSA IN A TECHNOCRATIC AGE

The HSRC (1981a:23) records that separate schooling led to fifteen subsystems of education, each providing education under different State Departments so that control was effected by different means and without professional co-ordination. This myriad of educational subsystems provided education of varying standards which, in the long run, affected economic development in the RSA.

Lack of co-ordination and the poor performance of the education system contributed to the failure of the education system to address a workforce needs of the country. As a result, employers blamed the education system for the stagnant productivity and falling profitability in industry and commerce (Nasson 1990:48). In addition, the shortage of skilled workers in the face of advancing technology was blamed on the education system. Behind the *De Lange Commission's* reform initiative was a need to tackle the skilled labour crisis (see 5:2.4.1).

The needs of industry and commerce for complex skills in the labour market of a technocratic age contributed to the institution of the *De Lange Commission* of enquiry (see 5:2.4). The *De Lange Commission* reported in 1981 that modern science, technology and management skills, which are the most powerful resources that human beings use to change their environment in a technocratic age, were not yet the cultural assets of significant sectors of the various population groups (HSRC 1981b:31). It became imperative that educational programmes be streamlined in order to orient prospective workers in complexities of the occupational world in a technocratic age.

The democratic order which prevailed after the 1994 elections in the RSA led to the creation of a single Ministry of Education which promotes the integration of education and training. An integrated approach to education and training (see 5:3.3) is viewed as a prerequisite for human resource development which should be accessible and efficient (African National Congress [ANC] 1991:35-36; HSRC 1995:5-6). The new education dispensation aims at producing a flexible workforce as demanded by the principles of technocracy. According to Rautenbach (1992:317) the education system should redress the imbalances of the past by integrating theory and practice to equip learners for successful careers.

2.1 Apartheid and education: the preservation of Afrikaner identity

According to Behr (1988:98) the exponents of *Christian National Education* [CNE] in the pre-democratic era period [the period between 1948 and 1994] believed that God ordained that there should be an Afrikaner nation, with a land and language of its own and a religion based on Orthodox Protestant-Calvinist principles. This view was the motivating factor which provided the basis for education along racial lines to protect and preserve Afrikaner identity and to cultivate the love of the nation [*volk*] and Christianity. CNE envisaged that *Bantu Education* be developed with the aim of preparing Blacks for a separate Black economy in the homelands (Malherbe 1977:196).

The system of segregated schooling that prevailed in the RSA requires that one reviews the provision of education according to the then existing education departments for Blacks, Indians, Coloureds and Whites.

2.1.1 *Bantu Education Act of 1953: education for Blacks*

In 1951 the *Eiselen Commission* submitted its report, *UG. 53 of 1951*, containing recommendations concerning education for Blacks (Van Niekerk 1991:77). The *Eiselen Commission*, the precursor of the *Bantu Education Act*, was necessitated by the drive for certificates by Blacks, which suggests meritocracy and the extreme aversion Blacks had to any system of education specifically designed for them. According to Rose and Tunmer (1975:246) the acquisition of certificates represented a key to a better economic world for Blacks. For example, in the Cape the possession of a standard six certificate exempted Black males from the *pass laws* and also gave them rights under the *liquor laws*.

The acceptance of the recommendations of the *Eiselen Commission* by the Union Government led to the passing of the *Bantu Education Act* in 1953. In terms of the *Bantu Education Act,* the responsibility for Black education was transferred from provinces and missionaries to the central government on 1 January 1954 (van Niekerk 1991:77). The control of Black education by the *Minister of Native Affairs* [then Dr H.F. Verwoerd] was designed to achieve a stricter and a more totalitarian control over the Black teacher and learners under the guise of efficiency and productivity of Black education.

The setting up of the *De Lange Commission* and its subsequent report, was an acknowledgement on the part of the government and organized business that Bantu Education was an economic failure. This is suggested by the fact that even if about 65% of RSA's potential workers were Blacks, in 1981 approximately 40% of Blacks had received no formal education (HSRC 1981b:50). Not only was education for Blacks in a deplorable state, Coloured education also had its problems.

2.1.2 *Coloured People's Education Act of 1963*

Centralization of education for Coloureds was achieved in 1963 through the passing of the *Coloured People's Education Act* of 1963 (Van Niekerk 1991:76). As a result, educational control was transferred to the Department of Coloured Affairs with effect from 1 January 1964. The rationale for the extension of government control over Coloured education was centralization, with a view to ensuring that policies of the government were adhered to.

The *Constitution of the Republic of South Africa, Act 110* of 1983 paved the way for the participation of Coloureds and Indians in the tri-cameral parliament (Van Niekerk 1991:84). This led to the recognition of Coloured education as an 'Own Affairs' under the *Department of Education and Culture, House of Representatives*. Linked to the 'Own Affairs' are factors like cultural identity and language differences which indicate the influence of the separatist ideology of apartheid.

2.1.3 *The Indian Education Act of 1965*

Although compulsory education had been instituted for Whites and Indians, it had not been fully implemented for Coloureds and Blacks (HSRC 1981b:22). However, Indian education was also taken from provincial control in 1965. According to Van Niekerk (1991:77) centralization of Indian education was achieved through the passing of the *Indian Education Act* [Act 61] of 1965.

The Constitution of 1983 made Indian education to be an 'Own Affairs' under the *Department of Education and Culture, House of Delegates*. It can be deduced that the education for Blacks, Coloureds and Indians was designed to control the direction of thought, to delimit boundaries of knowledge and to curtail contact across language barriers.

Bringing education under central control prompted the government to pass the *National Education Policy Act* in 1967, with the aim of co-ordinating the education for Whites. In line with the policies of CNE, the separation of education according to racial groups was completed.

2.1.4 *The National Education Policy Act [NEPA] of 1967*

The centralization of White education followed the *National Education Policy Act* of 1967 which empowered the Minister of Education, Art and Science to prescribe the policy for all educational matters (Venter & Verster 1996:119). In addition, the NEPA provided for the co-ordination of White provincial education departments by the Minister of Education. The NEPA embraced such principles as the requirements of compulsory education in White schools and uniformity in White education, in accordance with the needs of the country and language policies (Behr 1988:86).

The alignment of education to the needs and aspirations of the different racial groups, as was intended by education legislation, was based on functionalism, efficiency and productivity under the four systems created along racial lines.

2.2 **Provision of education: a projection towards workforce development**

According to De Kock (1971:43) apartheid, as practised by the National Party [NP], was to ensure the maintenance, protection and consolidation of the White race as bearers of Christian civilization in South Africa. This philosophy, which created separate education systems, led to inequalities in the provision of education, thereby producing unequal educational outcomes (see 5:2.3.3).

The education provided along racial lines developed the labour force in an unbalanced way. In 1979, for example, 99% of engineers, 98% of natural scientists, 91% of technicians and 72% of artisans and apprentices in the RSA were White (HSRC 1981b:24). The aversion to vocational and technical education by learners is noted by Cooper (1994:61), who contends that recent research has shown that in 1989 only 3% of learners in South African universities were majoring in engineering, compared to 18% of learners majoring in education. The provision of education did not ensure sustainable production of a workforce required for economic growth and development in a technocratic age. It would appear that the South African dilemma is the co-existence of rising unemployment and a shortage of skilled people at all levels (Rautenbach 1992:359). This line of thought may become lucid if one understands the structure of education in the RSA.

2.3 The structure of education: the four-phase system

According to Behr (1988:107) the system of differentiated education, as in the four-phase system, aims at providing balanced education that caters for the individual learner's needs, talents and abilities. Serving the needs of the broader community, as a technocratic age requires, remains the primary aim of education provision in the RSA.

2.3.1 *Pre-school education: preparation for future roles*

The rapid economic advances in South Africa during the 1950s and 1960s gave rise to the large scale employment of women in many sectors of commerce and industry and created the need for pre-primary [pre-school] education (Behr 1988:117). The government's policy of apartheid made it imperative that segregated and separate provisions be made for pre-school education of different racial group.

Vos and Brits (1990:85) state that according to the *Children's Act* of 1960, all kindergartens and pre-schools were to be registered. The establishment of creches and kindergartens in Black communities remained the responsibility of parents until the *Department of Education and Training Act* of 1979 provided for the establishment of pre-primary schools by communities as community schools. Since 1981, the department has insisted that the first 12 to 15 weeks of Sub A [Grade 1] be devoted to school readiness programmes in primary schools (Vos & Brits 1990:85). That was done in a bid to cover the preparatory work normally done during the pre-school period by kindergarten schools.

The *Indian Education Act* of 1965 and the *Indian Education Amendment Act* of 1979 provided for pre-primary education as part of the regular education system (Behr 1988:119). Grants and subsidies were provided for pre-school education in Indian communities, which enabled them to introduce programmes for pre-school education. It can be deduced that when learners from the different racial groups began primary school, they were not school-ready to the same degree. In the short term these differences were felt in primary school education, while in the long term they impacted on vocational and technical education.

2.3.2 *Primary school education: the acquisition of basic literacy and numeracy*

In White and Indian education, primary school education stretched from Sub A [Grade 1] to Standard 5 [Grade 7], while in Black and Coloured education it covered the programme from Sub A to Standard 4 [Grade 6] (Behr 1988:107). Primary school education was geared specifically to develop basic skills in literacy and numeracy. According to Vos and Brits (1990:85-96) the shortage of buildings in Black and Coloured education led to double sessions [the platoon system] which was not the case in White and Indian education. It appears that primary school education for Blacks and Coloureds was at a disadvantage when compared to that of the Whites and Indians.

Differentiation in higher primary school classes led to the grouping of learners in homogeneous classes according to their achievement. According to Vos and Brits (1990:86) the programme of differentiation was intended to allow each one to progress at one's own pace and according to one's own aptitudes and capabilities. It can be concluded that differentiation coincided with meritocracy and only those who were successful in primary schools went on to secondary school education.

2.3.3 *Secondary school education: differentiated education*

The implementation of the system of differentiated education by all the education departments in the RSA in 1973 resulted in the development of differentiated secondary schools (Vos & Brits 1990:86). Differentiated education is necessitated by individual differences among learners as well as the differentiated needs of industry in a technocratic age. According to Behr (1988:108) differentiation culminated in the offering of eight different fields of study [learning areas] in senior secondary schools, which are agriculture, arts, economic sciences, general, home economics, humanities, natural sciences and technical training. Although an impression may be created that ample vocational education opportunities exist, many learners follow academic curricula.

The racially divided education system created a situation where racial background determined the choice of subjects. Table 1, as adapted from the University of the Orange Free State [UOFS] (1993:12), indicates the ten most popular subjects taken by Black, Coloured, White and Asian [Indian] learners who were in Grade 12 in 1992/93.

TABLE 1: Popular subjects taken by Grade 12 learners in 1992/93

Subject	Blacks	Whites	Coloureds	Indians
Biology	84.32%	54.43%	83.74%	73.45%
Physical Science	15.83%	48.26%	22.93%	40.48%
Mathematics	27.34%	71.15%	42.22%	72.21%
Accounting	10.56%	32.01%	43.15%	53.39%
Business Economics	15.70%	29.92%	50.20%	13.83%
History	41.06%	23.57%	49.63%	15.48%
Geography	45.70%	34.21%	42.86%	43.53%

The choice of subjects determines one's area of specialization and vocational training. According to Behr (1988:141) as early as 1948 the *De Villiers Commission* which was instituted to investigate technical and vocational education in South Africa, had attributed lack of industrial training of Blacks to the limited space in which the trained [Native] worker could find an outlet for the practical application of one's skills. Black parents and communities in general attached great value to the social employment benefits of a good, academic secondary education and have yet to accept that a broad technical education can equally provide secondary schooling of value and relevance (Hartshorne 1992:61).

Accompanying the choice of subjects was the unequal distribution of resources through funding (see 5:4.4), classrooms, provisions of teachers, facilities and teacher qualifications (Sebidi 1989:3). These inequalities would produce unequal educational returns and outcomes in the form of matric results as indicated in table 2 adapted from UOFS (1993:10).

