TECHNICAL EDUCATION IN NAMIBIA: PAST TRENDS, PRESENT CIRCUMSTANCES AND FUTURE PROSPECTS

by

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DECLARATION

I declare that the thesis hereby submitted by me for the Ph D degree at the University of the Free State is my own independent work and has not previously been submitted by me at another university/faculty. I furthermore cede copyright of the thesis in favour of the University of the Free State.

……………………..

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Windhoek, Namibia

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DEDICATION

To my late father

Hennie Brunette

who had been my mentor and role-model.

Thank you for the sacrifices you made for me.

P.O. Box 11991
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TO WHOM IT MAY CONCERN

This is to certify that I have, in my personal capacity of freelance editor, edited the Ph D thesis of Mr H.C. Brunette and can, to the best of my knowledge, declare it free of grammatical errors.

The changes I have indicated concerning the thesis have been made by myself and Mr Brunette.

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SUMMARY

The emergence of technological education as an integral component of general education has become a significant international curriculum development of recent years. Its distinctive curriculum features are technological literacy and capability and it highlights the importance of "applied knowledge", "doing", "technological understanding" and "problem solving". Technological education at international level is growing in value and it is utilised to increase employability levels among school-leavers through involving businesses and industries from the private sector in activities such as syllabus design and material support. Against this background, the research study investigated the character, value and relevancy of technological education in Namibia over several decades.

The first phase of this study comprises a comprehensive overview of the literature on technological education at national and international levels. A study of technological education in various countries and specifically Germany, a previous colonial ruler of Namibia, identified the following characteristics:

- The status and value of technological education is very high and is considered as a vehicle for the attainment of economic prosperity and to decrease unemployment.
- The private sector provides financial, material and moral support to technological education, for example the design of syllabi at school level.
- Technological education improves the technological knowledge and skills of learners that enable them to get employment or become self-employed more easily.

The second phase involved research by means of questionnaires and interviews. The two structured questionnaires were administered to samples of 126 learners and 26 teachers respectively at technical secondary schools. Interviews were held with knowledgeable Namibian educators about the prevalence of current technical education in Namibia. The information gathered from the literature and the results of the questionnaires and interviews provided evidence that the status of technological education in Namibia had declined to such an extent due to neglect, that a new approach to technical education, namely technological education, is required. Some of the major findings are the following:

- Before independence Namibians were denied the opportunity to design technical education programmes as South African education programmes were used.
- The South African-based technical education did not consider local economic realities and employment demands although it was of a good standard, equalling that of South Africa.
- After independence Namibians were given opportunities to design technical education programmes.
- Local technical education programmes were developed according to perceived needs and not to scientifically established economic and industrial needs.
- There is evidence of poor quality at the various levels of technical education, resulting in learners leaving schools with theoretical knowledge but without practical capabilities and entrepreneurial skills.
- Poor planning procedures for technical education resulted in inadequate budgets which caused equipment to deteriorate and insufficient materials.

In view of these findings, recommendations are made in order for appropriate technological education to be designed properly and implemented effectively. Firstly, the status and value of technological education among Namibians need to be improved. Secondly, relevant technical education programmes that encompass purposes, content, processes, contexts and structures, which communities will be able to see as part of the school curriculum, need to be designed. Thirdly, the private sector must be involved in technological education. Finally, the ultimate value of this study is the contribution to the design and implementation of an appropriate technical education model which adds to the overall development of Namibia as a peaceful and economically vibrant country.

OPSOMMING

Die ontwikkeling van tegnologiese onderwys as ŉ integrale komponent van algemene onderwys is ŉ belangrike internasionale verwikkeling op die terrein van kurrikulumontwerp gedurende die afgelope jare. Die kenmerkende kurrikulumeienskappe is tegnologiese kundigheid en bevoegdheid, en dit beklemtoon die belangrikheid van "toegepaste kennis", van "om te doen", "tegnologiese begrip" en "probleemoplossing". Tegnologiese onderwys op internasionale vlak groei toenemend in waarde en word benut om die indiensnemingsvlakke van skoolverlaters te verhoog deur besighede en industrieë vanuit die privaat sektor te betrek by aktiwiteite soos sillabusontwerp en materiële ondersteuning. Teen hierdie agtergrond het hierdie navorsingstudie die karakter, waarde en relevansie van tegnologiese onderwys in Namibië bestudeer wat strek oor verskeie dekades.

Die eerste fase van hierdie studie bestaan uit ŉ omvangryke oorsig van literatuur betreffende tegnologiese onderwys op nasionale en internasionale vlakke. ŉ Studie van tegnologiese onderwys in verskeie lande en meer bepaald Duitsland, ŉ vorige koloniale heerser van Namibië, het die volgende eienskappe geïdentifiseer:

- Die status en waarde van tegnologiese onderwys is baie hoog en dit word gesien as ŉ belangrike medium om ekonomiese welvaart te bereik en werkloosheid te bekamp.
- Die privaat sektor verskaf finansiële, materiële en morale ondersteuning aan tegnologiese onderwys, byvoorbeeld by die ontwerp van skool sillabusse.
- Tegnologiese onderwys bevorder tegnologiese kennis en praktiese vaardighede van leerlinge wat dit vir hulle makliker maak om ŉ werk te bekom of om dit self te skep.

Die tweede fase het navorsing behels deur middel van vraelyste en onderhoude. Die gestruktureerde twee vraelyste is onderskeidelik bedien aan ŉ steekproef van 126 leerders en 26 onderwysers verbonde aan sekondêre tegniese skole. Onderhoude is gevoer met Namibiese onderwyskundiges omtrent die voorkoms van huidige tegnologiese onderwys in Namibië. Die inligting wat versamel is vanuit die literatuur en die resultate van die vraelyste en onderhoude het bewys verskaf dat die status van tegniese onderwys in Namibië tot so ŉ mate afgeneem het as gevolg van verwaarlosing dat ŉ nuwe benadering tot tegniese onderwys, naamlik tegnologiese onderwys, nodig geword het.

Die volgende is enkele van die hoofbevindinge wat gemaak is:

- Voor onafhanklikheid is Namibiërs die geleentheid ontneem om by die ontwerp van tegniese onderwysprogramme betrokke te raak omdat Suid-Afrikaanse onderwysprogramme gebruik is.
- Die Suid-Afrikaans-gebaseerde tegniese onderwys het nie voorsiening gemaak vir plaaslike ekonomiese realiteite en werkseise nie ten spyte daarvan dat dit van 'n goeie standaard was wat die standaarde van Suid-Afrika gereflekteer het.
- Na onafhanklikheid is Namibiërs die geleentheid gebied om tegniese onderwysprogramme te ontwikkel.
- Plaaslike tegniese onderwysprogramme is gebaseer op veronderstelde behoeftes en nie op ekonomiese en industriële behoeftes wat wetenskaplik vasgestel is nie.
- Daar is bewyse van onvoldoende kwaliteit op die verskillende vlakke van tegniese onderwys, wat veroorsaak dat leerders skole verlaat met teoretiese kennis maar sonder praktiese vermoëns en entrepreneursvaardighede.
- Swak beplanningsprosedures vir tegniese onderwys het gelei tot onvoldoende begrotings wat veroorsaak het dat die toestand van toerusting toegelaat is om agteruit te gaan en dat voldoende materiale nie beskikbaar gestel is nie.

In die lig van die bevindinge is aanbevelings gemaak om te verseker dat toepaslike tegnologiese onderwys ontwerp en effektief geïmplementeer word. Eerstens, die status en waarde van tegnologiese onderwys moet onder Namibiërs verbeter word. Tweedens, toepaslike onderwysprogramme wat gebaseer is op relevante doelwitte, vakinhoude, prosesse, kontekste en strukture, wat dit moontlik maak vir gemeenskappe om die resultate te sien in hul kinders se prestasies, moet ontwikkel word. Derdens, die privaat sektor moet betrek word by tegnologiese onderwys. Laastens, die uiteindelike waarde van die studie is die bydrae wat gelewer word tot die ontwerp en implementering van 'n toepaslike tegnologiese onderwysmodel wat 'n bydrae lewer tot die ontwikkeling van Namibië as 'n vreedsame en ekonomies vooruitstrewende land.

TABLE OF CONTENTS

CHAPTER 1:

ORIENTATION		**1**
1.1	INTRODUCTORY REMARKS	1
1.2	STATEMENT OF THE PROBLEM	2
1.2.1	Some specific problem areas	3
1.2.1.1	History of technical education within Namibia	3
1.2.1.2	History of technical education outside Namibia	4
1.2.1.3	Technical education in independent Namibia	5
1.2.1.4	International issues with regard to technical education	5
1.2.1.5	The relevancy of current technical education in Namibia	6
1.2.1.6	A new model for technical education in Namibia	7
1.3	PURPOSE OF THE STUDY	8
1.4	SIGNIFICANCE OF THE STUDY	9
1.5	CLARIFICATION OF TERMS	10
1.6	DEMARCATION OF THE FIELD OF STUDY	13
1.7	METHODS OF STUDY	14
1.7.1	Mode of research	14
1.7.1.1	Literature study	15
1.7.1.2	Empirical research	17
	a) Qualitative research	17
	b) Quantitative research	18
1.8	OUTLINE OF THE THESIS	18
1.9	CONCLUSION	19

CHAPTER 2:

THE NAMIBIAN EDUCATION SYSTEM: 1800-1990 …………………………….. 20

2.1 INTRODUCTION ……………………………………………………… 20

2.2 THE FIRST PHASE: TECHNICAL EDUCATION ALONG TRADITIONAL LINES ………………………………………………… 20

2.3 THE SECOND PHASE: CONTRIBUTION OF MISSIONARIES IN PROVIDING TECHNICAL EDUCATION ……………………………. 21

2.3.1 Political effects on missionary education ……………………………….. 21

2.3.2 The contribution of missionary societies to technical education ………... 22

2.4 THE THIRD PHASE: EDUCATION DURING GERMAN COLONIALISM, 1884-1915 ……………………………………………. 25

2.4.1 Character of the education system ………………………………………. 25

2.4.2 Education for whites ……………………………………………………... 26

2.4.3 Education for non-whites ………………………………………………… 27

2.4.4 Employment opportunities for trainees ………………………………….. 28

2.5 THE FOURTH PHASE: SOUTH AFRICAN ADMINISTRATION OF NAMIBIA, 1915-1989 ……………………………………………….. 28

2.5.1 South African military rule ………………………………………………. 28

2.5.2 Namibia under South African civil administration, 1919-1948 ………….. 30

2.5.2.1 The Education Proclamation of 1921 ……………………………………. 30

2.5.2.2 The Education Conference of 1923 ……………………………………… 31

2.5.2.3 Proclamation No 16 of 1926 ……………………………………………... 32

2.5.2.4 Education of non-whites …………………………………………………. 32

2.5.2.5 Education of whites ……………………………………………………… 33

2.5.2.6 New curriculum for mission schools …………………………………….. 34

2.5.2.7 Further training opportunities for non-whites …………………………… 35

2.5.2.8 Namibia’s international status after World War II ………………………. 36

2.5.3 Manifestation of the South African apartheid policy, 1948-1976 ………. 37

2.5.3.1 The Van Zyl Commission Report ………………………………………. 37

2.5.3.2 The Odendaal Commission Report ………………………………………. 38

2.5.3.3 Augustineum School …………………………………………………...... 39

2.5.3.4 Establishment of technical schools ………………………………………. 40
2.5.3.5 Skilled labour ………………………………………………………….. 41
2.5.3.6 Technical education for white children ……………………………….. 42
2.5.3.7 School curriculum content ……………………………………............... 43
2.5.3.8 The implementation of Bantu Education ……………………………… 44
2.5.3.9 Clashing viewpoints: United Nations and South Africa ………………… 47
2.5.3.10 Technical education and vocational training …………………………… 47
2.5.4 Technical education, 1976-1989 ……………………………................ 48
2.5.4.1 The Representative Authorities' Proclamation ………………………….. 48
2.5.4.2 The De Lange Report …………………………………………………… 49
2.5.4.3 Training of technical teachers ……………………………………….... 50
2.5.4.4 SWAPO's election manifest …………………………………………….. 51
2.5.4.5 Irrelevant curricula causing poor motivation among learners ……........... 52
2.5.4.6 Schools for Namibians outside Namibia's borders ……………………… 53
2.5.4.7 Demands to change technical education ………………………………... 56
2.5.4.8 Technical education in independent Namibia …………………………..... 57
2.6 CONCLUSION ………………………………………………………... 58

CHAPTER 3:

THE NAMIBIAN EDUCATION SYSTEM AFTER INDEPENDENCE ………….. 60

3.1 INTRODUCTION …………………………………………………….. 60
3.2 STRUCTURE AND POLICIES OF THE NAMIBIAN EDUCATION SYSTEM ………………………………………………………………… 60
3.2.1 Technical education at primary school level ……………………………... 64
3.2.2 Technical education at secondary school level …………………………... 65
3.2.2.1 Junior secondary school curriculum ……………………………………... 66
3.2.2.2 Senior secondary school curriculum ……………………………………... 67
3.2.3 Enrolment figures for technical subjects ………………………………… 72
3.2.3.1 Primary school enrolment ……………………………………………….. 72
3.2.3.2 Secondary school enrolment ……………………………………………….. 73
3.2.4 Examination results for technical subjects ………………………………. 74

3.2.4.1 Junior Secondary Certificate (Grade 10) 74
3.2.4.2 Senior Secondary Certificate 75
3.2.5 Learners with special needs 75
3.2.5.1 Pionier Boys' School 76
3.2.5.2 The industrial school 76
3.2.5.3 Comprehensive Schools for Excellence 76
3.3 DUALISTIC MINISTERIAL STRUCTURE OF TECHNICAL EDUCATION 77
3.4 STATUS OF TECHNICAL EDUCATION IN NAMIBIA 78
3.4.1 Declining status of technical education 78
3.4.2 The status of Design and Technology 83
3.4.3 Promotion of technical education 84
3.5 CHALLENGES TO TECHNICAL EDUCATION IN NAMIBIA 85
3.5.1 High costs of technical education 86
3.5.2 Quality of technical education 88
3.5.3 Gender equality in technical education 89
3.5.4 Accreditation of technical subjects 90
3.6 MINISTRY OF BASIC EDUCATION, SPORT AND CULTURE (MBESC) STRATEGIES 92
3.6.1 The MBESC National Strategic Plan 2001-2006 92
3.6.2 Vision 2030 Programme.. 94
3.6.3 Education for All (EFA) National Plan of Action 2001-2015 95
3.6.3.1 EFA Goal III 95
3.6.3.2 EFA Goal VI 96
3.6.4 MHEVTST challenges for the new millennium 97
3.7 TECHNICAL TEACHERS 97
3.7.1 Training of technical teachers 97
3.7.2 Teaching methodology for technical education 101
3.8 PRESIDENTIAL COMMISSION ON EDUCATION, CULTURE AND TRAINING: ISSUES RELATED TO TECHNICAL EDUCATION 103
3.9 RELEVANCE OF TECHNICAL EDUCATION PROGRAMMES 104

3.9.1 Educational relevance in the Namibian context …………………………… 105
3.9.2 Curriculum design ………………………………………………………… 106
3.9.3 Localisation of syllabi …………………………………………………….. 107
3.9.4 Education with Production (EwP) ……………………………………… 108
3.9.5 Job opportunities in Namibia …………………………………………… 109
3.9.6 University of Science and Technology ……………………….............. 111
3.9.7 Staffing norms …………………………………………………………….. 111
3.9.8 Financing of technical education: Materials and equipment …………… 112
3.10 WATERSHED FOR TECHNICAL EDUCATION ……………………. 114
3.11 CONCLUSION ………………………………………………………. 118

CHAPTER 4:

INTERNATIONAL PERSPECTIVES ON TECHNICAL EDUCATION ………… 119

4.1 INTRODUCTION …………………………………………………… 119
4.2 SOUTH AFRICAN INFLUENCES ON TECHNICAL EDUCATION IN NAMIBIA ...…………………………………………………………….. 119
4.2.1 The De Lange Education Report ……………………………………... 119
4.2.2 The Walters Education Report …………………………………….…... 120
4.3 INTERNATIONAL VIEWS ON TECHNOLOGICAL LITERACY ….. 120
4.3.1 Nature of technology ……………………………………………………. 123
4.3.2 Appropriate technology …………………………………………………. 124
4.4 THEORETICAL FRAMEWORKS TO TECHNICAL EDUCATION … 126
4.4.1 Progressivism …………………………………………………………… 126
4.4.2 Constructivism ………………………………………………………….. 127
4.4.3 Behaviourism ……………………………………………………………. 128
4.4.4 Four perspectives on technical education ……………………………….. 129
4.4.4.1 Technical education as content ………………………………………….. 129
4.4.4.2 Technical education as a process ……………………………………….... 129
4.4.4.3 Technical education as a method ……………………………………….... 130
4.4.4.4 Occupational or vocational approach …………………………………… 130

4.5	TECHNICAL EDUCATION: SCHOOL-BASED VERSUS ENTERPRISE-BASED ………………………………………………	130
4.5.1	The school approach ………………………………………………....	131
4.5.1.1	The Superimposed variation …………………………………………	131
4.5.1.2	The “Separate but Equal” variation ………………………………....	132
4.5.1.3	The “Separate and Inferior” variation ……………………………....	132
4.5.1.4	The “Common Core” variation ………………………………………	133
4.5.2	The enterprise approach ……………………………………………	133
4.5.3	The dual system approach …………………………………………	134
4.5.4	The integrated approach …………………………………………...	134
4.6	TECHNICAL EDUCATION AS THE KEY TO DEVELOPMENT …..	136
4.6.1	Importance of technical education …………………………………	136
4.6.2	Education perspectives on economic development ……………………..	138
4.6.3	Poverty alleviation through technical education ………………..............	139
4.7	QUALITY OF TECHNICAL EDUCATION …………………………..	142
4.7.1	Definitions of quality of education ……………………………………..	142
4.7.2	Standards for technical education …………………………………….	143
4.7.3	Assessment and certification ………………………………………….	143
4.8	INTERNATIONAL TECHNICAL EDUCATION PROJECTS ………..	144
4.8.1	UNESCO’s technical education standards ………………………………	144
4.8.2	World Bank projects ………………………………………………….	146
4.8.3	The International Labour Organisation (ILO) …………………………..	148
4.9	TRAINING OF TECHNICAL TEACHERS ……………………………	148
4.10	RELEVANCE OF TECHNICAL EDUCATION PROGRAMMES …...	152
4.10.1	Curriculum development ………………………………………………..	153
4.10.2	Developmental tasks for technical teaching……………………………….	155
4.10.3	Project-based Learning ……………………………………………….	156
4.10.4	Job-specific technical skill education versus general technical education .	156
4.11	TECHNICAL EDUCATION AND GLOBALISATION ……………….	158
4.12	TECHNICAL EDUCATION AND BUSINESS/INDUSTRY PARTNERSHIPS ………………………………………………………..	161

4.12.1 Rationale for partnerships ………………………………………………. 161
4.12.2 School-to-Work (STW) approach in USA ……………………………... 164
4.13 HUMAN RESOURCE DEVELOPMENT (HRD) ……………………... 166
4.14 POST-INDUSTRIALISM ……………………………………………… 168
4.15 TECHNICAL EDUCATION AND ENTERPRISE RELATIONSHIPS ... 169
4.16 CONCLUSION ……………………………………………………... 171

CHAPTER 5:
THE GERMAN EDUCATION SYSTEM WITH REFERENCE TO
TECHNICAL EDUCATION AND VOCATIONAL TRAINING ………………….. 172

5.1 INTRODUCTION ……………………………………………………… 172
5.2 HISTORICAL OVERVIEW ……………………………………………. 172
5.3 THE GERMAN EDUCATION SYSTEM SINCE UNIFICATION …… 173
5.3.1 Standing Conference of Ministers of Education ………………………… 174
5.3.2 Legislative framework ……………………………………………….. 174
5.4 DIVISION OF THE SCHOOL SYSTEM ……………………………… 175
5.4.1 Common paths of education of a German learner ……………………… 176
5.5 THE STRUCTURE OF SECONDARY EDUCATION ……………….. 177
5.5.1 Junior Secondary Education …………………………………………….. 177
5.5.1.1 Schools offering a single course of education at junior secondary level…. 178
5.5.1.2 Schools offering several courses of education at junior secondary level .. 180
5.5.1.3 Occupational orientation and the transition from School-to-Work ……... 181
5.5.2 Senior Secondary Education ……………………………………………. 182
5.5.2.1 General education schools ……………………………………………… 182
5.5.2.2 Full-time technical/vocational schools …………………………………. 183
5.6 ADMINISTRATIVE FRAMEWORK ………………………………… 186
5.6.1 General educational objectives …………………………………………. 186
5.6.2 Differentiation of educational programmes ……………………………. 187
5.6.3 Curriculum, subjects and teaching hours ……………………………….. 188
5.6.4 Assessment procedures ………………………………………………… 189
5.6.5 Teacher training ……………………………………………………….. 190
5.7 VOCATIONAL TRAINING IN THE DUAL SYSTEM ……………… 190

5.7.1 Apprenticeship training ………. 194
5.7.2 Training at *Berufsschulen* ………. 195
5.7.3 Quality control in the dual system ………. 196
5.7.4 Financing of the dual system ………. 197
5.7.5 Benefits of the dual system ………. 197
5.7.6 Unemployment among German youth ………. 198
5.8 GERMAN EDUCATION IN THE INTERNATIONAL CONTEXT ………. 199
5.9 DEBATES AND REFORMS IN GERMAN EDUCATION ………. 201
5.10 CONCLUSION ………. 203

CHAPTER 6:
THE INQUIRY: CONSTRUCTION AND ADMINISTERING OF THE RESEARCH INSTRUMENTS, PRESENTATION AND ANALYSIS OF THE RESEARCH DATA ………. 204

6.1 INTRODUCTION ………. 204
6.2 SURVEY RESEARCH ………. 204
6.3. QUESTIONNAIRES ………. 204
6.3.1 Advantages and limitations of questionnaires ………. 205
6.3.2 Validity and reliability of questionnaires ………. 205
6.3.3 Constructing and administering the research questionnaire ………. 206
6.3.3.1 Defining research objectives ………. 207
6.3.3.2 Selecting a sample ………. 207
6.3.3.3 Designing the questionnaire ………. 208
6.3.3.4 Pilot testing the questionnaire ………. 209
6.3.3.5 Pre-contacting the sample ………. 209
6.3.3.6 Writing a cover letter ………. 210
6.3.3.7 Following up with non-respondents ………. 210
6.3.3.8 Presentation and analyses of questionnaire data ………. 210
a) Learners' questionnaire ………. 210
b) Teachers' questionnaire ………. 222
6.3.4 Critical synthesis of questionnaires ………. 240

6.4 INTERVIEWS ………………………………………………………. 241
6.4.1 Advantages and limitations of interviews ……………………………… 241
6.4.2 Presentation and analyses of interview data ……………………….ּ...... 242
6.4.2.1 Interview questions put to the lecturer responsible for the training of technical teachers at a Namibian College of Education …..... 242
6.4.2.2 Interview questions put to members of school management at technical schools …... 246
6.4.2.3 Interview questions put to an Education Officer at the National Institute for Educational Development (NIED) 251
6.4.2.4 Questions put to a previous principal of a Namibian school ……………. 257
6.4.3 Critical synthesis of interviews 258
6.5 CONCLUSION ………………………………………………………. 259

CHAPTER 7:

SUMMARY, FINDINGS AND RECOMMENDATIONS ………………………….. 260

7.1 INTRODUCTION ……………………………………………………… 260
7.2 TECHNICAL EDUCATION BEFORE INDEPENDENCE …………… 260
7.2.1 Summary and findings ………………………………………………….. 260
7.2.2 Recommendations ………………………………………………………. 262
7.3 TECHNICAL EDUCATION AFTER INDEPENDENCE …………….. 262
7.3.1 Summary and findings ………………………………………………….. 262
7.3.2 Recommendations ………………………………………………………. 265
7.4 INTERNATIONAL PERSPECTIVES ON TECHNICAL EDUCATION.. 265
7.4.1 Summary and findings …………………………………………………... 265
7.4.2 Recommendations ………………………………………………………. 266
7.5 THE GERMAN EDUCATION PERSPECTIVES: IMPLICATIONS FOR NAMIBIA ………………………………………………………..... 267
7.5.1 Summary and findings ………………………………………………….. 267
7.5.2 Recommendations ………………………………………………………. 267
7.5.2.1 The Namibian state ……………………………………………………… 268
7.5.2.2 The Namibian private sector ……………………………………………. 269

7.5.2.3 Namibian citizens …….. 269
7.5.2.4 Regional educational participants …….. 269
7.5.2.5 The dual system …….. 270
7.6 EMPIRICAL RESEARCH RESULTS …….. 270
7.6.1 Summary and findings …….. 270
7.6.2 Recommendations …….. 271
7.7 CONCLUSION …….. 272

CHAPTER 8:
FRAMEWORK AND STRUCTURE OF THE PROPOSED TECHNOLOGICAL EDUCATION MODEL FOR NAMIBIA …….. 273

8.1 INTRODUCTION …….. 273
8.2 CHARACTERISTICS OF THE PROPOSED TECHNOLOGICAL EDUCATION MODEL …….. 275
8.2.1 Vision statement of technological education …….. 275
8.2.2 Mission statement of technological education …….. 276
8.2.3 Overall goal of technological education …….. 276
8.2.4 Objectives of technological education …….. 276
8.2.5 Priorities of technological education …….. 277
8.2.6 Strategies of technological education …….. 278
8.3 TECHNOLOGICAL EDUCATION POLICIES …….. 279
8.3.1 A suitable technological education system …….. 279
8.3.2 Work orientation through School-to-Work policies …….. 279
8.3.3 Relevancy of technological education …….. 281
8.3.4 Vocational and career guidance …….. 282
8.3.5 Employment-intensive education …….. 283
8.3.6 Learning materials …….. 283
8.4 TECHNOLOGICAL EDUCATION AS HUMAN RESOURCE DEVELOPMENT …….. 283
8.5 RATIONALISATION OF TECHNOLOGICAL EDUCATION …….. 285
8.6 ADMINISTRATION OF TECHNOLOGICAL EDUCATION …….. 287

8.6.1	Directorate of Technological Education ……………………………………	287
8.6.2	Financing of technological education ………………………………………	288
8.6.3	School-to-Work Contact Committee (STWCC) …………………………	290
8.7	STRUCTURE OF TECHNOLOGICAL EDUCATION ………………..	291
8.7.1	Primary schools ……………………………………………………………	293
8.7.2	Technical high schools ……………………………………………………..	293
8.7.3	Junior Secondary Education (JSE) Level ………………………………..	296
8.7.3.1	Grade 8 technological education programme ……………………………	296
8.7.3.2	Grades 9 and 10 technological education programme ………………….	298
8.7.4	Namibia Senior Secondary Certificate (NSSC) Education Level ………	300
8.7.4.1	The Cambridge System pathway ……………………………………….	301
8.7.4.2	The Trade Diploma pathway ……………………………………………	303
8.8	ADMITTANCE OF LEARNERS ………………………………………	305
8.9	ASSESSMENT OF LEARNERS ……………………………………….	305
8.9.1	Junior and Senior Secondary School phases …………………………….	306
8.9.2	Trade diploma programmes ……………………………………………...	306
8.10	CURRICULUM DEVELOPMENT …………………………………….	307
8.10.1	Syllabus development ……………………………………………………	307
8.10.2	Subject content ……………………………………………………….	308
8.11	ACCREDITATION OF PROGRAMMES ……………………………...	309
8.12	TEACHING STAFF …………………………………………………….	309
8.12.1	Pre-service teacher training ……………………………………………...	311
8.12.2	In-service teacher training ……………………………………………….	312
8.13	INTERNATIONAL COOPERATION …………………………………..	312
8.14	CONCLUSION ……………………………………………………….	313
BIBLIOGRAPHY	……………………………………………………………….	314

APPENDICES

Appendix 1	Research Questionnaire: Learners ……………………………………….	370
Appendix 2	Research Questionnaire: Teachers ……………………………………….	372
Appendix 3	Respondents' answers to questionnaire: Learners ……………………….	375

Appendix 4 Respondents' answers to questionnaire: Teachers ………………………… 381
Appendix 5 Learner enrolments in technical subjects in secondary schools ……….... 388
Appendix 6 Junior Secondary technical subject examination results ………………… 391
Appendix 7 Senior Secondary technical subject examination results ………………... 393
Appendix 8 Qualifications of technical teachers ………………………………...... 395
Appendix 9 Interview questions to Mr A. Van Wyk. (Lecturer at the Windhoek College of Education, responsible for the training of technical teachers) ... 396
Appendix 10 Interview questions put to Mr A. Mouton (Education Officer at the National Institute for Educational Development responsible for Technical and Technology Education) …………………………………………….. 397
Appendix 11 Interview questions put to teachers and school management at technical schools 398
Appendix 12 Interview questions put to previous principals of schools ……………… 399
Appendix 13 Interviews …………………….. 400

LIST OF DIAGRAMS

Diagram 2.1 The structure of Bantu Education in Namibia …………………………... 46
Diagram 3.1 Structure of the Education System in Namibia ………………………….. 62
Diagram 5.1 Basic structure of the German education system ……………………….. 176
Diagram 8.1 Structure of the School-to-Work Contact Committee (STWCC) ……….... 291
Diagram 8.2 Structure of technological education ……………………………………. 292
Diagram 8.3 Structure of technological education at Senior Secondary Level ……….. 300

LIST OF MAPS

Map 2.1 Map of Namibia ………………………………………………………… 25

LIST OF TABLES

Table 3.1 Craft and Technology enrolment figures ………………………………… 72
Table 4.1 Characteristics of Technology Levels …………………………………… 125

LIST OF ABBREVIATIONS

AG	Administrator General
ASTUN	Applied Science and Technology University of Namibia
BBC	British Broadcasting Corporation
BETD	Basic Teachers Teaching Diploma
BOLESWA	Botswana, Lesotho and Swaziland
CED	Cape Education Department
CDM	Consolidated Diamond Mines
CDP	Craft, Design and Production
CDT	Craft, Design and Technology
CPM	Capability Poverty Measure
DEC	Department of Education and Culture
DFID	Department for International Development
DNEA	Directorate of National Examinations and Assessment
DTE	Directorate for Technical Education
EEC	European Economic Community
EMIS	Educational Management Information System
ETSIP	Education and Training Sector Improvement Programme
EU	European Union
FEMSA	Female Education in Mathematics, Science and Technology in Africa
GCSE	General Certificate of Senior Education
HDI	Human Development Index
HED Tech	Higher Education Diploma Technical
HIGCSE	Higher International General Certificate of Secondary Education
HRD	Human Resource Development
HSRC	Human Sciences Research Council
HTS	Technical High School
ICET	International Council on Education for Teaching

IGCSE	International General Certificate of Secondary Education
ILO	International Labour Organisation
ITEA	International Technology Education Association
JUMP	Immediate Action Programme for Training, Qualification and Employment of Young People
JSE	Junior Secondary Education
LaRRI	Labour Resource and Research Institute
LMI	Labour Market Information
MBESC	Ministry of Basic Education, Sport and Culture
MEC	Ministry of Education and Culture
MHEVTST	Ministry of Higher Education, Vocational Training, Science and Technology
NAMAS	Namibia Association of Norway
NCCI	Namibia Chamber of Commerce and Industry
NEPRU	Namibian Economic Policy Research Unit
NIED	National Institute for Educational Development
NIMT	Namibia Institute of Mining and Technology
NQA	Namibian Qualifications Authority
NSSC	Namibia Senior Secondary Certificate
NTA	Namibia Training Authority
OECD	Organisation for Economic Cooperation and Development
PISA	Programme for International Student Assessment
PON	Polytechnic of Namibia
RME	Religious and Moral Education
RSA	Republic of South Africa
SACMEQ	Southern Africa Consortium for Monitoring Educational Quality
SADC	Southern African Developing Countries
SCANS	Secretary's Commission on Achieving Necessary Skills
SEP	Special Education Programmes Directorate
SIDA	Swedish International Development Agency
SMT	Science, Mathematics and Technology
SSE	Senior Secondary Education

STW	School-to-Work
STWCC	School-to-Work Contact Committee
STWOA	School-to-Work Opportunities Act
SWA	South West Africa
SWAPO	South West African Peoples Organisation
T-Tep	Toyota Technical Education Programme
TIMSS	Third International Mathematics and Science Study
TVET	Technical and Vocational Education and Training
UCLES	University of Cambridge Local Examination Syndicate
UN	United Nations
UNAM	University of Namibia
UNCN	United Nations Council for Namibia
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNEVOC	United Nations Educational, Scientific and Cultural Organisation International Project on Technical and Vocational Education
UNIN	United Nations Institute for Namibia
USA	United States of America
VET	Vocational Education Training
VTC	Vocational Training Centre
WCE	Windhoek College of Education

KEY TERMS

Cambridge system

Design and Technology

ETSIP

German Education system

Ministry of Education

Odendaal Commission Report

Presidential Commission Report

School-to-Work

Technical education

CHAPTER 1

ORIENTATION

1.1 INTRODUCTORY REMARKS

Namibia's independence on 21 March 1990 was preceded and positively affected by a major international conference which took place at Jomtien, Thailand, from 5 to 9 March 1990. At the World Conference on Education for All, educators from all over the world met in order to find solutions for education worldwide. The major theme of the conference was that all people should have access to basic quality education, both because basic education should be considered a right of citizenship and because development is built on a literate populace (World Declaration on Education for All and Framework for Action to meet Basic Learning Needs, 1990: 2-9). The conference participants identified technical education as a vital subject area that could add to development. Consequently, technical education in its various manifestations enjoys huge status at international level and is seen as a vital vehicle for economic development (European Commission, 2003: 11). The Namibian Ministry of Education (MEC) based many of its education policies on the outcomes of that conference (MEC, 1993b: 3-4).

The independence of Namibia and the subsequent introduction of the Namibian Constitution ended decades of colonial administration and brought about major changes for the people of Namibia (Angula, 2000: 13; Amukugo, 1993: 198; Diescho, 1999: 1). Education policies are determined by Article 20 of the Namibian Constitution which provides for decent education for all and universal, compulsory and free primary education within Namibia (MEC, 1993b: 3). As a developing country with limited resources, Namibia can ill afford to implement irrelevant educational policies that do not add to the development of the country and the wealth of its people (Pupkewitz, 2000: 67).

One field of study which could contribute towards constructive nation building is technical education (Rautenbach, 1992: 357; MEC, 1993b: 54). Therefore, a major question that needs to be researched is, "What characterised technical education before independence and what characterises technical education after independence?"

In Namibia technical education has a long history which can be traced back to even before the coming of Europeans (Salia-Bao, 1991: 13; Amukugo, 1993: 33). A study of this enhances the understanding of the ways in which technical education manifested itself. A better understanding of past and current technical education is possible as present technical education policies are built upon previous practices and policies. Knowledge about current technical education policies will guide policy makers and teachers to modernise technical education to fulfil society's expectations. For example, there is a need in Namibia to provide learners with technical skills for employment in all the sectors, and especially for self-employment (Niehaus, 2000: 77; Hangala, 2001: 2).

According to Bell (1987: 1-2), Rautenbach (1992: 357) and Van Rensburg (2001: 5, 74) there is no doubt that the development of quality and efficient technical education and its resultant practical orientation are of cardinal importance to the welfare of people in a country. In Namibia technical education has been proposed as one of the means to accomplish this (MEC, 1993b: 55). However, from statements made by the Namibian educational authorities, it became evident that the emphasis on Education for All (EFA) held repercussions and possible conflicts for the provision of technical education and access to it in Namibia (Clegg, 2004: 24; De Waal, 2002: 2). A study of these and other statements may indicate the stance and policies towards technical education in Namibia.

1.2 STATEMENT OF THE PROBLEM

Namibia, as a developing country, is confronted by demands on its basic education system that need to be addressed if there is to be a secure future and sufficient development for its people (Booysen, 2005c: 8-9). Many demands originate from the reality that the nature of society is becoming increasingly technological (Pupkewitz, 2000: 67; Schoeman, 2000: 74). Society is increasingly looking at the relevancy of syllabi of school subjects in order to ensure the highest level of output and cost-effective practices (Alberts, 1998: 201). However, the Presidential Commission Report (1999: 50) states that by 2010 Namibia will have produced over 200 000 school-leavers who will not be gainfully employed. According to Heita (2000: 43) about 16 500 school-leavers enter the labour market annually without the prospect of finding a job. Their inability to access technical education at school level and find employment makes one wonder about the relevancy of educational policies, in particular technical education.

Education authorities should therefore consider the relevance of technical education at school level. With limited resources at their disposal, Namibian educational authorities should ensure that the policies of technical education answer to the needs of the society (Pupkewitz, 2000: 67). Access to quality technical education should be easier than is currently the situation (Presidential Commission Report, 1999: 53, 57). At the beginning of the 21st century Namibian education is at a crossroads where mistakes of the past and the present need to be redressed (Booysen, 2003: 4; Booysen, 2005a: 5). It forces the current technical education practitioners to link up with the past in order to understand the present situation, but also prompts them to look beyond the present. This study therefore intends to investigate past and present information to verify the relevancy of technical education in Namibia and, if necessary, make proposals for the provision of technical education in order to ensure that it becomes relevant to the needs of Namibians.