Table 2: Matric results for all population groups indicating pass rates between 1988 and 1993

Year	Blacks	Whites	Coloureds	Indians
1988	56.75%	96.06%	66.04%	95.12%
1989	41.84%	95.97%	72.68%	93.59%
1990	36.73%	95.82%	82.04%	95.00%
1991	40.85%	96.03%	82.82%	96.03%
1992	43.84%	97.27%	86.46%	94.74%
1993	39.04%	97.29%	85.78%	91.34%

2.3.4 *Tertiary education*

Tertiary education, just like education in pre-primary, primary and secondary schools, was segregated. Legislation provided for the creation of separate educational institutions. Within the tertiary education sector were technikons, technical colleges, teacher training colleges and universities.

2.3.4.1 Technikons

According to Behr (1988:142) the purpose of *Act 40* of 1967 [now called the *Technikons National Education Act]* was to create a new type of institution for tertiary education intermediate between a technical college and a university. In line with the policies of apartheid, these colleges for advanced technical education [CATE], which later became known as technikons, were established along racial lines.

Among other functions technikons were to:

* provide intermediate and high-level occupational training with a strong practical emphasis;
* provide services to the community, commerce and industry by identifying talent and developing skills; and

* provide support for general learning, artistic activity and the advancement of culture (Viljoen [4]1987:1-3).

The rationale for the creation of technikons was the maximization of high-level labour force development. According to Vos and Brits (1990:92) the *Advanced Technical Education Amendment Act* of 1983 granted autonomy to technikons in line with that of universities.

2.3.4.2 Universities

The Extension of University Education Act of 1959 led to the establishment, maintenance, management and control of university colleges for Blacks, Coloureds and Indians (Behr 1988:193). To ensure that universities were run in line with the policies of apartheid, the *Fort Hare Transfer Act* of 1959 was promulgated, thereby transferring control of Fort Hare University from Rhodes University to the then Department of Bantu Education. According to Vos and Brits (1990:88) universities were ethnic-based: Fort Hare University was for Xhosa learners, the University of Zululand was for Zulu and Swazi learners, and Turfloop [University of the North] was for Sotho. There were ten residential universities for Whites, the University of Western Cape for Coloureds and the University of Durban-Westville for Indians.

Universities have the responsibility of furthering scientific education, bearing in mind the rapid advance of knowledge in general and in science and technology. It suffices to mention that university education remained the preserve of those who could afford the financial demands.

In June 1980, the Government requested the *Human Sciences Research Council* to undertake an intensive investigation into the provision of education in the RSA. Under the leadership of Professor J.P. de Lange, then Rector of Rand Afrikaans University [RAU], a commission of inquiry, the *De Lange Commission,* was instituted.

4 Dr G. van N. Viljoen was the Minister of Education and Development Aid and he was in charge of the DET.

2.4 The De Lange Commission Report of 1981 : adaptation in a technocratic age

The HSRC (1981a:19) indicates the terms of reference of the Commission as making recommendations regarding:

* guiding principles for a feasible education policy in the RSA in order to
(i) allow for the realization of the inhabitants' potential;
(ii) promote economic growth; and
(iii) improve the quality of life of all South Africans;
* the organization and control structure and financing of education;
* machinery for consultation and decision-making in education;
* an educational infrastructure to provide for a workforce needs of the RSA; and
* a programme for making available education of the same quality to all population groups.

The *De Lange Commission* addressed the demands of education in a technocratic age by proposing equal standards in education in the RSA irrespective of race, colour, creed or sex. It can be deduced that educational opportunity would be extended to all population groups in order to ensure the maximum development of human resources to the benefit of the nation. As a result, the expansion of and equality in the distribution of educational opportunities would guarantee that talent vital for the skills requirement of a complex industrial society of a technocratic age would be identified and developed (Nasson 1990:90).

2.4.1 *Technocratic values in education*

While commenting on the *De Lange Commission Report*, Chisholm (1984:389) states that the report proposed reforms designed to streamline and rationalize the existing education system and it also articulated a new meritocratic, non-racial, technicist educational ideology. The alignment of the Commission with technocratic values is suggested by such terms as, modernization, differentiated curriculum and harmonising of educational needs with those of society. The HSRC (1981b:15) notes that the provision of education should be directed in an educationally responsible manner [suggesting accountability] to meet the needs of the individual [implying meritocracy, vocationalism and talent-orientation], as well as the needs of society and economic development and should *inter alia* take into consideration a workforce needs of the country [indicating utilitarianism].

One other recommendation of the *De Lange Commission,* which relates to education in a technocratic age, is a demand for the training of teachers in the use of technology. Technological literacy is presumed to enhance the teachers' use of technology in the classroom, so as to make teaching effective and make learning a worthwhile activity. This view is fundamental to the human capital theory, which maintains the notion that both individuals [the teacher and the learner] will profit from the strong investment in educational resources and technology (Nasson 1990:90). The need for a competent, skilled and productive workforce requires a competent teacher body which can produce a competent learner body.

2.4.2 *Talent-orientation in the De Lange Commission Report*

The proposals of the *De Lange Commission* were intended for the development of the individual's talents and potential and thus also prompted the education policy-makers to emphasize talent utilization in education. The basis for mobility in a technocratic society is merit which is measured through examinations and tests. An intra-school emphasis on the degree of individual 'merit' or individual 'intelligence' would decide who in the working class was to be occupationally and socially mobile and who was not.

The practice of segregating South African education resulted in inequalities in education provision and relegated many learners to the level of the 'less intelligent' who qualified to be taken up in the unskilled labour force. However, Venter and Verster (1996:134) note that the *Bill on the National Policy for General Education Matters* of 1984 (Bill 85-84) acknowledged the importance of the improvement of education in the RSA and the necessity that uniform quality of education be assured for all population groups. This Bill aimed at levelling the education field which would lead to the maximization of talent in all population groups. It was presumed that changes which were effected would provide industry and the country with a skilled labour force as demanded by the principles of technocracy.

Hyslop (1990:79) maintains that a shift in policy [as suggested in the foregoing paragraph] did not mean that the basis of education was no longer racial or that what had occurred was a liberalization. Schools remained segregated and greater centralization in policy-making was enforced. Non-racial education became educational policy only after the 1994 elections, after which all inhabitants, regardless of race, would be recipients of the same system of education under a single National Education Department.

2.5 Education under the new dispensation : Outcomes-Based Education

The realignment of the education system in the RSA which followed the 1994 general election, is intended to keep the country abreast in technological and industrial developments in a technocratic age. Consequently, the new approach to the provision of education in the RSA has to fulfil the needs of the reconstruction and development programme [RDP] by redressing the imbalances of the past and ensuring an equitable and democratic society. Education and training will no longer be treated as separate entities. A further development in changing the face of education was the concession made by the *National Qualifications Framework* [NQF] that recognition would be given for all learning, including learning acquired on the job or through experience (Phillips 1994:18). Furthermore, the NQF would facilitate the grading of qualifications in relation to academic outcomes and requirements.

2.5.1 *A review of the events that led up to the new education dispensation in the Republic of South Africa.*

Proposals for the new education system were also made by interest groups, through documents like the government's *Educational Renewal Strategy* (ERS), the National Education Co-ordinating Committee's *National Education Policy Investigation* (NEPI) and African National Congress' (ANC's) *Ready to Govern.*

2.5.1.1. The Educational Renewal Strategy [November 1992]

The ERS proposed the creation of an education system that would:

* be democratic and non-racial;
* be a unitary system advocating national unity through the provision of equal educational opportunities and equal expenditure;
* redress past inequalities through joint State and community participation;
* extend learning opportunities; and
* provide effective education inclined towards vocationalism yet simultaneously providing for personal and social needs (Chetty, Chisholm, Mkwanazi, Motala & Tickly 1993:52-53; Department of Education 1992:1-21).

The reconstruction and development of the RSA calls for investment in people. If the economy of the country has to keep pace with advanced production processes of a technocratic age, then education and training will have to be integrated (Samuel 1990:116). This requires that there be a closer relationship between theoretical and practical learning, between education and training and the development of technology. The ANC discussion document on education policy (1991:11-16) provides an outline of an integrated education and training dichotomy, which would lead to the production of a flexible workforce. An integrated approach to education and training would be in the interest and needs of the country, since a technocratic age demands skills that would ensure the mobility and lateral transfer of workers in an ever-changing labour market.

2.5.1.2 Policy Guidelines for a democratic South Africa [May 1992]

The ANC, in *Policy Guidelines for a democratic South Africa* [entitled *Ready to Govern*], emphasized its stance and aims regarding the provision of education in the RSA, *inter alia*, through the redistribution of resources, improving the quality of education and providing a core curriculum that would lead to the satisfaction of the needs of the individual, as well as the socio-economic needs of society (ANC 1992:29-30). The raising of the productivity level and efficiency of the education system was suggested, with a view to making the individual and society adaptable to a technocratic age. It appears that the development of skills linked to the greater understanding and management of production, administration, planning and management should form the basis for the new education system.

The new education system is required to prepare people to play their part in a productive economy. The future of the country, the shape of its economy and the welfare of inhabitants depend on a viable, equitable, affordable and accessible education system. All these technocratic age principles, as listed above, influenced the drafting of the *White Paper on Education and Training* of 15 March 1995, which charted the course for education in the RSA.

2.5.2 *The White Paper on Education and Training [15 March 1995]*

The *White Paper on Reconstruction and Development* (1994:9-11) proposed education to meet basic needs, develop human resources [through education and training] and to build the economy. These proposals were adopted as values and principles of the *White Paper on Education and Training* of 15 March 1995. Education and training are regarded as strategies to ameliorate conditions of illiteracy and the chronic shortage of skilled personnel.

The White Paper on Education and Training (1995:21) maintains that values and principles of education and training include, among others, a call for a system that ensures open access to education and training opportunity of good quality, so that opportunities for lifelong learning are enhanced (see 5:4.2). Just as the *Constitution* guarantees equal access to basic education for all population groups, the *White Paper on Education and Training* advocates lifelong learning to all individuals living in the RSA, in relation to the labour force's needs for knowledge and skills to change jobs as is common in a technocratic age. The need for a mobile and flexible workforce is noted by Dimock (1968:177) who maintains that mobility assures fresh blood and viewpoints without opening up career services to partisan appointments.

The paradigm shift from an additive, product-orientated model of the curriculum to an outcomes-based curriculum model is suggested by the *White Paper on Education and Training* (1995:22) when stating that there should be an improvement of the quality of education and training. The academic-orientated education of the pre-1994 era led to the decline in the quality of education (see 5:2.1.1). According to Christie (1991:210) often people's life and work experience is more valuable and more relevant than formal qualifications. Subsequently, the improvement of the quality of education and training in the RSA should be related to the performance of tasks, both intellectually and manually, so that learners acquire skills and dispositions which are relevant to the demands of a technocratic age labour market.

The *White Paper on Education and Training* (1995:23) notes that improving the efficiency and productivity of the education system would require securing more funds for development, raising the quality of performance across the system and improving the life chances of learners. The fact that the Constitution of the country treats education as a basic human right demands that learners be afforded the opportunity to receive education of good quality (Maree 1995:48). This led to the setting up of the *Committee to Review the Organization, Governance and Funding of Schools*

[henceforth referred to as the *Hunter Commission*].

2.5.3 *The Hunter Commission Report [31 August 1995]*

The *Hunter Report* published on 31 August 1995 recognized that gross inequalities in educational attainments, employment opportunities, productivity and income have been laid down over years of minority rule and ethnically based economic, labour and social development. To make schooling accessible to all people and to ensure the equitable distribution of resources, the Commission recommended that schooling be gratuitous to those who cannot afford to pay for it, while those who can afford it would be required to make contributions towards operating costs (*White Paper on Education and Training* 1995:74). In short, the *Hunter Report* proposed that no learner be turned away from school on the basis of inability to pay school fees.

The *White Paper on Education and Training* (1995:74) indicates that there is a need to balance the considerations of equity with the need for maximum mobilization of human and financial resources in the reconstruction of education. The *Hunter Report* attempts to avert a situation where a learner may be excluded from educational opportunity, which when calculated in economic terms would amount to loss of potential workforce. By opting for either obligatory school fees or voluntary contributions, the *Hunter Report* was not totally influenced by humanitarian motives of educating learners for the sake of educating them, but by technocratic interests of maximizing human resource development for business interests.