1.2.1 Some specific problem areas

In seeking for some pointers as to what technical education in schools in Namibia may encompass, education literature from Namibia and other developing and developed countries provides interesting examples of past and current issues on technical education. These issues are briefly discussed below and so are the specific school-related problems which enjoy the attention of this study. According to Goodson (1984: 42) not only do curriculum histories provide a context for contemporary inquiry, but they also have the "…potential to transform our accounts: to pose fundamental questions and to point towards new agenda for study…"

1.2.1.1 History of technical education within Namibia

Namibia finds itself in a unique position in Southern Africa. For many years educational policies have been exported to and imposed upon Namibia through external governments with varying success (Amukugo, 1993: 41, 71, 214). Namibians had to adapt to these different educational authorities. The first signs of technical education at formal school level can be seen in the work that was done by missionaries (Scholtz, 1973: 9; Stals, 1967: 78; Buys and Kritzinger, 1989: 35). Although education was not the priority, the missionaries laid down the basis of formal education in early Namibia (Salia-Bao, 1991: 14). When Namibia became a German colony, educational developments took place more systematically. Colonists needed workers with practical skills, which resulted in some kind of technical education as part of its educational policies (Scholtz, 1973: 9; Amukugo, 1993: 43). Technical education, at that stage, can therefore be described as providing a skilled workforce for the German colonialists (Salia-Bao, 1991: 15). After South Africa took over the administration of Namibia as a C-Mandate in 1919, education developed along the lines of policies applied in South Africa (Odendaal Commission Report, 1964: 222; Amukugo, 1993: 46). According to Altbach (1977: 190) the education system developed in colonies usually resembled that of the colonising power.

Questions that can be raised are how the South African school curriculum and syllabi were implemented in Namibia, to what extent they answered to the needs of Namibians and to what extent Namibia benefited from them, if at all. Answers to these questions are to be found in the political and educational policy documents and perspectives, which will also guide the development of a new model for technical education in Namibia.

1.2.1.2 History of technical education outside Namibia

In the years preceding Namibia's independence, prospects for Namibians outside the country expanded as educational needs rose. Many Namibians left Namibia and joined the SWAPO schools in neighbouring countries with the support of the Lusaka-based United Nations Institute for Namibia (UNIN). Several schools in Angola and the Congo were established and attended by many exiled Namibians (UNIN, 1987: 186; Amukugo, 1993: 135). One such school was Loudima, where Namibians were educated with the support of the Namibia Association of Norway (SWAPO & NAMAS, 1986: 8-9).

Several questions can be asked such as which technical education syllabi were used and to what extent Namibians gained from technical education as offered in schools while in exile. The answers are to be researched in policy documents, which may provide insight into aspects that need to be considered in a new technical education model.

1.2.1.3 Technical education in independent Namibia

With independence the Namibian government inherited an education system that was one-sided and unbalanced (to the extent that it created a section of the population that was unskilled and illiterate) as well as resulting in a high unemployment rate (Stoermer, 1994: 5). Steyn, Steyn, De Waal and Wolhuter (2001: 44-45); Hartshorne (1999: 6) and Pigozzi (2004: 66) reason that the state has a specific responsibility towards its citizens. It is not an impartial provider of education. The particular political, social and economic context in which education exists is used by the state to achieve purposes which it considers to be advantageous or expedient. In this context there is a need to provide research accounts that explore and conceptualise technical education opportunities or the lack thereof in Namibia (Presidential Commission Report, 1999: 189). One question that needs to be answered is whether the character of technical education after independence differs much from what it was before independence. The answer will be researched in the technical subject syllabi at basic education level that were used before and after independence as well as from the viewpoints of technical teachers.

1.2.1.4 International issues with regard to technical education

The international community once deliberately isolated Namibia along with South Africa because of the apartheid system and the administration of Namibia by South Africa (UNIN, 1987: 250, 325). In the process Namibian education did not develop according to international trends, limiting technological innovation and depriving Namibians of meaningful interaction with the outside world. Since independence in 1990 Namibia has become an equal partner with other countries in educational matters (Angula, 1993: 9). As part of the global village Namibia has to take notice of the developments in technology and thus technical education that take place in other countries in order to stay abreast with new approaches, without disregarding own needs and tendencies (Schoeman, 2000: 74-75). UNESCO (2002: 27-28) states that technical education should be based on the employment needs of people and nations.

The questions therefore are what recent developments have taken place in technical education at school level internationally and which of these developments will suit the local Namibian realities to improve the provision of technical education. A synopsis of technical education as it is found in countries such as the United States of America and the United Kingdom provides insights into international trends in technical education. Germany has always been regarded as being on the forefront of technological development, supported by a very good education system which supports technical education and training (Führ, 1996: 144; Vincens, 2002: 12, 20; Reid, 2000: 7). Germany has well-developed technical education policies in place which makes it worthwhile to study and learn from them. The question is what Namibia, as a former German colony, can learn from a developed country like Germany in order to improve its own education system without disregarding Namibia's third world realities. Answers will be sought in the approach to and character of technical education as found in Germany.

1.2.1.5 The relevancy of current technical education in Namibia

Africa is experiencing a serious skills crisis, requiring urgent skills formation (Tikly, 2003: 547-549). In Namibia skills formation, specifically through technical education, is at a crossroads and is about to enter a phase which will make or break its future (P. Thom, personal interview, 26 July 2005). Technical education at school level has three major general aims. Firstly, it has educational value in the sense that learners are taught to enjoy working with their hands and to follow specific procedures to manufacture artefacts of materials. Secondly, it has personal value in the sense that social skills and values are instilled in learners. Thirdly, development can take place by providing knowledge and skills which learners can utilise either in working for themselves through self-employment ventures or as part of a company. In this regard Buchert (1994: 171) made the following statement:

> If education is to lead to development, this situation should be reflected in the content of education in terms of curricula which promote knowledge and skills for enterprise, could lead to filling informal sector jobs, and could promote a possible growth potential in the dominant informal and rural settings.

Access to technical education should be considered as a major issue. But providing access to technical education alone cannot be enough. Kallaway, Kruss, Donn and Fataar (1997: 82), for example, argue that access without quality improvement is a recipe for frustration and discontentment among stakeholders. The question therefore is to what extent Namibia's current syllabi are relevant to the needs of Namibians. The answer to the question is to be found in syllabus content, related documents and public opinion.

1.2.1.6 A new model for technical education in Namibia

Because of advances in technology, needs of people, communities and employers change continuously. New technologies demand a quick turnover of skills. Simultaneously, the new technologies demand changes in the educational processes with regard to updating skills (Steyn et al., 2001: 235). Education should therefore reflect the technological needs and social patterns of the Namibian society. A new model for technical education at school level is to be proposed that will incorporate the issues that have not been addressed by the current [2006] technical education system.

Against the background described above, the following issues need to be examined:

1. What are the historical, political and economic realities and perspectives which have moulded the character of technical education in Namibia since colonisation as well as after becoming a politically independent country?

2. What are the latest international trends in the provision of technical education and which aspects can contribute towards improving the Namibian technical education delivery systems?

3. What are the characteristics of technical education in Germany and which aspects may provide indications of how the provision of technical education in Namibia could be improved?

4. What are the perspectives of stakeholders about the relevancy of current technical education structures, policies and practices?

5. How can the problems be addressed and challenges met in order to correct the mistakes of the past?

6. Which model would be the most suitable and relevant according to which technical education could be provided optimally?

1.3 PURPOSE OF THE STUDY

This study explores the provision of technical education at school level and its relevance to social needs during the various political dispensations in Namibia. The purposes of this study are to discover society's access to technical education and the potential contribution of technical education to educational, social and economic development of the country by means of appropriate and relevant policies. Adedeji (1991: 2) considers development as

> …a process of interaction between human and material resources and the intervention of the application of technology for the purpose of producing goods and services to satisfy the needs of all people.

The changes in the respective Namibian constitutional frameworks have had and continue to have an impact on all facets of the Namibian society. Since the start of colonialism in Namibia, ministerial policies and political and economic changes have impacted on education continuously (Du Pisani, 1987: 13, 23). However, the development and provision of technical education are seen by some as unsatisfactory in the sense that its character has not changed much over decades, despite the changes of other societal institutions (Stoner and Engelbrecht, 2000: 9). Hence the purpose of this study is to explore, analyse and document the character of technical education as it manifested over many decades and how it contributed to the overall development of the Namibian society.

The goal of the research is to investigate the extent to which technical education at school level in Namibia has developed and become relevant against the background of national and international tendencies in technical education in order to develop a relevant model for quality technical education should it be deemed necessary. The stated goals can be achieved by means of the following objectives:

- to determine the historical development of technical education in Namibia;
- to study the policies and programmes about the provision of technical education;
- to determine the relevancy of current policies and practices;
- to determine the extent of use and perceived effectiveness of technical education policies and practices as found in literature in other countries;
- to determine the latest international trends in technical education;
- to determine technical teachers' opinions regarding current policies and practices;
- to determine what conclusions might be drawn from the data that is compiled;
- to suggest a more relevant technical education structure by developing a new model which could serve as a foundation for technical education in Namibia; and
- to contribute to the available international literature on technical education.

1.4 SIGNIFICANCE OF THE STUDY

Previous studies of education in Namibia fell short of examining technical education at school level in its essence. There is also limited information relating to technical education. This lack of information limits the development and delivery of programmes to assist technical teachers teaching at grass-roots level. Research results related to technical education can, and in fact should, be used to improve the development of programmes and facilities that assist technical teachers (Presidential Commission Report, 1999: 189). This research aims to fill the gap and in doing so, break new ground to link policy and practice for the provision of technical education in Namibia.

Furthermore, previous research in this subject at school level was mostly limited to the extent that references were only made to technical education in other research documents. This created the impression that technical education was not a priority of the Ministry of Basic Education, Sport and Culture (MBESC). Technical teachers, and subsequently principals, were frustrated by the lack of support that schools received from the MBESC and regional educational offices (P. Thom, personal interview, 26 July 2005). In recent times Namibian politicians have made reference to the importance of technical education on several occasions, but reality dictates the opposite. For example, schools and training institutions do not receive sufficient equipment and materials to teach syllabi (Van Zyl, 2000; A. Von Weiss, personal interview, 25 July 2005). Curricula were developed without proper market research done, with the result that the content of technical subjects might have been irrelevant up to now (L. Moller, personal interview, 28 July 2005). There seems to be few links with the local industry. Current developments within the Namibian education system indicate that technical education is at a crossroads with developments taking place (P. Thom, personal interview, 26 July 2005; see also 3.10). The significance of this thesis is that it provides an opportunity for the stakeholders of technical education to be heard.

This study provides a greater understanding of the provision and teaching of technical education in Namibian schools and technical education in its different manifestations as found in other countries. Firstly, the research findings could be used to inform policy makers with regard to teaching and learning of children taking technical subjects. Secondly, the teachers may start to reflect on their own practices and attitudes towards technical education and become more involved and proactive in developing technical education. Thirdly, it is expected that there will be a renewed and continued re-evaluation of technical syllabi to make these more relevant to the requirements for technical education and needs of societies. Another purpose of the study is to initiate a total rethinking of technical education to initiate a revival of this subject area in schools. Hopefully, the lessons learned from this study will contribute essential reference and insight to educational leaders, policy makers and other researchers in Namibia.

1.5 CLARIFICATION OF TERMS

The mode of education referred to, and which is researched in this study, is technical education. According to UNESCO technical education is regarded as part of the total educational process which should be taught at school level (UNESCO, 1974). Article 26(1) of The United Nations Universal Declaration of Human Rights states:

> Technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit (Commonwealth Secretariat, 1998: 19).

A closer look at the term "technical education" and its related concepts is thus of importance. According to the Barnhart Dictionary of Etymology (Barnhart, 1988: 119) the term "technical" is derived from the Greek words "technikos", meaning "of art" and "techne" meaning "a skill, art or craft". According to Black and Harrison (1995: 14) "technology" is a disciplined process using resources of materials, energy and natural phenomena to achieve human purposes (see 4.3). Le Roux (1989: 14) is of the opinion that technology is applicable to skills and expertise related to industry and applied sciences. Grossmann (2001: 8) views a skill as the capability to accomplish technology with precision and certainty, or the ability to perform a function that is acquired or learnt with practice. "Technological" (an adjective describing the concept technology) capability can be considered as the outcome of technology tasks involving an interaction between resources of knowledge, skills, experience, materials and tools as well as an awareness of perceptions needed for making balanced value judgements (Black and Harrison, 1995: 14, 17). They argue that technological literacy is the result of the teaching of technology that has three complementary sets of educational aims:

a) To give children an awareness of technology and its implications as a resource for the achievement of human purpose, and of its dependence on human involvement in judgemental issues.
b) To develop in children, through personal experience, the practical capability to engage in technological activities.
c) To help children acquire the resources of knowledge and intellectual and physical skills which need to be called upon when carrying out technological activities.

In independent Namibia technical education forms part of the broader "pre-vocational education" which is the responsibility of the Ministry of Education and covers Grades 1-12 (MBESC, 1996b: 10). The goal of technical education in Namibian schools is to develop creativity and practical skills, as a solid foundation for academic or vocational training (MEC, 1993b: 55). These practical skills are to be mastered in their contexts, for example woodwork and metalwork. This has to be distinguished from "vocational training" which was the responsibility of the now defunct Ministry of Higher Education, Vocational Training, Science and Technology (MHEVTST) that organised out-of-school training since 1995 (MHEVTST, 1999: 7). The concept of the vocationalisation of education is one that is particularly applicable to developing countries. According to Bacchus (1988: 31) the term "vocationalisation" refers to "efforts by schools to include in their curriculum those 'practical' subjects which are likely to generate among the students some basic knowledge, skills and dispositions that might prepare them to think of becoming skilled workers or to enter manual occupations". One of the routes to vocational training in Namibia would be through technical schools (MEC, 1993b: 94).

It would be unwise to limit the definitions of technical education and technological education. It is perhaps better to summarise what has been said about technical education, technological education and its related concepts, by setting certain parameters within which to view the terms "technical education" and "technological education". Thus, for the purpose of this study, technical education is referred to as that form of education that lies within the periphery of general education and has a strong emphasis on technology and practical skills, orientating the learner vocationally. As technological education encompasses a broader definition than technical education, in this study technological education refers to that area of the curriculum in which learners and teachers interact and employ physical, financial and technical resources through processes, techniques and methods in the generation and manufacture of useful objects or systems, based on aesthetical and value judgements (see 8.1).

The Namibian society uses the term "teacher" when referring to a staff member who is professionally qualified to teach non-adults in formal education and whose occupation is teaching. The term "learner" means a non-adult who is registered at a school and receives formal basic education (Republic of Namibia, 2001: 5, 7). In Namibia technical education is therefore taught by technical teachers to learners taking technical subjects in schools.

During this study the Namibian education authorities had several name changes. After independence the Ministry of Education and Culture (MEC) was formed to organise education in Namibia (MEC, 1993b: 19). In 1995 the MEC was subdivided into the Ministry of Basic Education, Sport and Culture and the Ministry of Higher Education, Vocational Training, Science and Technology (MHEVTST, 1999: 7). In 2005 the Ministry of Basic Education, Sport and Culture (MBESC) and the Ministry of Higher Education, Vocational Training, Science and Technology (MHEVTST) unified to form the Ministry of Education (MOE) due to political changes in Namibia (Jacobie, 2005: 21-22). Any references to the mentioned Ministries of Education relate to the policies and procedures that were in place during their existence and should be interpreted as such.

1.6 DEMARCATION OF THE FIELD OF STUDY

As Namibia is a mixture of a First World and a Third World society, the global and regional changes that are taking place have implications for Namibia's education system. If Namibia wants to become truly independent and contribute towards regional economic growth the accessibility to technical education and appropriateness of its curriculum have become a priority. Consequently the premise of this study is technical education.

The study is limited to the development and provision of technical education in Namibia before and after independence, with the focus on a relevant delivery system according to which it could possibly be implemented successfully. The literature is focused on, but not entirely restricted to Namibia before and after independence, South Africa and Germany. The choice of the above countries is based on the historical links that Namibia has had with them. Each of the selected countries has different approaches to technical education and has affected Namibian education over many years. The missionaries and German colonial authorities in Namibia provided the basic educational infrastructure which backed the development of formal education (Amukugo, 1993: 40-43). Germany is currently on the forefront of technological development, which can be attributed to a very good education system, specifically with regard to technical education (Führ, 1996: 144; Vincens, 2002: 12, 20; Reid, 2000: 7).

South Africa shared its education system with Namibia for many years, with the result that education in Namibia developed almost parallel with that of South Africa (UNIN, 1987: 39). Although Namibia received its independence from South Africa fifteen years ago, the educational links not only remained but became even stronger as Namibia and

South Africa share many cultural, economic and environmental matters. Namibia can also learn many lessons from South Africa, which has the strongest economy in Africa and which influences the Namibian economy vastly. Reference is made to other countries where relevant literature is available. Other references are merely by way of illustrating the various approaches to technical education and the reasons behind these approaches.

Results from an empirical investigation may complement the results from the literature study in describing, explaining, interpreting and improving Namibia's technical education curriculum. The study contributes towards education as a science through relevant research, in particular the discipline of Comparative Education. Comparative Education, as both an instrument of reform of planned development in education and a method of enquiry leading to the development of knowledge and theory, describes one objective of this study (Stone, 1984: 90). In doing so, Comparative Education penetrates to what is general and essential in education by studying the different ways in which education is provided (Stone, 1984: 61). This research, therefore, is aimed at rationalising the provision of technical education in Namibia to its essential and general characteristics in order to verify the viability, relevancy and sustainability thereof. Because the study also focuses on the significance of the technical education curriculum, it resides in the Faculty of Humanities Departments of Curriculum Studies and Department of Comparative Education and Education Management at the University of the Free State.

1.7 METHODS OF STUDY

1.7.1 Mode of research

The main purposes of this research are to understand technical education in its Namibian education system context and to compile and interpret perspectives regarding the curriculum and its underlying policies and syllabi. Other purposes are to identify and analyse critically those factors that contributed and can still contribute to its growth and to develop a model according to which technical education could be provided in future. To arrive at an effective analysis, a multiple method approach based on the logic of triangulation of data from a variety of sources should be applied in the design of the field of inquiry (Cohen and Manion, 1992: 57).

Triangulation includes qualitative and quantitative indicators which give broad coverage of education characteristics and allow for cross-checking of information (Motala and Mungadi, 1999: 23; Creswell, 1994: 174). Denzin (1988: 511) defines triangulation as

> …the application and combination of several methodologies in the study of the same phenomenon. These diverse methods and measures, which are combined, should relate in some specific way to the theoretical constructs under examination. Multiple methods in an investigation used to overcome the inherent weaknesses and biases of a single method. There is need for triangulation, as no single research method will ever capture all the changing features of the social world under study.

The three basic types of triangulation that can be utilised are firstly, data triangulation involving time, space and persons, secondly, investigator triangulation consisting of using multiple rather than single observers, and finally, methodological triangulation that consists of using more than one research method. For the purpose of this study, a triangulation of methods is utilised. The methods are:

a) A study of available, relevant literature is undertaken to ascertain the different viewpoints on technical education and to provide a theoretical framework.
b) An empirical survey comprising of self-structured questionnaires that scrutinise technical education from various viewpoints is undertaken and analysed by means of descriptive and inferential techniques.

1.7.1.1 Literature study

The literature study forms the peak of the triangle. Fink (1998: 3) describes literature review as a systematic and reproducible method of identifying, evaluating and interpreting the existing body of a variety of recorded sources about a specific topic produced by researchers. This is an essential part of the research as it lays the foundation for the rest of the investigation. According to De Wet, Monteith, Steyn and Venter (1981: 40-41) the aims of this type of study are as follows: "…to get perspective with regard to the latest research results about a topic, to receive guidance regarding the best techniques of the research methods that are to be used, to evaluate own research results and to determine the actuality of the chosen study area".

A literature study of both primary and secondary sources is undertaken, such as abstracts, dictionaries, government publications, encyclopaedias, books, journal articles and the Internet. The gathered information is scrutinised, from which conclusions are drawn. With regard to this study the researcher concentrates on three aspects in particular:

(a) A study of primary and secondary sources to determine the historical development of technical education in Namibia.
(b) A study of changes that are taking place in Namibia as a developing society and how this affects education, particularly the demands put on technical education.
(c) A study of secondary sources regarding global trends on technical education.

In the first instance (a), it must be mentioned that since the historical development of technical education is recorded to serve as the background to current and future developments, both secondary and primary resources are used. The very nature of this study implies that the historical evolution of technical education is of importance. It is therefore obvious that the use of the historical method is essential if the historical development of technical education in Namibia is to be restructured. A closer look at the philosophy underlying this method supports this assumption. The historical method is defined by Gottschalk as "The process of critically examining and analysing the records and survivals of the past" (1969: 48). He adds that historical analogies present the researcher with clues to possible, rather than probable behaviour, with the ability to anticipate rather than predict and to take precautions rather than control (Gottschalk, 1969: 281). The use of this method implies that before any analysis can be done, a construction of events pertaining to the topic in question must take place. The secondary sources provide mostly information about the origin of technical education in Namibia from the earliest beginnings, as most primary sources are not available any more. Along with this, primary sources are studied especially from the 1948 period to the present.

With regard to (b), many national and international writers from different sectors, political, economic, social and technological, have made observations and speculations concerning education in Namibia. Although much of what has been said revolves around the development of education since independence, little has been said about the relevance of the content to Namibian needs and future prospects of technical education. Much has also been said about how the changes that take place in Namibia affect the economy, but it is unknown how technical education must develop to meet the demands on it. As such, a study of literature that has special relevance to technical education is made. Once the demands made on technical education have been identified, discussed and evaluated, then recommendations and future prospects based on these findings can be made. Pertaining to (c), international perspectives on technical education are studied which may be relevant to Namibia's needs. Once these international perspectives have been probed, then suggestions for improving technical education based on these perspectives can be made.

1.7.1.2 Empirical research

a) Qualitative research

Qualitative research is better understood by the characteristics of its methods than by a definition. Sherman and Webb (1988: 7) summarise these characteristics as follows:

> …qualitative implies a direct concern with experience as it is "lived" or "undergone"…Qualitative research, then, has the aim of understanding experience as nearly as possible as its participants feel or live it.

Qualitative research is by definition descriptive, and represents an approach that emphasises research as "processes". It is holistic in the sense that studies have to be seen in the broader social context and require intensive immersion into the data and considerable familiarity with the research setting. Research designs are also generally less structured and flexible (Bogden and Biken, 1992: 58). Creswell (1994: 153) opines that data analysis should be done simultaneously with data collection and interpretation. According to Wiersma (1995: 211–212) underlying assumptions about epistemology of qualitative research designs can be identified. Among these are: (i) phenomena should be viewed holistically, and complex phenomena cannot be reduced to a few factors or divided into independent parts, (ii) since the researcher is operating in a natural setting as much as possible, openness should be maintained about what should be observed to reduce the chances of missing out on something important, and (iii) post-hoc conclusions should be the priority instead of prior assumptions and conclusions.

In view of the aforementioned assumptions, the interview method is utilised. Open-ended structured interviews were held and recorded with five interviewees, while three non-recorded interviews are also referred to in order to provide more information about technical education in Namibia. All interviewees are familiar with technical education and some of them are MOE officials directly linked to technical education.

b) Quantitative research

The main aim of quantitative research is to establish facts, statistically describe phenomena, explain and predict phenomena and show relationships between variables (Gall, Gall and Borg, 2003: 289). Quantitative research designs tend to be structured and prescriptive and the data from these studies is often described as hard, empirical or statistical (Bogden and Biken, 1992: 151). The data is by and large expressed as numbers and interpretations are made in terms of comparisons and partitioning of those numbers (Gall et al., 2003: 295). It is this characteristic of quantitative research that makes systematic observation an appealing component of positivist studies. By using the different methods discussed above in conjunction with and in support of one another, the belief is that a more complete picture of technical education in Namibia is formed, as well as how it should adjust to meet the demands made on it. Two structured questionnaires were developed, based on the literature study. The response was 100%, as the questionnaires were administered by the researcher. The data has been processed professionally and the findings and recommendations are based on the results obtained. Official education statistics about technical education subjects were compiled from the MOE Educational Management Information System (EMIS) statistics (see Appendices 5-8). However, a constraint during the study was the unavailability of the EMIS statistics since 2001 as statistics were not made public and were difficult to access.

1.8 OUTLINE OF THE THESIS

This introductory chapter provides an orientation towards technical education and illustrates the strands to be covered. The remainder of the thesis is structured as follows:

Chapter two deals with the historical development of technical education in Namibia before independence. It specifically examines how its character was defined by various determining factors such as philosophy, politics and economics. The status and relevancy of technical education during the different political phases are also established.

Chapter three provides an overview of the development of technical education after independence, based on the same determining factors as referred to in Chapter two. It identifies and discusses recent developments in technical education in Namibia. Current thinking with regard to the future role of technical education in Namibia are examined and assessed. Results of the action research are summarised, analysed and evaluated.

Chapter four aims to provide an overview of international perspectives regarding the concept technical education and related concepts. Latest international trends in technical education which could benefit Namibia's education system are indicated and discussed. It also examines strategies for focusing and prioritising technical education restructuring.

Chapter five aims to look at the provision of technical education in the Federal Republic of Germany. Aspects regarding technical education in Germany that could benefit technical education in Namibia are identified and discussed.

Chapter six relates the findings of the action research, based on the inquiry done by means of two questionnaires and interviews held with stakeholders.

Chapter seven offers a summary, findings and recommendations.

In the concluding chapter, Chapter eight, the findings of this thesis are tied together and recommendations as to how to improve technical education in Namibia are made. The researcher suggests a new improved technical education model.

1.9 CONCLUSION

This chapter presented an explanation of the problem, the statement of the problem and the rationale and aims of the study. The research method and terminology related to the problem were clarified. In conclusion the further course of the study was provided.

CHAPTER 2

THE NAMIBIAN EDUCATION SYSTEM: 1800-1990

2.1. INTRODUCTION

This chapter deals with the development of technical education during the different phases until Namibia's independence. The purpose of this study is therefore to review the literature on the provision of technical education during each phase. By focusing on particular areas of technical education and tracing their development from inception until Namibia's independence, an evaluation can be done as to whether this form of education was relevant or not. The perspectives gained will give a better understanding of the development of technical education during the colonial phases and shed light on present technical education. Only when one has a proper background, can one make statements and draw conclusions with authority and confidence.

2.2 THE FIRST PHASE: TECHNICAL EDUCATION ALONG TRADITIONAL LINES

Education in Namibia before the coming of the whites was informal in nature and was aimed at cultural cultivation and tribal lifestyles as determined by a subsistence economy (Goldblatt, 1971: 3, 10). Parents and community members taught basic practical skills to youngsters in order to survive and to participate in the subsistence economy. Salia-Bao (1991: 11) is of the opinion that the content of the informal curriculum included cultural instruction, vocational training and agricultural education. The learning of crafts and traditional apprenticeships in weaving, building and metalwork took place through observation and imitation. Rose (1973: 48) opines that

> [b]efore the coming of the European, education was an integral part of the Bantu social structure. If viewed only as the passing on of culture to new generations, the education of the Bantu child was efficient.

According to Amukugo (1993: 36) skills training in Namibia took place systematically, for example the Ovambo people had built up a "primitive" industry consisting of copper and iron forging. The social structure enabled skills transfer to the young in accordance with the specific economic activities performed by groups of people within a specific social formation. The arrival of the Europeans in Namibia altered this perception totally, as the needs of communities changed, altering the character of education. The first schools established by missionaries had a significant influence on all communities. The curricula and syllabi, although non-official and non-formal, that were used in these missionary schools, were European in nature as education was used specifically to replace the "primitive" cultures with European culture, cultural goods and skills (Vos, 1976: 32).

Bruwer (1966: 58) asserts that it is hardly possible to overestimate the enormous impact of the missionary endeavours on the indigenous inhabitants of Namibia. The presence of the missionaries undeniably changed the lifestyle of the indigenous people forever, because it introduced different principles, values and skills by means of European-based education (Jenny, 1976: 44). According to Tötemeyer (1978: 172)

> ...education became the most important instrument for change within the old order, altering outlooks and helping to create new economic and political structures.

2.3 THE SECOND PHASE: CONTRIBUTION OF MISSIONARIES IN PROVIDING TECHNICAL EDUCATION

2.3.1 Political effects on missionary education

The sole providers of education to the indigenous people were the various missionary societies operating in the region. As in many other African territories, European missionaries introduced formal education into Namibia in the early 1800s (Scholtz, 1973: 5-6, 9). The missionaries were the carriers of Western civilisation and took the responsibility upon them, not only to Christianise Namibians, but also to bring education, health and welfare to the people (Strauss, 1973: 59). Each missionary group established its own schools among a specific ethnic group or groups. Different missionary societies represented different cultures and political philosophies and used different languages as medium of instruction (Tötemeyer, 1978: 19-26).

Amukugo (1993: 43) remarks that although the various missionaries established separate schools, they followed a similar pattern of education. Apart from conversion to Christianity and basic literacy and numeracy training, industrial education along the lines of skills training was offered. Adolescents and adults were taught the art of gardening, building houses, making roads, the use of hand tools, and the making of furniture. The skills were used in the service of missionaries and white settlers.

The indigenous people found themselves in a difficult situation, because they had no choice but to accept the Western ideas, artefacts and economy in order not to be overwhelmed and overpowered. The subsistence economy of the indigenous people changed into a European economy, based on money, ownership of property and manufacturing of products. Through this acceptance of Western ideas acculturation took place and they were systematically pulled into colonialism (Sollars, 1972: 173). Many Namibians gave up their nomadic lifestyle and formed communities where people started to build houses, wear European clothes and use European products. At first practical-oriented education was not needed, but it became an option as communities became more differentiated, requiring people to have technical and economic skills in order to adapt to the European lifestyle (Burger, 1981: 59; Du Pisani, 1987: 15-16).

2.3.2 The contribution of missionary societies to technical education

Several missionary societies contributed much to the development of early Namibia, especially with regard to peace, infrastructure and skills training (Buys and Kritzinger, 1989: 35). Mission schools initially concentrated on spreading the Gospel, but industrial education along the lines of skills training followed later (Amukugo, 1993: 43).

The London Missionary Society created the first school in Namibia (Scholtz, 1973: 5). Although the main aim of education was to prepare the local inhabitants for a Christian life, a secondary aim was to teach them some basic skills in crafts and needlework (Heese, 1980: 27). As the nomadic people settled around Warmbad, a need developed for accommodation, with the result that locals were taught skills in how to make bricks, build houses and make basic furniture which they needed in the houses (Liebenberg, 1943: 140, 146-167; Scholtz, 1973: 9).

The Wesleyan missionaries' wives taught girls how to make clothes, grind maize and prepare westernised food. Boys were trained to use different types of implements, manufacture crude furniture and repair ox-wagons. For example, at Warmbad a rudimentary technical workshop was established where basic woodwork and metalwork were practised in order to repair the wagons of settlers and to support the missionaries in building churches, schools and houses (Heese, 1980: 39, 42). The indigenous children gained valuable practical experience in the process. It was not long before a group of people became skilled in different types of crafts (Irle, 1903: 128).

The Rhenish missionaries included basic technical skill training at schools in Windhoek and Okahandja (Buys and Kritzinger, 1989: 12; Heese, 1980: 77-76). Handwork instruction was identified as an important component of the syllabus with the aim to train people for practical service in German houses (Rhenisch Mission, 1910: 22; Moritz, 1914: 201). In 1855 the "Walwich Bay Mining Corporation" was established which operated small mines and several workshops to process copper, creating a need for skilled workers. This stimulated the teaching of technical skills (Heese, 1980: 163). Kritzinger (1972: 150-151) and Buys (1983: 167) opine that one strategy to develop communities was to invite qualified Christian tradesmen not only to spread Christianity but also to educate the locals in different crafts. According to Buys and Kritzinger (1989: 88), Hugo Hahn laid the foundation for formal education with the founding of the Augustineum School in Otjimbingwe. In that sense he can be seen as the father of technical education in Namibia, as basic technical skills were taught at the school by artisans.

The first group of Finnish missionaries, consisting of six missionaries and three tradesmen of the Finnish Missionary Society, started to work in Ovamboland in 1870 under the leadership of Dr Martii Rautanen. The aims were not only to Christianise the locals, but also to give them some education and training in different crafts (South African Outlook, 1956: 56). In 1899 a woman, Hilja Lindberg, was sent to train the girls in weaving techniques (Stals, 1967: 109). Training of local people as teachers in these technical crafts also took place. In 1891 there were already 21 trained teachers who taught basic languages, mathematics and craft skills in mission schools in Ovamboland. A boys' school was established in the Ovambo Region in 1926 where technical skills such as leatherwork and building construction were taught (Strassberger, 1972: 7; Lehtonen, 1999: 72). The initial training in crafts was not successful, however, as the local people did not show much interest in this type of education (Stals, 1967: 78). Hecker (1965: 88) opines that these early technical and vocational education ventures did not really bear fruit. According to Burger (1981: 59) these failures can be attributed to the fact that the communities at that time were not differentiated and there was no need for craft products.

The Catholic missionaries put much emphasis on gardening and handwork skills (Buys and Kritzinger, 1989: 30). In 1901 a handwork school for boys was established in Windhoek and various trades and crafts were taught. The training lasted three years after which the boys were employed by the colonial government to manufacture furniture and build new houses. Despite educational successes, the opinion was that the indigenous people were better suited as assistants to the German settlers than as independent or self-employed workers (Moritz, 1914: 204). The mission schools moulded their students into a semi-skilled and obedient labour force capable of attending to the needs of the colonial government and the settler population (Tobias, 1981: 23).

The influx of white hunters, traders and farmers established a need for education for white children. The white population enjoyed both missionary and European-based schools (Preller, 1941: 246; Heese, 1980: 176). In 1870 the first school for white learners opened its doors at Otjimbingwe (Mossolow, 1967: 105; Heese, 1980: 1). The first of many schools was opened by the Dorslandtrekkers in the Humpata District in Angola in 1882, and taught knowledge and basic technical and agricultural skills needed by the settlers (Nathan, 1989: 35; Van der Westhuizen, 1994: 85; Van der Merwe, 1951: 9-21). At Tunda children were trained in several technical subjects, such as basic woodwork and metalwork (Van der Westhuizen, 1994: 313, 324).

The following map shows the main centres where schools, specifically basic technical education-oriented schools, were founded:

Map 2.1 Map of Namibia

Source: Mendelsohn, J., Jarvis, A., Roberts, C. and Robertson, T. 2002: 39 (own adaptation).

2.4 THE THIRD PHASE: EDUCATION DURING GERMAN COLONIALISM, 1884 – 1915

2.4.1 Character of the education system

The German Imperial Government proclaimed Namibia a German protectorate in 1884 (Bruwer, 1966: 71). The German colonial authorities deliberately tried to enforce German citizenship and culture on the people. The establishment of German authority over Namibia provided security to the missionaries, with the result that missionaries increased their activities (Scholtz, 1973: 12; Buys and Kritzinger, 1989: 52). Watson (1994: 86) points out that one of the immediate effects of colonialism was that it unwittingly destroyed existing indigenous education patterns, many of which were not only closely linked with cultural norms but also had technical and vocational characteristics. Education was assigned the task of training Africans for manual work. Schellerin, a government official, clearly expresses this view when he states:

> We (Germans) cannot carry out settlement without additional labour. This must be provided by the Natives and we shall train them for it. We shall make the people realize that we are the masters of this country and the natives are the servants (Tobias, 1981: 23).

2.4.2 Education for whites

After colonising Namibia, the German population increased progressively. The growing numbers of white people in Namibia, especially the Germans and "trekboere" from South Africa, resulted in increasing educational needs for white children. Some historians see the establishment of a primary school in Windhoek in 1894 as the first step in the formal education of white children in Namibia (Fourie, 1971: 45). Other people claim that the first organised school for white Afrikaans children was the school at Kub in 1905 (Preller, 1941: 250; Mouton, 1995: 92). Nieuwoudt (1979: 55) asserts that the first school for Afrikaans children was established in Gannapan, near Kalkrand, in 1893. These schools not only educated children, but also trained them in basic practical skills.

Education improved during the peace that followed the internal wars after 1907. In 1909 the German Realschule was established in Windhoek to accommodate German children (Weitzel, 1980: 51). Primary schooling was divided into three phases: the lower primary school, middle primary school and senior primary school. Handwork periods formed part of the structure (Moritz, 1914: 17). Secondary school was a six-year programme starting with the sixth standard of the so-called *Unter Secunda.* The curriculum included academic and basic technical subjects and was based on the Prussian Realschule. After 1906 education was restructured and new regulations and prescriptions for school administration included official curricula, work projects and handwork for boys and girls.

The first government school at Grootfontein was established in 1902 and various subjects, including crafts, were taught in Afrikaans and German (Mouton, 1995: 172-175). When the majority of Dorslandtrekkers were relocated to Namibia in 1928 in areas such as Gobabis and Outjo, basic technical skills were also taught in newly established schools. By the end of German rule there were seventeen primary schools, two government secondary schools and one Catholic secondary school for girls (Katzao, 1980: 27; O'Callaghan, 1977: 97). Although education was aimed at German citizenship, the curriculum included some basic handicrafts, but a shortage in finances hampered technical-oriented education and education in general (Bruwer, 1966: 100-103). Only a few schools were equipped with tools for woodwork and metalwork, which hindered the development of technical education (Van Zyl Kommissie Verslag, 1958: 37).

2.4.3 Education for non-whites

The stability and development in Namibia brought about by the German administration meant that the missionaries could strengthen their education programmes, especially when seen in the light that education for indigenous people was left in the hands of missionaries. On the one hand education was left in the hands of the missionaries, but on the other hand the white settlers demanded certain values and technical skills to be taught beyond teaching the gospel (Noble, 1977: 55; Diescho, 1987: 153). The white population also demanded that the indigenous people be educated to be of service to the white people (Wellington, 1967: 196). This subordinance involved lower quality education and certain technical-oriented skills that could be helpful on farms, such as basic woodwork, metalwork, building skills and dressmaking. This practice was highly criticised by later politicians as exploitation and oppression of Namibians and gave momentum to the uprising against colonial educational policies (Amukugo, 1993: 117). The syllabi that were used in schools by missionaries were based on those of German schools, although adapted to local needs. However, the lack of properly trained Namibian teachers resulted in poor achievement. Despite the shortage of teachers about 115 mission schools with a total enrolment of 5 490 learners existed at the end of German rule (Lemmer, 1934: 63).