In response to the *Hunter Report*, the Department of Education tabled the *South African Schools Bill* for debate in parliament.

2.5.4 *The South African Schools Bill of 1996 [May 1996]*

Among other things the *South African Schools Bill* recognized the principle of equity, practicability and the need to redress past discriminatory laws and practices. According to the Bill, it is presumed that the principle of equity in education would lead to the maximum exploitation and development of human resources in a technocratic age. In addition, education in the RSA should lead to freedom and justice, where freedom means a minimum constraint by others to obtain quality education and justice means an equal distribution of wealth, power and other values consistent with this kind of freedom (Reimer 1971:99). Fundamental rights and freedoms enshrined in the *Constitution* of the

RSA require equal access to educational institutions and forbid any form of discrimination in education (Maree 1995:25).

The ratification of the *South African Schools Bill* led to the publishing of the *South African Schools Act*[5] on 15 November 1996.

2.5.5 *The South African Schools Act of 1996 [15 November 1996]*

The *South African Schools Act* aims at providing a uniform system of education under a single Ministry of Education for the organization, governance and funding of schools and to amend and repeal existing laws relating to schools. The onset of democratic rule which came after 1994 requires that education be transformed and democratized. The *South African Schools Act* took the *South African Constitution* as its point of departure and thus all relevant principles, for example, the right to education, non-discrimination in education, co-operative governance and the rights to language and freedom of language and religion have been entrenched in the Act (*South African Schools Act Made Easy* 1997:8).

In its preamble, the Act states that South Africa needs a new national school system to redress past injustices in education, to provide education of high quality and to lay a strong foundation for developing all people's talents and capabilities, eradicating poverty and improving the economic well-being of society and upholding the rights of all learners, parents and educators (*South African Schools Act Made Easy* 1997:1). A cursory look at the preamble of the Act gives an impression that it is a strategy for making the education system more responsive and responsible to technocratic values. According to Nasson (1990:90) it remains the function of the education system to regulate the supply of labour to skilled jobs.

---

5 The South African Schools Act was passed on 10 November 1996 and was published on 15 November 1996.

2.6 Summary

The evolution of the education system in the RSA from an apartheid and fragmented structure to a democratic and unitary system has been driven by the need for the maximum utilization, through education, of human resources in a technocratic age. The dawning of the democratic era in the RSA, as suggested by the period after 1994, intends to provide a literate and numerate workforce to industry. In addition, the new dispensation will provide opportunities for people to develop themselves in order to improve the quality of their lives and the standard of living in their communities. It is envisaged that the new education system will ensure sustainability and flexibility in a workforce as demanded by the principles of technocracy.

3 THE CHARACTER OF EDUCATION IN A TECHNOCRATIC AGE IN THE RSA

According to the HSRC (1981a:19) South African society is not homogeneous. This increased problems in the provision of education. In addition, the racially divided education system failed to provide for a workforce needs of the country as demanded by technocratic age requirements.

The new education dispensation in the RSA is based on the RDP principles to redress the imbalances of the past and the legacy of apartheid. A new national human resources development strategy must be based on the principles of democracy, non-sexism, equity and redress to avoid pitfalls of the past (ANC 1994:60). A paradigm shift, from an input model of education to an outcomes-based education [OBE], is a necessity for an expansive and efficient human resource development programme. According to Mkhatshwa[6] (1997:4) OBE demands that the teacher be more open and flexible, make use of a variety of learning experiences and implement a variety of ongoing assessment styles which in turn demand new management styles.

6 Father Smangaliso Mkhatshwa is the Deputy Minister of National Education in the RSA. His appointment on June 1 1996, came after the NP withdrew from the Government of National Unity [GNU].

3.1 Essential outcomes of education : utilitarian value of education

A technocratic age society requires that education produces people who can communicate effectively by using graphic, written or spoken language. Mkhatshwa (1997:5) states that the RSA is part of the information age and educationists must plan accordingly as knowledge is the electricity of the new globalization. The South African education system has thus to produce people who can participate in global affairs. Furthermore, it is imperative that education socializes the new generation with the requisite cultural values and communication competencies to become citizens of an international community (Department of Education 1997:11). The acquisition of such communication technologies as computers, will further ensure and enhance the exchange of information that would benefit the individual and the RSA in the competitive world of international production and finance.

The status of technology in communication cannot be overemphasized and Mkhatshwa (1997:6) notes that technology is the driving force behind industrialization. The level of technological advancement has a crucial influence in the industrialization of the country. For the South African education system, the greatest challenge is the teaching of the effective utilization of science and technology, to which the Department of Education (1997:11) states that the shortage of highly trained graduates in science, engineering and technology must be addressed. Investment in human resources means that the education system should ensure the implementation of technology education. Technology education can empower learners to utilize entrepreneurial opportunities through self-employment, to use technology creatively and to improve South Africa's international competitiveness and prosperity (Mkhatshwa 1997:6).

The introduction of equal educational opportunities and compulsory education policy are intended to ensure the mobilization of human talent and potential through education and training. According to Cooper (1994:19) in the late 1980s Japan produced 500 graduating engineers per million of the population and Australia 220, while South Africa produced only 35. These disparities, when transferred to economic terms, imply that South Africa lacks skilled personnel and engineers. The introduction of equal educational opportunities is viewed as a necessary step towards the utilization of talent to the maximum, which can function best if education and training are integrated (ANC 1994:68).

The linking of the outcomes of the education system with industrial and technological requirements makes the professionalization of teaching necessary.

3.2 Professionalism: efficiency and productivity in education

Mkhatshwa (1997:2) maintains that the campaign on the *Culture of Learning, Teaching and Service* [COLTS], launched by President Mandela on 20 February 1997, aims at restoring and enhancing the success of the education and training system. The restoration of the culture of teaching and learning infers professionalism in teaching. The Constitution of the *South African Council of Educators* [SACE] requires that a national registration for educators be established (Maree 1995:119). This body, SACE, has been founded and it has the capacity to establish criteria for entry into the teaching profession and to establish a code of conduct for educators. The quest for quality education in the RSA is viewed as a result of the concerted effort by the organized teaching fraternity which is under one umbrella body, the SACE. Creating a culture of learning and teaching is not an option and it is non-negotiable: it is a moral and political imperative central to national survival (Mkhatshwa 1997:2).

The role of the teacher as an agent of change is made imperative by two contrasting forces namely, the requirement for technologically relevant knowledge and teaching about tolerance. As a result, the present generation of teachers will have to be retrained in the requirements of a non-racial, democratic South Africa, since the untransformed cannot bring about transformation (Mncwabe 1994:116). In addition, the *Committee on Teacher Education Policy* [COTEP] (1996:7) states that teachers should be empowered to facilitate adaptation into a technocratic era. The inculcation of values like co-operation, unity and tolerance correlates with the teaching of technologically relevant knowledge to be undertaken by teachers.

Teachers and future teachers must look upon themselves as professionals, they must work as professionals and they must direct their qualifications for high quality education. While carrying out their professional duties, teachers should view categories of knowledge, skills and values holistically. In addition, they should become autonomous, flexible, creative and responsible for effecting the aims of education in the RSA (COTEP 1996:13). This requires that teachers be trained to carry out their professional, academic and occupational responsibilities.

The efficient execution of teaching functions, as demanded by the professional requirements for successful teaching, is linked to vocationalism.

3.3 Vocationalism : skills and competences for a flexible labour force

The success of the RDP is presumed to be possible only through an integrated approach to education and training. In a society that is increasingly tilted toward service, information and technology, the integration of education and training may help learners in the acquisition of skills that contribute to general employability (Hoyt 1991:451). The education system should ensure and advance a balance between theoretical and practical learning since the acquisition of skills relevant to industrial development is imperative in a technocratic age. Changes in the education system are crucial because the RSA lacks technical and vocational training for the bulk of the population (Christie 1992:42)and is consequently lagging in providing education in line with the demands of the technocratic age.

OBE, which emphasizes the acquisition of skills and competences valuable for, *inter alia,* industrial development, has been adopted in the South African education system. According to ANC (1994:59) the education system, through OBE, would ensure that people are able to develop their full potential. The realization and development of potential is a technocratic value, which necessitates the canalization of learners according to available jobs and their individual competencies. According to the principles of technocracy, just as industry produces a commodity which satisfies the demands of the consumer, education should produce people who will satisfy the needs of the changing technocratic age labour market (Searle 1988:29).

The provision of a skills-related education requires effective planning and competence in the execution of policies. This leads to the need for management and administrative structures that ensure that plans and policies are effectively implemented and executed.

3.4 Bureaucracy : administrative and management strategy of efficiency

According to Dekker and Van Schalkwyk (1995:468) at the end of the pre-democratic era in 1994, the administration of education at 'Own Affairs' level was under three councils of ministers for Whites, Coloureds and Indians. The education for Blacks was a 'General Affairs' under the

Department of Education and Training. Such an administrative structure produced unequal educational outcomes.

The *Constitution* provides for a national administration as well as nine provincial administrations for education under a single Ministry (Dekker & Van Schalkwyk 1995:470). This dichotomy between centralization and decentralization is intended to increase the efficiency and productivity of the education system, as well as catering for the diverse needs of the provinces. In addition, participatory management in educational institutions and democratic governance of schools require that other stakeholders in education be taken up in the professional management of schools, with the aim of improving the quality of education (*South Africa Schools Act Made Easy* 1997:1).

The four levels identified for education management are: macro-level [which is rooted in the Constitution], provincial level, district level and governance at school level. According to the *South African Schools Act Made Easy* (1997:8) the school governing body [SGB], comprised of educators, learners, parents and other interested groups, is a management team at school level. The SGB has to promote the interest of the school and try to ensure its development by providing quality education for all learners.

The education bureaucracy ascertains that schools care about the needs, goals, desires and interests of the communities and their role is to make sure that they are met (Whitaker & Moses 1994:76). Management at provincial level monitors standards in schools by controlling examination services. According to Rivers (1993:61) quality schools are created and sustained when quality leaders ensure that quality instruction, built around quality curriculum, is delivered in a quality environment. The emphasis on quality in education is also noted by Steyn (1996:131) who is of the opinion that management is responsible for quality processes, system and outcomes.

The extension of bureaucracy in education is necessitated by the needs of a progressive industry which expects schools to produce a competent labour force. It is evident that in a technocratic age education is expected to diversify its outputs.

3.5 Diversification of education : learning areas and fields of study

According to Dekker and Van Schalkwyk (1995:477) only 9% of White matriculants and 1% of Black matriculants followed a technical course in 1992. This suggests that there would be a shortage of skilled personnel with technical knowledge in the RSA. The *Council of Education Ministers* [CEM] identified eight learning areas namely, language, literacy and communication; mathematics and mathematical sciences; human and social sciences; technology; arts and culture; economic and management sciences; and life orientation, to be catered for in the South African education system (Outcomes-Based Education [OBE] 1997:26). It is envisaged that the learning areas would be studied in an integrated and holistic way rather than in an isolated way.

The proposed curriculum for the senior secondary phases emphasises vocationally orientated education in which six vocational fields containing both broad and specific subjects are indicated (Dekker & Van Schalkwyk 1995:478). It is intended that more learners align themselves with vocations in engineering, business, arts, agriculture, utility industries and social services. According to Searle (1988:26) it would be tragic if the education system failed to enlighten the young to attain skills and standards which are relevant to the present economic situation which demands flexibility and sustainability in a technocratic age. This requires that education and training be balanced with the aim of making the education system more responsive and relevant to the needs of technologically advanced industry.

The global economy is producing an extraordinary number of well-paying jobs, but these jobs have increasingly rigorous requirements for competencies and skills relevant for high productivity in a technocratic age (Kolde 1991:453). It is the responsibility of the education system to produce learners who can be employed in the 'shrinking workforce' of a technocratic age. Furthermore, Bondesio and Berkhout (1987:41-76) note that a number of canalization mechanisms which determine the channel or path a learner can follow through the educational structure include the availability of educational opportunity, financial considerations, guidance and quota determined by the principles of technocracy.

A society which values diversification in education would support meritocracy with the purpose of preparing the gifted and talented for specialization.

3.6 Meritocracy : knowledge and skills dictate employment opportunities

Technocratic societies presume that an individual's skills and knowledge will enhance one's efficiency and productivity. As a result, Christie (1991:195) is of the opinion that with the changing nature of production people need different skills. The number of skills one accumulates will make one more marketable in an environment where such skills are limited. It can be deduced that the education system which perpetuates the division of labour promotes the vested interests of the elite by creating cultural capital and differential access to power (Bergh 1993:482).

According to the Department of Education (1997:11) higher education in the RSA should produce highly trained people and useful knowledge to equip a developing society with the capacity to compete in a changing global arena. Although higher education is aimed at enhancing and promoting the country's success in international competition, it will also increase meritocracy. As a result, work will be divided into categories according to status and educational levels and there will be a technical division of labour. In addition, meritocracy will ensure a split between mental and manual labour and there will be a segmented labour market (Christie 1991:199).

3.7 Summary

The transformation of the South African education system is influenced by technocratic values of equity, competition, efficiency, flexibility and quality. Such transformation is motivated by three basic criteria namely, to provide the development of a society in which the quality of life of all inhabitants is improved; to provide equality of educational opportunity and equal access to education; and to ensure that productivity and the means of production are extended through the education and training of a workforce. These criteria are strategies for the production of a workforce that is skilled and flexible and which is demanded by a technocratic age labour market.

It is presumed that a 'good' education system will produce the skills industry needs. It is envisaged that this will be realized through the integration of education and training, driven by a new flexible curriculum. School governing bodies will ensure that quality education is effected in schools.

Having looked at the character of education in the RSA in a technocratic age, focus will now be on the effect technocracy has on education in the RSA.

4 EFFECTS OF THE PRINCIPLES OF TECHNOCRACY ON SOUTH AFRICAN EDUCATION

The relationship between State and schooling should not be treated as an over-simplified correspondence in which the labour needs of the accumulation process are unproblematically met by those institutions serving those needs (Christie & Collins 1982:61). Education is much more complex than a mere correlation of industrial needs to curriculum offered by the schooling system. Education must be a source of new ideas, of a social programme that is undergoing reconstruction just as a society does (Mncwabe 1994:93). As a result, the stagnation of the South African labour reproduction emanated from an education system that churned out learners for a racially segregated economic market.

The democratic era has ushered in a period of massive expansion of the education system in the RSA. According to ANC (1994:333) an equitable provision of learning materials, targeting of capital development programmes to areas of greatest need and strategies to promote community participation in school improvement initiatives, will launch the country into the twenty-first century as a competitive industrial State in the global community. In addition, the education system will ensure the adoption of technologically relevant education. This would be done with due regard to the acquisition of skills, knowledge and attitudes. In the RSA, *Curriculum 2005* is intended to give learners the opportunity to develop skills required to ensure sustainability in technological development.

4.1 Technologically relevant education : outcomes-based education and training

In an age of computers, data banks and ever-increasing amounts of information, one requires an education system to elevate the concept of 'creative thinking' to its proper level of importance (Searle 1988:28). OBE, as adopted in the South African education system, should ensure that learners differentiate fact from opinion and effectively use information in decision-making and problem-solving. According to Sebidi (1989:6) creative thinking as an educational strategy will do away with the banking system of education suggested by Freire (1970:4), in which learners become mere receptacles of neatly packaged knowledge. These views, as expressed by Searle and Sebidi, relate to outcomes-based education which is participatory and learner-driven, where the onus for learning rests primarily with the learner and not on the teacher.

Elmandjra (1986:736) is of the view that a society of knowledge is one which manages to overcome supremacy of technocrats. It is presumed that OBE would democratize the production and the fruits of science and technology for the betterment of society at large. The massive drive for the reconstruction and development programme, with its accompanying policies for redressing the imbalances of the past and equal access to opportunities, makes education an important vehicle for the transformation of South African society. Moynes (1984:5-6) is of the opinion that since in the information age an increasing number of people will be handling information and providing services, there will therefore be more people to interact with one another and schools have to emphasize the development of interpersonal skills. OBE is *inter alia* intended to make learners work effectively with others as members of teams, groups, organizations and communities (OBE 1997:24).

The education which provides learners and society at large with knowledge, skills, values and attitudes, acts as a strategy for adaptation in a technocratic age. Technology is always changing, therefore education should be change-directed and a lifelong process.

4.2 Lifelong education and training : an empowerment strategy for a flexible workforce

Lifelong education and training provides for a sustained programme of human resource development. It is a strategy that requires that the legacy of illiteracy and low skills of the majority of South Africans be overcome and that higher levels of skills for all be promoted as a central part of a wider economic and political reconstruction of society (OBE 1997:11). This is necessitated by the fact that entry into a productive and efficient labour force requires the refinement of existing skills and the acquisition of new skills.

Lifelong learning is central to 'open learning'. Learning should continue throughout life rather than be limited to childhood. Such a form of learning would be of direct relevance to the needs and life experiences of learners. Lifelong learning would create a situation where education and educational responsibility are the prerogative of neither the learners nor parents alone and education would not be confined to schools and conventional institutions of learning (Gardiner 1990:161). As a result, the NQF recognizes learning and experiences acquired at the work place and through other agencies of education and training support services.

The *National Investigation into Community Education* [NICE] (1995:56) proposes an education and training system which would ensure that learners proceed to higher levels of training, while they are holding on to their employment. This implies that people should be provided with skills that would promote self-directed learning. In a time of rapid technological and social change we can seldom predict what specific competencies will be needed in future, or even in the next few years, which makes the need to learn and re-learn certain vocational skills obvious (Husén 1979:170). Lifelong education may be used as a strategy to offset redundancy and poor working habits, such as inefficiency and low productivity, in the labour force.

The campaign for lifelong learning can provide impetus to the modernization and globalization effort in the RSA.

4.3 Modernization: world citizenship as a technocratic value

The realization that the RSA cannot exist in isolation provides motivation for the creation of an education system that would increase the country's fortunes in international politics and a global economy. Industrialization and concomitant economic developments in the 20th century have made South Africa the strongest country in Africa. The fact that [some] countries in Southern Africa depend on the infrastructure of transport, communication and electricity networks provided by the RSA has made South Africans believe that their country would lead the *African Renaissance*[7]. The education system is *inter alia* expected to promote the quest towards this ideal.

In order to ascertain maximum human resource development for a productive and efficient labour force, ten years of compulsory education of good quality for all learners has been implemented (ANC 1994:10). In addition, there is a drive to convert some colleges of education into community colleges. According to NICE (1995:64) community colleges are valuable in a technocratic age because they:

* have proven ability in mass-based education;
* have proven ability in building a skilled lower-middle and bottom-end human resource base; and
* create a link and flow between secondary and post-secondary education.

7 The African Renaissance underpins South Africa's interaction with the African continent. This concept gained ground after Deputy President Thabo Mbeki's famous *I am an African* speech. The African Renaissance is based on deliberate socio-economic development programmes.

Modernization and globalization also require the country's intellectual resources to be fully developed so as to be competitive in the world market. Higher education in the RSA should produce a competent, critical and reflective corps of graduates which can promote economic growth, the enhancement of a democratic political system and the development of the cultural and intellectual life of society (ANC 1994:6). Consequently, the emphasis on the quality of higher education would ensure that technology and science are improved for the betterment of society at large and in adherence to the principles of technocracy to produce a highly specialized and effective workforce.

The utilization of the potential of all learners will minimize the drop-out rates in the country. Wastage in education occurs when many learners who could have acquired the knowledge necessary to sustain economic and technological development do not complete the learning cycle. This is one problem the education system in the RSA should address.

4.4 The drop-out rates : inequalities in education provision

The substantial differences between Black and White attrition rates in schools were caused by the privileged economic position of White parents and the racially discriminating allocation of funds for education (Samuel 1990:19). During the pre-democratic era inequalities in educational provision and funding were complemented by the socio-economic and political system. According to records, the percentage of learners who started school in 1963 and then completed twelve years of schooling was approximately 58,4% Whites, 22,3% Indians, 4,4% Coloureds and 1,96% Blacks (HSRC 1981b:23).

According to Mncwabe (1994:10) if the *status quo* is predominantly unequal and unjust, education will also be increasingly unequal and unjust and there will be no place for education to improve the lot of the poor. Inequality in education increases drop-out rates which will lead to the loss of potential high-level workers. A growing shortage of a skilled and professional workforce will be experienced because the education system fails to train all people equally, and as a result the country will lag behind in the competitive economic markets of a technocratic age (Pillay 1990:47).

The pre-democratic era education system did not allow for equality of educational opportunity and this made it to be unpopular with Blacks.

4.5 Legitimacy crisis: resistance to education for servitude

According to Samuel (1990:1) armoured vehicles, riot police, fences and patrolling soldiers became a regular part of the educational scene in mainly Black schools and universities during the education crisis which confronted this country prior to 27 April 1994. This confrontation, between the aspirations of Blacks for quality education and the State machinery that wanted to maintain the *status quo*, led to the corrosion of the culture of learning, teaching and service. The institutional relations of the school produced the terrain for increasing numbers of young people to contest the legitimacy of the capitalist market order promoted by education in the RSA (Nasson 1990:49).

A long history of apartheid and other forms of unfair discrimination in education had caused schools to become dysfunctional, which eventually affected the efficiency demanded by technocratic age education systems. However, Hofmeyr and Moulder (1987:36) see the lack of legitimacy, rather than the lack of equality, as the fundamental problem in education in the RSA and until this bias had been corrected, until Blacks, in particular, were convinced that the political structures and decisions which govern their lives were legitimate, schools and universities would continue to be in turmoil. Conflict became endemic in education and the teachers were at the centre of the conflict, as the employer [the DET] wanted them to execute their professional duties, while the communities wanted them to respond to the needs and aspirations of the community (Mncwabe 1994:62).

The education system that was characterized by the unequal distribution of educational opportunities, as well as human and physical resources, produced learners and teachers who had a poor work ethics. In addition, the system had alienated the majority of its users [Black youth] and was rejected by a wide range of community organizations (Hofmeyr & Spence 1989:39). Even in the democratic era, Black education continues to present a dilemma and is still plagued by strikes and stayaways. In addition, many Black schools exhibit an absence of a learning culture. These issues also need to be addressed and resolved, not only the provision of education, so as to ensure that learners are equipped to acquire skills, knowledge, attitudes and values that would enable them to cope with the demands of a technocratic age.

4.6 Summary

The transformation of education in the Republic of South Africa is accompanied by the expansion of educational opportunity to include the previously disadvantaged community. This strategy should guarantee that the talents and skills that are required for industrial and economic advancement are identified and nurtured. Furthermore, education has to ensure sustainability and flexibility in the labour force as demanded by the principles of technocracy.

The new education system in the RSA is learner-centred and learner-driven. Outcomes-based education puts emphasis on what learners can do and not necessarily at the amount of knowledge learners can amass. In addition, the NQF, which is the strategy for the promotion of integration of education and training, ensures the implementation of lifelong learning. It is also envisaged that the NQF will ensure the mobility of workers from one occupation to the other as demanded by the dynamic labour market of a technocratic age.

5 CONCLUSION

Education in the RSA has gone through the phase whereby it was used as a disempowering tool, to a phase where it will be used as a means of modernization, transformation, reconstruction and preparation for jobs available in a technocratic age. Changes envisaged in education relate to an integrated approach to education and training, whereby educational outcomes are more important than the amount of information one can acquire. In this context, lifelong learning, which makes a worker flexible in the ever-changing labour market of a technocratic age, becomes imperative.

Curriculum 2005 has been designed to ensure that learners acquire skills, knowledge, attitudes and values necessary for effective functioning in a technocratic age. The education system should also make learners aware that a white-collar job is not necessarily the road to Utopia, since in a technocratic age a technical certificate may have more opportunities than a purely academic certificate. Consequently, learners should be trained to promote industrial development and technological advancement for the betterment of the South African society in a technocratic age.