2.4.4 Employment opportunities for trainees

The jobs available to non-whites were mostly restricted to artisan-type employment. On completion of their education, the boys were trained in a specific trade, and took up work like building, carpentry, saddlery, tailoring and shoemaking (Irle, 1903: 128). Others worked at the missions or on farms. Because of a shortage of white tradespeople in the colony, the government subsidised mission schools to train tradesmen and to provide handwork instruction to the indigenous people (Moritz, 1914: 185).

Namupala (2000: 17) claims that the skills education taught to black people was deliberately kept basic in order to enable them to become workers on farms and in white household settlements. Another viewpoint is that the additional labour was used to expand their settlement and therefore they introduced technical courses such as carpentry, brickmaking and domestic science for blacks (Amukugo, 1993: 45). According to the report of the Commission of Inquiries into Labour matters in Namibia (part 1), 1989, quoted by Van Staden (1994: 9), the expansion of infrastructures such as roads and railway lines in Namibia contributed to the teaching of technical skills in Namibia.

2.5 THE FOURTH PHASE: SOUTH AFRICAN ADMINISTRATION OF NAMIBIA, 1915-1989

This phase can be subdivided into subphases as the political events in South Africa and internationally brought about several changes in the administrative structures and policies of South Africa over the years. The researcher opines that this phase was crucial to the development of technical education in Namibia, and therefore requires consideration.

2.5.1 South African military rule

Namibia entered the arena of world politics for the fist time during the First World War, when Britain requested the Union of South Africa to oust the German administration in German South West Africa. Local politics and conflicts were set aside and Namibia became part of the international military offensive against Germany and its allies. When hostilities broke out, structured education in Namibia became almost non-existent, as many German teachers were called up to participate in the war, resulting in many missions putting their activities on hold (Fourie, 1971: 46). Most German missionaries and teachers were deported, with the result that missions were neglected and plundered (Buys and Kritzinger, 1989: 57). Education, including technical education, came to a standstill.

From 9 July 1915 with the Peace Accord of Khorab, Namibia was governed by a South African military government until 1921, at which point civilian administration was restored (Goldblatt, 1971: 204). During this military rule administration matters, such as education, continued to be organised on the principles of the German administration (Fourie, 1971: 47). The educational services that the South Africans inherited from the German administration in 1915 lacked any form of central control or co-ordination (Odendaal Commission Report, 1964: 218). For example, no purposely designed technical education syllabi were implemented during the German rule. The South African authorities immediately addressed the problem and created an official education system which was centralised in Windhoek. An Organising Inspector of Education was appointed to build a school system based on that of the Cape Province in South Africa (Odendaal Commission Report, 1964: 218; Fourie, 1971: 48).

According to Rhoodie (1967: 178) the new education authorities in Namibia faced three challenges. Firstly, Namibia had a heterogeneous but small population, consisting of divergent cultures, ideals and demands, secondly, the population was spread out over a vast expanse with little infrastructure that had major repercussions for the provision of education, and, thirdly, most non-white people had never been in contact with formal education. These factors made the developing of education an expensive exercise (Odendaal Commission Report, 1964: 219). Furthermore, Namibia experienced a severe shortage of schooled and skilled labour in all spheres of the community because of the deportation of many Germans by the Union Government after 1915 (Mouton, 1995: 201). Education was seen as the key to alleviate this labour shortage. Many schools were built and furnished. The well-known secondary school, Windhoek High School, opened its doors on 5 February 1917 (Mossolow, 1967: 104). The school accommodated Afrikaans children and later on followed an adapted version of the Cape Education curriculum in

South Africa as prescribed by the 1926 Education Act (Odendaal Commission Report, 1964: 232). Among the academic subjects, woodwork was offered to learners. The first matriculation examinations were written in 1926 (De Waal, 1977: 103-105).

2.5.2 Namibia under South African civil administration, 1919-1948

On 7 May 1919 the League of Nations appointed South Africa as mandatory over SWA on behalf of Britain because of its geographical link with the country (R.S.A., 1972: 10). Namibia was handed over to South Africa to be administered as a C-mandate. This meant that South Africa could administer it as an integral part of its own territory. By proclamation, full legislative and executive powers within the country resided in the Administrator of South West Africa (Namibia). In theory, the mandate meant that South Africa was supposed to govern Namibia in the interests of its people. In practice, South Africa treated Namibia as part of South Africa and imposed many of its own laws and regulations, including educational laws and regulations, on Namibians (Van Zyl Kommissie Verslag, 1958: 20; Wêreldspektrum, 1982: 85). This was significant for it determined educational development and the character of education, thus also technical education, in Namibia. Technical education in Namibia, with regard to the curriculum, content and examination, therefore showed the same character as that in South Africa. It developed parallel to that in South Africa and therefore experienced the same challenges in its development (Van Zyl Kommissie Verslag, 1958: 106; Diescho, 1987: 153-154; UNIN, 1987: 39).

2.5.2.1 The Education Proclamation of 1921

Government control of all the educational services for whites, coloureds and blacks came about with the implementation of the first Education Act, Education Proclamation, No. 55 of 1921. It was promulgated in order to organise and administer education in Namibia in a structured way. Therefore, as from 1 January 1922, education in Namibia was based on that of the Cape Province in South Africa (AGN 5 Verslag: 1983: 46). South Africa immediately addressed the education issue by appointing J.R. Lewis as Director of Education in charge of a Department of Public Education (Fourie, 1971: 49). Mission societies were allowed to continue educating the non-white people, and they received financial support from the South West African Administration, provided that they conformed to the government's regulations regarding education. The state assumed direct responsibility over white education and prescribed the South African Cape Province curricula and syllabi. On the one hand this provided a sound base for quality education and good standards. On the other hand there was little room for localisation of syllabi and content. The needs of the Namibian society were not taken into consideration when these syllabi were implemented. This mistake contributed towards the anti-colonial propaganda later on (Harber, 1993:422).

However, education developed progressively and the number of schools, learners and teachers increased drastically. As the number of white people increased, more businesses, farms and other economic ventures were established. More job opportunities were created and the demand for schooled artisans increased. In 1928 a "burgerskool" based on the same principles as schools in the Orange Free State province in South Africa was established at Stampriet. Agriculture and technical subjects among other subjects were introduced at that school (Fourie, 1971: 52).

2.5.2.2 The Education Conference of 1923

The education conference of 1923 was important in the development of technical education because it established uniform syllabi and standards for the first time. The Director of Education held an education conference in order to spell out the policy and administrative measures of the Department of Education. Among the issues that were explained were the following: a single curriculum applicable for all missionary schools, English and Afrikaans were introduced as formal mediums of instruction, the mother tongues of indigenous people had to be developed. Mission schools that followed the regulations would be subsidised and supported (R.S.A., 1968: 110). The education conference in 1923 tried to establish uniform syllabi and standards in mission schools.

Specific emphasis was placed on the importance of the teaching of handicrafts in order for black learners to be employed by local people and industries, namely "die belangrikheid van hande-arbeid in vergelyking met boekwerk in inboorlingskole"

(Scholtz, 1973: 24). At that stage several schools were equipped with basic tools needed for woodwork and metalwork (Van Zyl Kommissie Verslag, 1958: 36). It was agreed that "non-European" education should not proceed beyond Standard 2; it was only in 1933 that Standard 3 was provided in some schools. This was in line with the statement made by the Administrator of South West Africa in 1925, namely

> …the policy of the Education Department is to make the native develop step by step. It tries to check rigorously any attempt to make the native show as much progress in one generation as other nations showed only after three or four centuries of steady development (U.G. 20, 1927: 111-112).

2.5.2.3 Proclamation No 16 of 1926

The same policy of separate development that was in the process of manifestation in South Africa was applied in Namibia. The character of Namibian education took a drastic change in 1925 when legislation (Law No. 42 of 1925) was promulgated, which implied that the Administration of South West Africa had the power to administer schools, with final approval by South Africa (Cohen, 1994: 85). New measures were made by Proclamation No.16 of 1926 which made provision for classification of schools along racial lines, mission schools for coloureds and mission schools for blacks. Control and administration of these mission schools were the responsibility of the Department of Education within the Administration of South West Africa, while mission schools would execute the education of coloureds and blacks in practice. White education was solely the responsibility of the Administration of South West Africa (Lemmer, 1934: 160-168). Van Wyk (1965: 82) is of the opinion that the aforementioned education acts broadly described provision for technical education and industrial schools for whites only.

2.5.2.4 Education of non-whites

In northern Namibia, all schools were owned, managed and controlled by Finnish or Catholic missionaries. They could apply for a subsidy from the Administration and were supervised by an Organiser of Native Education based in Grootfontein. Syllabi in schools beyond the police zone did not originate from the Department of Education. They differed from those used in southern and central Namibia and were drawn up by the individual missionaries based on local needs. The Finns established the Finnish Industrial School at Ongwediva, and the South West African administration of the time was very pleased with the training done at that institution. It subsidised the institution with 100 pounds a year (South West Africa Report, 1928: 53). Woodwork was the main subject that was taught, and learners even manufactured and repaired school furniture at the school (Van Zyl Kommissie Verslag, 1958: 50-51). It seemed therefore as if the government did not promote technical schools for non-whites, although they encouraged the missionaries to teach technical subjects in mission schools (Lehtonen, 1999: 134).

Schools in central Namibia flourished in comparison with schools in northern Namibia. The result was that educational development took place more drastically in the south than in the north (O'Callaghan, 1977: 98). Furthermore, although education for the whites bloomed, the opposite was the case for the non-whites. Reasons were plenty, for example that education was South African based, and non-white parents were at first negative towards formal education as such and the new subjects that children had to take such as technical education (Rhoodie, 1967: 180-181). Rautenbach also points out one of the causes of this attitude. He explains that colonialism brought with it a schooling system favouring manual labour, which basically catered for "…the values of the administrator and the clerk, and not those of the skilled worker, technician or engineer" (1992: 365). Under the South African system, people saw labour as "…to be the province of slaves and the colonised people" (Rautenbach, 1992: 366). Technical education, with its supposed aim of making people more useful as manual workers, was thus considered of low standing.

2.5.2.5 Education of whites

The provision of technical education in Namibia was influenced by educational developments in South Africa. For example, in 1924 the South African Minister of Education and Finance held a conference in Durban which was attended by the various provincial administrators, including the Administrator of South West Africa (Namibia). Here it was agreed that the Union government would accept responsibility for technical and professional education not only in South Africa, but in Namibia as well (Botha, 1982:

47). The government continued to bear full responsibility for white education with subsidised schooling, free textbooks and equipment for teachers and learners.

Many new schools were established as the number of white people in Namibia increased. At first children received education in tent schools. In Gobabis a new four-classroom school was completed in 1935, and in 1937 a technical department was created with the building of a centre for “manual skills” (Van Rooyen and Reiner, 1995: 55). Primary, secondary and tertiary education opportunities were available to whites in Namibia. The significant increase in the number of white learners and teachers reflects the progressive settling of whites from South Africa and Angola in the territory since 1920. These people were mostly recruited to work in Namibia, for example technicians to oversee the construction and maintenance of infrastructure such as houses and roads (R.S.A., 1972: 134; Alberts, 1990: 104-105).

2.5.2.6 New curriculum for mission schools

The new curriculum that was put into action in 1933 emphasised the teaching of basic handicraft skills. The skills had to be taught in relation to the local needs of the learners and communities. The curriculum and objectives thus adhered to the principles of continuation and differentiation. However, in practical terms it did not function well (Scholtz, 1973: 49). The state also played no direct role in providing technical education for non-whites. Instead it encouraged the missionary societies to initiate technical education and to open technical schools. According to Burger (1981: 62) the shortage of qualified and enthusiastic teachers in these trades was one of the reasons why black learners did not receive technical education enthusiastically. Unsatisfactory teaching results and problems experienced by mission schools culminated in several inspections by the Director of Education. In 1936 it was found that four major problems existed: untrained teachers, too many schools for the available staff, inadequate equipment and irregular school attendance of learners. He particularly criticised the unimaginative teacher-centred methods as “more calculated to make the school a place of infinite boredom than of pleasure” (South West Africa Report, 1937: 40-41). Reasons for that were poor training standards of teachers, teachers had to teach in regions in which they did not know the customs and needs of the people, and a lack of basic tools. The training of teachers was not good, resulting in poor results (Tötemeyer, 1978: 174). For example, the Van Zyl Kommissie Verslag (1958: 69) reports that

> In die opleidingskole word nie aandag gegee aan die metodiek van houtwerk of naaldwerk nie, en die onderwysers teer in die praktyk, in hierdie vakke, op die beperkte kennis wat hulle as leerlinge in die laerskool opgedoen het.

2.5.2.7 Further training opportunities for non-whites

The development of the Namibian people eventually required more differentiated education, higher education standards and specific skills. The Conference of 1923 had stressed the importance of training non-white teachers. The result was that advanced learners and students were sent to South African schools and colleges for further training. However, problems with adaptation in South Africa forced the missionaries to establish local institutions of higher training (Van Zyl Kommissie Verslag, 1958: 44).

The SWA Administration discussed the possibility of the creation of schools for apprenticeship training with the different missionary societies. The aim was also to identify young blacks who had the potential to be trained as skilled labourers to work in the workshops of whites to receive better salaries (Van Zyl Kommissie Verslag, 1958: 44). As a result of this the Rhenish Mission Society started two apprenticeship schools, one in Otjimbingwe (1924) and one at Kranzplatz (1927) in Gibeon (Scholtz, 1973: 28-29; Bruwer, 1966: 62). However, although several young non-whites were trained as apprentices, the aims were not met because of the lack of job opportunities within the reserves. Training of non-white teachers for technical subjects in non-white schools was not offered at the two training institutions. According to the Van Zyl Kommissie Verslag (1958: 70) teachers had to use the little experience they obtained in primary schools to teach handwork subjects because of the poor technical education prospects.

The Roman Catholic Church started with formal teacher training at Döbra, situated about 20 kilometres outside Windhoek, in 1925 (Kritzinger, 1972: 389). Facilities for the training of teachers were usually very good and well-trained artisans from Europe taught different technical subjects, such as carpentry and metalwork. A well-equipped workshop with appropriate woodwork and metalwork machines was installed to support teacher training. Over the years this institution has trained many primary and secondary school teachers. The Finnish mission trained technical teachers in the north at Ongwediva and Okahau. Primary and secondary school teachers received training in for example technical subjects at the Augustineum School, which trained teachers alongside the normal school educational programmes (Mulder, 1972: 21; Van Zyl, 1979: 85).

2.5.2.8 Namibia's international status after World War II

The outbreak of the Second World War put much strain on educational development in Namibia, which left a serious shortage of equipment, tools, machines and human resources in Namibian schools (Van Zyl Kommissie Verslag, 1958: 70). Development stagnated at all levels and almost came to a standstill in Namibia, especially with regard to non-white education (Mossolow, 1967: 90, 104; Noble, 1977: 15). The result was that new technical education programmes could not be established in schools in Namibia.

After the Second World War the United Nations organisation (UN) replaced the League of Nations. One of the earliest actions of the UN was to declare that all the former mandated territories would come under its supervision as trusteeship territories (R.S.A., 1972: 18-20). Article 73(a) of the UN Charter stipulated that the ethnic population of a specific country was to be respected and that the education of these ethnic groups be offered in a responsible way. Article 76(b) specified that political, economic, social and educational development should take place in the territory until it reached independence (Duggal, 1984: 92-96). However, South Africa continued to administer South West Africa as a mandate. It challenged the right of the UN to enquire into or control the way in which Namibia and its people were governed (UNIN, 1987: 115). The UN rejected South Africa's claims of annexing Namibia as a fifth province and a long dispute began (Goldblatt, 1971: 249; R.S.A., 1972: 19). Education was affected directly. The first attempt by the SWA Administration to bring about some uniformity came in 1945, when an Organiser for Native Education was appointed in the northern areas, based at Grootfontein (Archive file EDU E742, Volume 2).

2.5.3 Manifestation of the South African apartheid policy, 1948-1976

When the National Party won the 1948 elections in South Africa, the policy of apartheid was not only established in that country, but was also applied in Namibia. It refused to recognise the UN's right as legal successor of the League of Nations to supervise South Africa's administration of Namibia (UNIN, 1987: 113). Several South African commissions of investigation regarding a suitable education policy for Namibia were initiated which determined the character of education in Namibia for many years. Since the Second World War, and especially 1948, the Namibian economy expanded with a corresponding demand for more skilled workers (Mossolow, 1967: 90, 96). As a result of the new political and economic development and to ensure sufficient supply of labour and proper control of the education system, the government had to realign its educational policies. After the Eiselen Commission (Amukugo, 1993: 56-57) made its recommendations regarding Bantu Education in South Africa, the extension thereof in Namibia was ensured through the 1954 South West Africa Native Affairs Administration Act. In 1958 the Van Zyl Commission, which was based on the Eiselen Commission in the RSA, made several recommendations which formed the basis of the education system and policies in Namibia (Van Zyl Kommissie Verslag, 1958: 89-137; Salia-Bao, 1991: 17; Amukugo, 1993: 57).

2.5.3.1 The Van Zyl Commission Report

A commission under the leadership of Dr H.J. van Zyl eventually made lengthy findings and recommendations on many aspects of non-white education. The commission also included advice regarding technical education. According to the Van Zyl Commission (Van Zyl Kommissie Verslag, 1958: 70) the non-white primary schools offered general handwork for boys and sewing for girls. However, the quality of technical education differed between urban and rural areas due to the lack of equipment and materials and the relevancy of skills that were taught. It was recommended that schools offering technical education be supported and that the subject be promoted at other schools. This important step was necessitated by the fact that it was realised that at a later stage the native children would be expected to contribute to the development of the community in which they lived (Van Zyl Kommissie Verslag, 1958: 93, 102).

Based on the recommendations, laws were promulgated to bring an end to mission schools, which, as stated previously, provided most of the education for non-whites dating back to the German period. The mission schools were taken over by the government so as to ensure the implementation of Bantu education. All non-white schools were required to become government schools with their curricula designed by the Department of Bantu Education. According to Salia-Bao (1991: 20) the goal of Bantu education was to provide menial labour and servitude to the white people's needs and desires, rather than self-determination. He is also of the opinion that the African curriculum under the Bantu Education Act emphasised the teaching of crafts and manual training at the expense of academic subjects.

The Van Zyl Commission recommended that one apprenticeship school or technical school be built for learners in northern Namibia to cater for learners from Ovamboland, Okavango and Kaokoveld. The school had to be built in the vicinity of Ondangwa (Van Zyl Kommissie Verslag, 1958: 103). The commission also recommended establishing a technical training centre in Ovamboland beyond Standard 6. This was "…to increase their efficiency in the practical performance of their duties, for instance courses in management and administration, commercial practice, mechanics, building, simple engineering, such as the construction and maintenance of ordinary roads, dams, etc." (Odendaal Commission Report, 1964: 259; R.S.A., 1972: 134). It was also recommended that a similar apprenticeship school be built in the Ovitoto reserve for Hereros, and that the classes offered at the Augustineum be moved to that new proposed school (see 2.5.3.5). The curriculum that was suggested comprised of three subject areas, namely building and joinery, tailoring and agriculture.

2.5.3.2 The Odendaal Commission Report

In 1962 the South African Government set up a body called the Odendaal Commission. Its job was to work out a master plan for development of all spheres in Namibia. In 1963 the Odendaal Commission recommended the setting up of eight ethnically separate homelands, based on the homelands approach in South Africa, thereby introducing apartheid formally to Namibia. The first homeland, Ovamboland, was established in

1967. In the 1970s they set up more homelands with limited powers of local government, but all of them under the control of the South African authorities (Tötemeyer, 1978: 55).

Even before the Odendaal Commission's suggestions for educational development were implemented, UNESCO withdrew from the territory (O'Callaghan, 1977: 37). In February 1962 the United Nation's (UN) General Assembly adopted Resolution 1705 (XVI) regarding "Special Education and Training Programmes for South West Africa". The UN General Assembly resolved that

> [a]mong the policies pursued by the Republic of South Africa under the Mandate, an important feature is to restrict the indigenous habitants to a rudimentary system of schooling and training designed to confine the people to rural occupations for the purpose of keeping them in a state of subservience to the European minority (Wellington, 1967: 394).

2.5.3.3 Augustineum School

As the oldest black school the Augustineum came into being at Otjimbingwe in 1866 as the result of the Rhenish Missionary Society that wanted to teach basic crafts and agriculture as part of their education (Preller, 1941: 78). It was moved to Okahandja after the decline of Otjimbingwe as Herero headquarters (Gaerdes, 1973: 148). In 1943 it was taken over by the SWA Administration because of financial problems (Scholtz, 1973: 88). Since 1956 a separate department structured technical education at the school. According to the International Court of Justice (1963: 137), technical courses such as carpentry, tailoring and masonry were introduced in 1956, and the duration of these courses was three years. Primary school and junior secondary school teachers, including teachers for technical subjects, received training. In 1965 a three-year technical education/vocational training course was also introduced (Scholtz, 1973: 88). Trainees could choose between practical subjects such as building, woodwork and dressmaking together with Afrikaans, English, practical accounting and Biblical studies. In 1968 the school was moved to Windhoek and continued to provide technical education of a high standard in well-equipped workshops (R.S.A., 1972: 134; Van Zyl, 1979: 83).

However, SWAPO considered the education at Augustineum as unacceptable, as it was part of Bantu education (SWAPO, 1981: 91). This was evident in several incidents of deliberate vandalism, protests and boycotts that took place at the school. One argument of SWAPO was that the standard of education was too low, which was, in fact, irrelevant as the same N-course technical syllabi had been implemented in non-white schools and in white schools since 1978 (UNIN, 1987: 43; Salia-Bao, 1991: 24, 87, 113; COSMOS High School, 1991: 13). However, staffing problems caused delivery problems of the courses (Salia-Bao, 1991: 87).

2.5.3.4 Establishment of technical schools

In 1956 the Augustineum was the only government institution for non-whites offering technical training in woodwork, bricklaying and tailoring (see also 2.5.3.5). The Odendaal Commission Report (1964: 241, 254-255) was positive towards the establishment of technical schools for all inhabitants. Legislation to speed up the process was suggested. The commission emphasised that technical education and training was a matter of great urgency especially in the former Ovamboland with a view to the proposed development in the northern areas. Technical training was to be encouraged at Augustineum, notwithstanding the small numbers making use of it. A technical training centre was also envisaged in Ovamboland for formal technical training after Standard 6, concentrating on training in bricklaying, woodwork and mechanics. Short technical education courses were also suggested, particularly for adult employees, to increase their efficiency with regard to mechanics and simple engineering.

The curricula and syllabi at schools for coloureds and basters were the same as those at schools for whites. The curricula made provision for certain subjects such as woodwork for boys and needlework for girls. Up to 1958 there was no institution for vocational training in Namibia, but, as in the case of whites, the SWA Administration offered financial aid in the form of subsidies and bursaries for such training in South Africa (Van Zyl Kommissie Verslag, 1958: 103). The establishment of training institutions was recommended in Namibia for teacher and vocational training. Provision was also made for the training of teachers in technical subjects at training institutions in the Cape

Province and Transvaal where 11 teachers were in the process of training in 1962 (Odendaal Commission Report, 1964: 236). In 1957 an Organiser for Woodwork and Metalwork education was appointed with the aim to organise and oversee the development of technical education in Namibia (Fourie, 1971: 62). The responsibility of this organiser was to promote and organise woodwork and metalwork in all schools except in the northern homelands. This made quality control of technical education at national level to some extent possible (Van Zyl Kommissie Verslag, 1958: 71, 86).

2.5.3.5 Skilled labour

By 1958 there were still no institutions for vocational or post-Standard 10 training in the area. It is common knowledge that Namibia, just as South Africa, experienced an acute shortage of skilled human resources, especially in the technological vocations, despite training initiatives (R.S.A., 1972: 131). In his opening address at a conference during 1981, the mining magnate, Harry Oppenheimer (Oppenheimer, 1981: 9) said in this regard that

> …there must be few people who do not agree that the shortage of skilled manpower, especially in the technological fields, is one of the acute problems facing South Africa today. Indeed, I would say that it is the most acute problem.

The shortage of skilled human resources in South Africa, as described by Harry Oppenheimer, most certainly also applied to Namibia because of the interwoven nature of education and economy in South Africa and Namibia. According to Njobe (1990: 38) colonial education at its best was mostly limited to basic vocational skill training. Because of the lack of skilled labour and training facilities, South Africans were recruited to work in Namibia.

Tötemeyer (1978: 134) asserts that technical education was not geared to the needs of Namibia. Its main objectives included producing a semi-skilled worker who required just basic technological skills in order to execute manual jobs. Salia-Bao (1991: 24) opines that most schools did not offer basic technical education and Namibians were denied access to acquiring the technical skills needed for the advancement of their communities.

2.5.3.6 Technical education for white children

Technical education for white children in mainstream schools was initially not offered in Namibia, due to the lack of facilities and equipment. Learners who wished to enrol in technical education were subsidised to go to South Africa. In 1969 there were already 79 boys and 30 girls who received such education (Fourie, 1971: 70). However, the need and demand for technical education in Namibia increased. The lack of skilled labour and proper technical education facilities forced the Consolidated Diamond Mines Company (CDM) in 1958 to make R200 000 available to the Administration of South West Africa for the establishment of a comprehensive secondary school in Windhoek (Marais, 1960: 3). This was done in reaction to the Van Zyl Commission's suggestions for the establishment of a comprehensive school (Van Zyl Kommissie Verslag, 1958: 42).

The school was built in 1962 and was supposed to teach academic and technical subjects at secondary level as well as train tradesmen after hours. The school opened with 37 learners, but only in 1966 did the principal incorporate a technical syllabus to provide the much-needed technical education (Hoër Tegniese Skool Windhoek, 1990: 11). In 1969 there were already 260 learners in the technical department of that school (Fourie, 1971: 70). Interest in technical education grew to such an extent that a pure technical school was proposed. This school opened its doors on 18 January 1972 when the technical department of the abovementioned school was transferred there and new learners were enrolled (Hoërskool Jan Möhr: 22-23). The school opened with 521 learners and provided technical education from Standard 6 to 10. The Cape Education Department curricula and syllabi were followed (Hoër Tegniese Skool Windhoek, 1990: 11). Technical subjects were initially offered in well-equipped and modern workshops, namely motor mechanics, metalwork, welding, fitting and turning, electricity, electronics, panel beating and technical drawing (P. Thom, personal interview, 26 July 2005). However, technical education in the years preceding independence was neglected and the quality deteriorated. This can be attributed to equipment and tools that were not replaced and modernised over the years and a lack of materials (Muller, 1989).

Another technical school, Pionier Boys' School, was established in 1955 (Mossolow, 1967: 104). The technical school was later transformed into a technical school for boys with special needs (Fourie, 1971: 62). Special practically oriented technical courses for learners with special needs were also designed and offered at academic secondary schools. By 1976 about 396 white learners were pursuing practical courses in 9 secondary schools (Melber, 1997: 112, 147). White primary schools offered handwork, consisting of basketry, metalwork and woodwork in well-equipped workshops. Several academic secondary schools throughout the country offered technical subjects as well, such as technical drawing, woodwork and welding. In fact, most white secondary schools had a technical department of some sort and offered subjects such as woodwork, metalwork and technical drawing. Qualified technical teachers offered these subjects in appropriately built workshops and were provided with modern equipment, tools and machines. Good quality materials were provided to work with. Education of white learners flourished under ideal situations, for example very good teacher-learner ratios and the growth in the numbers of learners who attended schools (Tötemeyer, 1977: 11). Cohen (1994: 142) and Salia-Bao (1991: 88) claim that whites had the opportunity to prepare themselves for skilled work in the middle and high level posts, an unlikely scenario for blacks, as their technical courses were below matriculation levels and on an inadequate scale.

2.5.3.7 School curriculum content

As a result of the fact that Namibia was administered as a fifth province, all education policies in South Africa were reflected in Namibia (Amukugo, 1993: 76). Syllabi were applied in tandem with those of South Africa and South African technical education textbooks were prescribed. The senior certificate examinations written in South Africa were also written in Namibia and marked in South Africa. Technical schools in Namibia became autonomous just as in South Africa. For example, Namibia shared the curriculum of the technical study area of that in South Africa which changed from restricting apprenticeship training to a broad education mode as illustrated by the following:

> …'n eng ambagsopleiding tot 'n breë algemene opvoeding met 'n tegniese karakter met as die hoogste eindsertifikaat die matrikulasievrystellingsertifikaat wat toegang verleen tot bykans enige kursus aan 'n universteit (Botha, 1982: 62).

Furthermore, the technical education syllabi were continuously adapted to economic needs. According to Steyn (1977: 193-194) the syllabi were developed

> …om in die behoeftes van 'n ontwikkelende land te voorsien, en dan spesifiek in die vraag na goed-opgeleide, bekwame en gebalanseerde ambagslui wat dringend noodsaaklik is vir die uitbouing van die ekonomie van 'n snelontwikkelende land.

One can argue that the statement was referring to the economic needs of South Africa and not of Namibia, and that the curriculum was therefore irrelevant. This was the viewpoint of many blacks frustrated by the poor quality of the Bantu education curriculum and the apartheid political policies (Melber, 1987: 129; Amukugo, 1993: 57-58, 70). Katzao (1984: 134) states that the technical subjects offered in white schools were relevant to the needs of engineers and technicians, whereas the technical subjects in black schools were aimed at semi-skilled labour in the building industry. Considering that Namibia shared the economy, workforce and education with that of South Africa, who built up the Namibian economy to a great extent and provided infrastructures and policies, one can reason that the content of technical education for whites in Namibia was of a high standard and mostly relevant to the needs of the white people (R.S.A., 1972: 130). However, technical education for non-whites was insufficient and technical subjects were taught inadequately and mostly theoretically, due to poorly equipped schools (Turner, 1993: 287).

2.5.3.8 The implementation of Bantu Education

The final phase of the implementation of the South African Education Act occurred with the realisation of the Odendaal Commission. It endorsed the 1958 Van Zyl Commission recommendations (Salia-Bao, 1991: 18). It was, in fact, only in 1968 that Bantu Education was fully implemented in Namibia. The Minister of Bantu Administration and Development of South Africa assumed full responsibility for "Bantu Affairs" in the territory, and control passed from the Administration to the Department of Bantu Education in South Africa (Odendaal Commission Report, 1964: 220, 244-252; Kros, 2002: 54). This was effected in terms of Act No. 39 of 1968 (South West Africa Constitution Act, 1968). In that year six homelands, namely Damaraland, East Caprivi, Hereroland, Kaokoland, Okavangoland and Ovamboland were created, resulting in further changes to the administration of education. For example, since 1973 education in Ovamboland had been regulated according to the Ovamboland Education Act No.11 of 1973, in which provision was made for the administration and supervision of education (Tötemeyer, 1978: 173). The policy of apartheid caused a system of separately administered educational systems to be created and controlled by South African departments through local branches in Namibia (Vos and Barnard, 1984: 80).

Generally, the education departments of the various homeland administrations were limited in their capacities to act independently as decisions concerning educational policy originated in Pretoria at the Department of Education and Training. Amukugo (1993: 70) is adamant that the introduction of Bantu education did not mean an improvement of the content of education, because subject content was irrelevant to Namibian needs. School boycotts caused disruptions in education and were followed by mass expulsions. Technical education was severely affected. It is estimated that between 1974 and 1975 about 6 000 dissatisfied teachers and learners fled to Zambia and Angola (Murray, Morris, Dugard and Rubin, 1974:173, Melber, 1997: 225, Tötemeyer, 1978: 182).

The adoption of Bantu education meant that the syllabi followed in black schools remained as rudimentary as before. It specifically emphasised the teaching of crafts and manual training, but of such a basic level that blacks were equipped for only unskilled work. In practice it meant that the quality of technical education in the northern zone was inferior to that in coloured and white schools. In the northern region the education varied between schools because each mission had its own rules and syllabi.

Bantu education dictated that schooling for black children was compulsory up to the third year only. The primary school curriculum included reading and writing the mother tongue and handicrafts. The syllabus for the senior primary level also covered homecraft for girls and soil conservation for boys. At junior secondary level, Form 1-3, three-year training in commercial, clerical and technical subjects was offered. At senior secondary level (Form 4-5) a two-year senior certificate course was offered which included woodwork, technical drawing and metalwork for boys (O'Callaghan, 1977: 119). However, since schooling for blacks was not compulsory many of them did not attend school because of all the obstacles linked to school attendance. For example, in 1977 only two black students matriculated in the northern part of Namibia (Thomas, 1978: 199).

Another reason for high drop-out rates can be attributed to irrelevancy of the school content (Melber, 1987: 129). There was no logical connection between the primary school content and that of the lower secondary phase. The primary school prepared the learners for a technical-oriented junior secondary course (see Diagram 2.1).

Diagram 2.1: The structure of Bantu Education in Namibia

PRIMARY SCHOOL PHASE	
Sub-Standard A	
Sub-Standard B	**Lower Primary**
Standard 1	Terminal Point for Compulsory Education
Standard 2	
Standard 3	
Standard 4	**Senior Primary**
Standard 5	Exit point for Primary Examination
SECONDARY SCHOOL PHASE	
Standard 6	
Form 1	**Junior Secondary**
Form 2	
Form 3	
Form 4	**Senior Secondary**
Form 5	Exit point for Matriculation Certificate/Senior Certificate

Source: Tjitendero, 1981: 7.

Because of its academic nature in contrast to the technical nature of the junior secondary phase, the senior secondary phase presented a jump from technical to academic subjects. The content of technical subjects was characterised by either too academic objectives or too basic technical skills, aimed at creating a group of semi-skilled workers (Amukugo, 1993: 70). The schools were also hampered by poor teacher-learner ratios and lack of materials, causing frustration amongst teachers and learners (Du Pisani: 1987: 20-21).

2.5.3.9 Clashing viewpoints: United Nations and South Africa

South Africa refused to recognise the UN's right to control Namibia until its independence and continued to administer the territory (R.S.A., 1972: 34). In reaction to this and the implementation of Bantu education specifically, the UN established the United Nations Council for Namibia (UNCN) by General Assembly Resolution 2248 (S-V) of 19 May 1967. This gave the UNCN the task of administering the territory until independence. South Africa's refusal to cooperate with the United Nation forced the UNCN to operate from Lusaka, Zambia (Duggal, 1989: 41). Educational structures were created and administered for Namibia outside its borders. Technical education was emphasised, as SWAPO considered it an important subject area in establishing skilled workers who could replace South Africans after independence (Cohen, 1994: 60). In 1968 SWAPO was recognised by the UN as the sole representative of Namibia, propagating its own educational policies and ignoring those of Namibia (R.S.A., 1972: 35). This meant that in reality all administrative structures were duplicated and that two education systems developed, one inside and one outside Namibia (see 2.5.4.6).

2.5.3.10 Technical education and vocational training

By the mid-1970s, several schools were offering technical education and trade training to non-whites: Ongwediva, Rundu, Katima Mulilo, Cornelius Goreseb, Okakarara, the Catholic school at Döbra and the Augustineum in Windhoek (R.S.A., 1973: 97-98, 106; Salia-Bao, 1991: 87). The demand for technical education was higher than the availability of vacant places at these schools. The result was that the level of the technical skills of blacks within the country was drastically inadequate, and no middle or high level technical training was available in Namibia (Mukendwa, 1985: 82). Together with the other deficiencies in their training, their lack of exposure revealed a policy of deliberately keeping them at the level of unskilled labourers or, at most, semi-skilled workers.

Many private companies started to train artisans as a severe shortage of qualified artisans hampered development (Collet, 1980: 191–196). Three companies, Rössing Uranium, Tsumeb Corporation and Consolidated Diamond Mines (CDM) began to train blacks for semi-skilled jobs previously reserved for whites. By the late 1970s the three companies admitted their first black apprentices (Katzao, 1984: 22). The various training schemes offered by the mines raised the levels of the semi-skilled black workers considerably. In 1979 CDM opened the Valombola Technical Institute at Ongwediva in Ovamboland to provide trade training. Several artisans were trained, but according to SWAPO (1981: 91) and Tötemeyer (1978: 177) it was only to enable workers to understand and implement the instructions of the white people.

2.5.4 Technical education, 1976 -1989

Education in Namibia changed drastically in 1976. The new political strategies that were implemented with the Turnhalle conference resulted in educational policy changes (Mey, 1977: 139; Werner, 1987: 73). For example, several new schools were built. Cosmos Technical High School opened its doors in January 1987 to accommodate children from the western suburbs of Windhoek. Learners had access to academic and technical N-courses. Several technical subjects such as technical drawing, welding and electricity were offered at the school (COSMOS High School, 1991: 13). In Rehoboth the M&K Gertze Technical High School was established, which offered several technical subjects.

2.5.4.1 The Representative Authorities' Proclamation

This Proclamation (Proclamation AG 8 of 1980: 10) established representative authorities for the eleven ethnic groups in Namibia. In practical terms it meant that each of the 11 ethnic authorities was in charge of the education of its respective group, including technical education (UNIN, 1987: 4; Administrator-General for South West Africa, 1980: 18, 38; AGN 5 Verslag, 1983: 53). Despite many changes, the inability of the education system to satisfy the country's needs for skilled workers remained. The expansion in formal education still fell short of providing in the country's skilled human resource needs (Amukugo, 1993: 93). Reports show that among those undertaking technical education only a few achieved success (AGN 5 Verslag, 1983: 71-72).

2.5.4.2 The De Lange Report

In South Africa Prof. J.P. de Lange, the president of the Human Sciences Research Council (HSRC) at the time, was given the responsibility to investigate the relevancy and quality of education programmes. Several findings and recommendations were made with regard to technical education in South Africa, which were also reflected in Namibia (HSRC, 1981d: i). As a result of the fact that the Namibian education system was based on that of South Africa, the findings and recommendations also applied to Namibia. Of the principles accepted for the provision of education, the one most clearly applicable to technical education was that

> …the provision of education shall be directed in an educationally responsible manner to meet the needs of the individual as well as those of society and economic development, and shall, inter alia, take into consideration the manpower needs of the country (HSRC, 1981c: ix).