The next chapter will provide a summary and synthesis of research findings on the development, character and effects of education in a technocratic age.

CHAPTER 6

SUMMARY, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

A mind so sharpened and stored is held ready for any calling, for a test. It is not narrowly specialised, hence limited by the boundaries of some inevitably partial academic province; it is trained and equipped for life...

(Lee, G. C. Education in modern America 1960:84)

CHAPTER 6

1 INTRODUCTION

The influence of technocracy in the development, character and effects of education has been discussed through the use of the three exemplars namely, the United States of America, the People's Republic of China and the Republic of South Africa. While the three exemplars differ politically, economically, socially and in degree of technological development, their educational systems work towards a similar goal of modernization to meet the demands of a technocratic age.

Modern technology takes on a new role as the gateway between the learner and learning. As a result, technocratic societies expect learning to be more than the acquisition of knowledge but also for it to develop capabilities for further learning (see 6:5) to ensure that learners are adequately equipped to meet the challenges of life in a technocratic age.

2 SUMMARY

The purpose of the study namely, to research and record the development, character and effects of education in a technocratic age, is highlighted in chapter 1 (see 1:1.2). The statement of the problem (see 1:2) which necessitated this research has been outlined.

The aim and objective of the research (see 1:4) were formulated and each was discussed in the following chapters:

Chapter 1 of this study serves as the orientation of the research and the background to the study. The statement of the problem is outlined and the sub-elements of the problem identified (see 1:2). The methods (see 1:3.1.3) as well as the aims (see 1:4.1) of research are presented and the field of study is delimited in terms of time [a technocratic age] and space [the United States of America, the People's Republic of China and the Republic of South Africa] (see 1:5.1), with the resulting data recorded in demarcated chapters (see 1:5.2).

In Chapter 2 the concepts which have a bearing on education in a technocratic age are elucidated (see 2:2). The nature of technocracy and its implications for education are reviewed (see 2:3) and

the implications of State control of education are outlined (see 2:4).

Chapter 3 of the dissertation focuses on the development, character and effects of education in a technocratic age in the United States of America. Of note are the *National Defence Act of 1958* (see 3:2.2.1), the *Marland Report* (see 3:2.2.2), the *Gifted and Talented Learners's Act of 1978* (see 3:2.2.3) and community colleges (see 3:3.5)and the role played by the afore-mentioned in relation to the principles of technocracy.

In chapter 4 focus rests on the development, character and effects of education in a technocratic age in the People's Republic of China. Of particular note are 'Red' schools (see 4:2.1.2), Key institutions (see 4:2.3.1), work-study institutions (see 4:2.3.2), the *Great Proletariat Cultural Revolution* (see 4:2.4) and the *Four Modernizations Movement* (see 4:2.5) as strategies adopted by the Chinese education system in response to the demands of a technocratic age.

Chapter 5 of the dissertation focuses on the development, character and effects of education in a technocratic age in the Republic of South Africa. Of particular note in this regard is the contribution of the recommendations of the *De Lange Commission* (see 5:2.4.1) and the ANC's reconstruction and development programme (see 5:2.5.1.2). In addition, the move from separate education systems to the creation of a single education department (see 5:2.5.5) and the implementation of *Outcomes-Based Education and Training* (see 5:2.5) feature prominently in South African education in the new dispensation, which is in line with the principles of technocracy.

Chapter 6 provides a record of the findings, conclusions and general recommendations for the planning of education in a technocratic age.

The study of the education systems of the United States of America, the People's Republic of China and the Republic of South Africa in a technocratic age indicates the diversity which prevails in the three aforementioned countries. On the other hand similarities prevail in all three countries because technocracy has influenced the nature of education provided. These similarities relate to, among others, the oscillation between centralization and decentralization of the control of education (see 3:3.6; 4:3.3; 5:3.5), the promotion of specialization in education (see 3:3.7; 4:3.3.3.1; 5:3.6), the linking of vocationalism with education (see 3:3.5; 4:3.3.3.2; 5:3.3), the proliferation of professionalism in education (see 3:3.3; 4:3.3.5; 5:3.2)and talent-orientation and meritocracy in education (see 3:2.2; 4:3.4; 5:3.6). In addition these countries have introduced ten years'

compulsory education (see 2:4.2.1) which indicates the commitment of each country to human resource development as demanded by the principles of technocracy.

It is on the basis of the above-mentioned that findings were made and conclusions were drawn. In addition, to make education more relevant to changing human needs in a technocratic age, recommendations for the planning of education were informed by the findings and subsequent conclusions of the research.

3 FINDINGS

The findings herein contained relate to the literature study conducted. These findings have been traced in the development, character and effects of technocracy on education in the United States of America, the People's Republic of China and the Republic of South Africa. It has been found that, to comply with the demands of a technocratic age:

* Education is talent-orientated and meritocratic (see 2:2.1)
* Education ensures and promotes specialization (see 2:2.2)
* Education is vocation-orientated (see 2:2.3)
* Education accommodates the proliferation of professionalism (see 2:2.4)
* Education affords scientism significant status (see 2:2.5)

These findings feature prominently in the dissertation and have been recorded in the discussion of exemplars.

3.1 Education is talent-orientated and meritocratic

The realization that the nation's intellectual resources should be fully utilized in a technocratic age necessitated the introduction of specialized education which aimed at the maximization of potential and talent in the United States of America (see 3:2.2). In addition, the Federal Government passed the *Gifted and Talented Learners' Act* of 1979 with the aim of developing the potential of the gifted for the betterment of American society (see 3:2.2.3). Talent-orientation and meritocracy in education in the People's Republic of China manifest themselves in Key schools which cater for the needs of bright and gifted learners (see 4:2.3.1). Furthermore, education in the PRC encourages competition and coaching for examinations (see 4:3.3.1). Entrance examinations determine whether the learners will be eligible for higher education or not (see 4:3.3.4). Technocratic societies presume that skills and knowledge enhance efficiency and productivity. As a result higher education in the

Republic of South Africa is intended to produce highly trained people who can compete in a changing global arena (see 5:3.6). Modernization and globalization necessitate the development and maximum utilization of the country's intellectual resources (see 5:4.3) according to the principles of technocracy.

The maximization of talent and meritocratic tendencies are related to provision of specialized education.

3.2 Education ensures and promotes specialization

Technocratic societies expect educational institutions to be special centres of competence in science, mathematics, telecommunications and technology (see 3:3.6). As a result, the American education system supports the selection of learners with outstanding talent (see 3:2.2.3) for specialized training in order to enhance technological and industrial development (see 3:4.1). It suffices to mention that the *Four Modernizations Movement* in the People's Republic of China (see 4:2.5) promotes specialization of functions. Furthermore, the notion of academic middle schools and vocational middle schools in the education system of China extends specialization (see 4:3.3.3). Higher education in the People's Republic of China is specialized and it is divided into two subject areas, humanities and science and technology (see 4:3.3.4). To effect specialization, the education system in the Republic of South Africa has identified eight learning areas which are linked to the 12 fields of study in the NQF (see 5:3.5). In addition, the education system attempts to produce specialists who have knowledge, values, attitudes and skills that can facilitate adaptation in a technocratic age (see 5:4.1).

The provision of specialized education is closely linked to vocations in a technocratic age.

3.3 Education is vocation-orientated

Diversification in education, which is linked to vocation-orientated schooling, has as its directive the meeting of industrial needs (see 2:2.3). Community colleges are important agencies in the American education system for the improvement of living conditions and standards, as well as to the development of appropriate skills, values and concepts that would enhance the efficiency of a workforce (see 3:3.5). In the People's Republic of China's education system vocational middle schools which include technical, normal, agricultural and vocational schools cater for the needs of

the learners who will enter a workforce on completion of middle school (see 4:3.3.3.2). In addition, better schools and Key institutions are established in urban areas while work-study schools (see 4:2.3.2), which are created in order to produce a literate workforce, are found in the countryside (see 4:4.4.2). The provision of vocation-orientated education in the Republic of South Africa is aimed at harnessing the life experiences, skills, energies and aspirations of learners (see 5:2.4.1). As a result, the South African education system advances the notion of the integration of education and training as part of the reconstruction and development programme (see 5:3.3) in order to produce flexible workers equipped to fulfil a role in a technocratic society (5:4.2).

Vocation-orientated education leads to the socialization of workers into the technocratic age labour force. For one to follow a vocation one should be prepared to be a professional.

3.4 **Education accommodates the proliferation of professionalism**

The principle of professionalism ensures training, initiation and induction of learners into a technocratic age workforce (see 2:3.4). This in American education demands that teachers be competent in their work and that they be upholders of the universality of science (see 3:3.3). Furthermore, the need for universal citizenship and the pursuit of a strong competitive economy that could hold its own in the world market-place (see 3:4.2) increases the value of professionalism in the education system of the United States of America. The levels of teachers' efficiency are crucial for the successful implementation of the *Four Modernizations Movement* in the People's Republic of China (see 4:3.3.5). In the people's Republic of China professionalism is presumed to be necessary for the advancement of science and technology which would serve modernization (see 4:3.6). Professionalism in the Republic of South Africa has to ensure racial tolerance and economic development (see 5:3.2). In addition, the transformation of the South African society, the quest for improving the quality of life of all inhabitants and the successful implementation of OBE (see 5:3.7) depend to a large degree on the professionalism of those who are responsible for education.

Meritocracy, specialization, vocationalism and professionalism are made imperative by scientism in a technocratic age.

3.5 Education affords scientism significant status

In a technocratic age the acquisition of scientifically-refined knowledge is presumed to be a means towards the elimination of ignorance, prejudice and everything that is likely to hamper development (see 2:3.5). Education in science, engineering and mathematics is regarded as being crucial for economic vitality and security of the United States of America (see 3:3.4). As a result, the application of standardized and quantitative measures in American education ensure the quality of the education provided by educational institutions (see 3:4.1.2).

The education system in the People's Republic of China regards science-orientated education as being imperative for modernization (see 4:3). Scientists and technicians are 'brain workers who serve socialism' and therefore the education system in the People's Republic of China is pressured to ensure the mastery of science and technology (see 4:4.1). In the Republic of South Africa there is a drive towards the acquisition of technologies like computers in order to make the individual and the country competitive in international production and finance (see 5:3.1). Science and technology are driving forces behind modern industrialization and the South African education system puts emphasis on the integration of education as pure science and training as applied science (see 5:4.1) as demanded by the principles of technocracy.

The above-mentioned findings have been explained and expanded on in the discussion of exemplars and certain conclusions can be drawn from them.

4 CONCLUSIONS

Education in a technocratic age should serve the purpose of ensuring the meeting of the requirements of technological development. This function of education coincides with mechanization, modernization and industrialization. As a result, it has become imperative that education inculcates knowledge, skills, attitudes and values inherent in technological production.

4.1 Meritocracy: social stratification and division of labour

The adherence of technocratic societies to meritocratic tendencies leads to the creation of stratified societies. The fact that individuals are selected on the basis of talent and intellect for admission to further study programmes, as well as specific occupations, ensures the division of labour on the basis of merit. Such elitist practices in education reconcile people to their social positions, since the type of work an individual performs determines one's salary and social position as well as power over others. To effect meritocracy, technocratic societies need to use examinations to select the talented and intellectually gifted for training in specialized education.

4.2 Specialization: fragmentation and distortion of reality

Specialization does not necessarily present reality as an integrated unit. As a result, technocratic societies fragment knowledge into particular subject fields without showing their interrelationships. This narrow view of reality creates the impression that some fields of study are more important than others. For instance, technocratic societies perceive science and technology to be of greater significance and relevance than humanities. In addition, specialization produces specialists who are illiterate in the other specialists' fields. The view that presents reality not as a totality of related systems and subsystems, but as a conglomeration of independent systems, causes people to perceive and constitute reality as unrelated parts.