The commission was also of the opinion that too much emphasis was being placed on academic education. The result of this overemphasis was a mismatch between what schools were producing and what industry was expecting. This situation had serious negative implications for the economic growth of Namibia. Various recommendations followed, the most important being the call for greater emphasis on technical and vocational oriented education (HSRC, 1981b: 154-155).

Another report which investigated several aspects of technical education such as the relevancy of technical syllabi in schools, was the Walters Report. The committee, chaired by Dr Walters, Director of the Cape Department of Education and Culture at the time, concluded its work by stating that the South African curriculum did not adequately teach work attitudes, thinking skills and productivity awareness, causing improper work ethics (DEC, 1990: 80). Although the Namibian education authorities were starting to create an own education system, the changes that the De Lange and Walters reports suggested could be seen in syllabi which were applicable in Namibia until the end of 1994 when the last South African senior certificate examinations were phased out.

2.5.4.3 Training of technical teachers

One of the major problems that faced technical and professional education from the beginning, was the shortage of technical teachers. When South Africa took over the administration of Namibia and educational and economic development took place progressively, the need for teachers increased (Hoërskool Jan Möhr: 8-9). At first teachers, therefore technical teachers as well, were recruited in South Africa to teach in Namibia. When the training of technical teachers was initiated in South Africa in 1921 with the introduction of two teacher certificates, namely the National Technical Teachers' Diploma and the National Technical Teachers' certificate, many Namibians received training and returned to teach technical subjects at public and missionary schools (Odendaal Commission Report, 1964: 232, 236). Local teacher and professional training institutions were created in later years.

The Consolidated Diamond Mines (CDM) financed a small technical training institute in the Ovambo area and Rössing Uranium Company gave bursaries to prospective students every year, especially in the engineering sciences (Rössing Uranium Ltd., 1980: 10). By 1982 there were nine centres offering full-time teachers' training, namely the seven that operated before, the Khomasdal Teacher Training College for Coloureds, Rehoboth Basters and Namas, and the Windhoek Teacher Training College for Whites in Windhoek. In all these colleges the training of technical teachers was done, although syllabi and quality of training differed. For example, at the Khomasdal and Windhoek Teacher Training Colleges the same syllabi were used as in South African teacher training colleges. Lecturers training technical teachers at this College also linked up with the Graaff-Reinet Teachers' College, South Africa, in getting training materials and syllabi of high standard (A. Van Wyk, personal interview, 9 February 2003). Prospective technical teachers who wished to study a 4-year degree programme in technical education, had two options. They could attend the University of Port Elizabeth for the B.Ed (Woodwork & Metalwork) course, or the University of the Orange Free State for the B.Ed (Bedryfsonderwys) course. Qualified tradesmen usually attended professional teacher training courses in South Africa to become qualified teachers.

Proclamation AG 89 of 14 July 1980 of the Law of the Academy for Tertiary Education (Law 13 of 1980), made provision for a tertiary educational institution (Salia-Bao: 1991: 21; AGN 5 Verslag, 1983: 42-43). The new multi-racial Academy for Tertiary Education was to play a role in the training of technical teachers in Namibia as a Higher Education Diploma Technical (HED Tech) was offered. Unfortunately the interest and enrolment in this course was very low. According to the Department of National Education (1984: 21), the lack of enthusiasm among potential students pointed to a curriculum that did not correlate with society's technical and vocational needs. According to SWAPO (1981: 91) the training was substandard and too academic in nature. SWAPO was adamant that schools were overcrowded, that equipment was scarce and that the syllabi were based on racist indoctrination (SWAPO, 1981: 92). This view was repeated at a conference held in Windhoek during February 1990. There it was stated that the content, pedagogy, quality and the ethos of the colonial educational enterprise were irrelevant and outmoded to the socio-economic aspirations of Namibians who wanted better technical education and vocational training in schools (Angula, 1990: 5).

2.5.4.4 SWAPO's election manifest

SWAPO always claimed that technical education is important for Namibia's development. According to the election manifesto of 1989 SWAPO promised the nation to develop science and technology education. The following promises were made:

> Onder SWAPO regering sal onafhanklike Namibië klem lê op 'n wetenskaplik tegniese kultuur. Dit sal 'n beleid volg van verwerwing, aanpassing en gebruik van kennis en tegnologie om die mense se basiese behoeftes te bevredig en om die lewenspeil van alle Namibiese burgers te verbeter. Tegniese opleidingsinstitusies sal opgerig word om tegniese bekwaamhede op te bou (SWAPO verkiesingsmanifes, n.d.: 10).

According to Ellis (1984: 65-67) and Amukugo (1993: 134, 202) SWAPO was biased towards a strong technical and prevocational system, which was inspired by SWAPO's socialist ideology of "solidariteit, vryheid, geregtigheid en broederskap" (SWAPO verkiesingsmanifes, n.d.: 1; Harber, 1993: 423). Priority would be given to the creation of junior apprenticeship schools and the establishment of technical schools. These schools would provide specialist education and training in subject areas such as metalwork, woodwork, building and plumbing (SWAPO verkiesingsmanifes, n.d.: 12). Provision would also be made for technician training (SWAPO verkiesingsmanifes, n.d.: 14).

2.5.4.5 Irrelevant curricula causing poor motivation among learners

SWAPO always asserted that the curricula used in Namibia were South African based and therefore irrelevant to the needs of Namibians. The following points of criticism about technical education with regard to the Cape Education Department were expressed:

- technology learned in schools did not help learners in society because the equipment they used was often industrial or commercial cast-offs and would therefore be obsolete and out of date soon;
- technology as it was developed in past curricula encompassed a limited range of skills, processes and knowledge resulting from a narrow perspective;
- the school environment was unrealistic and lacked an examination of the social issues of technology;
- the problem with technical subjects such as woodwork as an educational endeavour was that the disciplines were learned within a context that limited their general applicability; and
- technical education syllabi did not encourage teamwork. In today's work environment groups are preferred, especially when several kinds of knowledge and expertise are required that call for the participation of several individuals whose work must be coordinated.

Nahas Angula, Secretary for Education and Culture of SWAPO before independence, advocated relevant curricula such as general education with a strong science component as well as theoretical and practical skills development courses, as found in the "Education with Production" approach (Angula, 1987: 112). A World Bank study of 1989 cited Namibia as having 25 pre-primary schools, 1 174 primary/secondary schools, one technical school, two agricultural schools, three technical institutes, two special schools and one industrial school (World Bank, 1991: 114). These figures are incorrect with regard to technical schools, as there were already four technical schools and many schools offering technical subjects. The four technical schools were Augustineum (Academic and Technical school in Windhoek), Cosmos High School (Windhoek), M&K Gertze Technical High School (Rehoboth) and Windhoek Technical High School (see 2.5.3.9 and 2.5.4). Regarding the relevance of the curricula, the report stated that it was largely irrelevant, as it did not prepare learners for skilled employment. With regard to the content of technical subjects, the report stated:

> Some diversified secondary schools include optional craft studies, but the teaching is largely academic and bears little relation to the practical needs of industry or the individual (World Bank, 1991: 120).

It is obvious that SWAPO regarded pre-independence education in Namibia as qualitatively, quantitatively, structurally and ideologically inappropriate. According to them the major objective of the education system was to justify and maintain colonial domination through maintaining illiteracy and poor life skills (Ndilula, 1988: 397).

2.5.4.6 Schools for Namibians outside Namibia's borders

SWAPO's educational policy while in exile was guided by the overall objectives stated in its political programme. Within the general framework of SWAPO's policy for Namibian independence and social reconstruction, education was given a central role. The following are some of the points that were highlighted in SWAPO's education policy:

- the urgent need for training of technical and professional personnel at institutions of technical and higher learning in different parts of the world;
- the provision of work-oriented, comprehensive education and training for adults and children at SWAPO schools; and
- literacy and skills training to all members of the community with political education and production-oriented skills for self-reliance (SWAPO, 1983: 3).

The liberation struggles against colonial rule in many countries invariably had a vanguard movement headed by political elite with a nationalistic outlook. Therefore, liberation schools have, in such struggles, often been set up in liberated areas or friendly countries. In the case of SWAPO, schools were established for refugee children under the supervision of SWAPO and UNIN in neighbouring countries. During that period the Namibian *Schools-in-Exile* established a network of contacts with international organisations, non-governmental organisations and sympathetic governmental agencies. These schools in exile became laboratories for experimentation with new ideas. It included piloting of technical education curricula in schools (Angula, 1982a: 5-10).

The first primary school was opened at the end of 1973 in Lusaka, Zambia. After the collapse of the Portuguese empire in April 1974 and the subsequent independence of Angola in 1975, young Namibians were encouraged by SWAPO to seek political asylum in Angola (Harber, 1993: 423). This resulted in a larger school, the Namibian Health and Education Centre, at Nyango in the western part of Zambia (Ndilula, 1988: 397-398). Namibian schools were also founded on the Island of Youth in Cuba (Avenstrup, 1993: 1; Hickling-Hudson, 2004: 300). Two schools were established in Cuba, namely the Hendrik Witbooi School (1978) and Hosea Kutako School (1981). These schools offered education from primary to secondary levels and included practical subjects such as technical education and agriculture. In 1978 the United Nations Council for Namibia's (UNCN) "Nationhood Programme for Namibia" offered, among others, technical education to refugee Namibians. The opening of the N'gunza Vocational Training Centre in Angola strengthened this type of education further (Ndilula, 1988: 399; Harber, 1993: 423). Another example is the school at Loudima in the Congo. This technical school was established with aid from the Namibia Association of Norway (NAMAS) in 1986 and contributed much to the development of technical skills among exiled Namibians. This school was based on SWAPO's educational programme which had the following aims:

- to provide general education with a strong scientific base;
- to develop skills as a major component of the general education programme; and
- to encourage activities that formed an integral part of the educational programme (Angula, 1982b: 6-7).

The syllabi that were followed at this school included manual training from the lower primary phase, and specifically technical subjects and industrial production from the junior secondary level (SWAPO & NAMAS, 1986: 8-9). The subjects and content showed a strong bias towards technical subjects and fewer academic subjects and were based on "Education with Production" (Agapitus, Svendson, Tjeldvoll and Welle-Strand, 1991: 10; Hoppers, 1996: 34). "Education with Production" could promote development of personality traits and the application of acquired skills in everyday community life (Clegg, 2004: 24). Mbumba (1989) reported the following about this school:

> At the senior secondary level, we established the Namibia Secondary Technical School in 1986 in the Congo. It is a model school, very well planned, constructed and furnished with the generous assistance of the governments of Norway, Denmark and Finland. Its syllabi have a core academic programme supplemented with technical courses in agriculture, animal husbandry, metalwork, and woodwork. It is the type of secondary school system we would like to have in Namibia: schools that prepare students for further academic studies as well as give others a basis for professional and vocational training.

It is interesting to note, however, that SWAPO's experiments with education outside Namibia were not always considered successful. Hinz, Melber, Modise and Patemann (1987: 30) reached the following conclusion:

> The behaviours within educational systems are under scrutiny, but it is admitted that the SWAPO schools have not overcome the "colonial" patterns of "authoritarian modes of reception", in other words, "teacher talk", and "rote-learning", etc. have not been overcome in practice among exiles outside Namibia. It seems that old, authoritarian methods have been used to inculcate a new set of "political data", the methods are not emancipatory.

This viewpoint was supported by Agapitus et al. (1991: 53). In fact, the very same reasons that were given for the dissatisfaction of Namibians regarding Bantu education, can be repeated about the relevancy and quality of educational programmes at the Loudima school. An evaluation report of the NAMAS education activities suggested that

> …the ultimate responsibility for the lack of relevant curriculum development (in relation to overall aims), dysfunctional organisational structure and poor school leadership, rests with NAMAS (Agapitus et al., 1991: 57).

Technical education in Namibia was positively affected by the curricular activities that took place at Loudima (Alberts, 1998: 186). For example, technical education syllabi were piloted at that school to verify their viability in an independent Namibia.

2.5.4.7 Demands to change technical education

Several shortcomings were identified. In 1982 and 1983 a five-volume report was published in Windhoek, having been commissioned by the Department of Education. This report, "Ondersoek na die Onderwys in SWA/Namibië", gave specific attention to the relevance of education and stressed the following:

1. "Bestaande kurrikulums en sillabusse maak nie voorsiening vir kulturele diversiteite nie." The content covered mainly issues of general content and not the ideals and aspects of the different culture groups and common Namibian content.
2. "Bestaande kurrikulums en sillabusse is eensydig akademies georiënteerd." Technical and vocational oriented education was neglected at school level. The one-sided emphasis on academic education was non-functional in a third world country such as Namibia, because it did not address the developing demands of either the country or the communities (AGN 3 Verslag, 1982: 31-50).

One of the biggest points of criticism against the South African education system in Namibia was the lack of teaching technical skills at school level (Smith, 1986: 49-50). It seems therefore that education programmes for Namibians at school level within and outside Namibian borders, specifically with regard to technical education, did not meet the requirements of the Namibian realities. In 1983 an investigation into the viability of the education system was launched. Several groundbreaking findings were made as well as suggestions for improvement. An issue was the lack of skilled workers and the AGN (1983: 125-126) stated it as follows:

> Die behoefte aan geskooldes kan grootliks bevredig word deur ŉ beroeps- of loopbaan-baan op senior sekondêre vlak in te stel.

According to the suggestions curricula that these schools would follow, would be designed in collaboration with the employers in the technical trade fields of work. In this regard Aucamp (1986: 76, 77) stated that South African technical education curricula at school level were outdated because they were updated in a haphazard way without taking the rapid technological developments into consideration. The eventual result was poor technological preparation and few study opportunities for the South African, and thus Namibian, youth to continue studies in technological fields after completing school. This unfortunate situation was also noticed by Franz (1996: 7) who wrote that:

> …few vocational training institutions provided training up to artisan level, while apprenticeship training was provided for mainly white young people. Only a limited number of people took trade tests annually. The South African system with its standards, curricula and testing systems turned out to be inappropriate for Namibia.

In 1988 Dr Gert Günzel, at that stage Head of the College for Out of School Training, Windhoek, delivered a plea for appropriate and relevant technical and vocational training in Namibia during his address at the opening of the Academy's academic year. He said that the emphasis on academic education in Namibia had lowered the prestige of technical and vocational education:

> Although Namibia has a grave shortage of highly skilled technical human resources and middle-level personnel like technicians and foremen necessary for development of technical capability, technical studies do not seem to be highly considered by our inherited education system (Academy Bulletin, 1988: 8-9).

2.5.4.8 Technical education in independent Namibia

In 1989 three conferences on Namibian education were held by a group of concerned educators outside and inside the Namibian territory with the idea of stimulating debate on a new education system for Namibia. The major aim was for Namibian educators to collaborate in the critical analysis of the then Namibian education system. The idea was to share ideas about a new education system by suggesting priorities and strategies for a desirable education system.

At one of these conferences, Nahas Angula, Secretary for Education and Culture of SWAPO at the time, envisaged the future education system. He said that it would be based on universal basic education, implementing the philosophy of "education for all". Technical education and vocational training and its future role in independent Namibia received much attention at this conference. He remarked that technical and vocational education would be emphasised and secondary education would be comprehensive with a strong bias towards science, mathematics and technology. Higher education would reflect the national needs and special emphasis would be placed on the development of higher institutes of technology (Angula, 1989: 15). When answering a question Angula replied that schools should teach what is needed, namely the basic technical skills that were in demand, such as skills needed in fisheries, agriculture, mining and manufacturing. Emphasis should be put on skills which the economy needed, and which would help Namibians to become independent workers (Angula, 1989: 19). Prof. Anim supported him by saying that realities in Africa had shown that about 60% of educational resources should be geared towards the teaching of technology, at school level and beyond.

With regard to the design of appropriate curricula for technical and vocational education, it was agreed that it should be relevant to the needs of communities and the country as a whole. It should not be a rigid curriculum applied the same everywhere, but should rather be flexible. It should be designed to counter unemployment and prepare children for the labour market. Children should therefore be taught to be reasonably self-sufficient through self-employment. Basic life skills would be taught for learners to adapt to everyday challenges (Curry, Le Roux and Harlech-Jones, 1989: 33).

2.6 CONCLUSION

This chapter deals with a period during which decisions on the fate and fortunes of Namibia were taken by persons and bodies outside Namibia. The people of Namibia had very little say in these deliberations, especially with regard to politics. Politics directly affected the education system, especially the character of technical education.

Thus, before independence, technical education in Namibia was not designed according to the needs and demands of Namibians, despite the endeavours of the German and South African administrations within and of SWAPO outside Namibia's borders. Both education systems fell short of providing technical skills to Namibians in order to become financially independent and contribute to the country's overall development. However, although not always relevant to Namibians' needs, the standard of technical education was good as it equalled that of South Africa.

During the late 1980s it became clear that Namibia's independence was imminent. The political stage was set for change. Only time would tell whether the post-independence technical education policies would be based on the needs and demands of Namibians and benefit technical education. A study of technical education after independence may shed light on this.

CHAPTER 3

THE NAMIBIAN EDUCATION SYSTEM AFTER INDEPENDENCE

3.1 INTRODUCTION

The development and relevancy of technical education in pre-independent Namibia was discussed in Chapter two. Chapter three investigates the development and character of technical education after independence. It also examines new approaches and strategies towards technical education. The central argument of the chapter is that it is not viable and sustainable to design technical education programmes which are irrelevant and unrelated to the educational requirements, employment demands and economic realities of Namibians. I also argue that technical education cannot be equal to academic education with regard to financing, organisational structures and delivery programmes because of the fundamental differences that characterise these two types of education.

3.2 STRUCTURE AND POLICIES OF THE NAMIBIAN EDUCATION SYSTEM

At independence on 21 March 1990, the former eleven ethnic education departments combined to form a single ministry, the Ministry of Education and Culture (MEC, 1993b: 21). The MEC was a transition from being eleven separate yet centralised education authorities to becoming one integrated yet decentralised authority (MEC, 1993b: 19, 172). Education was made universal and compulsory. The broad goals of the MEC were:

- improved access to schooling;
- improved learning outcome and learning with understanding;
- improved curricula and examination systems;
- equitable distribution of educational resources and services; and
- reform of secondary education (MEC, 1993b: 32-42).

The specific educational goals, based on the abovementioned broad goals and as indicated in the Broad Curriculum, are as follows:

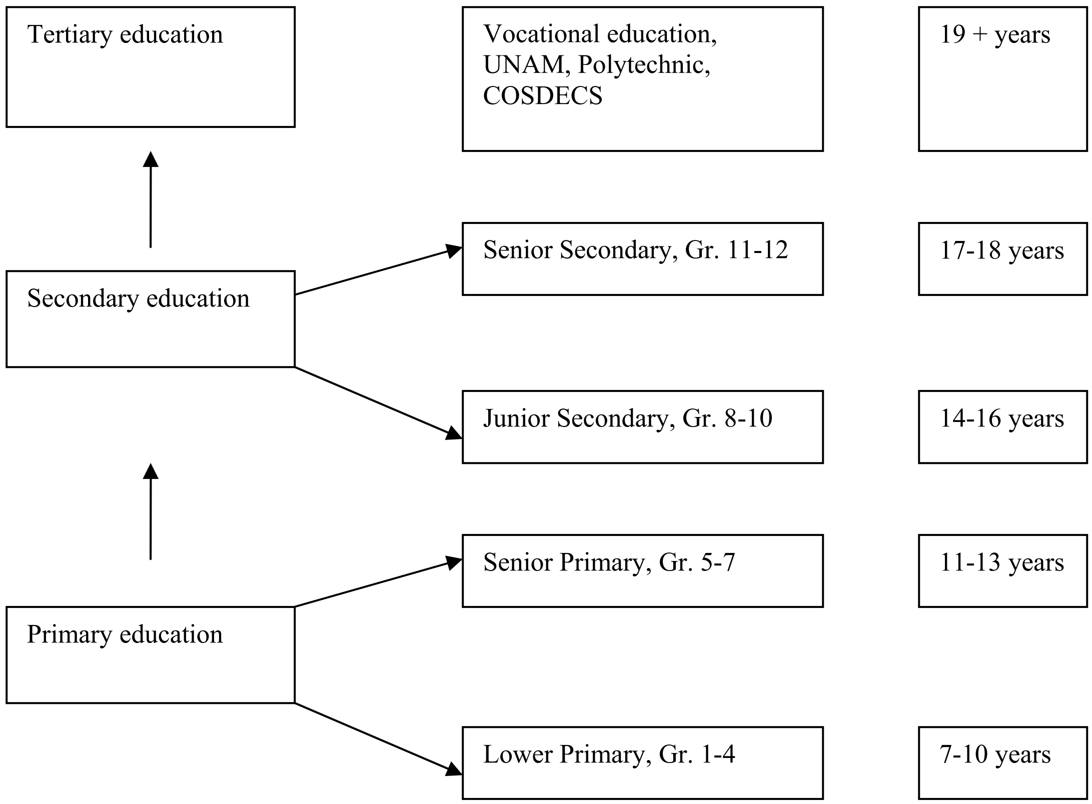
1. Support and stimulate learners throughout childhood and youth, and prepare them for the responsibilities and challenges of adult life and citizenship.

2. Encourage perseverance, reliability, accountability and respect for the value and dignity of work.
3. Develop knowledge, understanding and values, creativity and practical skills as a solid foundation for academic or vocational training, and for a creative, meaningful and productive adult life.
4. Lay a foundation for the development of human resources and economic growth of the nation (MBESC, 1996b: 4).

It is clear from the abovementioned goals that Namibia's political and education planners intended to educate Namibians to become hard-working, skilful and loyal citizens in order to meet the personal and national economic challenges of a new independent state. The references to creative and practical skills in particular create an expectation that technical education would be addressed sufficiently. Education should be appropriate to the needs of learners as future citizens which will enable them to live, work and participate in a society which is increasingly scientific and technological.

If it is Namibia's concern to provide an effective technical education system, then Namibians need to reconsider whether the characteristics of the current technical education are appropriate and relevant. The formal education system comprises of seven years of free primary education, three years of junior secondary education, and two years of senior secondary education, from the age of six years. Formal education is divided into four phases: Lower primary (Grades1-4), Senior Primary (Grades 5-7), Junior Secondary (Grades 8-10) and Senior Secondary (Grades 11-12). At the end of the primary education cycle (Grade 7), learners sit for a semi-external examination as a transition to junior secondary education. The external Junior Secondary Certificate (JSC) examinations are written at the end of Grade 10. Senior secondary education learners write either the International General Certificate of Secondary Education (IGCSE) or the Higher International General Certificate of Secondary Education (HIGCSE) or a combination thereof, in collaboration with the University of Cambridge. The localisation of subjects and the Senior Secondary phase curriculum started several years ago and was planned to be completed in 2005 (see 3.2.2.2, last paragraph). Diagram 3.1 shows the structure of basic education as implemented by the MEC (MEC, 1993b: 100):

Diagram 3.1: Structure of the Education System in Namibia



The structure and curricula of Namibia's education system were planned to optimise educational opportunities to all Namibians and free Namibia from colonial education structures, based on apartheid (MEC, 1993b: 2). Njobe (1990: 63-65) argues that education for liberation should be based on the real as against the imagined needs of society. He is also of the opinion that school curricula should be selected to develop from the foundations of accumulated progressive traditional experience, knowledge, value systems and technical skills and be enriched by the experience of other societies. Since technical education was identified as a need, it should be developed to fulfil society's requirements. The borrowed content and methodology need to be carefully selected and grafted into what is essentially indigenous curriculum content. If this is true, the real needs of the Namibian society should be determined by means of a human resources survey. School syllabi should then be based on the needs which the survey indicates, something that has not been done in Namibia before, since or after its independence.

The curricular reform in Namibia after independence was based on the principles which SWAPO propagated in exile in the past, and also set out in January 1990 before Namibia became officially independent (SWAPO, 1990: 5). It entailed the following: change of educational ethos, administrative reform, curriculum renewal, change of medium of teaching, teacher education reform, strengthening of distance and adult programmes, professional development opportunities and decentralisation with regard to decision-making processes. The reform programme was guided by five overarching goals reflecting the structure and policies of the government. These were equity of access and opportunities, promotion of internal efficiency, enhancing effectiveness in teaching and learning, strengthening life-long education and democratisation of education enterprise. Angula (1986: 2) based SWAPO's education policies on the political programme of SWAPO. The main principles behind SWAPO education as it became obvious in the Namibia Secondary Technical school at Loudima, Congo were:

1. General education with a strong scientific base.
2. Skills development as a major component of the general education programme.
3. Production activities as an integral part of the education programme where practical and technical skills could be applied.

The Minister of Education at independence, Nahas Angula, made it clear at a conference that the current [1991] teaching programme was too academic, irrelevant, non-uniform and unbalanced (Angula, 1991: 10). He was of the opinion that technical education with its inherent practical hands-on characteristics was the answer to Namibia's human resources and economic needs. The need to introduce learners to modern technology and practical skills was also identified (Snyder, 1991: 164,171). However, the priority was to uplift Namibians by means of general education programmes for all. Despite the realisation of the importance of practical skills, the MEC continued to downplay practical skills in technical education and stated:

> We must be clear that our concern is not to prepare individuals for specific trades or to provide skills training except as part of general education (MEC, 1993b: 92).

The statement is in direct conflict with the ruling party's election manifesto which promised trade training (see 2.5.4.4). This reflects the ignorance of the value of technical education for the teaching skills in a country hampered by unemployment, with the result that Namibia's economy has suffered severe skill shortages since 1994 (Grossmann, 2001: 43). General education is too academic in nature and does not equip learners with the technical skills that would enable them to get employment, or become self-employed, after leaving school (Ngavirue, 2006: 1). Eventually these practical skills shortages will obstruct business activities and self-employment (NEPRU, 2001: 3, Sibeene, 2006: 1).

3.2.1 Technical education at primary school level

The primary education policy requires learners to take a generic handwork subject from Grade 5 to Grade 7. Learners can choose between agriculture, home ecology or craft and technology. Craft and technology is a generic technical subject that provides learners with basic technical skills (MEC, 1993b: 89). The syllabus prescribes a mix of various skills to be taught, such as drawing, woodwork, metalwork, leather work, motor mechanics and weaving. The materials used are mainly waste materials which may be collected in and by the communities. The syllabus allows for localisation as some materials are more frequently available in different regions, the content of the subject is based on the society's needs, and learners can choose subject options based on the crafts, availability of materials and traditions of the local communities.

However, many schools have broken tools or no materials at all to teach the subject effectively, and have to use recycled materials, causing unfinished syllabi (MBESC, 2002: 80). The economical reality is that many rural communities are so poor that life is a struggle for survival, and they cannot contribute finances and materials to education. As a result of the limited number of trained technical teachers in Namibia, academically oriented teachers have to teach craft and technology. This subject prepares learners who intend to take technical education in the junior secondary and senior secondary phases.

3.2.2 Technical education at secondary school level

The secondary school system of Namibia was invented many years before independence. In the latter years of the 1980s, the Namibia Secondary Technical School in Loudima, Congo, piloted a new junior and senior secondary school curriculum with a view to be evaluated for possible implementation in Namibia (Angula, 1982b: 2; Agapitus et al., 1991: 64; Alberts, 1998: 186). The overall intention was to equip the students for real life situations so that they could apply their skills on their return to Namibia. The Junior Secondary curriculum was based on BOLESWA (Botswana, Lesotho and Swaziland) standards and moderated by the examination directorates of Zimbabwe and Zambia (Salia-Bao, 1991: 62; Swarts, 1995: 6). The MEC (1993b: 94) stated that:

> Basic Education will include a pre-vocational curriculum for all Namibians. One more academic route to technical education will begin in senior secondary school and perhaps continue through to a system of Polytechnics. Another route for vocational training would be through technical schools….

From the statement it is clear that the educational authorities committed themselves to providing technical education and that it was initially based on the approach of the Loudima school, where a "polytechnical" line was followed (Agapitus et al., 1991: 650). The statement also makes provision for technical schools in the traditional sense of the word. However, the educational planners soon realised that the education system in exile was not always relevant to the needs of the Namibians, as it was based on statistics and perceptions that were not always correct (Agapitus et al., 1991: 4). Robert West (1995a: 92) pointed out that in the absence of projections of labour needs, a "general line" and a "polytechnic line" were offered in the Namibian senior secondary school phase. He also stated that theoretically, the junior secondary curriculum was intended to prepare young people for the labour market, while senior secondary education was intended for those who required higher education levels. However, he made it clear that finances were restricted and that primary education was the priority for the Namibian government at that stage. Another route for technical education was to be through distance education (MEC, 1993b: 105).

3.2.2.1 Junior secondary school curriculum

At Loudima learners were introduced to technical education. According to the Loudima model all learners had access to woodwork, metalwork, building, domestic science, textiles, commerce and typing (Agapitus et al., 1991: 35). Much of this approach was implemented after independence. Towards the end of 1990 the MEC addressed the task of curriculum reform in practical terms. A new junior secondary curriculum was planned somewhat hurriedly and implemented from the beginning of 1992 in Grade 8, and progressively in Grades 9 and 10 in the two following years (MEC, 1993b: 74). It was decided that schools offering technical subjects within the pre-vocational area could make a selection between eight subjects such as bricklaying, plastering and painting, electricity, fitting and turning, metalwork and welding, motor mechanics, panel beating and spray painting, woodwork and technical drawing. Syllabi for these technical subjects were developed by appointed subject panels under NIED, consisting of technical teachers who were experts in the respective subjects. This process of syllabus review and development is still under way. In the light of continuous curriculum review, Stoner and Engelbrecht (2000: 21) found these different technical subjects too fragmented and costly. They suggested that at this level a new generic subject be created, namely Craft, Design and Technology (CDT), to replace the abovementioned traditional eight technical subjects.

A typical technical field of study at junior secondary level is as follows:

Grades 8, 9, and 10:

- English
- Afrikaans Home Language
- Mathematics
- Life Science
- Geography
- History
- Technical Drawing.

Technical subjects:

Grade 8:

- Basic engineering (a generic subject consisting of principles of woodwork, metalwork, electricity, motor mechanics and welding)

Grades 9 & 10, one of the following technical subjects:

- Bricklaying & plastering and painting
- Electricity
- Fitting and turning
- Motor mechanics
- Metalwork and welding
- Panel beating and spray painting
- Woodwork.

3.2.2.2 Senior secondary school curriculum

Several options were on the table when a senior secondary curriculum was decided upon. The South African curriculum, specifically the Cape Education curriculum, could be retained, a local curriculum could be developed, or some internationally renowned system could be adapted and adopted. The first option was rejected because of the limited relevance and political connections to it (SWAPO verkiesingsmanifes, n.d.: 16).

The second option was not accepted either because a senior secondary curriculum would need to be accepted in other countries where Namibia wished school-leavers to continue their studies. The third possibility was therefore chosen. It was decided to implement the International General Certificate of Secondary Education (IGCSE) curriculum (Geingob, 1993: 10). Several reasons can be offered for this decision:

- SWAPO in exile had been experimenting with that curriculum at a school at Loudima in the Congo;
- the University of Cambridge Local Examinations Syndicate (UCLES) already had a firm reputation in the subregion; and

- UCLES appeared willing to modify their curriculum to meet Namibia's specific demands (Avenstrup, 1993: 1-3).

The Loudima School was held as an example of an integrated teaching approach and high standards. In senior secondary school woodwork and metalwork were part of the Craft, Design and Production (CDP) line (Agapitus et al., 1991: 35). Andersson, Callewaert and Kallós (1991: 66) asserted that Namibia already had different experiences concerning teaching across the academic disciplines, establishing a balance between theory and practice, between intellectual teaching and manual training, between knowledge and skill. They suggested that the Loudima project should provide basic orientations for the Namibian school curriculum. This reflects the total ignorance of the good standards of education that prevailed in Namibia, as well as all the efforts that had been made over decades to create an education system that was envied by all its neighbours, despite shortcomings such as inequality. For example, the technical skills that were taught in schools were relevant to personal growth, the needs of the industries and the skills that were required to become self-employed in Namibia at the time (Agapitus et al., 1991: 4).

The Cambridge International General Certificate of Secondary Education (IGCSE) curriculum, with some modifications to suit local needs, was adopted for the senior secondary phase. In 1994 the curriculum was introduced to schools, and at the end of 1995 the first national cohort sat for the examination. Of 42 HIGCSE and IGCSE subjects in the curriculum, 17 were syllabi specially devised for Namibia (Swarts, 1995: 8). Several forces influenced the localisation of the IGCSE curriculum. Firstly, there was the desire for a common school experience for all learners, the country's labour needs and financial constraints (Angula, 1993a: 14). Prior to independence secondary learners in different parts of Namibia had been provided with different educational experiences in a fractured system (Grossmann, 2001: 52). Since 1990, at junior secondary level, unity had found expression in a common core of English and five content subjects, apart from the non-promotional subjects. Initially it was proposed to address the country's labour needs by providing two broad streams in the senior secondary school, a "general line" and a "polytechnic line". The new curriculum was based on fields of study and supplementary subjects, and schools could select the field(s) of study and supplementary subjects for which they had the professional and material resources. Each learner could choose one of the six fields of study and two other subjects, according to interest and aptitude (Van der Merwe, 1993: 31; Nashenda, 1995: 34).

The second factor which influenced the modification of the IGCSE curriculum was the desire for relevancy and quality as it was feared by the MEC that a uniform curriculum might lead to sacrificing standards (Avenstrup, 1993: 34-35). Eventually the curriculum that was produced was a highly structured one (Van der Merwe, 1993: 29). Each learner was required to select a field of study, a grouping of three related subjects (four in the case of technical fields of study) and two supplementary subjects (one for the learners following a technical field of study). Each school would offer one or more of the 19 fields of study, depending on its resources. In addition, Higher IGCSE syllabi were developed in thirteen subjects, at a level somewhere between Standard grade and Higher grade and O-levels and A-levels, to enable learners to satisfy requirements for admission to South African universities (Lotter, 1993: 46-47). Any IGCSE school might offer HIGCSE subjects if both the school and the regional office were confident of its ability to do so. Learners could choose only IGCSE subjects, or a combination of IGCSE and HIGCSE subjects. English would be compulsory (Reddaway, 1993: 17).

Technical education falls under the F-field of study. The following nine technical subjects are offered at IGCSE level: bricklaying, plastering and painting, electricity, electronics, fitting and turning, metalwork and welding, motor mechanics, panel beating and spray painting, woodwork and technical drawing (MBESC, 1998b: 11). Appointed subject panels at NIED prepared the syllabi for the technical subjects. Only one technical subject is currently offered at HIGCSE level, namely design and technology. However, because of financial and time constraints coupled with inexperienced teachers regarding syllabus development, the South African Cape Education (CED) model was superficially adjusted and the UCLES assessment structure was superimposed on it (Mannel, 1995: 125; P. Thom, personal interview, 26 July 2005). Other reasons which can be mentioned are the high standards of the South African technical education syllabi, technical teachers who had been trained according to RSA philosophies and syllabi and the absence of the involvement of stakeholders such as the industrial sector (Stoner and Engelbrecht, 2000: 45).

According to the Pilot Curriculum Guide for Formal Basic Education (MBESC, 1998b: 11, 23) a technical field of study according to the Cambridge system is as follows:

Grades 11 and 12:

English (HIGCSE or IGCSE)

Afrikaans 1st Language (HIGCSE) or Afrikaans 2nd Language (IGCSE)

Physical Science (HIGCSE or IGCSE)

Mathematics (HIGCSE or IGCSE)

Design and Communication (IGCSE)

One subject from Design and Technology, Design and Realisation or Technology and Practice (IGSCE/HIGCSE).

The technical subjects offered on IGCSE level as part of Design and Realisation or Technology and Practice are:

Design and Realisation: Bricklaying and Plastering

Design and Realisation: Fitting and Turning

Design and Realisation: Metalwork and Welding

Design and Realisation: Woodwork

Technology and Practice: Electricity

Technology and Practice: Electronics

Technology and Practice: Motor Mechanics

Although the junior secondary phase (Grades 8-10) and the implementation of the Cambridge system in the senior secondary phase have been hailed as successful, Mannel (1995: 136) identifies many shortcomings relating to technical broad stream education:

i) Most of the teachers feel that they are not adequately prepared to create the appropriate environment which would be conducive to ensure that the candidates would achieve the expected standards.

ii) The prescribed assessment model for the Junior Secondary Phase seems dislocated from that of the Senior Secondary Phase and should be restructured.
iii) There is a lack of appropriate text/reference books and teaching and instructional materials in most of the subjects. Unqualified, underqualified or even qualified teachers with no special training in the relevant subjects are in a total vacuum without these materials.
iv) Most schools do not have the necessary tools, materials or other equipment which would enable candidates to design and complete projects which would account for up to 50% of their final promotion mark.
v) Adequate advisory and assistant services are non-existent in some educational regions.
vi) Technical drawing totally lost its character in its new version as design and communication. When taken with another technical subject, it is a duplication of the drawing aspect in that subject.

The syllabi were compiled at the National Institute for Educational Development (NIED). The naivety of the MEC (1993b: 93) regarding curriculum development is explained by the suggestion that learners need to be involved in the local content of their pre-vocational studies, although no reference is made to the involvement of businesses and industries. It seems an unacceptable practice that learners, who are considered to be non-adults with limited experience in technical knowledge and skills as well as the economy, are to be consulted when developing syllabi. This demonstrates a lack of vision and technological orientation by the Namibian education authorities, showing that economic and educational needs are subjected to political and humanistic aims (Clegg, 2004: 30). Of course learners are important stakeholders in education, but not at that level.

Technical schools and academic schools teaching technical subjects are found all over Namibia, and they provide access to technical education to many learners. However, a crucial mistake has been made not to offer technical education in schools in the two regions of Namibia where locals are known for their exquisite metalwork and woodwork, namely the Caprivi and Kavango education regions (L. Moller, personal interview, 28

July 2005). It is ironical that the regions from which Namibia gets its raw materials, such as teak, are excluded from technical education. These materials have to be transported at huge costs to far-flung education regions, increasing the costs of technical education.

The localised Namibia Senior Secondary Certificate (NSSC) curriculum has been launched in 2006 which will eventually replace IGCSE and HIGCSE curricula. According to the localisation programme, the IGCSE syllabi change to Ordinary Level syllabi, and the HIGCSE syllabi change to Higher Level syllabi (NIED, 2005: 1-2). Technical education was affected by the localisation process as one generic technical subject will gradually replace the nine technical subjects as from 2007, bringing an end to the structure and character of technical education that Namibia inherited from South Africa (see 3.10).

3.2.3 Enrolment figures for technical subjects

3.2.3.1 Primary school enrolment

Thousands of learners received a good basis for technical education when they were enrolled for craft and technology. Table 3.1 shows that the number of learners taking craft and technology in Grades 1-4 (lower primary) is small, which can be attributed to the fact that at that level the subject forms part of handwork. The number of learners taking the subject at senior primary level increases significantly, which shows that the subject is popular at that level. However, most learners take either agriculture or home ecology. The assumption is that many of these Grade 7 learners would continue with a technical subject at secondary level.

Table 3.1: Craft and Technology enrolment figures

Year	1997	1998	1999	2000	2001
Gr. 1-4	761	385	2063	1569	3294
Gr. 5-7	4301	19577	29308	28060	28392
Total	**5062**	**19962**	**31371**	**29629**	**31686**

Source: MBESC EMIS Statistics, 1997-2001.

3.2.3.2 Secondary school enrolment

The number of learners taking technical subjects in secondary schools is disappointingly low, compared to learners taking craft and technology at primary level. It can be attributed to several factors such as the low status of technical education, limited opportunities for taking technical subjects and the lack of technical equipment and technical teachers that forced schools to close technical workshops (Van Zyl, 1998; Booysen, 2006c: 3). The problem was so acute at one stage that the MBESC (1996a: 16) indicated that the status of pre-vocational subjects needed to be assessed. The enrolment figures of the various technical subjects in Appendix 5 show a huge variance, indicating that technical drawing and woodwork are the most popular subjects. Technical drawing benefits from the fact that it is a compulsory subject for the technical field of study, but woodwork seems to be popular among learners for its employment value (Stoner and Engelbrecht, 2000: 21). Another popular technical subject is motor mechanics. Fitting and turning shows poor enrolment figures, as does bricklaying and plastering. Electronics is offered only from Grade 11, but also shows low numbers of learners.

There is a huge difference between the enrolment numbers of the Junior Secondary and Senior Secondary phases, for example, educational statistics for 2001 in Appendix 5 show that 1 767 learners were enrolled for woodwork in the Junior Secondary phase compared to 149 learners in the Senior Secondary phase. Several factors contribute to this difference in enrolment, such as poor performance of learners at Junior Secondary level and the huge contrast between Grade 10 and Grade 11 (Presidential Commission Report, 1999: 120). Many learners also drop out of school because of a too low point count which does not allow them to continue with Grade 11 (Presidential Commission Report, 1999: 100). Some schools offer technical subjects only up to Grade 10, which forces learners either to attend another school that offers technical subjects at Senior Secondary level or to take academic subjects at the current school, which is usually the case. One subject that showed a huge decline in numbers and status is panel beating and spray painting. No new intakes of learners took place since 1997 and the workshops eventually closed down. It can be attributed to the fact that syllabi for Grades 11-12 were not developed as well as the lack of professionally trained teachers in that subject area, resulting in a decline of interest in the subject (P. Thom, personal interview, 26 July 2005).

3.2.4 Examination results for technical subjects

3.2.4.1 Junior Secondary Certificate (Grade 10)

The examination results of all the technical subjects indicated in Appendix 6 show that many learners struggle to perform well. In fact, most learners' achievements were on average lower than a D-symbol, and in some subjects, such as 1999 motor mechanics, almost half of the learners achieved an Ungraded symbol. This indicates an unfavourable symbol distribution which is symptomatic of the problems experienced by technical education. Only bricklaying, plastering and painting and woodwork show an acceptable spreading of symbols. The results of metalwork and welding are not good either, with the majority of learners attaining below average grades.

This should be a source of concern to educational planners and teachers alike, as indications are that the quality of education is declining at primary level already, especially with regard to mathematics (MBESC, 2004: xiv, 155). There can be many reasons for this, such as outdated equipment, shortage of materials, and a lack of qualified teachers (P. Thom, personal interview, 26 July 2005). The respondents' answers to the questionnaires as indicated by Appendices 1 & 2, confirm the problems that technical subjects experience, such as a lack of materials and qualified teachers.

Another reason for concern may be the small and still dwindling numbers of Grade 10 candidates writing the JSE examinations in some technical subjects. Not only do the numbers decrease from Grade 8 when these learners enter the secondary schools, but also the number of learners writing the JSE examinations in some technical subjects. Fitting and turning shows a decrease in enrolments, as well as motor mechanics and woodwork. However, electricity and technical drawing show an increase in numbers. The poor results in some technical subjects did not go unnoticed by the former MBESC. The MBESC was not impressed by the relatively high percentage of ungraded candidates in several subjects, but especially with regard to technical drawing, motor mechanics, electricity, metalwork and welding (Maletsky, 2001: 2).

3.2.4.2 Senior Secondary Certificate

As already mentioned, the number of learners writing IGCSE and HIGCSE examinations is well down from the JSE examinations. It means that resources are wasted at JSE level, because few learners continue with technical education on Senior Secondary levels. There is little continuation between the JSE and SSE levels. One of the reasons may be that learners take technical subjects because they think it is not difficult. However, the JSE results in Appendix 6 show that many learners achieve either poor grades or are Ungraded, resulting in a big fall-out of learners after the JSE-phase.

Some technical subjects show only single-number enrolments, such as bricklaying, plastering and painting, electronics and fitting and turning, raising the question of the affordability and viability of these subjects. The number of candidates achieving Ungraded is lower in the SSE-phase, which indicates that these learners achieved better results. The technical subjects that fared best are woodwork, electronics and fitting and turning, which show a balanced grade distribution. They are followed by technical drawing and motor mechanics. The improvement may be attributed to the fact that these learners chose technical subjects, as they wish to study professional courses at institutes of higher education.

3.2.5 Learners with special needs

The MEC took up the responsibility to provide education and training to learners with special needs and abilities. Included in this group are not only children with physical, psychological and mental impairments, but also above average, gifted and very talented learners (MEC, 1993b: 130). At independence several schools for learners with special needs were taken over from the South African administration (Taljaard, 1990: 5, Appendix 8). Two of these schools which have taught technical subjects and contributed much to skill training are the following:

3.2.5.1 Pionier Boys' School

This school for learners with special needs has played an important role in providing basic skills to learners who would have been unemployed otherwise. The implementation of vocational training at this school was approved by the Examinations Board of Namibia and in 1996 the school was registered as a vocational training centre with the MHEVTST (MBESC, 1996a: 27). According to the registration certificate, registration number 15/11/96/7211/11, the school was certified as a vocational training centre, leading to the National Trade Certificate. The programme is very popular but access is limited due to a lack of space and specialist teachers (MBESC, 1998a: 14, 16). However, it was difficult for the various principals of that school to get well-trained teachers, as most of the artisans who applied for the teaching posts were not professionally qualified (P. Thom, personal interview, 26 July 2005). That resulted in poor quality of education and training in most trades, especially trades such as welding/fabrication, plumbing and pipe fitting, carpentry/joinery and auto mechanics.

3.2.5.2 The industrial school

Before independence the Otjozondu Industrial School, situated near Otjiwarongo, provided technical education and trade training for juvenile delinquents. The school continued for a while after independence, and was re-established at Klein-Aub near Rehoboth. An industrial school for ninety girls at Klein-Aub in the Hardap Region was planned in 1999, to supplement the industrial school for boys which had existed in Klein-Aub for several years (Republic of Namibia, 1999: 30). However, no technical education or industrial training currently takes place at the school, as the school is now responsible for teaching learners with special needs. In reality it means the industrial school does not exist any more, causing an unfulfilled need in society (MBESC, 2002: 5).

3.2.5.3 Comprehensive Schools for Excellence

This type of school was recommended by the Presidential Commission of 1999 (Presidential Commission Report, 1999: 167). The rationale behind this school is to address the shortage of senior secondary school graduates with good marks in science and technology (Clegg, 2004: 15). The first school becoming a school for excellence was

Windhoek Technical High school (HTS), which also doubles up as an academic school. The first intake of learners in this programme took place in January 2005. However, in reality technical education has not benefited since HTS became a "school for excellence".

3.3 DUALISTIC MINISTERIAL STRUCTURE OF TECHNICAL EDUCATION

At Namibia's independence, the Ministry of Education and Culture was created with a mandate to organise education at basic and tertiary levels. This meant that educational policies and activities were centralised and coordinated. However, in 1995 the MEC was subdivided into two separate ministries of education, namely the Ministry of Basic Education, Sport and Culture (MBESC) and the Ministry of Higher Education, Vocational Training, Science and Technology (MHEVTST). Although this step was taken to decentralise educational management, it caused a lot of communication breakdowns between schools and tertiary training institutions (MHEVTST, 1999: 8; P. Thom, personal interview, 26 July 2005). A third ministry, the Ministry of Youth and Sport, was created, causing further confusion among educators and trainers, as many functions overlapped with those of the education ministries (MHEVTST, 1999: 6).

One of the major problems that technical education faced was the fact that the three mentioned ministries had a say over technical education at different levels, including school level. Technical education fell under the jurisdiction of the MBESC (MBESC, 1996b: 20, 36). The MHEVTST likewise laid claim to it (MHEVTST, 1999: 7, 124). Technical education programmes were also run by the Ministry of Youth and Sport, especially with regard to previously exiled SWAPO youth members. This arrangement required many secondary schools to report to two different ministries and this created confused lines of authority, contradictory statements of objectives and inconsistent patterns of accountability. Duplication of technical education programmes was the order of the day, putting much pressure on the limited financial and human resources. For example, the MBESC budgeted for technical education, but the MHEVTST expected certain standards of technical teaching to ensure that school leavers can study at institutions of higher learning. The Presidential Commission recognised this huge problem and recommended a single Ministry of Education and Lifelong Learning, which should carry the responsibilities of all three existing ministries (Presidential Commission Report, 1999: 47). There was a lack of synchronisation between the various education authorities (MHEVTST, 1999: 10).

Education was further decentralised when the seven educational regions were increased to thirteen regions (MBESC, 2002: v). This caused the educational policy to become extremely fragmented and ineffective, producing a great volume of uncoordinated mandates, programmes, budgets and projects that provided little coherent direction, increased the complexity of educational governance and practice and consumed a lot of resources. Another factor that affected technical education negatively was the fact that most education officers in the ministries had no technical education training or background whatsoever (P. Thom, personal interview, 26 July 2005). Despite this they had to make critical decisions about the future of technical education (De Waal, 2002: 1).

The problems encountered with the two separate education ministries were recognised at a conference held in Windhoek on 10-11 March 2005 when the financial support of NGOs and other stakeholders was lobbied. During that conference the uncoordinated education activities of the two ministries and the need to revamp the education system became clear (Booysen, 2005a: 5). The dualistic character of the education sector came to an end in March 2005 when the new Namibian president and cabinet were appointed. It became evident that education was to be restructured when the two ministries of education formed a new ministry, the Ministry of Education (Jacobie, 2005: 21-22).

3.4 STATUS OF TECHNICAL EDUCATION IN NAMIBIA

3.4.1 Declining status of technical education

The debate between technical and academic education is one that often revolves around the issue of status. In Namibia the development of technical education did not match the development in academic education (Poor Management, 2005). The reasons are fourfold. Firstly, at an educational research seminar held in Windhoek in 1991 Kazapua (1991: 92) remarked that technical education in Namibia is considered inferior in comparison to general academic education. This negative perception originates from colonial times. Many parents see technical education as leading to less-desirable occupations and that academic education is the best route for success in life (Grossmann, 2001: 77). Rautenbach points out one of the causes of this attitude. He explains that colonialism brought with it a schooling system which basically catered for "...the values of the administrator and the clerk, and not those of the skilled worker, technician or engineer" (Rautenbach, 1992: 365). Manual labour was considered to be the duty of colonised people. Technical education, with its supposed aim of making people more useful as manual workers, is thus considered as of low standing. Many Namibians see this form of education as another means of being oppressed and subsequently dislike manual-based technical education (Tötemeyer, 1978: 177; Figaji, 2000: 107).

A second negative perception towards technical education stems from the criticism levelled by some educationists that technical education does not really have a positive effect on employment opportunities (Psacharopoulos and Woodhall, 1986: 89; World Bank, 1995: 80). The Namibian Ministry of Education (MOE) even goes so far as to suggest that the school curriculum has little impact on the employability of learners (MEC, 1993b: 145). Statements by Psacharopoulos (1987: 25) that workplace-based technical and vocational education gives a better social return than school-based education contributed further to a decline in the status of technical subjects. Advocates of this viewpoint question the assumption that the introduction of systematic, well-planned basic education programmes will necessarily lead to increased individual employability and a reduction in the mismatch between demand and supply of human resources (Hoppers, 1996: 67). They base their opinion on the belief that there is an over-estimation of the absorptive capacity of the workforce for occupation-specific technical education. Surely since then there have been large changes in economic growth, the occupational structure of individual economies and persons, and educational policy that should dramatically impact on the potential returns for schooling (Hawley, 2003: 609). For example, studies have shown that the returns for technical education are generally higher than those for academic education (Bennel, 1996: 235; Siphambe, 2000: 294-296).

Over forty years ago Foster (1965: 143) put up a strong case against assumptions about the role and potential of technical, vocational and agricultural education in schools. He first propagated this "vocational school fallacy" view in 1964 when he argued that

> ...the vocational aspirations of children and the occupations they enter are almost exclusively determined by factors which lie outside the school. No amount of formal, technical, vocational or agricultural instruction alone is going to check the movement from the rural areas, reduce the volume of unemployment, or indeed necessarily have any effect on the rate of economic development (Foster, 1965: 150).

Foster thus questioned whether schools should focus on developing specific technical skills, or on providing firm foundations in knowledge and skills relating to literacy, communication, mathematics, science and vocational values and attitudes (King and Martin, 2001: 25). According to Foster the latter seems to be a better option as it would enhance skills education and training in the informal sector, without compromising the quality of training in the formal sector's technical institutions. Carnoy (1995: 214) shares Foster's idea about the inflexibility and economic burden of technical education. These arguments run counter to the UNESCO report of 1990 which sees technical and vocational education as the connecting links between the school and industries (UNESCO, 1990: 14). Statements such as these have increased the general public's negative perception of the value of technical education to such an extent that some government officials use it as an excuse to negate technical education (MEC, 1993b: 63).

The answer to this perception lies in ensuring that technical education syllabi are based on real human resource needs surveys, a greater understanding of self-employment and the types of skills which need to be taught (Tikly, 2003: 547). Foster based his viewpoint on technical education in Ghana and Nigeria, and the fact that many exiled Namibians during that time lived in those countries, makes one wonder whether the negative perceptions towards technical education in Namibia did not originate from Foster's viewpoint. King and Martin (2001: 39) report that Foster did not make these statements because he was against technical education, but because of the fact that it is "hypocritical" to talk about more practical training in African schools when most of them are so poor that they cannot even afford a few nails and hammers. Another point that they make is that expectations of and demands on technical education are not dichotomies between school and society, but rather complex compounds of both.

Thirdly, the high cost of technical education affects the status of technical education negatively (Hoppers, 1996: 72; Atchoarena and Delluc, 2002: 50-52). Mr I.F.J. van der Merwe, the Director of the Directorate of Examinations and Assessment (DNEA) in the present MOE reports that the recurrent costs per learner for technical subjects are almost twice as high as for academic subjects (Van der Merwe, 1992: 5). This is because technical schools require specialised buildings and equipment, considerable material inputs, usually with high import content, and special teachers with marketable skills. The result is that the MOE has been unable to ensure adequate flow of resources to the small number of schools. Several schools closed down the practical classes because of the lack of materials and the struggle to get qualified technical teachers. Windhoek High School phased out woodwork, while Academia Secondary School phased out technical drawing and offers woodwork only in the junior secondary phase (B. Greef, personal interview, 23 September 2001; T.W. De Swart, personal interview, 23 September 2005). The Windhoek Technical High School threatened to close down its workshops due to the lack of materials and old equipment that not only hampered practical work, but increased the safety risk (Van Zyl, 1998). The result is that parents do not want to send their children to the schools for technical education, or otherwise advise them to take the academic option. These beliefs are shared by Stoner and Engelbrecht (2000: 47, 54) who state that

> [p]re-vocational education has low status in the eyes of the general public, is unknown to industry and tends to be associated with special education schools catering for learners with learning difficulties or behavioural problems.

According to Goodson (1983: 203) and Ries (1998: 15) high status subjects such as natural science attract the most money and investment in education, as they need state-of-the-art equipment. The low status of technical subjects in Namibia is demonstrated by schools reporting that financial support for technical subjects had largely dried up since independence (P. Thom, personal interview, 26 July 2005; T.W. De Swart, personal interview, 23 September 2005). Technical schools had to rely heavily on school development funds for acquiring materials and equipment (Clegg, 2001: 51-52). Auala (2000: 91) and Iijambo (2001: 176) also believe that the lack of finances does not allow for practical subjects. However, Nahas Angula drew attention to the importance of science and technology for the development of the economy of Namibia by stating that

> [s]cience and technology must be at the centre to provide us with the tools and means to develop and market high value-added goods and services and to open new opportunities for employment and investment (Presidential Commission Report, 1999: 188).

He emphasised the importance of increasing the number of qualified teachers and learners in mathematics, science and in the technology fields as follows:

> Equally we need to see a comparable shift in attitude and response of our business sector and for business teaching and research institutions to ensure that the education system is providing skills that fit the demand of industry and commerce (Presidential Commission Report, 1999: 189).

According to Figaji (2000: 107) young Namibians increasingly tend to aspire to administrative employment rather than working as craftsmen or setting up their own businesses. She puts the blame on the low status of technical education in Namibia which involves physical work and is perceived as less prestigious than private service or trading, as well as a lack of political will from the Namibian educational authorities. She suggests that promotional campaigns are needed for technical and occupational education and the manufacturing sector. A study done by Watson, Crawford and Farley (2003: v) shows that technical education has little value and status where governments lack strategies and thus policies relating to technical education. The Namibian government is no exception in this regard (Presidential Commission Report, 1999: 164, 169).

Fourthly, the status of technical education in Namibia is negatively affected by the perception that it is inferior to academic education and gives access to manual labour with low wages (Wolf, 2002: 58; Clegg, 2004: 16; Wikipedia, 2005a: 1). Technical education is stereotyped to such an extent that most Namibian parents deter their children from taking technical subjects.

3.4.2 The status of Design and Technology

The coming of political independence in 1990 meant the coming of new ideas to the education system. One of these was the “Design and Technology” approach which became part of teaching technical subjects. One of the strongest arguments for educational change after independence was the need to make the curriculum relevant to the needs of the country, given the new social order. Hence, adopting the “Design and Technology” approach meant departing from the traditional Cape Education Department approach and moving to a more progressive way of teaching.

It is important to put design and technology into the appropriate context and perspective. According to its critics, the Cape Education Department (CED) system was based on rote learning without practical work and learner-centred education (MEC, 1993b: 119; Abrahams, 2000: 29). However, the researcher has a different viewpoint about these points of criticism and differs from this stereotyped idea about the CED-system, as technical education has always included basic and advanced practical work (Edwards, 2002: 1-2). The underlying philosophy of “Design and Technology” has to do with the promotion of “creativity” and “problem-solving” (Theuerkauf, Haupt, Wagner, Weiner, 1995: 20). This implies a situation where learners are presented with problems for which they are expected to seek solutions through investigation and practical work.

Teachers held various views regarding the relevance of the “Design and Technology” approach in their teaching. The South African trained teachers felt threatened, firstly, as they had not been trained in this different approach. Secondly, despite what the exiled politicians and educators asserted, the general opinion was that the quality of technical education, especially the practical work, was under threat (P. Thom, personal interview, 26 July 2005). It took many workshops and meetings of the Technical Subject Committee and its subcommittees at NIED to convince technical teachers and explain the new approach. Subsequently, the “Design and Technology” approach was accepted, but through localising the syllabi it was ensured that the practical component was not compromised. Stoner and Engelbrecht (2000: 21) suggest that technical education in general should follow this generic approach. This approach is in line with International Labour Organisation proposals for teaching broad-based skills (ILO, 2005: iv). Design and technology had been offered in two schools only in Namibia since 1996. There was a steady increase in enrolments, up from 17 in 1996 to 33 in 2001 (see Appendix 7). The learners achieved satisfactory grades. The reason for this small number of learners taking the subjects can be attributed to the lack of teachers in this subject.

3.4.3 Promotion of technical education

The Presidential Commission (Presidential Commission Report, 1999: 167) recognised the low status of technical education and suggested programmes to increase the status and popularity of the subject area. Despite the promises of politicians to strengthen technical education and vocational training, technical education was not promoted as promised. Atchoarena and Delluc (2002: 41) argue that one reason is that the government did not give technical education the sustained attention it was supposed to get. Eventually it was up to technical and academic schools to promote technical subjects among learners of feeder schools. However, it is difficult to convince parents that technical education will empower the learners and that these subjects are interesting and enjoyable despite their low status. Staines (2001: 3-4) reports that career guidance has a low status in the schools as it is not part of the assessed curriculum. The lack of career guidance among learners in Namibian schools contributes to the low status of technical education and lack of information. The Presidential Commission Report (1999: 57) also recognised this flaw in the system and recommended that career guidance in schools be strengthened.

Another reason for the low status of technical education is the current lack of vertical movement of learners into vocational training, because Grade 12 technical education is not accredited at the NQA as parallel to the N3 programme (Van Zyl, 2001; De Waal, 2002: 1). Technical education is therefore seen as a “dead end”, which lowers public perception and aspiration for vocational training (Presidential Commission Report, 1999:

52). Ironically, graduates from technical schools have to access employment and studies on the strength of their academic qualifications, rather than their technical competencies. The Presidential Commission (1999: 169) recommended further that a Committee for Science and Technical Education be established to address this deficiency and also to link with other institutions such as the Vocational Training Board. Despite all these proposals not much progress was made, resulting in poor career guidance and access to technical oriented jobs and studies. Until Namibians recognise technical education as an important subject and promote it with the same vigour as mathematics, technical education will not fulfil the valuable role in the Namibian society that it is supposed to fulfil.

Several strategies are needed to promote technical education. Technical subjects and courses at school level should receive the accreditation by the Namibian Qualifications Authority (NQA) and training institutions that they are supposed to have. Technical teachers should be professionally qualified and trained through means of specialised diploma and degree programmes (Booysen, 2005c: 8-9). It is up to technical teachers to show that they are on the same level as for example mathematics and science teachers. Some individual schools can encourage business involvement by establishing closer ties with local small businesses through organisations such as the Rotary Club or the local Chamber of Commerce. These schools organise seminars for small business owners and mentors, to be attended by learners and parents. The Technical Subject Committee at NIED should embark upon a promotion programme among schools, the public and enterprises. A national membership organisation could be instituted as a vehicle through which employers can express their commitment by helping learners to learn transferable work skills and by providing employment and training that are needed by society. Career guidance teachers must make sure of the correct facts and potential of technical education as well as investigate how it can contribute to national development.

3.5 CHALLENGES TO TECHNICAL EDUCATION IN NAMIBIA

After Namibia's independence, education authorities faced several challenges. The development of education is decisive for continuous growth in a transitional society on the road to an independent and modern society (World Bank, 1995: 81). The task of maximising the competence of our children has required new urgency. Two of the top challenges of our day lie behind this urgency. Firstly, the rapidly expanding role of technology, now taking the form of automation, decreases the demand and the opportunity for persons of limited competence and skills while it increases the demand and opportunity for those competent particularly in the use of computers, in problem solving, and in the willingness to accept responsibility (Mannel, 1995: 134-135).

Secondly, the challenge of eliminating racial discrimination requires not only equality of employment opportunities and social recognition for persons of equal competence, but also the equalisation of the opportunities to develop the intellectual capacity, skills and motivational systems upon which competency is based (MEC, 1993b: 34-36; Angula, 2000: 16). The biggest challenge may be to give Namibians access to technology. Ngubane (1996: 13) and Thom (Personal interview, 26 July 2005) argue that the lack of access to technology inevitably leads to people being disenfranchised. It leads to yet another divide in our society: the "technology-haves" as opposed to the "technology-have-nots" (see 4.11 and 4. 13). In Namibia this divide could be addressed by means of technical education that is offered by means of an appropriate technical education model.

3.5.1 High costs of technical education

The cost of technical education has always been regarded as being very high (Kazapua, 1991: 92; Atchoarena and Delluc, 2002: 44). Generally speaking, the high cost is due to a smaller class size and to the need of expensive equipment, facilities and teaching materials (Lauglo and Lillis, 1988: 23). However, without it training is irrelevant, yields poor results and school leavers are unable to find jobs. The high costs and difficulty of developing an effective and diversified schools system are well documented by the World Bank and other agencies. According to a World Bank report (1991: 120-121) technical schools are not only expensive but a doubtful pay-off. The report suggests that it would seem more desirable to concentrate on improving skills in the informal sector and small-scale industries through non-formal extension programmes. The establishment of in-house technical training by industries rather than building fully equipped technical schools was recommended. Psacharopoulos and Woodhall (1986: 89) and Claassen

(1992: 110) argue that an irrelevant education system costs a country more than it delivers.

The high costs of Namibian technical education were recognised even before independence. For example, high maintenance expenses of equipment and buildings at the Loudima school in the Congo made its sustainability highly unlikely (Angula, 1991: 46). The former MBESC used the aspect of high costs to change perceptions and sentiments about technical education against the subject. However, this argument does not hold water as the percentage of technical education expenditures in total education expenditures was only 2% in 1995 (Atchoarena and Delluc, 2002: 45). In perspective, this percentage represents a very small figure compared to the rest of Africa.

One aspect that contributed to the stagnation of technical education is the issue of school fees. Article 20 of the Namibian Constitution states that primary education in public schools will be free of charge, resulting in a high degree of dependency on the government and a reluctance to help paying costs that government is expected to pay. Where school fees are paid, the amounts are small, which means that schools have limited funds with which to buy materials and tools. These schools may be caught in a predicament, because parents may be willing to pay more only if they see tangible improvements being made in schools (T.W. De Swart, personal interview, 23 September 2005). In the absence of adequate funds it will be difficult for schools to pay for improvements. The lack of finances for technical education was cited by the Presidential Commission, which stated:

> The Commission was informed that the more practical subjects in this brace of options, except Agriculture, tend to be avoided by schools and learners. The reason for this is that neither learners nor the Ministry nor the schools can afford the materials. Teachers with the required skills are hard to come by, and machinery is getting old (1999: 170).

However, since the Presidential Commission's findings few positive changes have taken place regarding technical education. The shortage of funds also became evident during a meeting of the technical education curriculum panel held at NIED on 27-28 June 2000. At this meeting the subject advisor for technical education in the Khomas Region told the meeting that technical schools could budget only N$90,00 per learner for materials, but that regional offices could not even budget that small amount because of the lack of money (Mouton, 2000). This clearly demonstrates the difficult situation in which technical education finds itself. A study conducted among school principals by a local newspaper revealed that technical education was hampered by the lack of support from the MBESC (Booysen, 2003: 4-5). The principals also cited the overemphasised academic content over the technical and job-oriented skills, causing unemployment among school leavers. One principal suggested a total paradigm shift towards technical education and entrepreneurial skills.

3.5.2 Quality of technical education

One of the goals of the Namibian education system is quality of education (MEC, 1993b: 37). In his opening statement at the World Assembly of the International Council on Education for Teaching (ICET) on 17 July 2000, the president of Namibia, His Excellency President Nujoma, stated the following:

> The solid foundation of quality education for all will ensure that our future is meaningful and sustainable. In other words, education must be the enabling catalyst for the process of finding solutions to socio-economic challenges (Nujoma, 2000: 4).

However, concern about the efficiency and quality of the Namibian education system has been increasing since shortly after independence. One study (Chuard, Jarousse and Mingat, 1995: 87) emphasised the high costs of the system as compared to other countries, while there were still major disparities in the quality of education and resource allocations. At a conference held in Windhoek seeking donor funds to improve the Namibian education system, the poor quality of education in general was recognised, despite the huge efforts to put it on higher levels. During that conference an ambitious educational revamp programme was announced, called the Education and Training Sector Improvement Programme (ETSIP), to improve the quality of education and Namibia's labour force (Dentlinger, 2005: 1; Booysen, 2005b: 13-14; Booysen, 2006a: 2). The quality of technical education was compromised not only by a lack of funds and a lack of teachers and materials, but also by the lack of professional support. For example, only two educational regions had subject advisers with the task of providing subject advice to technical teachers in all the schools offering technical subjects. According to Jurie Viljoen, a member of Parliament, subject advisers do not contribute to quality education and good results, as they do not give advice but have to deliver messages and letters (De Bruyn, 2005: 4). This resulted in inadequate subject support, because technical teachers did not receive the necessary guidance regarding matters such as project work, evaluation and budgeting for materials (T.W. De Swart, personal interview, 23 September 2005).

This is confirmed by the results of the research (question 5, Teachers' questionnaire). It is alarming that only four respondents (15,4%) indicated that they received regular visits from technical subject advisers. Another contributory aspect was the budget constraints of NIED which prevented NIED from providing national workshops. The need was expressed to appoint a national subject adviser for technical subjects in order to:

- act as subject adviser in the educational regions where there is no subject adviser;
- liaise with other subject advisers;
- establish links with other ministries and the labour market;
- promote technical education amongst learners in schools in all regions;
- coordinate technical education workshops, in-service training and guidance; and
- support technical teachers (Brunette, 1998a).

3.5.3 Gender equality in technical education

After the Beijing Conference, international donors and non-governmental organisations concerned about the education of girls, and science and technical education in particular, have invested money and time in projects, programmes and strategies that should work through participatory approaches. The Female Education in Mathematics, Science and Technology in Africa (FEMSA) conference held in Swaziland in 1999, resulted in giving African governments a mandate in addressing the problems, causes, coping strategies and solutions of girls in studying mathematics, science and technical subjects (FEMSA, 1999:

10). One of the issues emphasised was the promotion of girls, among other marginalised groups, in science, technical and vocational education without delay. In this regard Wasanga (1997) noted the following: "Female education is one of the most powerful forces for the intelligent utilisation of technological innovations in Africa." The Namibian MHEVTST stated clearly that serious gender imbalances exist in the Vocational Education Training (VET) system in Namibia (MHEVTST, 1999: 24-25; Republic of Namibia, 1999: 26). This is also reflected by the Presidential Commission (1999: 164, 169). The enrolment in the formal vocational training programme for Grade 10 and Grade 12 school-leavers in the vocational training centres of Government providers is higher for female learners. For example, among the 1998 intake, 69% were female and 31% were male trainees (Republic of Namibia, 1999: 26). Efforts are made in Namibia to equalise technical education in the sense that technical education is provided for all learners and not according to stereotyped gender lines. However, at school level technical education in Namibia is still stereotyped along traditional gender lines.

3.5.4 Accreditation of technical subjects

The ILO (2005: 5) recommends that institutions such as the NQA develop a national qualifications framework to facilitate lifelong learning, assist enterprises and employment agencies to match skill demand with supply, guide individuals in their choice of training and careers and facilitate the recognition of prior learning and previously acquired skills, competencies and experience. This framework should be responsive to changing technology and trends in the labour market and recognise regional and local differences, without losing transparency at the national level (MHEVTST, 1999: 114).

The current Ministry of Education (MOE) enrols learners in 19 technical subjects in 141 secondary schools. These subjects are taught in Grade 8 to Grade 12 and are examined for the Junior Secondary Certificate and as part of the Cambridge system. Oddly enough, they are not accredited in the vocational training system, neither are they included in the stated criteria for the selection of candidates for apprenticeships, traineeships or skills upgrading courses, showing the inflexibility of the system (Stoner and Engelbrecht, 2000: 13). This awkward situation in Namibia was described as follows:

> Dié probleem word net ondervind by vakleerlinge wat graad 12 aan volwaardige tegniese skole voltooi het. Die naskoolse stelsel maak nie voorsiening vir die standaard van onderwys wat hulle op skool ontvang nie. Die naskoolse sentrums is geskep vir leerlinge wat die skool aan die einde van graad 10 verlaat en hulself dan wil bekwaam in ń ambag. In die vorige onderwysstelsel was ń leerling wat graad 12 aan ń tegniese skool voltooi het se kwalifikasie gelykstaande aan N3 of die huidige vlak 2, waarna hy sy eerste ambagstoets kon aflê (De Waal, 2002: 1).

It is therefore a waste of time for learners interested in doing a technical trade to continue with technical studies beyond Grade 10, because Grade 12 technical school-leavers do not receive any recognition in Namibia for further technical studies (Van Zyl, 2001). In reality they have to start all over again at Namibian technical training institutions together with Grade 10 school-leavers (P. Thom, personal interview, 26 July 2005). This is one of the reasons why technical education is not a popular choice among young Namibians. Namibian tradesmen were previously trained according to the South African N-technical trade courses, which provided good standards of training. Some schools provided training in the N-courses, with good results, such as the Windhoek Technical High School.

A new vocational training framework was implemented in 1994 with the promulgation of the National Vocational Training Act of 1994 and the 1996 Amendment Act (WVTC, 2000: 11; Presidential Commission Report, 1999: 163). This new framework ruled out the N-technical programmes and replaced them with a local system comprising of three levels. The new framework was developed without consulting technical schools or informing them about the changes in the system, causing much frustration, mistrust and anger (P. Thom, personal interview, 26 July 2005). The result was that a vacuum was left in some schools which could not fulfil the community's expectations as an alternative school-based course was not provided in the place of the N-courses (Brunette, 1998c; De Waal, 2002: 1).

However, many private schools and enterprises involved in in-house training reverted back to the N-courses, because of the low standards of the Namibian equivalent. One particular institution is the Namibia Institute of Mining and Technology (NIMT), which achieves high standards of artisan training (NIMT, 1999: 1, 15; L. Moller, personal interview, 28 July 2005). The Windhoek Technical High School also offers the choice of the N-courses to interested candidates (P. Thom, personal interview, 26 July 2005).

3.6 MINISTRY OF BASIC EDUCATION, SPORT AND CULTURE (MBESC) STRATEGIES

The now defunct MBESC identified several problems in basic education and developed strategies to improve education that would affect the provision of technical education inherently.

3.6.1 The MBESC National Strategic Plan 2001-2006

The Ministry of Basic Education, Sport and Culture has developed a five-year strategic plan according to which education at primary and secondary levels in Namibia is to be improved (MBESC, 2001a: 1). The plan deals with “critical issues” needing attention to improve the quality and performance of the education sector. A process of identifying issues and areas to be addressed within the period 2001-2006 has been suggested. The following goals have been identified which can be related to technical education:

- Equitable access.
  - Introduce new and maintain existing programmes to empower Namibians of all ages to contribute to their own well-being through the artistic, cultural and economic development of Namibia, by 2005.
- Teacher education and support.
  - Allow all teachers, teacher educators and education managers continuous access to opportunities for acquiring the additional knowledge and skills they need, by 2003.
  - Ensure that all teachers demonstrate the understanding, knowledge, competencies and attitudes required of professionals in their field.
- Physical facilities.
  - Provide and maintain the necessary facilities that create an environment conducive to learning, by 2006.

- Quality of education.
    - Improve teaching and learning of English, mathematics, science and skills-related subjects at all levels, and improve the teaching and learning of entrepreneurial skills at secondary level, by 2006.
    - Ensure that learners with special interests, talents or potential have access to different areas of specialisation, by 2005.
- Efficiency and effectiveness.
    - Ensure that ministry employees possess the required skills and competence to properly perform their duties and responsibilities, by 2006 (Republic of Namibia, n.d.: 23-24).

According to the abovementioned goals, the government of Namibia seemed to be dedicated towards the education and training of its people in theory. However, it seems as if these goals that were identified have not been achieved as yet in practical terms. The available literature and research results show that:

1. Equipment, tools and facilities for technical education are insufficient or outdated.
2. A small number of learners have access to technical education.
3. Technical education teachers are not always professionally trained and no opportunity exists for professional and further training (P. Thom, personal interview, 26 July 2005; Presidential Commission Report, 1999: 166; Stoner and Engelbrecht, 2000: 4, 32).

The issue of technical education is unfortunately poorly addressed in the strategic plan. In fact, there was only one direct mentioning of technical education, namely:

- the creation of at least one comprehensive "School of Excellence" that should be developed in each education region, specialising in the sciences (including agriculture, mathematics, commerce and technical education); and
- some generic objectives that relate to technical education were listed as follows:
    - to introduce new and maintain existing programmes aimed at empowering Namibians of all ages to contribute to their own well-being, and aimed at the artistic, cultural and economic development of Namibia; and

- to improve the teaching and learning of English, mathematics and science skills, as well as other skills-related subjects at all levels, and to improve the teaching of entrepreneurial skills at secondary level (MBESC, 2001a: 8-10).

On the one hand credit must be given to the ministry's recognition of the importance of a strong foundation in mathematics and science (MBESC, 2001a: 14). On the other hand MBESC documents have shown that mathematics and science were emphasised, but that technology was neglected (MBESC, 2001a: 9). This is also evident through the fact that only one reference to the concept "technical education" could be found in the document.