4.3 Vocationalism: utilitarianism in education

Technological developments have made the utilitarian value of education important. Consequently, the education provided by schools in a technocratic age, has been adapted to the labour requirements of industries. This, on the other hand, has influenced education to lose its autonomy since education is expected to answer for a workforce needs of the country. Educational reforms are thus not motivated or necessitated for educational reasons but demanded by the labour needs of industry. To align themselves with technocratic ideals, educational institutions provide learners with qualifications, dispositions, values, attitudes and skills demanded by the world of work. In addition, schools need to offer vocational guidance programmes in order to help learners in the choice of careers. Thereby schools act as socialization agencies for technocratic societies.

4.4 Professionalism: the production of a competent worker

In a technocratic age the competence of teachers is measurable in terms of the results they produce. Much emphasis is therefore placed on teacher training and qualifications. Furthermore, it is required of teachers to be able to use educational technology, regardless of whether they have the aptitude for the skills associated with technology. It appears that professionalism advances the notion of orderliness, uniformity and conformity to prescribed standards. This in education is implemented through pre-packed curricula, prescribed teaching methods and adhering to rules and regulations.

4.5 Scientism: predictability and objectivity

Scientism, in a technocratic age, emphasizes objectivity in education, thereby overlooking the fact that human beings are by nature subjective. According to scientism, human beings experience the world by means of their intellect and their senses. Efficiency is thus viewed only in quantitative terms. This led to the use of measuring instruments in the assessment of the learning process. To aggregate human experiences and behaviour to the objective and measurable is tantamount to suggesting that people are but clones of one another. Human beings are consequently reduced to predictable entities and learning is presumed to be a linear process. In addition, scientism creates the impression that the social world can be manipulated and reorganized through the use of the same principles that govern the natural world.

4.6 Technologically appropriate education: adaptation to a technocratic age

Education is provided within the confines of the spatio-temporal milieu. Competition and industrial growth in a technocratic age requires that education respond to the technological needs of the particular country. The provision of education is influenced by globalization and the need for the proper management of technology. As a result, educational reforms are dictated by peripheral forces. Education, as a technocratic strategy for investment in human capital, needs to be responsive to the demands of the labour market. Subsequently, many young people are forced by compulsory education laws to attend school until they reach a certain age.

4.7 Bureaucratic control in education: conformity and uniformity

The expansiveness of education in a technocratic age requires that educational standards be set and maintained. A bureaucratic system with its proclivity for systematization and uniformity is set up to ensure the maintenance of educational standards and the efficiency of the education system. The creation of a bureaucracy and institutionalized power are affronts to individuality, since one is required to conform to set rules and organizational procedures. Consequently, bureaucratic control causes one to lose one's personal identity to a mass identity. Under such circumstances the nurture of talent and creativity could be difficult to effect.

Having outlined the conclusions drawn from the study, focus will rest on recommendations regarding the nature and provision of education in a technocratic age.

5 RECOMMENDATIONS

The provision of education needs to be changed in relation to changing human needs in a technocratic age. Modern science and technology, if correctly used, can ensure that education breaks down barriers which exist between areas of specialization by facilitating their integration. Education should *inter alia* be flexible and it should empower learners to set the pace of their learning. These recommendations may help in the creation of user-friendly education systems. Furthermore, the recommendations may help in the creation of opportunities for teachers and learners to communicate with and to understand one another better than at present.

Recommendation 1

Education should encourage learners to co-operate and not only to compete

Education should instil communal values of co-operation, racial tolerance and peaceful coexistence in the learners. Proper socialization and humanization imply living in harmony with society at large, while simultaneously living in harmony with oneself. As a result, education should create a sense of belonging for learners which would give support to the idea that each learner has a responsibility towards others. In addition education should improve the quality of community life, ensuring social harmony and unity. Thereby, education should instil the spirit of *Ubuntu*, humanness or personhood,

in the learners.

Recommendation 2

Education should be democratized

A democratic political order and society cannot succeed without a democratic form of education. Democracy in education should be related to the creation of structures and procedures for decision-making, drawing up of policy and control of education. Of note in a democratic education system should be the practice of participatory decision-making, which enhances the decision-making skills of stakeholders. Education should be undertaken as a partnership of different interest groups: the State, learners, teachers, parents and the business community, who should contribute in appropriate educational matters. In addition, democracy in education should relate to what is done in schools, the choice of subject matter, the approaches and methods of learning as well as the meeting and balancing of the needs of the individual and broader society.

Recommendation 3

Education should encourage an integrated view of reality

Reality in a technocratic age is complex in itself and cannot be viewed or presented simplistically. The different subjects which are offered in school should be treated as interrelated aspects of reality. This approach would enable the learners to realize that, although each subject is unique, all subjects interact to yield a unified understanding of the world and life. The integrated view of reality will address the notion that some subjects are more important than others. Subsequently, education will ensure the totality of reality, which will eventually lead to the development of the learner as a total person. Furthermore, the integration of subjects as aspects of reality will also break down barriers that exist between theory [the mental aspect] and practice [the manual aspect] in the education phenomenon. In this context education will afford mental labour the same respect as manual labour and *vice versa*. Such an approach in education should ensure that those who qualify themselves in the two divergent areas [the mental and manual] be treated with equal respect. The *National Qualifications Framework* serves as a framework for the creation of equality between mental and manual labourand it will also create opportunities for learners to acquire work-related skills that

would increase their mobility in a technocratic age workforce.

Recommendation 4

Education should encourage lifelong learning

The pace at which change occurs in a technocratic age requires that people learn continuously. Education should thus broaden the application of skills and concepts that it inculcates. This should ensure that learners are enabled to be flexible in the ever-changing labour market of a technocratic age. In addition, lifelong learning would enable learners to search for information on their own and to participate in self-directed learning. In a technocratic age it is common to find that workers need to change their jobs continuously in order not to become redundant and stagnant. The challenge facing education in a technocratic age is that, in addition to its task of teaching learners how to earn a living, it should teach them how to live meaningfully in a technocratic age.

Recommendation 5

Education should treat a learner as a total person

Education should not only make a learner literate, more vocal and more technically skilled; it has to develop the learner physically, aesthetically, socially and ethically. The view of an individual as a total person should cease to remain intellectual rhetoric. To claim relevance to the needs of the learners, education should promote the view that learners are unique and they should be treated as such. Education in a technocratic age should thus develop all the faculties of the learners in accordance with their particular abilities and aptitudes. Furthermore, education should equip learners with skills, knowledge, values and attitudes that are appropriate for living meaningfully in a technocratic age.

Recommendation 6

Education should enable learners to cope with demands of a technocratic age

The type of education one receives influences one's habitation of the world. Education should be viewed as a simultaneous activity, through which an individual is fitted to the existing order, while the existing order is fitted to the individual. Education should not compromise the needs of the learner to social demands, nor should it compromise social needs to individualistic, hedonistic unbridled freedom and apathy. In a technocratic age education should promote a learner's self-esteem and self-confidence. Education should ensure that learners are enabled to integrate learning and living, to pursue the understanding of environmental issues [both social and physical] and to live meaningfully in a technocratic age world.

The fact that human potential is diverse and intrinsically unbounded requires that individual aspirations not be limited by the values and visions of education planners. Education should be provided in friendly, relaxed schools where there is time to help young people to become responsible human beings. In addition, education should not restrict the development of the learners, but should instil in them a sense of freedom and accountability.

6 CONCLUDING REMARKS

The dawn of a technocratic age led to changes [in production processes and economic activities] which demanded the acquisition and utilization of skills and knowledge relevant to the new era that was evolving. Consequently, education in a technocratic age became inclined towards meritocracy, specialization, vocationalism, professionalism and scientism.

The provision and nature of education in a technocratic age lead to the maintenance of the *status quo* in which ordinary people are dominated by experts. Technocratic societies measure one's value and worth in terms of the knowledge one possesses and one's utility value measured in terms in terms of one's contribution to the technocratic system itself. It would appear that in a technocratic age, educational qualifications are used to perpetuate the social division of labour in societies, where intellectually challenging jobs are reserved for specialists.

The aforementioned views have been discussed throughout the dissertation. The researcher is of the opinion that the degree to which education in a technocratic age equips the learners with values and skills demanded by the labour market remains a question for further research.

BIBLIOGRAPHY

Alcorn, P.A. 1986. *Social issues in technology*. New Jersey : Prentice-Hall.

A Nation at Risk. 1981. *The imperative for educational reform*. U.S. Government : Printing Office.

ANC. 1991. *Discussion paper for ANC on education policy*.

ANC. 1992. *Ready to govern : ANC policy guidelines for a democratic South Africa*.

ANC. 1994. *Implementation plan for education and training*.

ANC document. 1994. *The reconstruction and development programme*. Johannesburg: Umanyano.

Apple, M.W. 1982. *Education and power*. Boston : Routledge & Kegan.

Arfken, D.E. & Lansford, Z. 1988. Business teaches education lessons on excellence. *Educational Horizons*, 66(4) : 148-151.

Armytage, W.H.G. 1965. *The rise of technocrats*. London : Routledge & Kegan.

Aronowitz, S. & Giroux, H. 1987. *Education under siege*. London : Routledge & Kegan.

Arrow, K.J. 1973. Higher education as a filter. *Journal of public economics*, 2:193-216.

Avineri, S. 1968. *The social and thought of Karl Marx*. London : Cambridge University.

Ary, D., Jacobs, R.C. & Razavieh, A. 1990. *Introduction to research in education*. Fort Worth: Holt, Rinehart & Winston.

Bartels, D.T. & Eppley, F.C. 1995. Education in Mainland China. *Social Education*, 59(1): 31-37.

Behr, A.L. 1988. *Education in South Africa : Origins, issues and trends* 1652-1988. Pretoria : Academica.

Berger, P., Berger, B. & Kellner, H. 1974. *The homeless mind*. New York : Vintage.

Bergh, A. 1993. Curriculum reform and reconstruction in Africa and Latin America. In : Dekker, E. & Lemmer, E. (eds). *Critical issues in modern education*. Durban : Butterworths.

Bergh, A.M. & Berkhout, S.J. 1994. The hidden curriculum : neglected dimension of the South African educational reform debate. *Educare*, 23(1) : 52-53.

Bersson, R. 1982. Against feeling : aesthetic experience in a technocratic society. *Art Education*, 35(4) : 34-39.

Bierlein, L.A. 1993. *Controversial issues in educational policy*. Newburry Park : Sage.

Birnbaum, N. 1973. *The politics of the future*. Change, 5(9) : 28-37.

Bondesio, M.J. & Berkhout, S.J. 1987. *Onderwysstelselkunde. Department of Educational Management, Historical and Comparative Education*. Pretoria : Pretoria University.

Bowers, C.A. 1977. Emergent ideological characteristics of educational policy. *Teachers' College Records*, 79(1) : 33-54.

Bowers, C.A. 1982. The reproduction of technological consciousness. *Teachers' College Records*, 83(4): 529-557.

Bowles, S. & Gintis, H. 1973. IQ in the US class structure. *Social Policy*, 3(4-5) : 65-96.

Brameld, T. 1965. *Education as power*. New York : Holt, Rinehart & Winston.

Bruckerhoff, C. 1988. Education for the 1990s. *Educational Foundations*, Fall : 5-9.

Brunck, J.W. 1975. *Child and adolescent development*. New York : Wiley.

Buchland, P. 1984. Technicism and De Lange. In : Kallaway, P. (ed). *Apartheid and Education*, Johannesburg: Ravan.

Burris, M.A. 1991. Chinese medical schooling : global science, local schools. In : Epstein, I (ed) *Chinese education : problems, policies and prospects*. New York : Garland.

Burris, B.H. & Heydebrand, W.V. 1981. Educational control in the United States. *New Directions for Higher Education*, 9(3) : 5-25.

Bush, V. 1945. As we may think. *Atlantic Monthly*, 176(1) : 101-110.

Bushnell, D.D. 1964. Computers in education. In : Gross, R. & Murphy, J. (eds). *The Revolution in the school*. New York : Harcout, Brace & World.

Calabrese, R.L. 1988. Schooling, alienation and minority drop out rates. *The Clearing House*, 61 (March) : 325-328.