3.6.2 Vision 2030 Programme

The Namibian government embarked on a major programme to develop the country at all levels in the new millennium, called the Vision 2030 programme (Booysen, 2005b: 13-14). The focus of the programme is as follows:

> From a science and technology perspective the government sees Namibia to be a newly industrialised country in 2030, where social and economic programmes have been developed based on having adequate technical and institutional capacity to harness, use and apply science technology for the country's continuous development, in such ways that citizens, as a whole, will fully share in the science and technology process and its benefits (MHEVTST, 2005: 7).

With regard to education, many scientists, engineers and technicians, among others, are to be trained to achieve Vision 2030 (Grossmann, 2001: 3). The MBESC report about the proposed educational development, activities, achievements and challenges in the new millennium, which includes the Vision 2030 for the ministry, emphasised subjects such as science, mathematics and languages. However, despite the state's concern about technical education, as expressed in the Presidential Commission Report, no direct reference to technical education was made. It seems as if the MBESC did not share the enthusiasm and value of the MHEVTST about technical education. The mission statement of the MBESC for the new millennium was declared as follows:

> We in partnership with our stakeholders are committed to providing Namibian residents with equitable access to quality education and culture programmes to develop the abilities of individuals to acquire the knowledge, values, skills, attitudes and understanding they will require throughout their lifetime (Republic of Namibia, 2000: 360).

It was not made clear whether the skills in the mission statement include technical skills, but it is doubtful, as the subject area has been neglected in the past and the present and it seems as if it will still be neglected in the future (Angula, 2000: 13). The only reference to technical education is that "vocational education should be incorporated into the school system, so that some students who leave school would already have technical skills which could make them competitive in the labour market" (Government of Namibia, 2004: 94). This can be interpreted in three ways. Firstly, the wrong impression is created that no technical education has been offered at school level up to now, secondly, practical skills should be taught, and, thirdly, these schools should be part of the vocational training system. The lack of mentioning technical skills creates the impression that technical education is neglected deliberately. This becomes evident in the Vision 2030 national vision which emphasises academic education, especially natural sciences and mathematics, as a prerequisite to a "knowledge-based economy" (MBESC, 2004: xiv).

3.6.3 Education for All (EFA) National Plan of Action 2001-2015

The government of Namibia developed National Priority Objectives in 2001 in order to ensure that education for all is achieved by 2015 (Republic of Namibia, n.d.: 7). With regard to technical education, the following two goals are applicable:

3.6.3.1 EFA Goal III

Ensuring that the learning needs of all young people and adults are met through equitable access to appropriate learning and life skills programmes.

- National Priority Objectives
    - Provision and improvement of the programmes, facilities, staffing and management of good quality to cater for the needs of all young people.

- National EFA programmes
    - Improving the design and operation of the junior secondary curriculum to equip learners with life and employable skills (Republic of Namibia, n.d.: 34, 36).

3.6.3.2 EFA Goal VI

Improving quality of education and excellence so that recognised and measurable learning outcomes are achieved, especially in literacy, numeracy and essential skills.

- National Priority Objectives
    - Streamlining and upgrading the facilities, learning materials, staffing (teachers) and service delivery systems performance to ensure high standards of quality and to meet the varying needs of all learners.
- National EFA Programmes
    - Developing and enforcing procedures for delivery and measures for the evaluation and appraisal of achievement on programmes on vocational and life skills at all levels, especially in the rural communities.
    - Carrying out a comprehensive upgrading of all facilities, training materials, staff and the pedagogy of formal and non-formal basic education and training.
    - Ensuring participation of learners in the determining of learning programmes at institutions, especially those relating to life skills and occupations.

The abovementioned goals, objectives and programmes clearly demonstrate that the Namibian government, through the current MOE, is dedicated towards establishing well-equipped schools and providing access to quality education, including technical education. However, the question remains whether these goals only remain in policy documents or whether they are implemented in practice as suggested. Reality shows that these policies have not been implemented yet, considering the poor Grade 10 results in 2004 (Philander, 2004: 1). Clegg (2004: 24) also opines that EFA programmes are expensive which usually affect technical education in schools, as traditional craft-based technical education is replaced with design led programmes that are broader and do not focus on any particular craft or skill., and are less expensive to implement.

3.6.4 MHEVTST challenges for the new millennium

In 2000 the MHEVTST identified several aspects that needed further development and consideration in the new millennium. These aspects had far-reaching consequences for the provision of technical education at basic and tertiary levels. The following aspects are among those that were identified:

- skills need to be relevant;
- resources need to be available;
- continuous education and training of vocational instructors need to be established;
- vocational education and re-training need to take place to prepare trainees to be multi-skilled to meet the demands of market economies;
- global competition needs to be competitive with education and training; and
- current mismatches need to be addressed (Republic of Namibia, 2000: 182).

It remains to be seen how and when technical education at school level will be affected by the strategies of the MHEVTST, but logic has it that links should be formed between the two ministries in order to coordinate educational programmes such as technical education. However, since the MBESC and MHEVTST were unified into the MOE, no official links have been established between technical schools and training institutions.

3.7 TECHNICAL TEACHERS

3.7.1 Training of technical teachers

The shortage of technical teachers worldwide including Namibia can be attributed to several factors, some of which include their absorption into the more lucrative private sector, inadequate numbers being trained in teacher education institutions, and their promotion into better paying administrative positions (MHEVTST, 1999: 83, 90). According to Kazapua (1991: 92) there has always been a shortage of qualified technical teachers in Namibia. Two of the reasons are that technical teachers are continuously lost to the better paying private sector, and job opportunities are always matched with those who have completed their training. The situation is worsened by the fact that many technical instructors teaching at schools are underpaid if compared with the salaries the same persons would receive in industry (Craelius, 1989: 17; Naanda, Malangu and Ngodji, 1994: 5). They suggest cooperation between UNAM and the Windhoek Vocational Training Centre (VTC), namely that the pedagogical aspects could be provided by UNAM and the practical skills by the VTC. The importance of technical teacher training was also emphasised in a letter from a previous principal of the Windhoek Technical High School, Mr J. Muller, to the MEC. Mr Muller identified the following technical teacher-training programmes to be provided:

1. A Technical Teacher's Degree course at a University.
2. A diploma course for technologists.
3. Technical certificate training at an institution of higher learning (Muller, 1991: 1).

Naanda et al. (1994: 5) also argue that there are no clear strategies for technical teacher or instructor training. Andersson et al. (1991: 94, 96) suggest that a technical teacher-training programme be included in all diploma and degree programmes to be offered at Colleges of Education and University levels. The MEC (1993b: 79) proposed a Technical and Vocational Education Instructor qualification, which would prepare teachers for instruction in pre-vocational skills and for other technical careers. Mkandawire (1993: 69), during proceedings of the national conference on IGCSE and HIGCSE held in May 1993, also foresaw the provision of a Bachelor's degree in Technical or Vocational Education to supplement the diploma which the Faculty of Education at UNAM was offering. However, despite the positive intentions, no teacher-training programmes evolved. The only training of technical teachers that took place was at the Windhoek College of Education. This teacher-training programme was based on the Cape Education Higher Education Diploma (HED) course.

When the Basic Teachers Teaching Diploma (BETD) programme replaced the HED programme in 1994, a downscaled type of technical teacher training was implemented, based on lower level knowledge and skills. In this programme the teaching of technical skills was neglected because too little time was allocated to it. Naanda et al. (1994: 10-11) suggested that lecturers with the necessary technical training and industrial experience from the University of Namibia could teach the part of pedagogical studies which does not require specialisation in technical and vocational education. The same authors also recommended that pedagogical studies which required specialisation in technical education be taught by expert trainers with relevant industrial experience and teaching qualifications.

Teacher training in Namibia has been accused of being irrelevant to the subject content and economic needs of Namibians (De Bruyn, 2005: 4). Another factor is that the historical neglect of technical education in Namibian schools caused disorientation towards technical education at school level. Despite the fact that school-leavers are not oriented in technical education, the stakeholders insist that some of them should become technical teachers (MHEVTST, 1999: 124). The crux of the matter is that they do not know what technical education in the true sense of the word really is. The result is that in many cases professionally unqualified craftsmen are employed to give technical education (Stoner and Engelbrecht, 2000: 12). Although some of them perform really well despite the fact that they have not received professional training, many of them cause much damage to technical education as a subject because of an unprofessional approach. Bacchus (1988: 22) warns that teachers who are not trained in technical education cannot teach it properly, as technical skills are distinct from general academic knowledge. Bell (1987: 1) argues that the shortage of skilled technicians could be blamed on the antipathy of teachers towards industry and on their lack of industrial experience.

The MBESC Educational Management Information System (EMIS) statistics indicated in Appendix 8 show that many teachers teach technical subjects without the necessary subject or professional training. The vast majority of craft and technology teachers are underqualified or not qualified at all. The question arises how they can teach the subject with limited knowledge and resources. They are the educators who have to lay the foundation for technical education. However, without the knowledge, interest and sensitivity toward the subject area that is unlikely to happen. The number of woodwork teachers is dwindling fast, resulting in principals closing down practical workshops and phasing out the subject at their schools. Appendix 8 shows that the number of technical drawing teachers decreased from 46 in 1999 to 36 in 2001.

The Presidential Commission cited (1999: 165) that the lack of trained teachers had a negative impact on technical education. The practical work components of the technical school syllabi were two of the areas least effectively taught in the curriculum (1999: 166). It was clearly stated that the training of technical teachers needed serious attention. It was recommended that a training course for technical teachers be established at the Polytechnic/ASTUN and located in a Department for the Training of Technical Teachers (Presidential Commission, 1999: 193). That institution should become the leading institution in technological education in Namibia. It should be concerned not only with pre-service but also with in-service training of teachers. Another suggestion was that conversion courses should be established for teachers with other specialisations to equip them to teach technical subjects (Presidential Commission, 1999: 133). The lack of technical teacher-training programmes was evident in a speech made by UNAM’s previous Vice-Chancellor, Prof Katjavivi, at their seventh graduation ceremony. In that speech he referred to the efforts made for the training of science, mathematics and agriculture teachers. No mention was made of technical education however, showing the lack of interest in and awareness of that particular field of study (UNAM, 2003: 89, 119).

Katjavivi (UNAM, 2003: 92) envisaged in 1995 that the Polytechnic was to provide science and technology-based training where practical skills needed by the industry and business would be taught. A training programme was proposed at a workshop held in 1996 where the need for well-trained technical teachers and instructors was recognised (MHEVTST, 1996: 2). Two general levels of competencies were identified:

1. Instructors for practical training with sufficient knowledge of trade theory and some pedagogical skills, to be employed at the VTCs.
2. Instructors with a high level of competencies in theory as well as in practical skills combined with pedagogical and didactic skills, to be employed at technical schools and VTCs.

The nation-wide shortage of technical teachers was identified by the Presidential Commission (1999: 178). It recommended that a department of technical training and vocational teaching be established at the Polytechnic. The training of technical teachers was somehow addressed by the Instructor Training Programme which was developed and established at the Polytechnic of Namibia. However, this programme is currently in its pilot phase and is not based on the school curriculum, but caters for the VTCs only. It offers very little for technical teachers at school level, and the programme is structured in such a way that only full-time employees of industries who are in possession of trade certificates can enrol for the course (Polytechnic of Namibia, 2002: 140).

Reliance on untrained teachers, expatriates and volunteer teachers may provide some solution in the short term but in the long term it creates more problems for the system. This is so because the untrained teachers are not equipped with skills to do their job well and expatriates have a high turnover rate. Furthermore, expatriates may be highly skilled and committed to teaching but their training and work experience were gained in socio-economic and cultural situations that are different from those of Namibia.

3.7.2 Teaching methodology for technical education

Many politicians and educators referred to the Cape Education educational philosophy and methodology as teacher-centred, ineffective and based on rote learning. The MEC "introduced" learner-centred education to Namibians and defined it, among other definitions, as follows:

> A general reorientation of the organisation of school work with a view to fostering the acquisition of basic knowledge and skills by all learners (MEC, 1993b: 120).

Zimba (1995: 83) refers to learner-centred education as

i) teaching and learning that are based on students' experiential, developmental and scholastic background, interests, goals, hopes, aptitudes and learning needs,
ii) students that are active participants and partners in their own education, and
iii) the striving for understanding, competence, knowledge, skill mastery and application, and the quest for excellence.

If the abovementioned definitions are true to post-independence education in Namibia, I am of the opinion that learner-centred education also took place before independence with regard to technical education. The character of technical education is such that skills and abilities cannot be taught in a theoretical, teacher-centred way without teachers and learners being involved in analytical and problem-solving activities (Lutherdt, 1995: 94, 95; Edwards, 2002: 1-2). Statements referring to the teacher-centred education of pre-independence are therefore not true in all subjects. Much has been said about teacher-centred education which, according to the MBESC, was the trademark of the South African-based education system that was implemented in Namibia (MEC, 1993a: 10).

According to that methodology knowledge was to be more permanent than static and education was very much a matter of conveying factual information. It was believed that one had to learn as much information as possible, leaving hardly any time for developing practical, social or thinking skills. Apparently memorisation and repetition were the only cognitive skills developed under the CED system (NIED, 2003: 12). However, I believe that these assumptions are not totally correct and that the CED system was and still is unrighteously blamed for all Namibia's education problems. For example, technical subjects demand problem solving and practical skills, not rote learning, whether it is part of the CED system or the MOE system. However, looking at the state of technical education before independence, the assumption of rote learning may be applicable to the schools that followed the Bantu education curriculum. Ample evidence supports that assumption. In one of the few studies relating to technical education in Namibia, Katzao (1984: 116), blames poorly equipped schools, poorly trained teachers, unmotivated learners and teachers and irrelevant syllabi for the decline of technical education. However, with regard to the schools which followed the Cape Education curriculum, much emphasis was placed on practical skills and the application thereof. Schools were well equipped, teachers were well trained and learner-centred education prevailed. Syllabi emphasised practical skills, resulting in high standard work being delivered (Katzao, 1984: 132). It is unfortunate that the MOE ignores the quality technical education that prevailed in these schools, notably with regard to practical work.

A study by Naanda et al. (1994: 3) showed that few technical teachers were trained at the University of Namibia in 1994 and that the emphasis was put on developing their teaching skills for teaching technical subjects, rather than on the technical skills themselves. This indicates the misconceptions among educators about teacher training before and after independence, because the same mistakes were made. For example, before independence there was a lack of technical teachers and technical schools, a situation that still continues after fifteen years of independence. SWAPO criticised the South African system of being irrelevant and too academically oriented, while the current Namibian system is found to be inadequate and too academic as well (Presidential Commission Report, 1999: 163).

3.8 PRESIDENTIAL COMMISSION ON EDUCATION, CULTURE AND TRAINING: ISSUES RELATED TO TECHNICAL EDUCATION

In 1999 a Presidential Commission was set up to investigate many aspects of education. Amongst the findings with regard to technical education were:

- Technical education cannot be optimised due to a lack of materials and tools.
- Technical teachers with the required skills are hard to come by.
- A low enrolment for this subject area makes technical education very expensive.
- Technical education has a low status because of the wrong perception that "less able" learners should take technical subjects. This contributes to its low status.
- Poor career guidance contributes to the neglect of technical education.

One important suggestion was made to address the problems surrounding technical education. The suggestion was to expand and create Comprehensive Secondary Schools, also referred to as "Schools of Excellence" (Presidential Commission Report, 1999: 169). It was also suggested that a Comprehensive Secondary School should be established in every political region, well staffed and equipped in mathematics, science and technical subjects to provide superior preparation for entry into university engineering courses.

In reality it means that these schools should cater for the most able learners only, which immediately indicates that these learners would be subjected to aptitude tests, a practice that is currently not allowed. Parents may feel that their children are discriminated against. On the other hand technical education is expensive and only able and interested learners should be allowed access to technical subjects in order to save costs. By doing that the status of technical education would also be improved (Bottoms and Phillips, 1998: 28). I feel that aptitude and interest tests should be done at technical schools. If not, the percentage of learners who will never enter those technical occupations for which they have been trained, but have instead moved to alternative employment which offers less practical and also higher income potential, will be significant. Dr Hangala (2001: 2), President of the Namibia Chamber of Commerce and Industry (NCCI), asked for more technical schools to "produce the people who do the work". He is adamant that Namibia neglects technical education because of a lack of a vision towards technical education. This sentiment for the preservation of technical schools was also expressed by the leader of the official political opposition, Mr Mudge (Gurirab, 2006: 4-5).

3.9 RELEVANCE OF TECHNICAL EDUCATION PROGRAMMES

Southern Africa is currently known for its economic and political instability and high unemployment figures. Many politicians and education officials highlight socio-economic challenges such as famine and unemployment when addressing the nation (Nujoma, 2000: 4). A reason for this situation is irrelevant educational programmes, where political ideology is taught rather than knowledge and skills that support employment, and economic and industrial development. Without educated and trained workers the socio-economic problems will not be solved. Educational programmes should therefore be relevant to the socio-economic needs of societies. Smit (1983: 6) regards the relevancy of education as focussing on skills that are essential for the economic development of communities. Bacchus (1988: 38) opines that technical education is the type of education that teaches relevant skills as it yields greater individual and social economical returns than an education that does not transmit technical skills.

The only way to determine the essentials of educational programmes, such as the content of technical subjects, is to do a market survey among communities, enterprises and businesses to establish the real needs of Namibian societies, something that has not been done as yet (L. Moller, personal interview, 28 July 2005). It seems as if technical education syllabi are designed on what education officials perceive as relevant for Namibians and not on what has been methodically established by means of surveys.

3.9.1 Educational relevance in the Namibian context

Namibia struggled with the relevancy of its programmes for many years. Ironically many Namibians left Namibia because of the irrelevant school programmes and content of subjects (UNIN, 1987: 70, 186), but the schools that they attended while in exile, like the school in Loudima, also struggled with irrelevant content (Agapitus, 1991: 24-27). The MHEVTST is correct when it defines relevance of educational programmes. It is referred to as “an idea best understood in terms of context and process” (MHEVTST, 1999: 36). However, when breaking down the relevancy of programmes, it becomes clear that little emphasis is placed on technical education, especially seen in the dualistic organisational nature of technical education (see also paragraph 3.3). According to the MHEVTST, relevancy of educational programmes is to:

- create a positive environment for academic pursuits;
- inspire new talents and fuel the enthusiasm of students toward academic work;
- provide opportunities for reflection and creativity among academics;
- create a cultural anchor to give direction and social purpose;
- meet the national needs for human resource development; and
- demonstrate contributions to social change and progress (MHEVTST, 1999: 37).

The above statement surely puts academic education above technical education, which holds negative implications for the development, financing and delivering of technical education. This viewpoint is strengthened by the fact that in real terms there is a serious misalignment between the skills of school-leavers and graduates produced by the education system and the demands of the economy (Presidential Commission Report, 1999: 72; Clegg, 2004: 8). This opinion is shared by participants at a workshop who stated that there is a lack of technical know-how because exposure to technical education was limited (UNAM, 1999: 33, 51). Tötemeyer (2000:113) feels that the Namibian society is in dire need of trained technologists, scientists, engineering and versatile technicians. The present oversupply of untrained and semi-trained workers must be converted into a pool of well-trained technologists, engineers and qualified technicians. Claassen (1992: 110) argues that if the curriculum impact on the economic development of a country is small, it could well be that the school fails to prepare the school-leaver for the world of work. According to this argument, it is not the education system which is the culprit, but the lack of relevance of the programmes within the formal system.

There are several stumbling blocks in the way of making technical education relevant to society's needs. The first stumbling block revolves around the rigid, centralised decision-making processes which hinder schools to respond to changes in training needs by an adaptation of the syllabi to suit the needs. The second obstacle regarding technical education hinges on the quality of education. A third obstacle is the lack of cooperation between schools and the local industry. Finally, poor career guidance hinders the popularity of technical education, not only in schools but also after completion of basic education. The 2001 Namibian housing and population census revealed that only 15 771 (2,3%) of all those aged 15 years and over and who have left school continued with technical training (Republic of Namibia, 2003: 34). This is an indication of the poor status of technical education in Namibia, as well as the lack of opportunities in technical education after school. The number of school-leavers who ends up at the Community Skills Development Centres (COSDECS) is very limited because of the limited numbers of students that can be accommodated, with the result that most of them revert to the streets in search of low-skilled work (Von Plato, Du Plooy and Brunette, 2001: 21).

3.9.2 Curriculum design

Roodt (1999: 10) is adamant that self-employment can only take place if quality skills are taught at school level. She argues that only better skills will enable people to choose self-employment as a viable alternative for preventing unemployment and creating wealth. The involvement of industries and businesses in curriculum design should therefore be strengthened. Existing efforts in joint curriculum design among schools should be reinforced. This will require schools to welcome employer input to a degree that has not been common in the past. Open communication between stakeholders is the only way to substantially ensure that work-based learning will take place (Hangala, 2000: 62). Working together on curriculum design will change school apathy and build important bridges on the way to long-term partnerships. It will require a multi-faceted approach which takes into account the abilities and interests of employers (Pupkewitz, 2000: 66).

If successful, more employers will become active and committed partners in educating the youth for sustainable employment. Pupkewitz (2000: 67) suggests that the Namibian education system should be more function-driven, made more relevant to the needs of the industry and commerce and provide technical, science and mathematical skills. It seems as if technical education is provided in an ad hoc manner which does not lead to clear mobility paths for school-leavers (Presidential Commission Report, 1999: 52).

Curricular innovation is essential and is one of the greatest challenges for education planners in Namibia. Education should impart skills, particularly those practical skills for self-employment, so that school-leavers will be able to earn an income. The curriculum should favour practical technical theory and skills, since the formal labour market does not have the capacity to absorb all school-leavers.

3.9.3 Localisation of syllabi

The South African education system as implemented in Namibia was criticised for its irrelevant subject content. The localisation of syllabi was therefore emphasised at Namibia's independence (MEC 1993b: 122). The introduction of a new education system meant that syllabi had to be designed to fit the Namibian Broad Curriculum. The MEC invited experienced teachers to rewrite the syllabi in a new format according to Namibian educational goals and objectives. A committee consisting of experienced technical teachers but inexperienced in syllabus design, was compiled to design new technical syllabi. However, the old South African Cape Education Department (CED) syllabi were rewritten in the Namibian format (P. Thom, personal interview, 26 July 2005). This was because of the fact that the technical teachers regarded the CED syllabi as being of a high standard and that they wished to continue with it. It was also the only frame of reference that they had on which the new syllabi could be based. With the introduction of the Cambridge system, localisation of subjects got further momentum and involved Namibians, contributing to the development of curriculum design skills (Van der Merwe, 1993: 28; Avenstrup, 1993: 35; MBESC, 1999a: 11).

As the responsibility of writing syllabi shifted towards NIED, more attention was given to localisation of syllabi (MBESC, 2001b: 17-18). The members of the Curriculum Panel for Technical Subjects approached syllabus design with much enthusiasm, although many mistakes were made initially due to inexperience in that regard. One challenge was to make technical education relevant to Namibian needs. For example, a letter was sent to the MBESC to motivate that the subject Design and Communication be changed to Technical Drawing and Design. Reasons given were:

- The syllabi and question papers did not meet the needs of local industries.
- The quality of the content of the syllabus was below the standards of requirements for technikons, universities and even training in the private sector.
- The syllabus did not make provision for practical work that related to competencies in trades, for example to read a plan.
- The design part was approved, but it was too much emphasised (Alberts, 1997).

Regrettably nothing has changed after the letter. Localisation of technical subjects is still hindered by vagueness surrounding the new approach to technical education (see 3. 10).

3.9.4 Education with Production (EwP)

Many countries have experimented with implementing an alternative technical and vocational curriculum directed at agricultural and technical training. This educational curriculum approach of intentional and institutional interaction between development of knowledge and skills on the one hand and processes of production on the other has been described by Jansen as having an ideological, socialist character (1989: 221-111). According to Van Rensburg (2001: 5, 9) traditional schools are isolated from economic and social realities. He regards EwP as the only alternative that can resolve Africa's high unemployment rate by linking manual skills, work and study in such a way that they interact dynamically, strengthening all-round learning as well as achieving real economic growth. Hoppers (1996: 35) points out that the work dimension has been regarded as a major vehicle for making education less elitist and more responsive to the needs of personal and socio-economic development. Based on this perspective, the Presidential Commission suggested that technical school learners should participate in maintenance of school furniture and buildings (Presidential Commission Report, 1999: 107, 170).

The MHEVTST recognised the fact that the private sector should create internships at different levels to support training (MHEVTST, 1999: 23). The Presidential Commission reported that on-the-job education and training could be a solution to the low productivity levels among technician trainees (1999: 55). A new subject, Enterprise and Principles of Production, was suggested by the Presidential Commission to be implemented in schools, based on the "Education with Production" experiment at the Loudima school (1999: 56). It was also suggested that technical subjects at secondary schools be rationalised in future. Heita (2000: 43) states that it is high time for technical and vocational education to be linked to the world of work in order to be relevant and benefit the economy.

3.9.5 Job opportunities in Namibia

Tötemeyer (2000: 113) is of the opinion that the Namibian economy and society crucially need scientific and technical knowledge that can be translated into practical skills and work. He also feels that employment realities in Namibia, as a developing country, differ from those in developed countries. Jobs in industrialised countries require the development and application of knowledge of work. But in Namibia people need knowledge and skills to become self-employed, as few opportunities exist in the limited industries and shrinking resources. Education is dependent on the industrial and business world for the generation of job opportunities for its school-leavers. Heita (2000: 43) is adamant that without technical education to provide a technological base for school-leavers, development in Namibia will come to a standstill and unemployment will rise.

A study in 2001 revealed that the political dispensation before independence denied many people proper education, resulting in a shortage of skilled people. However, it was found that after more than a decade of independence the social inequalities still persist as a result of the lack of practical technical skills. The study further revealed that the current [2001] education and training system does not yet fully meet employers' demands, as basic skills, practical experience and motivation to continue studies in vocational training are lacking (Grossmann, 2001: 88). In this regard Heita (2000: 43) feels that there is a need to introduce vocational subjects in the general school system so that curriculum activities should recognise the vocational value of technical education.

The importance of careful and well-informed planning and of proper management of educational development in order to ensure balance between access to education on the one hand and educational infrastructure and human power on the other, cannot be over-emphasised. Ideally planning must aim at (a) ensuring the equilibrium between new developments and the capacity of the economy within which those developments take place, (b) rationalising and systematising the development of infrastructure and human resources essential for the sustenance of the development of technical education and (c) anticipating obstacles that may derail intended development and suggesting creative ways of circumventing such obstacles if they arise.

Within the education context aim (a) above implies three considerations. Firstly that people must be trained at a rate at which they are needed in the economy and also provided with skills which are suited to the needs of the economy. Secondly, the new developments must not lead to an imbalance in the education system. For example, the rapid expansion of technical education without a matching increase in the expansion teacher training results in the worsening of the quality of education, as we have seen. Thirdly, any new developments in technical education should match the growth of the private sector. If not, skilled people will find themselves without jobs. Small industries should be encouraged, because they contribute much toward job creation. In this regard Van Schalkwyk (1988: 163) argues as follows:

> Sonder die bedryf wat aan mense werk verskaf, is die onderwys se werk eintlik vrugteloos omdat dit weinig nut het om ń mens te skool sonder om ook aan hom ń werksgeleentheid te verskaf waarbinne hy sy vermoëns en skoling kan uitleef.

3.9.6 University of Science and Technology

The MHEVTST envisaged the creation of a University of Technology in Namibia to promote the development of technical expertise (MHEVTST, 1999: 135-137). The Presidential Commission proposed that the Polytechnic of Namibia should become the Applied Science and Technology University of Namibia or ASTUN (1999: 116). The Presidential Commission justified this on the following grounds:

- The demand for technologists is not nearly being met at the present time and this will hamper the expansion of the economy.
- An improved status for technical education will attract more competent learners.
- The Polytechnic is already able to award degrees and has the staff and other capacities to do so at moderate cost.
- Additional national responsibilities should be assigned to the Polytechnic, most notably technical teacher training (Presidential Commission Report, 1999: 156).

3.9.7 Staffing norms

Relevancy of education also means that appropriate staffing norms and reasonable timetabling procedures should be followed. The problem about technical education is the fact that only fifteen learners are allowed in a technical workshop, due to the practical nature of the subject area and safety regulations (Clegg, 2001: 49). As a result of this, schools offering technical subjects are advantaged in the sense that they have more teachers on the staff list than other schools. The MBESC argued that it was not cost-effective and indicated that the teacher-learner ratio of 1:15 will be scrapped. The new staffing norms, applied without exception, will leave many technical schools and schools offering technical subjects no other choice but to stop offering these subjects (Clegg, 2001: 65).

Schools offering technical subjects would in future be staffed according to the number of learners in the school, not taking specific subjects into consideration. It means that learners should be persuaded not to take technical education, but rather academic subjects. Schools are advised to gradually drop practical subjects from the curriculum because the MOE cannot afford to have small class groups (Clegg, 2001: 8-9). This clearly shows the MOE's stance against technical education.

3.9.8 Financing of technical education: Materials and equipment

Technical education is a very expensive undertaking. A World Bank report on Namibian education emphasised the fact once again (1991: 120). The education ministries recognised the lack of materials and physical facilities and undertook to improve the situation (MEC, 1993b: 40). In 1995, Dr West, Chief Educational Planner, said:

> Improvisation should by no means be neglected. Teachers should know how and where to beg and borrow the wherewithal to make equipment relevant to their subject. Basic woodworking skills and modelling skills in cardboard and Perspex would be an undoubted asset to the young teacher (West, 1995b: 26).

The abovementioned statement shows the lack of knowledge about technical subjects, because even basic woodworking skills need special tools and materials, not to mention more specialised technical and design skills. To stay relevant to the needs of learners and society, equipment should be updated regularly and the required materials need to be provided to teach the prescribed syllabi. However, technical teachers complained that the equipment in the workshops was outdated (P. Thom, personal interview, 26 July 2005; Teachers' questionnaire, items 6-8). Technical teachers face the very real prospect of becoming deskilled, since they lack the necessary equipment and other resources to work in their respective technical fields. The provision of materials and equipment in education was hampered further by MBESC budget constraints (Tangeni, 2000: 1-2).

The shortages of ministerial funds, materials and equipment were of such an extent that technical subjects suffered in quality. In this regard the principal of the Windhoek Technical High School suggested the closure of the school as a result of continuous under-budgeting for the school's funds by the MBESC in a letter to the regional director of the Windhoek education region (Van Zyl, 1998). In fact, it also became known that the MBESC's annual budget per learner in schools offering technical subjects was only

N$33,00, the same at that for learners taking academic subjects, compared to N$560,00 per learner taking technical subjects before independence (Groenewald, 1999).

The principal of M&K Gertze Technical School in Rehoboth explained that the school had not received materials and equipment from the MOE since 1993. Had it not been for the local community, technical education would have come to a standstill (Q. Green, personal interview, 24 September 2005). The Under-Secretary of Formal Education in the MBESC at the time, Dr Burger, explained that funds were allocated to the educational regions according to the budgets, but that some educational regions diverted funds between budget votes (Brunette, 1998b: 1). This means that the funds in the MOE budgeted for technical education were utilised for expenses other than technical education, with the result that technical education in some of the regions did not have funds to provide materials and maintain equipment. In some cases reasonably equipped workshops were left unused because of a lack of technical teachers, but mostly workshops lacked basic equipment and materials for teaching (Presidential Commission, 1999: 166; Booysen, 2006c: 3).

The lack of facilities for practical work in technical subjects in most schools is one important factor responsible for the poor quality of education and rote learning in technical subjects. This is further enhanced by the lack of materials and equipment to train technical teachers at the institutions of higher learning. Tjitendero (2000: 105) and Ausiko (2005: 2) recognise that a huge backlog in the provision of physical infrastructure, materials and well-equipped classrooms exists which should be addressed before quality education can be achieved. Pupkewitz (2000: 67) makes it clear that the maintenance and the updating of the Namibian school infrastructure are important to stay relevant to the job market. Bacchus (1988: 22) warns of the fact that when equipment and materials are lacking, there is a tendency for the theory aspect of technical education to dominate the practical aspect, thereby denying technical education to be taught qualitatively and taking its rightful place. Therefore it seems as if technical education has been neglected, mismanaged and negated by the MOE to a huge extent. It really looks as if it wants to rid itself from the subject area.

3.10 WATERSHED FOR TECHNICAL EDUCATION

Tuesday, 10 June 2004 can be considered as the watershed regarding the future of technical education in Namibia. At a meeting at the National Institute for Educational Development (NIED) various stakeholders met to decide the future of technical education (Booysen, 2006c: 3). The two consultancy reports on pre-vocational education played a major role in the decisions. However, MBESC and DNEA members indicated that the lack of finances was to be the major factor. A proposal by the chairperson, Dr P. Swarts, to remove technical education in total from the MBESC was not acceptable to certain members. The rationale to remove technical education in its current (2006) format from basic education was that it could be better offered by the Ministry of Higher Education. A counter-proposal was made to keep technical drawing and design and technology in basic education. It was decided to develop a generic technical subject along the lines of design and technology as from Grade 5 to Grade 12, and to develop technical drawing also from Grade 5 to support the newly developed design and technology syllabus (January, 2005: 2). Although Stoner and Engelbrecht (2000: 65) indicated that the future of other pre-vocational subjects such as home economics and fashion and fabrics was also at stake, the MBESC decided at the 2004-watershed meeting to continue with it.

The MOE therefore makes a quantum conceptual leap by presuming that a technical subject and skill specialisation are irrelevant to Namibians. Ironically this decision is directly opposed to what black Namibians worked for so hard before independence, as well as the recognition that exposure to pre-vocational practical subjects helps people find and create employment (Angula, 1991: 10; MEC, 1993b: 63; Geingob, 1993: 11). This position is reminiscent of, but at the same time very different from the strong practical and pre-vocational bias that is found in the curriculum designed by SWAPO in the 1980s, which then drew inspiration from socialist ideology (see also paragraph 2.5.4.4, SWAPO’s election manifesto). One of the biggest points of criticism against the colonial education system in Namibia was the lack of teaching technical skills (Smith, 1986: 49-50). It seems as if the current [2006] educational planners are making the very same “mistake” of which they accused South Africa before independence.

It looks as if the current MOE is to embark on the “lean curriculum” as followed by other African countries. Such a lean curriculum is consistent with low technology levels which require little technology input and problem solving (see Table 4.1). This is partly on pragmatic grounds. Given the poor state of many African education systems and the likely limits to improved quality and resourcing, it is argued that it makes best sense to concentrate on providing core subjects without adequate quality. These subjects tend to be an “international” language, mathematics, science and a “national” language. Part of the argument for the time and resources being given to these subjects is that the first three subjects are the only really important subjects needed in the era of globalisation (DFID, 2001: 33). This assumption is based on the contention that rapid technological change means that learners do not need technical skills and knowledge across the traditional range of technical subjects. Another argument for the lean curriculum is the fact that rapid technological change of globalisation requires schools to develop future workers who have basic generic skills in literacy, numeracy and science (World Bank, 1995: 71).

However, this is against the “pragmatic education philosophy” of Minister Nahas Angula who stated in 1991 that practical production and skill qualification had to be achieved within the frame of general education (Agapitus et al., 1991: 64). This new academic drift of rationalised technical subjects, attempting to upgrade their status by becoming more like mainstream academic subjects, will further undermine the status and value of traditional technical education in Namibia. The MOE decision to scrap traditional technical education creates more questions than answers, such as:

1. Which ministry is willing to take over the responsibilities of technical education?
2. Will there be enough funds to develop such education in order to provide quality and relevant education?
3. Won’t this new policy contribute towards more unemployment, as Grade 10 and Grade 12 school-leavers will lack practical and employable technical skills?
4. Does it mean that learners who wish to enrol in technical schools will have to be enrolled in a Vocational Training Centre (VTC)? Will the necessary pedagogical aspects regarding the education of children be followed in the VTC?

5. What will happen to all the tools, equipment, materials and specially designed workshops at schools? What will happen to the millions of dollars worth of recently acquired tools, equipment and workshops that were built with NAMAS funds and donors? Will NAMAS still fund technical education in future?
6. Should design and technology involve skills and the use of materials? Doesn't it mean that technical workshops in schools need to be retained and provided with certain materials and tools?
7. Who will teach these generic subjects seeing that no Namibian teachers are trained in design and technology?
8. Which textbooks will be used? In the light of localisation of subjects, it means that money needs to be spent once again on the development of textbooks.
9. How will current [2006] technical education programmes be phased out and when will the new generic syllabi be ready to be implemented?
10. How will the employers and other stakeholders in the private sector react to this decision of the MOE to scrap technical education, as they were not consulted?

These are some of the questions that need to be answered before the current MOE can implement the new policies on technical education. Unfortunately no other options were even discussed at the meeting, as it seemed as if the now defunct MBESC had decided to get rid of technical education even before the meeting was held. Proof of this is the way in which the meeting was held and the concerted efforts of MBESC representatives to get rid of it. Oddly enough, the now obsolete MHEVTST was not even present at the meeting, and it will have to be seen whether its officials will address technical education successfully. It is obvious that the demise of technical education according to the Cambridge system started even before Namibian independence. According to the evaluation report of the Loudima model, the technical part of the IGCSE was neglected, resulting in a shift from the school's production and integration goals to an academic emphasis on goals based on the western-European model (Agapitus et al., 1991: 26).

This new policy towards technical education is on the one hand typical of a technocratic dispensation which requires from learners that they be trained competently for the maintenance and development of scientifically, technologically and sociologically determined functions, as well as the promotion of the national economy. Such a technocratic approach regards the individual learners in terms of their utility value for the advancement of the technocratic order which, it is believed by some, represents the symbol of humankind's advancement toward a more efficient and better world. In such a technocratic world education is directed at the attainment of pragmatic and utilitarian ends. And as a result, education will be reduced to mere training and vocational preparation in the interests of nation building, without due regard for the individual person's quest for self-empowerment as a human being (Poor Management In Education, 2005). A mechanistic and narrow form of education should be guarded against.