Chambers's Twentieth Century Dictionary. 1955. S.v. 'professionalism' p. 1077. London : Chambers.

Chanan, G. & Gilchrist, L. 1974. *What school is for*. London : Methuen.

Chen, T.H. 1981. *Chinese education since. 1949*. New York : Pergamon.

Chetty, D., Chisholm, L., Mkwanazi, Z., Motala, S. & Trickly, L. 1993. Competing strategies: the NP and NEPI options. *Indicator SA*, 10(2) : 49-54.

Chisholm, L. 1984. Redefining skills : Black education in South Africa in the 1980's. In : Kallaway, P. (ed) *Apartheid and Education*. Johannesburg : Ravan.

Christie, P. 1991. *The Right to Learn*. Johannesburg : Ravan.

Christie, P. 1992. From crisis to transformation : education in post-apartheid South Africa. *Australian Journal of Education*, 36(1) : 38-52.

Christie, P. & Collins, C. 1982. Bantu Education : apartheid ideology or labour reproduction? *Comparative Education* 18(1) : 59-75.

Cleverley, J. 1985. *The schooling in China*. London : Allen & Unwin.

Coetzer, I.A. & Van Zyl, A.E. 1989. *History of Education : a few contemporary educational issues*. Pretoria: UNISA.

Collins, R. 1979. *The credential society*. New York : Academic.

Cooper, D. 1994. Students shun Cinderella sciences. In : Sonn, F. (ed) *DSA in depth : restructuring education*. Cape Town : IDASA.

COTEP. 1996. *Norms and Standards for Teacher Education.*

Cremin, L.A. 1961. *The transformation of the school*. New York : Knopf.

Cremin, L.A. 1990. *Popular education and its discontents*. New York : Vintage.

Cuban, L. 1988. You're on the right track, David. *Phi Delta Kappan*, 69 (April) : 571-572.

Dawson, D.J. 1987. Credentials and commodity knowledge in curriculum. *Education and society*, 5 (1&2) : 29.

Dekker, E. & Van Schalkwyk, O.J. 1990. 1 ed. *Modern Education Systems*. Durban : Butterworths.

Dekker, E. & Van Schalkwyk, O.J. 1995. 2 ed. *Modern Education Systems*. Durban : Butterworths.

De Kock, W.J. 1971. *History of South Africa*. Pretoria : Department of Information.

Department of Education. 1997. *Draft White paper on higher education*. Pretoria : Government Printers.

Department of Education. 1994. *Educational Renewal Strategy*: *questions and answers*. Pretoria: UNISA.

De Novellis, R.L. & Lewis, A.J. 1974. *Schools become accountable : a PACT approach*. Washington : Association for supervision and curriculum development.

Dewey, J. 1965. *The school and society*. Chicago : University of Chicago.

Dictionary of Education. 1959. S.v.'character' p. 84. New York : McGraw-Hill.

Dictionary of Education. 1959. S.v.'development' p. 167. New York : McGraw-Hill.

Dictionary of Education. 1959. S.v.'mass education' p. 331. New York : McGraw-Hill.

Dictionary of Education. 1959. S.v.'scientism' p. 487. New York : McGraw-Hill.

Dictionary of Education. 1959. S.v.'vocationalism' p. 603. New York : McGraw-Hill.

Dimock, M.E. 1968. *The Japanese technocracy*. Tokyo : Walker/Weatherhill.

Dore, R. 1976. *The diploma disease*. London : Allen & Unwin.

Dreckmeyr, M. (ed). 1989. *Only Study Guide for ODI 401-C*. Pretoria : UNISA.

Dreyer, J.M. 1994. Promoting the potential of children. *Educare,* 23(1) : 70-74.

Du Plooy, J.L., Griessel, G.A.J. & Oberholzer, M.O. 1982. *Fundamental Pedagogics for Advanced Students*. Pretoria : Haum.

Education Digest. 1991. *America 2000 : An Education Strategy* : 1-7.

Education and Science. 1983. *Chinese handbook series*. Beijing : Foreign Languages.

Eisner, E.W. 1992. Educational reform and ecology of schooling. *Teachers College Records*, 93(4): 610-618.

Ekins, P.A. 1992. *New world order : grassroots movement for global change*. London : Routledge.

Ellul, J. 1964. *The technological society*. New York : Vintage.

Elmandjra, M. 1986. Learning needs in a changing world. *Futures*, 13(6) : 731-737.

Engelbrecht, S.W.B., Yssel, J.C., Griessel, G.A.J. & Verster, T.L. 1984. *Education III*. Goodwood: Via Afrika.

Epstein, I. (ed). 1991. *Chinese education : problems, policies and prospects*. New York : Garland.

Eurich, A.C. 1964. Preparing better teachers. In : Gross, R. & Murphy, J. (eds). *The Revolution in the school*. New York : Marcout, Bruce & World.

Faquan, L. 1980. Promote respect for teachers and raise their position. *Red Flag*, 13 : 62-67.

Faulkner, J.K. 1965. *The emergence of technocracy as a social reform movement*. Michigan: University Microfilms.

Feller, G. 1995. East meets West outline. *Internet World*, 61(3) : 48-50.

Finn, J.D. 1964. Technology and the instructional process. In : Gross, R. & Murphy, J. (eds) *The Revolution in the school*. New York : Harcout, Brace & World.

Fisher, F. & Mandell, A. 1988. Relegitimating meritocracy : educational policy as a technocratic

strategy. *Telos*, 76 : 50-65.

Foster, P.J. 1977. Education and social differentiation in less developed countries. *Comparative Education Review*, 21 (2-3) : 211-229.

Fourie, D.I., Oberholzer, M.O. & Verster, T.L. 1995. 2 ed. *Education 1*. Pretoria : Via Afrika.

Fraser, W.J., Loubser, C.P. & Van Rooy, M.P. 1990. *Didactics for undergraduate students.* Durban : Butterworth.

Freire, P. 1970. *Pedagogy of the oppressed.* New York : Herder & Herder.

Furgoson, M. 1993. Flying and seeing : new ways to learn. In : Dreckmeyr, M. (ed) *Contemporary problems in Didactics II.* Pretoria : UNISA.

Gardiner, M. 1990. Liberating language: People's English for the future. In: Nasson, B & Samuel, J (eds). *Education from poverty to liberation*. Cape Town: Phillip

Garland, V.E. & Yang, D.T. 1994. East meets West : technology training in the PRC. *T.H.E.: Journal*, 21 (b): 50-53.

Gerth, H.H. & Mills, W. (eds) 1977. *From Max Webber*. New York : Oxford.

Gillette, A. 1979. Structural changes in eduction since 1954. *International Review of Education*, XXV (2-3) : 267-296.

Griessel, G.A.J., Louw, G.J.J. & Swart, C.A. 1995. *Principles of educative teaching*. Pretoria: Acacia.

Gunter, C.F.G. 1990. *Aspects of educational theory*. Stellenbosch : University Publishers.

Halls, W.D. 1985. Democratization in secondary and higher education. In : Watson, K. (ed) *Key issues in education*. London : Helm.

Hamm, R.L. 1981. *Philosophy of Education*. Illinois : Interstate.

Hartshorne, K. 1992. *Crisis and challenge : Black education 1910-1990.* Cape Town : Oxford University.

Hawkins, J.N. 1983. *Education and social change in the People's Republic of China*. New York: Praeger.

Hayhoe, R. 1984. *Contemporary Chinese education*. London : Helm.

Hemming, J. 1980. *The betrayal of youth*. London : Boyars.

Hicks, D. 1991. Reflections on the need for future education. *Futures* 23 (6) : 623-634.

Higgs, P. & Higgs, L.G. 1994.University education in post-apartheid South Africa. *Educare*, 23 (1): 42-44.

Hofmeyr, J. 1989. Equalizing educational opportunity. *South African Journal of Labour Relations*, 13 (2) : 20-42.

Hofmeyr, J. & Moulder, J. 1987. Power games. *Leadership*: 36 - 37

Hofmeyr, J. & Spence, R. 1989. Bridges to the future. *Optima*, 37 (1) : 38-47.

Hooper, B. 1991. Gender and education. In : Epstein, I (ed) *Chinese education : problems, policies and prospects*. New York : Garland.

Honig, E. & Hershatter, G. 1989. *Personal voices : Chinese women in the 1980s*. Stanford : Stanford University.

Hoyt, K. 1991. Educational reform and relationship between private sector and education. *Phi Delta Kappan*, (Feb) : 450-453.

Hsueh, F. 1975. A school-run factory in Peking. *Prospect*, 4 : 489-491.

Hu, S.M. & Seifman, E. 1987. *Education and socialist modernization*. New York : AMS.

Human Sciences Research Council, 1981a. *Education system planning*. Pretoria : HSRC.

Human Sciences Research Council. 1981b. *The De Lange Commission Report on the provision of education in the RSA*. Pretoria : HSRC.

Human Sciences Research Council. 1995. *Ways of seeing the National Qualifications Framework*. Pretoria : HSRC.

Husén, T. 1974. *Talent, equality and meritocracy*. The Hague: Nijhoff.

Husén, T. 1979. *The school in question*. London : Oxford.

Husén, T. 1985. The school in an achievement-orientated society. *Phi Delta Kappan* (Feb): 398-400.

Husén, T. 1990. *Education and the global concern*. New York : Pergaman.

Hyslop, J. 1990. Schools, unemployment and youth. In : Nasson, B. & Samuel, J. (eds). *Education from poverty to liberation*. Cape Town : Phillip.

Jennings, J.F. (ed) 1993. *National issues in education : the past is prologue*. Indiana : Phi Delta Kappan.

Johansen, J.H., Collins, W.H. & Johnson, J.A. 1990. 6 ed. *American Education*. Dubuque, Iowa: Brown.

Kearns, D.T. 1988. An educational recovery for America. *Phi Delta Kappan*, 69 : 565-560.

King, E.J. 1979. *Other schools and ours : comparative education today*. London : Holt, Rinehart & Winston.

King, E. 1994. Chinese educational developments in comparative perspective. *Comparative Education*, 20 (1) : 165-182.

Kolde, R.F. 1991. Integrated learning for a competitive workforce. *Phi Delta Kappan* (Feb) : 453-454.

Laszlo, A. & Castro, K. 1995. Technology and values. Educational *Technology* 35 (2) : 7-13.

Lategan, M.M. 1986. *Onderwys vir die begaafde kind: 'n Historiese-pedagogiese deurskouing. Unpublished thesis*. Pretoria : UNISA.

Lee, G.C. 1960. *Education in modern America*. New York : Holt, Rinehart & Winston.

Le Roux, C.S. 1995. *The evolution and educational implications of children's rights movement : a study in time perspective. Unpublished M.Ed dissertation*. Pretoria : UNISA.

Lin, J. 1993. *Education in post-Mao China*. London : Praeger.

Lo, B.L.C. 1984. Primary education in China : a two-track system of dual tasks. In : Hayhoe, R (ed) *Contemporary Chinese education*. London : Helm.

Löfstedt, J.I. 1980. *Chinese educational policy*. Stockholm : Almquist & Wiksell.

Longman Dictionary of Contemporary English. 1991. S.v.'education' p. 325. England : Longman.

Longman Dictionary of Contemporary English. 1991. S.v.'effects' p. 326. England : Longman.

Longman Dictionary of Contemporary English. 1991. S.v.'technocrat' p.1087. England : Longman.

Longman Dictionary of Contemporary English. 1991. S.v.'technology' p.1087. England : Longman.

Lucas, C.L. 1972. *Our western educational heritage*. New York : McMillan.

Lunenburg, F.C. & Ornstein, A.C. 1991. *Educational administration : concepts and practices*. Belmont : Wadsworth.

Luthuli, A. 1962. *Let my people go*. New York: Meridian.

Maehr, M.L. 1976. Continuing motivation. *Review of Education Research*, 46 (3) : 443-462.

Malherbe, E. 1977. *Education in South Africa. Volume 2 : 1923-1975*. Cape Town : Juta.

Marchello, J.M. 1987. Education for a technological age. *Futures*, 19 (5) : 551-556.

Maree, L.M. 1995. *Education under the new Constitution*. Goodwood : Via Afrika.

Marland, S.P. (Jr). 1972a. *Education of the gifted and talented : report to Congress of the United States by the US Commissioner of Education*. Washington DC : Government Printers.

Marland, S.P. (Jr). 1972b. The school's role in career development. *Education Leadership*, 50 (Dec): 203.

McKay, J., Gore, J.M. & Kirk, D. 1990. Beyond the limits of technocratic physical education. *Quest*, 42 (2) : 52-76.

Mingyuan, G. 1984. The development and reform of higher education in China. *Comparative Education*, 20(1): 141-148.

Mkhatshwa, S. 1997. *Address at graduation ceremony at the Mankwe Christian College of Education: The Role of Teacher Education in the new South Africa with special reference to Mathematics, Science and Technology on 10 May 1997.*

Mncwabe, M.P. 1994. *Black teacher's dilemma.* Braamfontein : Skotaville.

Morgan, E. 1984. Technocratic vs democratic options for educational policy. *Policy Studies Review*, 13 (2): 263-278.

Moynes, R.E. 1984. Megatrends and education's future. *Education Canada*, Fall/Autumn : 4-8.

Naisbitt, J. & Aburdene, P. 1990. *Megatrends 2000.* London : Sidwick & Jackson.

Nash, R.J. & Agne, R.M. 1972. The ethos accountability: a critique. *Teachers' College Records*, 73 (30) : 357-370.

Nasson, B. 1990. Redefining inequality. In : Nasson, B. & Samuel, J. (eds). *Education from poverty to liberation.* Cape Town : Phillip.

NASSP-Bulletin. 1992. *Principal's role to become more demanding as school transformation occurs.* 76 (541): 40-53.

Newt Davidson Collective. 1973. *Crisis at CUNY.* New York : Newt Davidson Collective.

NICE. 1995. *A framework for the provision of adult basic and further education and training.* Pretoria: Government Printers.

Niu, X. 1992. *Policy education and inequalities in Communist China since 1949.* London : University Press of America.

OBE. 1997. *Background for educators.* Pretoria: Department of Education.

Olsen, E.G. & Clark, P.A. 1977. *Life-centering education.* Midland : Pendell.

Oxenham, J. (ed). 1984. *Education versus qualification.* London : Allen & Unwin.

Oxford Advanced Learner's Dictionary of Current English. 1981. S.v.'character' p. 139. Oxford: Oxford University.

Oxford Advanced Learner's Dictionary of Current English. 1981.S.v.'effects' p. 276-277. Oxford: Oxford University.

Oxford Advanced Learner's Dictionary of Current English. 1981. S.v.'meritocracy' p. 252. Oxford: Oxford University.

Oxford Advanced Learner's Dictionary of Current English. 1981. S.v.'profession' p. 666. Oxford: Oxford University.

Oxford Advanced Learner's Dictionary of Current English. 1981. S.v.'professionalism' p. 666. Oxford : Oxford University.

Oxford Advanced Learner's Dictionary of Current English. 1981. S.v.'science' p. 760. Oxford : Oxford University.

Oxford Advanced Learner's Dictionary of Current English. 1981. S.v.'specialist' p. 827. Oxford: Oxford University.

Pai, Y. & Krueger, J. 1980. Accountability: a technological view of education. *Journal of thought*, 15 (4) : 27-35.

Parmley, D.M. 1995. Interactive technologies : new tools for communication in the classroom. *The Delta Kappan Gamma Bulletin*, 61 (3) : 27-32.

Passow, A.H. 1979. *The Gifted and the talented*. Chicago : University of Chicago.

Pepper, S. 1991. Post-Mao reforms in education: can ghosts of the past be laid to rest? In : Epstein, I. (ed) *Chinese education : problems, policies and prospects*. New York : Garland.

Phillips, B. 1994. A private sector perspective. In : Sonn, F. (ed) *DSA in-depth : reconstructing education*. Cape Town : IDASA.

Pillay, P.N. 1990. The development and underdevelopment of education in South Africa. In : Nasson, b. & Samuel, J. (eds) *Education from poverty to liberation*. Cape Town : Phillip.

Posthuma, A. J. 1986. On interpretation and reinterpretation of History. In : *Gister en Vandag*, 11: 12-13.

Power, E. J. 1982. *Philosophy of education*. New Jersey : Prentice-Hall.

Price, R.F. 1979. *Education in modern China*. London : Routledge & Kegan.

Prickett, E.M., Higgins, K. & Boone, R. 1994. Technology for learning. *Teaching Exceptional Children*, 26(4): 56-60.

Qiping, Y. & White, G. 1994. The marketization of Chinese higher education. *Comparative Education*, 30(3): 219-237.

Qu, B, (ed). 1991. *Educational reform in China*. Beijing : People's Education.

Rai, S.M. 1994. Modernization and gender. *Gender and education*, 6(2) : 119-129.

Random House Webster's College Dictionary. 1991. S.v.'scientism' p. 1201. New York : Random House.

Rautenbach, W. 1992. Technical and vocational education. In : McGregor, R. & McGregor, A. (eds). *McGregor's Education Alternatives*. Kenwyn : Juta.

Reimer, E. 1971. *School is dead*. England : Penguin.

Rivers, D. 1993. Creating quality middle schools. *Journal for quality and participation*, 16(1) : 56-59.

Robins, K. & Webster, F. 1989. *The technical-fix : education, computers and industry*. London : Macmillan.

Rose, B. & Tunmer, R. (eds). 1975. *Documents in South African education*. Johannesburg : Donker.

Rowney, D.K. 1989. *Transition to technocracy*. Ithaca : Cornell University.

Sadovnik, A.R., Cookson, P.W. & Semel, S.F. 1994. *Exploring education : an introduction to the foundation of education*. Boston : Allyn & Bacon.

Samuel, J. 1990. The state of education in South Africa. In : Nasson, B. & Samuel, J. (eds) *Education from poverty to liberation*. Cape Town : Phillip.

Saylor, J.G., Alexander, W.M. & Lewis, A.J. 1981. *Curriculum planning for better teaching and learning*. Tokyo: Holt, Rinehart & Winston.

Schaeffer, E. 1978. Normative crisis in higher education. *Educational Forum*, 42 (4) : 411-419.

Searle, P. 1988. Values in education. *Education Journal*, 3 : 26-29.

Seay, M.F. 1953. The community school. In : Henry, N.B. (ed) *The Community School*. Chicago: University of Chicago.

Sebidi, L.J. 1989. The trauma of Black education in South Africa with People's Education as the possible way ahead. *Religious Education*, 47 (2) : 3-6.

Seybolt, P.J. 1973. *Revolutionary education in China*. White Plan : International Arts and Science.

Shapiro, S. 1984. Crisis of legitimation. *Interchange*, 15 (4) : 26-39.

Shen, J. 1994. Educational policy in the People's Republic of China. *Journal of Educational Policy*, 9 (1) : 1-13.

Smyth, J. 1987. Teachers-as-intellectuals in a critical pedagogy of schooling. *Education and society*, 5 (1&2): 11-28.

South African Schools Act Made Easy. 1997. Pretoria: Department of Education.

Stanley, M. 1980. Social science and legitimate policy discourse. *Teachers' College Records*, 81 (3): 270-292.

Stenhouse, L. 1988. *An introduction to curriculum research and development.* London : Heinemann.

Stevenson, H.W., Lee, S-Y. & Chen, C. 1994. Education of gifted and talented students in Mainland China, Taiwan, and Japan. *Journal for the education of the gifted*, 17 (2) : 104-130.

Steyn, G.M. 1996. The quest for quality in our schools. *Educare,* 25 (1&2) : 120-135.

Stone, H.J.S. 1979. *Staat, gesag en onderwys. Unpublished D.Ed thesis.* Bloemfontein : UOVS.

Stratemeyer, F.B., Forkner, H.L., McKim, M.B. & Passow, A.H. 1957. 2 ed. *Development of curriculum for modern living.* New York : Teachers' College.

Swanson, A.D. & Zhian, Z. 1987. Education reform in China. *Phi Delta Kappan*, 68 (5) : 373-378.

Tannenbaum, A.J. 1972. A backward and forward glance at the gifted and talented. *Principal*, 51 : 18-19.

The New Encyclopaedia Britannica. 1990. Chicago: University of Chicago.

Toffler, A. 1970. *Future Shock.* Sydney : Pan.

Toffler, A. 1980. *The Third Wave.* London : Pan.

Tsang, C. 1968. *Society, schools and progress in China.* Oxford : Pergamon.

UNESCO. 1960. *Standard Setting Instruments*, 1 (1) : 3-4. New York : UNESCO.

Unger, J. 1982. *Education under Mao. 1960-1980.* New York : Columbia University.

UOFS. 1993. *Education and Manpower development*, 14. Bloemfontein: Research Institute for Education Planning.

Vandenberg, M.N. 1985. Technology, society and culture. *Technology in society*, 7 (4) : 411-422.

Van Niekerk, L. 1991. The emergence of provincial education systems in South Africa. In : Van Niekerk, L., Rousseau, J.D. & Schoeman, S. (eds). *Only study guide for EDU302-T.* Pretoria : UNISA.

Van Rensburg, P. 1991. Critical innovations : education for employment. *Matlhasedi*, Nov/Dec: 29-32.

Van Rensburg, C.J.J., Landman, W.A. & Bodenstein, H.C.A. 1994. *Basic concepts in education.* Halfway House: Orion.

Van Schalkwyk, O.J. 1988. *The education system : theory and practice*. Pretoria : Butterworth.

Venter, I.S.J. 1985. *History of Education*. Durban : Butterworth.

Venter, I.S.J. & Van Heerden, S.M. 1989. *The grounding of History of Education*. Durban : Butterworth.

Venter, I.S.J. & Verster, T.L. 1996. 2 ed. *Educational Themes in Time Perspective part 3*. Pretoria: UNISA.

Viljoen, G. 1987. The role of technikons in a balanced system of tertiary education. *Research Bulletin, Journal of the SAPRHS*, 17 (5) : 1-3.

Vos, A.J. & Brits, V.M. 1990. *Comparative Education and National Education Systems*. Durban: Butterworth.

Webster's New Collegiate Dictionary. 1981. S.v.'meritocracy' p. 713. Springfield : Merriam.

Webster's New Collegiate Dictionary. 1981. S.v.'specialization' p. 1107. Springfield : Merriam.

Webster's New Collegiate Dictionary. 1981. S.v.'vocationalism' p. 1301. Springfield : Merriam.

Whitaker, K.S. & Moses, M.C. 1994. *The restructuring handbook : a guide to school revitalization*. Massachusetts : Allyn & Bacon.

White Paper on education and training in a democratic South Africa. 1994. Pretoria: Government Printers.

White Paper on education and training. 1995. Pretoria: Government Printers.

White Paper on the RDP. 1994. Pretoria: Government Printers.

Wiersma, W. 1991. *Research methods in education : an introduction*. Boston : Allyn & Bacon.

Willis, P. 1988. *Learning to labour : how working class kids get working class jobs*. England: Gower.

Wilson, C. T. 1995. Issues in instructional design related to computer technology implementation in the classroom. *The Delta Kappan Gamma Bulletin*, 61 (3) : 5-9.

Woods, P. 1979. *The divided school*. London : Routledge & Kegan.

World Bank. 1985. *China : issues and prospects in education*. Washington : The World Bank.

World Book Dictionary. 1987. S.v.'meritocracy' p. 1300. Chicago : World Book.

World Book Dictionary. 1985. S.v.'technocracy' p. 2154. Chicago : World Book.

World Book Dictionary. 1985. S.v.'technocratic' p. 2154. Chicago : World Book.

World Book Dictionary. 1985. S.v.'technological' p. 2154. Chicago : World Book.

Wynn, R., De Young, C.A. & Wynn, J.L. 1977. 8 ed. *American education*. New York: McGraw-Hill.

Xinyan, Y. 1982. We must attach importance to family education. *Red Flag*, 15 : 14-18.

You, J. 1991. *China : a comparative study*. Canberra : Australian Government.