In the United Kingdom, educators realised that the General Certificate of Senior Education's (GCSE) A-levels and vocational qualifications, on which Namibia's education system is based, provide inadequate skills to learners and students. It seems as if employers in the UK are dissatisfied with the skills of school-leavers. Engineers fear that the broad range and the early focus on social needs and on discussing the nature of technology would weaken the teaching of skills of design and construction (Black, 1998: 8). Plans for the biggest education reform which include the teaching of more relevant mathematical, science and technical skills are already under way. The proposals are a way for the nation both to recognise the capabilities of its young people and to provide them with the skills to become effective citizens and workers (BBC news, Monday, 18 October, 2004). Ironically the Namibian educational authorities are strengthening the very same policies which the UK intends to change in order to become relevant.

On the other hand a generic "academically-orientated" technical subject over-emphasises academic education, which ignores the "practical-oriented" needs of a given socio-economic situation (Booysen, 2006c: 3). Although this approach develops broadly applicable competencies, the pursuit of these raises many problems, especially about whether the ability to transfer such competencies across contexts and in practical situations can be learned (Black, 1998: 9). It will inevitably lead to what Ronald Dore (1980: 11) calls "The Diploma Disease" as people chase after higher qualifications with the hope of increasing their chances of employment. The result, inevitably, is the school-leaver problem as people fail to get jobs due to a lack of employable technical skills.

The implication is that any generic technical subject must have practical work, as applying theory in practice provides the practical experience that is necessary. It means that if the MOE wishes to implement the new "Design and Technology" approach, practical workshops at academic schools need to be equipped to make experiential learning possible through practical work, which will require more materials and trained teachers. It raises the fear that the debates used against technical education, specifically lack of funds, will also be used against Technological Education (see Chapter eight) and will eventually cause the demise of technical education in Namibia in any format.

3.11 CONCLUSION

As the world is moving at an accelerated pace into new technological fields, it places new demands on education systems to prepare the youth for the realities of the world. However, Namibian schools are producing many learners without technical skills, while industry looks for people with technical know-how. It has been pointed out that technical education in Namibia has been neglected over decades and is to be replaced by an alternative type of technical education, which may also be irrelevant to Namibia's demands. This alternative technical education may deliver poorly educated and minimally trained school-leavers to an economy which has been geared to operate with a semi-skilled technical workforce. Technical education should be aimed at developing an understanding of and appreciation for the processes and products of technology and at stimulating the kind of reasoning that would enable learners to observe phenomena, identify and analyse problems, examine solutions, distinguish alternatives, comprehend documents and apply practical skills. In order to improve Namibia's technical education, cognisance should be taken of the technical education trends at international level. The next chapter discusses international trends that may benefit technical education policies in Namibia.

CHAPTER 4

INTERNATIONAL PERSPECTIVES ON TECHNICAL EDUCATION

4.1 INTRODUCTION

In the preceding chapters the development of technical education before and after Namibia's independence was examined. The purpose of this chapter is to review the international literature on technical education. The aim is to develop a clear and thorough theoretical and conceptual understanding of technical education based on the latest technical education trends and perspectives coming from outside Namibia's borders. Subject-based curriculum restructuring, based on educational perspectives from South Africa and elsewhere, has been an important area of continuity in the Namibian educational reform process since 1919.

4.2 SOUTH AFRICAN INFLUENCES ON TECHNICAL EDUCATION IN NAMIBIA

4.2.1 The De Lange Education Report

One of the most influential reports that changed educational perspectives in Namibia before independence was the De Lange Report. The 1981 De Lange Report stated that the South African (therefore also the Namibian) industry and economy consisted of a dualism between a modern and a traditionally industrial and economic sector. The modern sector was characterised by capital-intensive methods of production and automation. On the other hand, De Lange also stated that the traditional sector was characterised by traditional crafts and economy and was environmentally deprived as they did not provide appropriate circumstances and opportunities for cognitive development in mathematics, science and technology industry (HSRC, 1981a: 4-5). The report suggested that the classical teaching approach in formal schooling, which assumed a strong academic and abstract character, should be replaced by a teaching model based on developing the concrete and practical, which is in line with technical education. De Lange argued that technical education together with a practical teaching approach was the best strategy to introduce traditional communities to a modern technological culture (HSRC, 1981a: 16). To establish this link between technical education and cultural and economic change, De

Lange suggested differentiation in technical education so that black learners could "adjust to new situations, to cultivate a productivity-oriented work ethic, and to master new technological knowledge and skills" (HSRC, 1981a: 17-18). In practical terms the De Lange Report suggested that differentiation of technical school subjects should start at an early age. In other words, technical education should comprise of different technical subjects. The findings and recommendations of the De Lange Report were well accepted but were not implemented in Namibia, because of political developments.

4.2.2 The Walters Education Report

Namibian educational planners also took note of the ideas and suggestions of the 1990 Walters Committee Report that investigated career education in South Africa. In contrast with the findings and suggestions of the De Lange Report, the Walters Report found:

1. Diversification of the curriculum is expensive. Costs may amount to double the expenses of general education.
2. All forms of secondary education increase the productivity of workers. In this regard, diversified schools are no better than conventional ones.
3. Diversified curricula are difficult to implement due to the lack of new teaching material, lack of teachers with new qualifications, and lack of new equipment.
4. Vocational-oriented education does not improve learners' attitudes toward manual labour (DEC, 1990: 37-38).

Both these reports had positive effects on the development of education, therefore also technical education, in South Africa. The effects were also felt in Namibia. However, 1990 spelled out a new political dispensation for Namibia, nullifying any direct future effects of South African educational policies on the Namibian education system. The Namibian education system opened itself up to new educational approaches from the international arena, and was only indirectly affected by South African policies after 1990.

4.3 INTERNATIONAL VIEWS ON TECHNOLOGICAL LITERACY

At independence literacy levels, especially technological literacy, in Namibia were low compared to those in developing countries elsewhere in the world (MEC, 1993b: 3, 62).

Technological literacy is a challenging concept that should be correctly understood as it provides the basic assumptions for technical education (see 1.5). In order to see the future of technical education in Namibia, it is important to see how the modern western world perceives technology. Van Schalkwyk (1988: 280) describes technological literacy as:

- the interpretation of technical terminology;
- the ability to apply technical instructions;
- insight in the working of machines and apparatus;
- physical handling of machines and apparatus; and
- the understanding of and adherence to safety measures.

In many countries, such as the United States of America (USA), there are renewed calls from politicians, educators and employers to develop technical education as prerequisite for technological literacy as a key component of general education (Raizen, Sellwood, Todd and Vickers, 1995: 1). The U.S. Department of Education has described technological literacy by means of a rather short-sighted definition as computer skills and the ability to use computers and other technology to improve learning, productivity and performance (U.S. Department of Education, 1996: 5). The International Technology Education Association (ITEA) defines it as "the ability to use, manage, understand, and assess technology" (ITEA, 2002: 1) and states that abilities cannot develop without knowledge and skills. In this regard Hunter (1992: 26) sees technological literacy as

> …an appreciation of the scientific method as a powerful way of knowing; the ability to distinguish technology from science but also to see the connections; and an understanding that the world we live in is increasingly technological, not only in regard to products, but in the whole organisation of modern life.

This definition recognises that technological discovery and the practical application thereof cannot be segregated from the scientific method, and the impact of technology should best be viewed holistically. However, it also means that technology should be distinguished from science because of its unique differences in goals and application values. This means that the incorporation of technology in the classroom requires more than computers, namely that learners develop an appreciation for technological concepts, skills and an understanding of what technology is as a discipline. It also means that teachers should develop technical skills in practical workshops, but also integrate these practical skills with problem solving, evaluation, analysis and critical thinking skills that complement other subjects of the curriculum.

The need to become technologically literate is very important in today's technocratic society. Crompton (1987: 6) asserts that since the 1960s society's economic and educational needs changed because of the following rapid technological advancement:

- rapid technological change;
- decrease in large-scale employment by the manufacturing industry;
- the rise of the service industry;
- the rise of the information and knowledge industries; and
- consequent unemployment of youths and adults.

These changes resulted in different approaches to teaching technology. Three broad outcomes of school-based technical education are indicated by contemporary literature, namely attitude, capability and knowledge. According to the International Technology Education Association (ITEA, 1996: 36), technical education should be designed to

> …develop the student's perceptions and knowledge of technology, psychomotor skills, and provide a basis for informed attitudes about the interrelationship of technology, society, and the environment.

The abovementioned definition has several implications. For example, it addresses the status and value of balanced technical education, has connotations to theoretical and practical content, refers to skills, and involves the daily needs of societies and environmental conservation through appropriate policies and actions. The teaching and learning of technological literacy depend greatly on the physical and mental maturity of teachers and learners alike. How well a learner may learn a technical skill or concept depends on the readiness of the individual to respond to stimuli. As learning is a holistic process, it involves both physical and mental aspects. As a result of what is known about learning readiness, educators seem to feel that teaching technology to learners from a very young age is entirely feasible, as long as it is presented on a level corresponding with their physical, mental and emotional development. For example, the abilities of first-graders to use tools such as hammers and saws are described by Kirkwood (1992: 30). He also noted an increase in learners' abilities to communicate technical information to others. By no means has the understanding of appropriate technology depended much on the linguistic abilities of people. Ngubane (1996: 13) states that the lack of equal access to technology is frequently also the result of a language barrier. Technological literacy therefore also implies the teaching of correct technical concepts and language.

4.3.1 Nature of technology

Technology, and certainly technical education, can be characterised as more of an activity than a discrete body of content (Black, 1998: 2). Technological knowledge can be divided into procedural knowledge which relates to the activity, and conceptual knowledge which relates to the body of content. While the traditional focus of technical education has been on activity, this has represented a narrow interpretation of procedural knowledge. However, the separation should only be visible when designing syllabi, it is not a separation which should be evident to the students.

According to Williams (2000: 1-6) learners should see technology as a thoroughly integrated activity, not one which can be separated into content and process, or theory and practice. Kimbell (1996: 32) states that the continual interaction between the thinking skills and the concrete reality of activity is what enables the development of capability in technology. This presupposes that textbook technological concepts and skills should link up with real life situations. However, reality sometimes dictates that these two areas are separate. This separation is evident in:

- timetabling – theory and practical sessions are scheduled at different times;
- examinations – separate theory and practical examinations negating application;
- the use and design of work spaces – separate theory areas and practical areas; and
- teaching methods – lecturing versus demonstrations and experiential learning.

Ortega and Ortega (1995: 14, 16) identify an increase in learners' motor skills and coordination at a young age, implying that the technical syllabi found in the traditional technical school curriculum do not always take advantage of the physical readiness and interest of youngsters to practise these skills. The literature also suggests that children involved in technical education acquire important capabilities that are not included in traditional academic areas. Greenwood (1988: 8, 10) explains that learners understand and appreciate the value of technological literacy and apply technology early in their lives. Thomson (1999: 16) describes how learners in Scotland studied and shared technological information, learned to operate technological devices and increased their understanding of technological systems through technical education. This enhanced their mental and psychological development from childhood to adulthood, benefiting their immediate personal environment in the process.

Learners should get a clear message that thinking in technology cannot be separated from technological activity. One without the other does not represent technology adequately to learners. This implies that Namibian syllabi for technical education should be developed as an integral part of education and society in future.

4.3.2 Appropriate technology

The European Economic Community (EEC) has emphasised for many years that technology and vocational training "of the right kind" should be chosen, with each country taking its own decisions in terms of its own contextual realities but adhering to international trends (Mallinson, 1980: 218; European Commission, 2003: 24-26). In order to be relevant, appropriate technology needs to be identified by subject experts after consultation with industries and businesses (Tikly, 2003: 547). The concept "appropriate technology" is an important one for developing countries such as Namibia to keep in mind. It makes sense for a developing country to acquire and develop higher technologies in order to address self-sufficiency, unemployment and development. When technical subject syllabi are developed, the question comes up which type of knowledge and skills and level of technology need to be given to teachers to be relevant. Three levels of technology which characterise every country's technological development can be distinguished. Table 4.1 shows the three levels of technology according to which Namibia can orientate itself and strive towards progressive technological development:

Table 4.1: Characteristics of Technology Levels

Characteristics of Technology Levels		
Low	**Intermediate**	**High**
Applies the basic principles of science.	Applies advanced principles of science.	Tests and develops new scientific theories, finds new applications and applies them to highly specialised situations.
Requires simple tools and facilities.	Requires machines and complex facilities (equipment, workshops).	Requires sophisticated machines and equipment, support facilities, and many different technology systems which apply high technology in their own activities.
Uses little processing of raw materials, other than heating, cutting and shaping.	Uses advanced processing methods which can change the physical characteristics of materials.	Uses highly specialised processing techniques which result in materials that have very specific characteristics.
Requires little technology.	Requires medium to high energy at a constant rate.	Requires high energy initially, but has the potential of requiring less total energy than other levels.
Uses mostly muscle power with high physical energy input and lower output.	Uses tools and machines, with physical energy input and medium to high power output.	Uses automated machines, with low physical energy input and high to ultrahigh power output.
Provides little control over the environment.	Provides limited control over the environment.	Provides greater control over the environment, with the potential of being able to alter and create new artificial environments.
Can provide benefits to only those few people who come into direct contact with it.	Can provide benefits to many people, even though they may not come into direct contact with it.	Can provide benefits to people all over the world, representing all countries and all cultures.
Provides the opportunity to solve immediate problems of a society.	Provides the opportunity to solve current and short-range problems of a society.	Provides the opportunity to solve current, short-range, and long-range problems on a global scale.

Source: Minton and Minton, 1987: 76.

Psacharopoulos and Woodhall (1986: 157) believe that if employers are directly involved in planning the curriculum and syllabi or in providing practical training, technical and vocational education will utilise appropriate technology relevant to labour market demands and will develop industrial skills more effectively. The abovementioned types and levels of technology force educational planners in Namibia to reflect on relevant technology that ought to be taught by means of technical education. The creation, duplication and teaching of advanced technology are the only hope for countries to develop economically. Namibia can also become a more prosperous country if international trends in technical education are studied, evaluated, adapted and implemented. Identifying relevant technology types and levels to be taught can rectify the current unfortunate situation where Namibia relies on imported and sometimes outdated technology. Many of Namibia's economic problems, such as unemployment and poor productivity, have occurred because of using the older technology much longer than it should have been used (Dentlinger, 2004: 1) It is simply a matter of making appropriate choices in choosing and developing technology. There is no doubt that Namibia has to choose the higher levels of technology and adapt systems, in particular the technical education system, according to the characteristics of high-level technology. If not, Namibia will never become competitive in the global economy.

4.4 THEORETICAL FRAMEWORKS TO TECHNICAL EDUCATION

Domains of study and practice, such as technical education, are founded on theoretical frameworks. It allows teachers to organise and synthesise knowledge and skills and serves to describe and predict behaviour and experience. A look at the various theoretical frameworks may provide insight into an appropriate, technological base for Namibia.

4.4.1 Progressivism

It is described as a particular type of educative practice which is the result of and a practical application of experimentalism as a philosophy of education. Schools should be seen as laboratories which do not have fixed syllabi, and should experiment with practical problems of daily life (Van Rensburg and Landman, 1984: 384). John Dewey (1859-1952) was one of the exponents of this educational approach. He was adamant that learning should take place through experience and doing and that the acquisition of skills should be harmonised with the needs of societies (Dewey, 1938: 40). The curriculum should be built around the personal experiences, interests and needs of learners.

According to Dewey the home, workplace and school should blend together to generate a continuous fulfilling experience in life. This viewpoint gave support to the School-to-Work movement in the 1990s which asked for links between school and workplace. Therefore, progressivism has much to do with pragmatism which states that the utility value of subjects is very important and that learners should become problem solvers.

4.4.2 Constructivism

Constructivism has roots in both philosophy and psychology. Several scholars distinguish between radical constructivism, social constructivism and cognitive constructivism. Doolittle and Camp (1999: 1) assert that cognitive constructivism is most compatible with career and technical education. For example, it recognises that individuals construct unique mental models based on differing experiences, which supports the technical education requirement of learners learning a core set of historically reliable knowledge and other skills. With regard to technical education, Doolittle and Camp (1999: 15) argue that cognitive constructivism embraces five central concepts:

1. All teaching within career and technical education must begin and end with an appreciation of the learners' understanding.
2. The learner must identify with a core set of currently accepted knowledge and other skills within career and technical education.
3. Career and technical knowledge and skills are dynamic; thus students must have the skills necessary to adapt.
4. Students' idiosyncratic understandings of career and technical knowledge and skills must be valued, as these understandings may lead to new discoveries, insights and adaptations.
5. The goal of career and technical education must be an occupationally self-regulated, self-mediated and self-aware individual.

DeMiranda and Folkestad (2002: 13) are of the opinion that technical education lends itself to the typical learning and instruction approach of the cognitively-based education model. They assert that the design characteristics and instructional practice found in technical education accord closely with the cognitive view of learning, knowledge and instruction. According to them the aspects of collaborative learning (discovering, sharing and using knowledge), socially distributed exercise (sharing of expertise), designing/making (taking ownership of applicable technology) and project-based learning (collaborative learning environments) reflect cognitive perspectives.

4.4.3 Behaviourism

Behaviourism asserts that the only reality is the physical world and has its foundation in psychology that states that learning is a physiological response to stimuli (Van Rensburg and Landman, 1984: 248). The behaviourist model is extremely mechanistic and supports the competency-based education model. It simply means teaching the learner specific competencies and measuring the achievement of that before proceeding to new competencies (Spring, 1997: 392). Applied in the classroom, this approach dictates the separation of learning material into organised bits of information and specific skills, tests the learners after each lesson, and rewards the learners for proper responses to the tests.

Therefore the use of performance objectives to provide structures for lesson plans, criterion-referenced measures to measure task completion and reliance on task lists for completion of the curriculum, derive from the behavioural learning theory. Regarding technical education, syllabi designed to provide specific predetermined knowledge and skills based on community needs do not represent knowledge and skills constructed internally by the learners, but rather knowledge and skills externally enforced on the learner. According to Finch and Crunkilton (1999: 32-35) technical education remains oriented towards competency-based syllabi, with the point of departure the needs and standards of industry, and delivered using a pedagogy that is based on predetermined objectives that include condition, task and standard.

It seems as if technical education in Namibia should be based on a balance between the principles of behavioural, cognitive and constructivist theories of learning (Doolittle and Camp, 1999: 5). Appropriate elements of the various theories should be identified and taken into account when a new technical education model for Namibia is designed.

4.4.4 Four perspectives on technical education

Literature indicates at least four perspectives on technical education. Although not mutually exclusive, each view seems to be the result of a different philosophy of education. A discussion may provide an appropriate perspective for Namibia's education.

4.4.4.1 Technical education as content

Proponents of the content view see technical education as providing learners with knowledge about technology. To them, technology is an academic discipline which can be taught without the practical application of skills (Wright, 1996: 2-3). According to Dugger (1997: 11) the subject content should be quantifiable and universal in nature. Proponents of this viewpoint such as De Vries (1994: 35) refer to technical education as technology education. He calls this the "technology concepts approach" which usually refers to science teachers who wish to teach science with relevant ideas from technology, but who lack the practical workshops or practical experience required to fully explore the design and product development process.

4.4.4.2 Technical education as a process

Another view regards technical education as a process during which skills need to be taught to learners. Learners are then required to replicate the process. Learning activities typically involve making artefacts based on prescribed designs in classrooms equipped with machines and tools from the woodworking, metalworking and similar trades. It differs from the content view in so far as that it focuses on technical skills rather than on knowledge. Proponents of this viewpoint such as Dunn and Larson (1990: 37) refer to technical education as "design technology" or "children's engineering". Ackerman, Etchison, Lydic and Spiro (1997: 7) see this approach as identifying needs, generating ideas, planning and creating, testing and finding the best solutions. In other words, it is about applying technical knowledge and skills in product development. De Vries (1994: 34) uses the concept "craft-based approach" which stresses traditional practical skills based on psychomotor skills but design is neglected. This approach was typical of the technical subjects as prescribed by the Cape Education system which was applied in Namibia until 1994.

4.4.4.3 Technical education as a method

Proponents of this approach take existing syllabi and build technical education skills around it. According to Kirkwood (1992: 30) three aspects are important: firstly, the learner, secondly, the school curriculum, and thirdly, appropriate technical activities based on existing curriculum content. New syllabi are therefore just an extension of implemented syllabi. For example, this approach was used by technical teachers (by ignorance) after independence to develop Namibian technical education syllabi based on the R.S.A. Cape Education Department's syllabi (see paragraph 3.9.3).

4.4.4.4 Occupational or vocational approach

This approach involves a high degree of hands-on transformation of materials into products, but emphasises current industrial practice rather than traditional craft skills, though it can overlap. De Vries (1994: 37) refers to the "industrial oriented approach". Classrooms are usually equipped with modern industrial equipment and teachers have usually been trained in industry. Learners are usually attached to industry in some way, for example by means of an apprenticeship, to gain practical experience. This approach is used where education links learners and teachers with preparation for work and an economically active life.

It seems as if a balanced combination of the perspectives viewing technical education as a process and occupational approach is most suitable for Namibia. This would enable learners to acquire the relevant employable technical skills as required by industries.

4.5 TECHNICAL EDUCATION: SCHOOL-BASED VERSUS ENTERPRISE-BASED

Many scholars agree that the question whether technical education should be the responsibility of the education system or that of the business sector is a major issue, especially in developing countries. On the one hand technical education can be a school function but implemented to some extent, especially as far as practical skills are concerned, in a business surrounding if the objectives, syllabus content and standards are described and controlled by the education system. On the other hand it can be a function of the enterprise, where the objectives, content and standards are controlled by the enterprise (Hughes, Bailey and Karp, 2002: 276). Baron (1965: 149) argues that

> [t]he whole nature and approach to the education of the school-leavers depend on whether it is viewed as an extension of the work and hence as having its roots in the educational system, or whether it is viewed as a growth downwards from the occupational structure and hence has its roots in industry and commerce.

Masri (1994: 63) maintains that if vocational preparation is mainly a function of the school it means that it is oriented more towards the needs of the individual and is an integral part of the educational structure with possible links with the higher educational level. However, to say that technical education is a function of industries means that it is oriented more to job requirements. A study of the approaches to technical education may provide guiding principles according to which future technical education can be designed.

4.5.1 The school approach

The school approach assumes that businesses and industries are unable to take full responsibility for personality and character building. Advocates of this approach argue that the school, as the symbol of the formal education system, should be the main controller of vocational preparation which is thus considered an integral part of the educational structure (Lewin, 1993: 224). The benefits of school-based technical education are also described by King (1967: 199) as subjecting learners to a wide range of humanising influences and that, in association with practical work, it is possible to develop both personal qualities and a good understanding of other conventional subjects. According to Masri (1994: 66-68) the school approach has the following four main distinct variations:

4.5.1.1 The Superimposed variation

This variation specifies specialised technical education as preparation for employment and is forced on the general education programme. Theoretically, the link with higher education is strong, but in practice few school-leavers carry on with university training because of lower academic achievements. They are usually guided to join employment at the basic occupational levels. Stenström and Lasonen (2004: 38) refer to the concept *vocational enhancement* which entails reforming the content of vocational education and training separately from academic education. Esteem for vocational education is assumed to be linked with the quality of the theory and practical skills in technical education.

4.5.1.2 The "Separate but Equal" variation

According to this variation, the technical school exists on equal terms side by side with the general school. The duration is similar and leads to a recognised level of educational attainment. Stenström and Lasonen (2004: 39) use the term *linkages* strategy, where technical and general educational tracks are given the same formal status and are linked through a common certification framework. Both types of education guarantee access to further education, and earlier studies are recognised irrespective of the track.

Although the course content of the technical track incorporates a strong component of general education, such a component does not have the same depth as in the general school. The technical component is usually broad based, but designed to fulfil job requirements as far as possible. However, although theoretically on par with the general secondary school, the technical secondary school usually suffers from a relatively low status in practical terms. Its link with higher education is almost restricted to technician education and the unpopular levels it prepares for contribute to its low status (Masri, 1994: 67). Learners in these schools are usually frustrated, as they have difficulties in accessing institutions of higher education. In Namibia the current technical schools fall under this segment to an extent.

4.5.1.3 The "Separate and Inferior" variation

This type of approach puts technical schools from the outset on a lower level than general schools, and regards technology as inferior to subjects such as science and mathematics (Raizen et al., 1995: 32, 137). Although it subscribes to a general education perspective, it attempts to improve relevance by giving an explicit practical bias to the syllabi through the introduction of compulsory or optional practical subjects (Hoppers, 1996: 35). The course study is usually shorter than in the general secondary school and the link with tertiary education is very weak. This approach gives technical education a marginal position in sub-Saharan Africa (Atchoarena and Delluc, 2002: 38). Compared with the "separate but equal" variation, it has the advantage that learners have no unrealistic educational or occupational expectations. Schools in Namibia that fall in this category are the schools that educate learners with special needs, such as the Pionier Boys' School in Windhoek.

4.5.1.4 The "Common Core" variation

This variation is a compromise between the "superimposed" and the "separate but equal" variations. General and technical secondary schools, which can exist separately or within the same system share, according to this variation, a common core syllabus. Some subject areas which are considered important for nation building usually constitute a common feature in both types of schools. For the school to be a preparation ground for employment or further study, the elective subjects have to be taken in a "parcel" that corresponds with a certain vocational line. Thus, a learner who opts for a technical vocation would take the elective subjects from the technical field, such as technical drawing and woodwork. Examples are the Cambridge system that is currently [2006] used in Namibia, and the American comprehensive high school system.

The biggest advantage of the school-based system is the fact that the objective of education is not only to prepare the youth for employment, but also to teach them appropriate values, norms and citizenship. The biggest criticism against a purely school-based system is the fact that it runs the risk of training individuals for whom there is no actual demand or who will not take up the type of employment for which they have been trained.

4.5.2 The enterprise approach

Proponents of the enterprise approach believe that technical education and industrial training have little place in the general school. The rationale for this thinking originates from its assumed cost-effectiveness, relevance and flexibility. It is true that industry-based technical education schemes are more economical and relevant than school-based ones (Hoppers, 1996: 34). A major advantage is that the training cost is usually distributed among employers and that existing equipment and tools can be utilised. Industry-based education is flexible, offers smooth transition from school to work and does not suffer from a long time-lag when responding to emerging training needs. A disadvantage of this approach is that learners are considered as too young to be exposed to an environment known for crude language and asocial behaviour.

4.5.3 The dual system approach

This approach dictates that two separate systems of vocational preparation exist side by side, namely the school-based system and the enterprise-based system (Nijhof and Streumer, 1998: 65; Führ, 1996: 159). Many developed and developing countries revert to this approach. In developing countries formal in-plant technical education is a newcomer, while the traditional school-based system would have been in existence for some time. With the development of industries in developing countries, the expanding skilled human resource needs and the inability of the education system to respond effectively, have sped up the in-plant technical education system (Tikly, 2003: 555; Frank, Gerwin and Hahne, 2004: 1). A disadvantage of this approach is that the two systems can exist and develop in isolation from each other without coordination of activities and with rivalry in matters such as policy making, obtaining financing and standard setting (Führ, 1996: 159). The dual system of technical education and training of apprentices in Germany is widely regarded as the best and most efficient part of an already efficient education system (Uhtmann, 1991: 5).

4.5.4 The integrated approach

This approach views technical education as an integrated part of the education system, integrated with all other modes and systems of vocational preparation within one educational framework. The integration with businesses and industries is also an important consideration in this approach. Albert Einstein stressed a conductible educational milieu when he was quoted saying, "I never teach my learners, I only attempt to provide the conditions in which they can learn" (cited in Walter and Marks, 1981: 1).

Traditional pedagogy tends to assume that the acquisition of knowledge and understanding by the mind is a passive exercise. However, experiential learning based on the integrated approach is based on hands-on experiences to motivate learners to make connections between concepts and real-world applications through curriculum integration (Hoppers, 1996: 76). One result of this curriculum has become known as the integrated science, mathematics and technology (SMT) approach (Raizen et al., 1995: 27). An example is the renewal of the occupations in the German metal and electronic industry, where skills and theory are integrated and not seen as separate trainable elements (Nijhof and Streumer, 1998: 30). Experiential or experienced-based learning includes technical education. It is an integrated, experience-based, instructional programme designed to prepare learners to be knowledgeable about technology, its evolution, systems, technologies, utilisation and social and cultural significance (Defining Technology Education., 2001: 1-3). To optimise technical education as experiential learning, conducive conditions such as suitable equipment, materials and workshops must be present and should be created if they are not.

Technology education programmes are among the first to demonstrate an integrated approach to learning in secondary schools (Raizen et al., 1995: 27). Facilities are state-of-the art as a result of partnerships with businesses and industry. It has a collaborative approach in which learners taking technical education interact with teachers of mathematics, natural science and social studies. Cooperative learning, ingenuity challenges and computer-assisted instruction are some of the methods used to provide learners with hands-on learning experiences in which they can show established learning outcomes (Hoppers, 1996: 76-77). Acceptance of this approach is based on the growing concern that the learners of tomorrow will be seriously handicapped if they are unable to apply what they know from studying the three subjects separately. Stenström and Lasonen (2004: 38) refer to this as the “unification approach”, where the division between technical and general education is abolished by combining them within a unified system and developing syllabi that integrate the two types of education.

Member states of the European Union have accepted this approach. They are increasingly working together in aspects such as the:

- creation of interest among the European youth for the integrated science, mathematics and technology (SMT) subject area from an early age;
- improvement of the quality of SMT curricula;
- provision of ideal SMT teaching environments such as equipped classrooms; and
- development of training programmes for pre-service and in-service teachers to teach SMT effectively (European Commission, 2003: 3-7, 27).

I believe that the integrated method should be considered by developing countries. In fact, this approach ought to form the base of a new Namibian technical education model.

4.6 TECHNICAL EDUCATION AS THE KEY TO DEVELOPMENT

4.6.1 Importance of technical education

According to Gonzales (1998: 52) technical education is important for the development of a country and is included in general education to satisfy the general public's need for a more literate technological foundation. Hoppers (1996: 15) states that economists from a growing number of countries agree that more attention to technology will help to improve their competitive position in world markets. In a study it was found that education is best able to meet the requirements of industry and economic development if there is a specific demand for certain categories of technically trained people (Forum, 1993: 1). Contrary to this, technical education seems to be less effective if it is supply-based. It may therefore be argued that a financial investment that would create employment opportunities is preferred as it would ensure that education becomes more demand- and skill-driven (Nijhof and Streumer, 1998: 25). In this regard Keith Lewin (1993: 224) argues that

> [i]t is clear that, in general, vocational and technical education can have a substantial role to play both in the development of specific skills and in relation to flexible skill preparation of the workforce for changing markets.

The idea of teaching technology was based on the belief that the production process is the source of social wealth and a purposeful pedagogical means of developing the individual's full personality (Blandow and Mosna, 1994: 97; Hoppers, 1996: 21). Rautenbach (1992: 357) has no doubt that the development of quality technical education is of cardinal importance to the welfare of people in a country. He states that it is important to notice that countries that have shown a tremendous development in their economy have emphasised technical education and continue to do so. Countries such as Israel and Taiwan which have cutting-edge technology produce 60% technical training at secondary school level while countries in Southern Africa produce only about 11% in technical education. Switzerland and Germany reflect almost the same trend as Taiwan and Israel. These countries do not only emphasise technology theory, but the application thereof in practical ways to solve problems in everyday life (Rautenbach, 1992: 357). A study done by Gindling, Goldfarb and Chang (1995: 343, 352) on return levels to education in Taiwan between 1978 and 1991 showed that investment in technical education in Taiwan yielded positive results. For example, private returns to education in Taiwan during that time were stable and contributed to a skilled workforce.

Gardner (2002: 1) states that although mathematical and linguistic skills are valued most in schools, there are at least six additional types of intelligence to consider, namely spatial, interpersonal, intrapersonal, naturalist, existential and kinaesthetic intelligence, which are all important for technical subjects. UNESCO (2002: 9, 21; 2004: 1) emphasises that priority should be given to technical education by governments, as people with technical skills are major contributors to financial successes. The European Commission (2003: 5) emphasises that there is a need to increase the interest in mathematics, science and technology from an early age. Sufficient interest in the areas, which is falling in most countries, is a condition *sine qua non* for the work in this field. Tjitendero (2000: 105) alleges that the economic and industrial development in Asian countries is the result of massive expenditure in education, especially technical education. In this regard the Japanese ambassador to Southern Africa, Yasukuni Enoki, stated that technical education is considered to be one of the most important school subjects, and that the Japanese educational authorities promote the subject aggressively. According to him technical education contributed to the industrial economic development of post-WW

II Japan. He was very specific about the role of technical education by saying the following:

> In Japan we established technical schools before the industries in order to provide employable work skills and values and not *vice versa* (Enoki, 2003).

Even Psacharopoulos seems to be reversing his view about the value of technical education at school level. In a review about technical education, Psacharopoulos and Patrinos (1993: 224) conclude:

> The profitability of technical/vocational education is, therefore, an empirical question. It is best dealt with at the individual country level, analysing data from nationally representative surveys.

Technical education at international level enjoys growing importance and popularity. The pressure on governments in Africa and Latin America to diversify their school curricula, with emphasis on technical skills and technical schools, has been particularly strong (Watson, 1994: 86). Despite many initiatives regarding technical education, the Americans are also concerned about the levels of technical education in the USA. In 2002 only 14 states required technical education in Grades K-12 and few teachers are trained to teach the subject. The result is that most Americans lack practical skills, workers are unprepared for high-tech jobs, and they lack the critical thinking skills necessary to make reliable decisions about technology (Career Tech Update, 2002, April: 1, 3).

4.6.2 Education perspectives on economic development

As education underlies economic and industrial development, it implies that only those countries, whose school systems are going to address the technological issues and values arising from modern societies, are likely to survive (Bennel and Segerstrom, 1998: 285). Curricula and syllabi need to become more flexible as technology and its applications create a need for improved cognitive content.

Mukyanuzi (1990) provides three economic perspectives on education that he calls the academist, the vocationalist and the technicalist perspectives. The academists view the purpose of education as that of developing learning principles and not specific subject content and work-related skills. The vocationalists claim that no country can afford the luxury of a purely academic education. They want education to prepare learners and students for socio-economic roles through the acquisition of work skills, values and attitudes. Hoppers (1996: 21) believes that the vocationalist approach produces curriculum elements that may focus cognitively on a variety of future vocational options and on the workings of a labour market; effectively, on broadening vocational awareness, and motorically on practical work skills. The technicalists argue that education should teach the understanding and appreciation of today's technological environment through an understanding of science and mathematics. According to Mandebvu (1994: 59) the most relevant type of education for African countries which benefits economic development most, is the technicalist type of education, which does not encourage theoretical learning or practical skills training for its own sake, but a synthesis of the two.

Njobe (1990: 64) is of the opinion that technical education in post-colonial societies, such as Namibia, is of utmost importance and should receive priority consideration in models of education systems. One reason justifying this priority is internationally based on the fact that modern life and development, especially for developing nations, are dominated by technology. He suggests that practical skills and theoretical knowledge should be widely covered from basic levels of education, based on the international trend.

4.6.3 Poverty alleviation through technical education

Atchoarena and Delluc (2002: 52) argue that in a context of globalisation and growing unemployment, a country's economic success depends increasingly on access to technology and on the technical skills of its workforce. In this regard Tikly (2003: 557) argues that the development of higher order technical skills has a trickle-down effect within the education system as the overall capacity for learning new skills is increased. According to Dante V. Liban, Director-General of Technical Education and Skills Development Authority, Philippines, technical education is the most powerful weapon to win the war against poverty. It empowers the poor, serves as an instrument for capacity building and gives access to skills and knowledge needed to become self-employed. He also states that technical education at various levels, beginning at school level, is the key instrument in developing the workforce to be globally competitive (Liban, 2002: 2-5).

Poverty alleviation is one of the four main aims of the Namibian government. The other three are to reduce inequalities, to create employment and to promote economic growth. Tötemeyer (1992: 47) argues that any regional development in Namibia has to address the reduction of existing interregional disparities and thus contribute to a more equitable distribution of wealth, opportunities and development. According to the MOE education provides the opportunity to change the unequal wealth distribution in Namibia.

The UNDP in Namibia refined its approach to the Human Development Index (HDI) by introducing the Capability Poverty Measure (CPM). In this policy two basic and related concepts are used. These are the concepts Capability Poverty and Income Poverty. A person who has few skills that are marketable or can be used for self-employment, is a “technology-have-not” and capability poor (see 4.11). Capability poverty leads to income poverty. The capability-poor person finds it difficult to obtain employment, therefore income, or finds it difficult to create income-generating activities (UNDP, 1996: 10).

The result is that Namibia has an unemployment rate of about 31%, with the resulting poverty and social problems that are associated with it (Republic of Namibia, 2003: 41; MHEVTST, 1999: 2). However, the Namibian Labour Resource and Research Institute (LaRRI) puts the unemployment figure at 34%, with young people under the age of 25 most affected (Kuteeue, 2004: 1). In fact, the Namibian Ministry of Labour (2001: 68) estimated that 50% of the 15-24 years of age economically active persons were unemployed 1997. The Namibian MOE has repeatedly identified poverty as the main “enemy” of the Namibian nation. The MOE has also repeatedly said that economic, social and political poverty can only be alleviated through proper education. Unfortunately the MOE focused on academic rather than technical education. However, academic education only will not alleviate poverty. The nature of technical skills as provided by technical education is such that the tables can be turned from capability poverty to capability employment and income generation.

According to Evans and Herr (1978: 4) there are three basic objectives in any public school technical education programme: firstly, to meet the human resource needs of society, secondly, to increase the technical education options available to each learner and thirdly, to serve as a motivating force to enhance all types of learning. Bissoondoyal (1994: 1) links education, specifically technical education, with economic and social development. UNESCO is also of the opinion that cooperation amongst Southern African Developing Countries (SADC) countries regarding technical education and vocational training would reduce poverty. SADC member states are encouraged to consider six aspects, namely

- the need to move technical education and training systems towards comparability, harmonisation and eventual standardisation;
- joint development provision and exchange of technical education materials;
- networking through the exchange of experiences, ideas and information to broaden the knowledge base;
- development of an accreditation system for Technical and Vocational Education and Training (TVET) so as to move towards harmonised, equivalent and eventually standardised certification;
- increased networking through regional bodies and associations; and
- support for the inclusion of entrepreneurial skills in TVET (UNESCO, 2001: 6).

The abovementioned statement makes it clear that UNESCO promotes cross-border cooperation in technical education. Up to now cross-border cooperation among schools in different countries has been restricted to sport activities only. In real terms the technical high school in Upington is the nearest technical school in the Republic of South Africa (RSA) to coordinate activities. Exchange programmes, modular teaching programmes and technical support are but a few areas of cooperation that can be explored. Eventually it may lead to a similar situation as in the European Union, where a skills card is recognised across European borders.

It seems therefore that at international level, technical education is considered to be the answer for ailing economies, poor human resource skills and peaceful development through promoting self-employment and employable skills.

4.7 QUALITY OF TECHNICAL EDUCATION

4.7.1 Definitions of quality of education

A number of definitions of "quality of education" exist in international and local literature. Sometimes quality is seen in terms of inputs and outputs (Smith, 1997: 42-47); quality is seen as "fitness for purpose" (London, 1997: 88-97); and an empirical or research-based definition of quality referred to as core values (Chapman and Aspin, 1994: 37). The "fitness for purpose" perception originates from manufacturing industries and generally refers to the production of goods to meet specific criteria (Riley, 1994: 41). In this regard quality means what users want it to mean. Sayed (1997: 21-29) suggests two variants of the "fitness for purpose" approach: a producer-driven approach which refers to the extent to which education measures up to production specifications; and a consumer-driven approach where quality is judged by the extent to which it meets the specified needs and interests of consumers. To Namibian education authorities quality of education refers to several components:

- well-prepared teachers with professional expertise and skills;
- understanding and application of skills;
- good citizenship and democracy;
- sufficient textbooks and instructional materials; and
- improvement of physical facilities, not only classrooms but also laboratories and practical workshops (MEC, 1993b: 37-40).

However, despite the MEC's intentions to establish quality education, this national educational goal has not been achieved yet (Amupadhi, 2000: 2). This review of international and Namibian approaches to "quality of education" indicates that quality is a continuously negotiated concept involving many components. The aspect of quality assurance needs to be clarified in Namibia. However, the Namibia Qualifications Authority (NQA), which was established in 1997, still has to provide guidelines and ensure quality of education through its policies. The establishment of a quality assurance system continues to be a major challenge. The setting of educational standards is an important quality control measure to ensure that technical education adheres to and complies with national demands and international quality of education levels.

4.7.2 Standards for technical education

Parents and communities easily accept world-class standards for sciences and mathematics. These are high status subjects that are the basis for university entry and provide access to high-wage jobs in the economy. Standards for technical education are, however, a different matter. The subject has not belonged to the dominant academic culture of schools and has been viewed as non-academic, thus affecting its status negatively (Raizen et al., 1995: 7, 32). According to Lewis (2002: 11-14) technical education in the USA benefited from setting standards. He maintains that standards in technical education are necessary, because it spells out what students should know to be technologically literate. It also provides an opportunity for improved public relations.

Public understanding and acceptance of technical education is a prerequisite for changing negative attitudes towards the subject. It presupposes that there is agreement on a minimum set of competencies which each learner must achieve at each stage of schooling, as well as the minimum conditions under which these competencies should be taught. The quality of technical education would be more acceptable to the private sector if high standards prevail in the subject area (Hewett, 1997: 11). Finally, it offers possibilities for renewal in technical subjects in Namibia, just as in any other country.

4.7.3 Assessment and certification

Assurance of quality and high standards of technical education is vital to the status and relevancy of the subject area (Cobb, 1998: 54; Ries, 1998: 17). Many stakeholders are involved in assessment and certification. Firstly it affects the training system, because assessment is closely linked to the way in which training is organised and with the institutions responsible for it. Secondly it affects the functioning of the labour market, since it is the employers who put value to a diploma or certificate when they recruit personnel and determine salary scales (Nijhof and Streumer, 1998: 56). A study of different approaches to assessment and certification of technical qualifications may have benefits for the Namibian system of assessment and certification. For example, the French education system is characterised by a highly diploma-oriented approach. Technical training is usually school-based and leads to state-controlled certifications, called *Baccalauréat Technologique* and *Baccalauréat Professional*. Although employers are consulted, they are not involved in the assessment of technical education, and remain independent and free to recognise the certification or not (Watson, 1991: 23-25).

In Germany education and training is done through a dual apprenticeship system and carried out for the main part within the firm, as well as at school (see 5.7). Employers play an important part in defining the orientation and content of education and they also participate in the assessment activities (German Federal Foreign Office, 2003: 320). The British utilise a competence-based system which requires learners and students to show that a particular skill under assessment has been mastered. They use performance standards as a criterion for skill assessment or a series of activities specifically defined by the bodies representing the employers (Masri, 1994: 157; Nijhof and Streumer, 1998: 107). Assessment may be the responsibility of a variety of bodies, either training institutions or boards of employers, independent of the location and duration of the training. On the other hand the National Board of Education in Finland provides guidelines for technical and vocational qualifications. Further and specialist vocational qualifications can only be taken in competence-based assessment (Finland National Board of Education, 2001: 1-2). It seems therefore that competence-based technical education is the acceptable norm in Europe, of which Namibia should take note.

4.8 INTERNATIONAL TECHNICAL EDUCATION PROJECTS

4.8.1 UNESCO's technical education standards

Namibia has a long history with the various agencies of the United Nations, who supported Namibia during its struggle for independence. For example, the United Nations Institute for Namibia (UNIN) in Zambia and the United Nations Vocational Training Centre for Namibia in Angola educated and trained many Namibians in exile, especially with regard to technical skills (Amukugo, 1993: 137-138; UNIN, 1987: 164-165). UNESCO promotes technical education in all countries, especially developing countries such as Namibia. It is also committed to set minimal standards for technical education and realises its importance and relevance for national development. In order to achieve that, UNESCO proposes that technical education programmes should

- be interdisciplinary in character, as many occupations now require two or more traditional areas of study;
- be based on curricula designed around core knowledge, competencies and skills;
- include studies of the social and economic aspects of employment;
- include an interdisciplinary perspective to equip students to work in the changing employment environment, and to incorporate a multicultural perspective, which includes the study of languages as preparation for international employment;
- include the study of at least one foreign language of international use, which, while conducive to a higher cultural level, will give special emphasis to the requirements of communication, the acquisition of a scientific and technical vocabulary, and the need to prepare for international employment and multicultural working environments;
- include an introduction to organisational, planning and entrepreneurial skills; and
- emphasise instruction in safe and environmentally sound procedures relative to the materials and equipment used in a given occupational field, the importance of safe working conditions, and the health aspects relative to the occupation as a whole, including emergency and first-aid training (UNESCO, 2002: 28).

However, it is not only in Namibia where technical education is misaligned with the needs of society. Concern in the USA about the ignorance of technical education led to an investigation into the state thereof, and the following key recommendations were made to promote technical education in order to be competitive with that of Asian countries:

- federal and state agencies should create education laws that integrate technology content into K-12 standards, curricula, instructional materials, and student assessment in non-technology subjects;

- states should better align their K-12 standards, curriculum frameworks and students' assessment in non-technology subjects such as history, science and arts with natural standards that stress technology connections throughout all subjects;
- the National Science Foundation (NSF) should support the development of one or more assessment tools for monitoring technological literacy among people;
- industry, science and technology museums should provide more opportunity for non-technical people to become involved in debates about technical education;
- federal and state government agencies and private foundations concerned about good governance should support executive education programmes intended to increase the technological literacy of government and industry leaders; and
- the NSF, in collaboration with industry partners, should provide funding for innovative, effective approaches towards improving the technological literacy of students and the public at large (Career Tech Update, 2002, March: 1-3).

In 2000 UNESCO formed the International Centre for Vocational Training in Bonn, Germany, in order to coordinate technical education and vocational training in developing countries (Werner and Bellaire, 2000: 1). UNESCO views technical education and vocational training (TVET) as the key to poverty alleviation, peace, conservation and sustainable development as seen in the 2004 Bonn Declaration which states the following:

> ...[w]e affirm that skills development leading to age-appropriate TVET should be integral to education at all levels, and can no longer be regarded as optional or marginal (UNESCO, 2004: 1).

4.8.2 World Bank projects

The World Bank is to some a powerful arm of neo-imperialism, resulting in many countries negating its outstretched hands of support. Others regret that it is powerless, incapable of influencing policies in the countries in which it operates (Castro, 2002: 387). However, many countries depend on World Bank funding for technical education projects. The World Bank integrates science and technology (S&T) and regards it as critical inputs for economic development and poverty alleviation. According to Watson et al. (2003: 1) a country can only reap the benefits of science and technology if the following factors are considered: (i) investment in human resources, training and development, (ii) the demand for knowledge by the private sector, (iii) public policies that provide the appropriate enabling environment for strong knowledge institutions, and, (iv) the level and quality of the information and communication technologies that permit the flow and dissemination of knowledge and information. They emphasise that if the appropriate S&T infrastructure, which is composed of these four factors, is not developed, countries fall further behind, rendered stagnant by problems that other more technologically-advanced countries have long since overcome.

Assessment of World Bank education projects shows that several technical schools and related institutions have underutilised facilities. For example, analysis of projects noticed underenrolment at technical schools worldwide, despite the fact that the World Bank emphasises its importance to economical development (World Bank, 1995: 81). These schools have more costly equipment and higher learner-teacher ratios than general schools, causing their spare capacity combined with high unit costs to indicate extreme inefficiency, given the constraints on public expenditure (Lauglo and Lillis, 1988: 23). The answer to this situation is not to focus on the underutilisation of facilities, but rather to see it as spare capacity. In other words, if there is evidence of spare capacity, expansion of technical education in existing schools should lead to a reduction in unit costs. This viewpoint is not shared by the Namibian MOE, as technical education is considered not cost-effective (see 3.9.7).

Many African countries were pressured to diversify their school curricula. The creation of technical schools was highly emphasised (Watson, 1994: 85-87). This resulted that funds from general education were channelled to technical education. For example, Kenya’s 30 technical schools have been allocated disproportionate amounts of funding, causing primary schools to have a shortage of funds (Sifuna, 1992: 133-145). Walters also argued that many Third World governments held the view that diversified curricula would correct the supposed imbalance between education and the workplace, but experience, it was argued, had cast doubt on this assumption (DEC, 1990: 37). It is important to take cognisance of the fact that countries that have shown a tremendous growth in their economy have emphasised the importance of technical education, for example in Israel and Taiwan 60% of technical training is provided at secondary level. Switzerland and Germany reflect almost the same trend as Taiwan and Israel (Rautenbach, 1992: 357).

As in Namibia, enrolment of learners in technical schools in most countries in sub-Saharan Africa has declined in recent years. The low status and standard of technical education in many African countries, widespread universal secondary education and the fact that it does not secure meaningful employment have contributed to that (Van Rensburg, 2001: 8-9). However, the exception seems to be Mozambique, where the Ministry of Education's technical schools and institutes have enrolled about a quarter to a third of all secondary school day students, a high proportion by international standards (Ziderman, 1997a: 144). This can be attributed to several factors, of which the rebuilding of the economy through providing technical and vocational education is a priority. In this regard the World Bank funds the ETSIP project to optimise Namibia's education system.

4.8.3 The International Labour Organisation (ILO)

The International Labour Organisation (ILO) is much involved in setting standards for technical education. It defines a training system as the systematic preparation of individuals to improve their capacity to perform market and socially valued functions, i.e. it comprises the full continuum of technical education and skill formation processes (ILO, 2005: 5). To improve return on technical education, the ILO recommends:

- the promotion of partnerships with businesses;
- the provision of incentives for co-financing;
- the creation of skill-based certification systems; and
- decentralisation and encouragement to develop the private sector.

4.9 TRAINING OF TECHNICAL TEACHERS

The professionalism and enthusiasm of teachers have much to do with standards, methods of training and certification (Gonzales, 1998: 52). Poorly trained teachers will not be able to teach the various aspects of technical subjects without proficiency in technology, especially when specialised knowledge and skills need to be taught (Burns, 2002: 298). Teachers are seen as the key to quality technical education and increased learner-centred instruction. For example, Sarason (1971: 51) argues that teacher training in the United States of America was changed after the launch of the Russian Sputnik. A major force behind this was the president of Yale University, who disapproved of the content of teacher-training programmes. His major points of criticism were familiar ones: there was an excessive emphasis on so-called technique or “how to do it” courses while “do it” courses were neglected, teachers did not have a deep enough grasp of the subject matter they had to teach, and the training of teachers tended not to take place in the context of the needs of the society. The result was a major improvement in the training of teachers in science, mathematics and technical education (Sadker and Sadker, 1991: 165, 293). The same happened in 1983 with the issuing of a report “A Nation at Risk”, which blamed public schools for the USA’s difficulties in competing in world markets with Japan and West Germany (U.S. Government, 1983: 7-10). Dykman (1993: 23-27), in reflecting on the status of technical teacher education in the USA, notes that problems facing the field include declining teacher enrolments, low teacher salaries and significant reductions in traditional sources of state and federal support for technical teacher education.

According to Mandebvu (1994: 59) the training of teachers should emphasise the holistic nature of the subject, showing the integration of knowledge gained from other school subjects and developing the skills of problem analysis, synthesis of solutions, realisation of solutions and the evaluation of effort. These teachers would be able to produce a school-leaver best suited for further training for both the formal employment sector in industry and business, and the informal sector. He argues that such school-leavers should be able to easily adapt to socio-economic changes occurring to them. The qualities that technical teachers need to teach technology successfully are crucial.

King and Martin (2001: 39) blame the poor results of technical education in Africa on the continual weakening of teacher quality. According to Sternberg (1998: 69-72) specific characteristics need to be instilled in teachers that will help them in developing the teaching skills necessary to apply sound teaching methods, based on cognitive skills:

1. Technical teachers must assume the role of coach. This requires teachers to monitor the application of technical skills during problem-solving activities.
2. Technical teachers should help learners to reflect on the processes used while designing, constructing and testing artefacts and solving problems (learning-by-doing) and compare their approaches with those used by others in the class.
3. Technical teachers should use a classroom resource that is often underutilised, namely the potential of learners. Teachers should create classroom situations and climates that promote cooperative learning, where learners engage actively in active problem solving and reflection activities that unlock their potential.

In Namibia the intake of student technical teachers for training is based on the number of vacancies from Grade 5 to Grade 10 (A. Von Weiss, personal interview, 25 July 2005). No training programmes for Grade 11-12 are currently in existence. Arguments against developing such training programmes are, for example, the costs involved and the small number of learners taking technical subjects. According to Williams (2000: 5) the planning of teacher supply should not be confined to forecasting numbers and determining annual intakes of teacher-training institutes, but should seek to maintain flexibility so that teacher supply can adjust to rapidly changing economic situations. The current teacher-training programmes in Namibia do not include the perception of learners' transition from school to work as an integral part of their training either. Linking school and work will require extensive professional teacher development to provide teachers with the knowledge and skills needed to build programmes with work-related experiences as well as new methods of assessment that will help students' transition to work.

Sako (1991: 489) draws attention to the similarities in the underlying principles of Germany and Japanese teaching practice, where much responsibility for educating and training youngsters falls upon the teachers and supervisors who themselves have received sufficient training in technical and pedagogical skills, resulting in professional mentoring.

Mentoring is important in technical education. Edwards (2002: 1-2) feels that beginner teachers should be trained to utilise a mentor so that they can stay motivated. He proposes that technical teachers need to be trained to be sensitive towards the following aspects:

1. Technical education can only be taught successfully if the teacher prepares well.
2. Technology is learner-centred by its very nature and in the methodology employed and therefore learners, teachers and stakeholders should be interactive.
3. Because life is not a single approach strategy, technical teachers should be trained to teach learners how to investigate, design and do problem solving.
4. Beginner teachers should know how to recycle materials and use it to teach technical education in an era where the economical use of resources is vital.
5. Learners taking technical subjects are not taking it for academic pursuits and need to be taught practical skills, social skills and concepts such as critical thinking, decision making and problem solving as part of an integral education process.

According to UNESCO the preparation of technical teachers is crucial to the future of technical education and should be done in a responsible way as part of the tertiary programme. All programmes should be designed with the following objectives in mind:

- to maintain standards of education and professional preparation in effect for the teaching profession as a whole and to contribute to raising these overall standards;
- to develop in future teachers the ability to teach both theoretical and practical aspects of their field, with special emphasis on the need to use, whenever possible, the information and communication technologies;
- to develop in future teachers the responsibility of keeping up to date with trends in their field, as well as with the related work opportunities;
- to develop in future teachers the ability to guide learners with special needs; and
- to ensure that future teachers are equipped, by means of supplementary training, to teach other subjects related to their primary subject (UNESCO, 2002: 44-45).

The School-to-Work approach to technical education requires a specific approach to teacher training (paragraph 5.12). Teachers should not only be equipped with pedagogical knowledge and practical skills, but also with knowledge and skills regarding the following:

- how to involve learners in organised workplace experiences;
- how to help learners to understand the function of a workplace;
- how to involve workplace representatives in school curricula and syllabi;
- how to provide workplace experience for learners through school activities;
- how to initiate and maintain contact with employers and the community; and
- how to link school and workplace practices (Schmidt, Finch and Moore, 1997: 4).

The European Commission (2003: 14) clearly states that the success of initiatives at school level and the continuity thereof rely on the quality of teacher education, which presupposes that the following should be taught at pre-service and in-service levels:

1. The ability to form links between theory and practice which is an important factor in all stages of education but particularly in initial teacher education.
2. The development of reflective practitioners who are well supported by partnerships between schools, universities and enterprises.

Considering the abovementioned objectives, technical teacher training in Namibia does not comply with the international objectives and approaches. The only objective that is only partially met is the one of broad-based knowledge training. Since Namibian schools are not designed to allow learners and teachers to learn from experience, Namibian teachers may not have the models and skills to enable them to draw from lessons learned or to evaluate outcomes. For example, the Namibian Basic Education Teacher's Diploma (BETD) offers little quality training for technical teachers and covers a large spectrum of academic subjects, enabling teachers to teach subjects up to junior secondary level only.

4.10 RELEVANCE OF TECHNICAL EDUCATION PROGRAMMES

Marsick (1998: 128) and Hansen (2000: 3) opine that today's schools are designed to create good citizens in an industrial era dominated by physical capabilities and by bureaucratic command and control organisations which leave little room for creative education. They feel that real-world challenges should be brought into classrooms as the starting points for learning, around which curricula and subject content can be integrated.

4.10.1 Curriculum development

Some literature on curriculum change shows no evidence that altering the curriculum of schools leads to, or is associated with, changes in economies of countries. A study done by Foster in 1965 showed that technical education did not contribute much to the industrial and economic development of Ghana and that technical education may be less profitable as an investment than general education (Foster, 1965: 143). Studies conducted in Tanzania and Colombia by the World Bank suggest that there is simply no evidence of significant social or private benefits arising from attempts to make school curricula responsive to economic conditions (Psacharopoulos and Woodhall, 1986: 60-64, 229-235). Psacharopoulos (1987: 23-37) later not only repeats this viewpoint, but adds that technical school learners specialising in a technical field of study might be less flexible than workers with a general education. He further argues that the high costs of technical education also lead to lower social rates of return, which is a crucial consideration in developing countries suffering from budget shortages. Walters shares this viewpoint and notes that many Third World countries have found that academic education provides better results than technical education (see 2.5.4.3 and 4.2.2). According to Walters, this does not mean that technical education in its entirety is irrelevant, but rather that it needs to be provided in closer association with on-the-job training (DEC, 1990: 38). In contrast, Claassen (1992: 110) argues that if the curriculum impact on the economic development of a country is small, it could well be that the school fails to prepare the learner for the world of work. According to this argument, it is not the education system which is the culprit, but the lack of relevance of the curriculum. As Lauglo (1994: 9) correctly points out:

> There is certainly no international law to show that secondary school-based vocational training gives no labour market advantage over purely academic education.

Growing frustration with the products of education is evident in many developing countries. The school curriculum was identified as a particular problem since it was overly academic and was prejudiced against children with practical talents and interests (Bell, 1987: 1; Noah and Eckstein, 1988: 49). This raises the issue of vocationalisation of education. Buchert (1994: 171) is of the opinion that if education is to lead development, this situation should be reflected in the content of education in terms of curricula which promote knowledge and skills for enterprise, could lead to fulfilling informal sector jobs, and could promote growth potential in the dominant informal and rural settings.

Massaro (1993: 41) maintains that the narrowing down of the curriculum so that basic skills and knowledge should be taught well has become an important trend in education. It is not without significance that all the major East Asian countries have placed values education and moral education as a central feature of schooling, in case technological changes destroy their social fabric. It is noteworthy that these same countries have achieved their remarkable technological development and economic success, not by free market capitalism, but by a fruitful and constructive partnership between the state and the private sectors in developing school curricula (Harris, 1986: 60).

The statements by some educators and economists that the content of school curricula and syllabi does not contribute towards the industrial and economic growth of a country, as well as viability of specific fields of study such as technical education, are doubtful (DFID, 2001: 34). These arguments ignore factors such as relevancy of subject content, employable skills and values and attitudes of learners and teachers. Common sense tells us that if a learner is taught specific technical skills, that learner will be better equipped to function productively and effectively in the national economy. This means higher productivity, greater competence to do work and better quality workmanship which are all contributory factors for economic growth. I therefore agree with Ziderman (1997b: 361) that in order for technical education to be successful in Namibia, it must be more responsive to market skills.

According to the European Commission (2003: 11) an ideal technical education curriculum in European schools and beyond should include:

- the development of closer and mutually beneficial links with industry;
- the development of practical activities set within real-life scenarios;
- developing technological literacy through consideration of the impact of technology on society;
- the introduction of topics of relevance to industry in the 21st century;
- the development of collaborative teams actively involved in the design process;
- the introduction of pedagogy which results in the adoption of learning goals and the development of autonomous, lifelong learners;
- improving the status of technology as a subject within the curriculum; and
- making important connections to other areas of the curriculum.

Namibian education authorities have to take note of these aspects, especially the development of practical activities and links with industry.

4.10.2 Developmental tasks for technical teaching

Technical teachers should be aware of the developmental tasks according to which technology should be taught. These tasks may be divided into four groups: biological, psychological, sociological and cultural (Minton and Minton, 1987: 106-109). The biological tasks that technical teachers have to be aware of indicate the need for activity-based technical syllabi where learners are involved in manipulative operations through hand-eye coordination. Sociological tasks refer to the fact that technology affects all people, and all people affect technology, and that technical education can improve society (Sadker and Sadker, 1991: 160). An understanding of a technological society and how it functions is crucial to the accomplishment of psychological developmental tasks, for example to cope with the demands of the technocratic society of today. Cultural tasks deal with the skills which are necessary to function in a technology-oriented culture. It refers to studying technology in terms of how products are made, how they operate, and how they may be used. When considering technical education syllabi in Namibia, one realises that the mentioned tasks are mostly absent as little proof of these tasks is to be found.

According to Minton and Minton (1987: 111) technical education, when planned and implemented correctly, should achieve the following developmental tasks to be relevant:

- Teach relevant classroom content applicable to today and the future, change content as technological cultures change.
- Activities and application of skills should be developed around the personal needs of learners through individual or small-group activities.
- Activities should be made challenging and the level of difficulty should reflect the physical and mental readiness of learners.
- Teachers should monitor the success rate of the learners' accomplishments of activities and adapt the activities, for example, if a learner moves through a sequence of tasks without accomplishing some which are critical, he or she will be hindered in the attempt to develop new tasks.

4.10.3 Project-based Learning

The model of most educational settings is learning-before-doing. Pea and Gomez (1993: 38-42) suggest that science and technical classrooms should change to learning-in-doing, a model that dictates the authentic practice of applying technology through practical activities and conversations with fellow learners. One of these authors' primary assertions is that scientific and technologic inquiry should extend beyond the classroom and engage learners in project-based activities. The now defunct MBESC supported this, which would enable learners to interact with off-school-site experts in the real world to address mutual problems and seek solutions to problems together (MBESC, 1999b: 8, 21).

4.10.4 Job-specific technical skill education versus general technical education

This debate has continued for many years. Some economists have long argued that the returns on general technical education are higher than those on specific training, since education is transferable whereas many skills tend to be job-specific. According to Waetjen (1992: 25) in a time when the concept of educational "disciplines" like technical education subjects is felt to be outmoded, considerable effort is being made to establish technology education as an “academic discipline”. Holton and Trott (2001: 1) relate that new workplaces in the USA require broader skills than ever before and place intense pressure on all providers of workforce preparation to enhance the competitiveness of the workforce. Parnell (1996: 18) contends that the greatest sin committed in many schools today is the failure to help students to

> …..use the magnificent power of the brain to make the connections between knowing and doing, academic and vocational education, knowledge and application of knowledge, one subject-matter discipline and another, and subject-matter content and the context of use.

According to an article in *The Economist* (1994: 25-26) the training system which seems to be coping best with technological innovation and global competition is the American one. It seems as if the American tradition of providing people with masses of general academic and technical education and leaving the training of specific skills to the market, is becoming more relevant. An attempt in 1990 in England and Wales to implement a generic technical education subject was heavily criticised. The new generic approach meant that former teachers of craft, design and technology and of home economics had to come together to implement a new subject (McCormick, 1993: 47). The curriculum was very ambitious, and the implementations were uneven. There was much criticism, particularly from engineers who feared that the broad range, the early emphasis on social needs and the theoretical aspects of technology would weaken the teaching of practical skills of design and construction (Black, 1998: 8). In the Namibian context the generic approach may also create problems, as the new MOE Design and Technology syllabi are also broad, Namibian industries are very limited and there are no links with schools. The training levels of Namibian institutions are generally not high, as Namibian industries mainly focus on low-skill manufacturing jobs based on the needs of communities, small enterprises and micro-industries (MHEVTST, 1999: 124; Kuteeue, 2004: 2).

The World Bank has supported many countries in the world to diversify the secondary school curriculum by placing greater emphasis on vocational preparation and skills and by integrating pre-vocational skills more closely with the academic curriculum; the intention was to raise the status of pre-vocational courses and to develop schools that are neither purely academic nor purely technical, but that offer a balanced mixture of general and technical education (Psacharopoulos and Woodhall, 1986: 230). The objectives of curriculum diversification relate to external as well as internal efficiency, as the objectives should include meeting human resource demands, rectifying academic bias to make the school curriculum more relevant to the needs of the labour market, and improving the overall quality of school education and employability of school leavers. Walters (DEC, 1990: 128) recommends that specialisation of technical subjects should only be considered during the last two years of the normal 12 school years and should not take place before the age of 16 years. UNESCO (2002: 22) also suggests that premature and narrow specialisation should be avoided and that, in principle, the age of 15 should be considered the lower limit for beginning specialisation in technical education. Should some kind of technical specialisation take place, a period of common studies providing basic knowledge and generic skills should be taught before a special branch is chosen.

4.11 TECHNICAL EDUCATION AND GLOBALISATION

Outside influences that are external to and not governed by the nation state are implicit in themselves in the modernisation of education. This changing situation has become commonplace through use of the term globalisation (Münk, 2003: 39). Consideration of education and training in societies in transition on itself requires a broader perspective than when dealing with one country. The Namibian and African context also provides too narrow a view of technical education policy, which is closely influenced by conditions affecting employment systems. Hence, any discussion of transition focusing on technical education policy which fails to look beyond Africa is incomplete in many respects. Greinert (1999: 15) argues that the implementation of technological principles points to two factors in a situation of global competition: one technical, aiming at as complete an integration as possible of education in productive activities, and one organisational, aiming at an effective system of flexible wealth creation and working processes.

It seems as if globalisation places a new emphasis on skills development. A lack of skills means that individuals are increasingly likely to struggle to gain wage employment and lack key capabilities that could enable them to access sustainable niches in self-employment (Schneeberger, 2002: 64). In a globalised economy, lack of skills is an important element of social exclusion. It therefore emphasises the importance of responsiveness of schools and training institutions towards relevant skills, for example the technical and entrepreneurial skills to become self-employed (DFID, 2001: ix). The 1990 Walters Report noted the rise of high-skill technologies in the world and skill-intensive forms of work organisation in the global economy, developments that gave renewed prominence to the importance of a broad generic technical education:

> It… seems essential for vocational education to concentrate on broad skills within a particular field rather than on vocational-specific skills, as a result of rapid changes in technology (DEC, 1990: 45).

According to Spring (1997: 151) globalisation of education to meet the needs of the global economy began in 1983 in the USA when "A Nation at Risk" by the National Commission on Excellence in Education proclaimed the necessity of educating learners for the global labour market. In this regard the Carnegie Foundation Report (1983: 18) stated:

> We especially believe that businesses, in their role as employers, should be much more involved in the process of setting goals for education in America. If the business community gets more involved in both the design and delivery of education, we are going to become more competitive as an economy.

The World Bank noted a decade ago that the skills of workers are keys to economic success in an increasingly integrated and competitive global economy (World Bank, 1995: 36). Since then, globalisation of education has been linked with School-to-Work programmes in order to prepare school learners sufficiently to be productive and efficient students. National economies increasingly become entangled in global manufacturing and industrial trends and to compete with world markets they have to adjust their economies, and therefore their education, appropriately. Ilon (1994: 99) is convinced that teaching of skills, or the lack thereof, to individuals results in either “technology-haves” or “technology-have-nots” which will determine economies in future. He posits that

> [p]rofessions will be divided between those that are globally competitive but where mastery and competence are highly valued, and jobs where global competition means that people with limited and low level skills are competing in a world market with others of similar backgrounds.

There is a growing recognition that globalisation has a social dimension that requires a social response. Education and training, specifically with regard to technology, are components to both the economic and the social response to globalisation (UNESCO, 2002: 54). It is also suggested that technical programmes should be designed in such a way that international employment across cultural boundaries can take place (UNESCO, 2002: 23-24). Global competitiveness means that countries should have competitive service and industry sectors. Business and industry involved in competition on a global level have become increasingly worried by the growing gap between the capabilities of high school graduates and the skills and knowledge that employers need (O’Neill, 1992: 6). Technical education is regarded as the key instrument in developing a workforce that is globally competitive (Liban, 2002: 2). The Namibian government recognises that globalisation affects Namibia. The Presidential Commission Report (1999: 3, 21) states:

> Globalisation, or the rapid change in technology and patterns of trade, with a freer flow of goods, funds, manufacturing capacity and information across international boundaries, means that for a society to remain competitive its members must constantly be learning.

Despite globalisation, education should also be context-specific (Hawley, 2003: 609). Therefore technical education in Namibia can never be the same as in other countries. A localisation programme of subjects offered in Namibian schools has been in place since 2002 to ensure that education stays relevant by means of contextual developments without negating international developments in technical education (NIED, 2002: 1; L. Moller, personal interview, 28 July 2005). Namibia should therefore strike a balance between global trends and local demands when technical education syllabi are designed.

Developing countries should consider all positive and negative factors when participating in the global economy. Unfortunately not all aspects of globalism are positive. Developing countries participating conditionally in the global economy can be exploited. Sometimes these countries have to submit to regulations and policies that may harm them in the long run. For example, many multilateral agencies are imposing own monetary agendas of structural adjustment, while bilateral agencies are insisting on what has become known as political conditionality, thereby limiting the freedom of African states to develop their own economic and educational strategies (McGrath, 2000: 9). The pressure on governments in Africa to diversify their school curricula with emphasis on technical and vocational skills training has been strong (Watson, 1994: 85-87). The result is that many governments have been forced to channel funds from primary education to technical education. Also, multilateral agencies and bilateral aid donors have been insisting on structural adjustment programmes as a prerequisite for receiving new, or increased, technical assistance. This means that education is being dictated by external forces. Namibia, as a recipient of funds from international organisations to finance educational development, must be careful not to be exploited or misdirected.

4.12 TECHNICAL EDUCATION AND BUSINESS/INDUSTRY PARTNERSHIPS

The importance of establishing links between education and private enterprises is emphasised by Noah and Eckstein (1988: 49) who came to the following conclusion after studying education and business partnerships in Britain, France and West Germany:

> Business people wish to see the distance between the world of work and the world of the schools sharply diminished, and to that end they propose changes in the school curriculum, in teacher training and in-service education, and in the management and structure of the school system.

4.12.1 Rationale for partnerships

Traditionally, education has led to educators viewing school-based learning as separate from work-based learning. Governments are increasingly transferring some of the financial burdens of education from public to private funds, and are also trying to ensure that technical education is relevant to the needs of the labour markets (Psacharopoulos and Woodhall, 1986: 157; Kraak, 1997: 57). The rationale is that if employers are directly involved through a partnership network in planning the syllabi, providing expertise or some technical training, then technical education will be more relevant to labour market demands and will develop technical and industrial skills more effectively (Diehl, Hoffinger and Weisstein, 2002: 287). In the USA, Strong (1990: 148) surveyed state directors of technical education and concluded as follows:

> I would suggest if all schools or school departments at all levels would heed the challenge and take a proactive role in building effective linkages with business and industry, then vocational education's role would not only become more clear, but there would be no question as to the role of vocational education as the workforce provider of the nation.

According to UNESCO (2002: 10) technical education should be broad based which facilitates horizontal and vertical articulation with the education system and between the worlds of work. One aspect that is emphasised is the teaching of relevant and quality practical skills that employers need. In other words, despite the fact that a generic curriculum is propagated, good technical skills need to be practised in the curriculum. Gleeson (1990: 215-217) supports linking subjects with working life. He refers to specific principles that concern learners of fourteen years and older and states that:

- the link between academic subjects and the working world should be emphasised;
- the value of economic and technical comprehension should be emphasised;
- vocationalised and general education should be accessible to all learners and not stereotyped to be for underachievers only;
- existing academic subjects should be revised and developed to link learners' experience with new technological developments; and
- continuous development with specific futuristic elements should be emphasised.

Work-based learning involves secondary school learners in real-world situations through apprenticeships (Frank et al., 2004: 1). Spring (1997: 172) states that countries with strong apprenticeship-like school systems, such as Austria and Germany, have lower ratios of youth-to-adult unemployment. However, some parents fear that children who engage in School-to-Work education will be disadvantaged when applying for university. Some studies also indicate that it is not taken for granted that learners learn more through such education (Carnevale, 1992: 29). Another factor is that schools are not designed to allow for and take advantage of learning through job-attachment experiences. One reason is that technical teachers may not have enough experience of apprenticeship models and skills to enable them to draw from lessons learned and link with enterprises (Marsick, 1998: 129).

By linking preparation for work (technical education) to continuing education at work (job and social skills), preparation for work becomes one of the anchors for an integrated continuum of workforce development programmes (Frank, 2005: 2). The synergy created should strengthen entry programmes and enhance the economic competitiveness of the graduates. One strategy used was the “Adopt a School” programme, resulting in the formation of school-business partnerships (Schmidt et al., 1997: 85). Businesses are encouraged to become co-responsible for technical education, for example the provision of materials or practical training workshops, in return for tax credits (Ries, 1998: 16). A very good example in South Africa is the Toyota Technical Education Programme (T-Tep), a joint venture between Toyota Motor Corporation in Japan, Toyota SA, Toyota dealers and technical schools (Top Revs, 2000: 4). South African schools such as Newton Technical High School in Port Elizabeth and Louis Botha Technical High School in Bloemfontein were provided with hi-tech simulators, electro-magnetism boards, master electrical boards, engines, transmissions and other equipment (Beeld, 1997: 5). Technical teachers receive in-service training from Toyota staff members to update their skills, while school- leavers are offered job opportunities at Toyota (Algera, 2003). Namibia is unfortunately not part of this particular project or any other project similar in nature.

In this regard the USA Department of Labour requested integration and dialogue between two major groups, one based mainly in the world of work, the other consisting mostly of educators. Their proposal to schools and employers was the following:

> Our primary message to schools is this: Look beyond the schoolhouse to the roles students will play when they leave to become workers, parents and citizens…To employers we say: Change your view of your responsibilities for human resource development. Your new responsibilities must include developing the human resources in your community, your firm, and your nation (1992: 17).

Despite these calls for better collaboration, education and businesses still found it difficult to coordinate activities at the beginning of the 21st century. In 2002 an urgent plea was made not to separate education from workforce development. While industries and businesses must get involved in education, schools must give the industry and business communities a rightful role in education (Career Tech Update, 2002, May: 1-2).

4.12.2 School-to-Work (STW) approach in USA

In 1991, the Secretary's Commission on Achieving Necessary Skills (SCANS), issued its report on the competencies, skills and personal qualities needed to succeed in the high performance workplace (Raizen et al., 1995: 35). The SCANS report challenged schools, parents and businesses to help all students develop competencies in the basic skills, thinking skills and personal qualities required for work in the current and future workplace. It identified five broad categories of competencies that would lead to successful transition from school to work (U.S. Department of Labour, 1992: 5-10):

- Resources – Identify, organise, plan, and allocate resources.
- Interpersonal – Work with others on teams, teach others, serve clients, exercise leadership, negotiate, and work with diversity.
- Information – Acquire, interpret, evaluate and communicate information.
- Systems – Understand complex interrelationships and can distinguish trends, predict impacts, as well as monitor and correct performance.
- Technology – Work with several technologies and select appropriate tools for tasks.

The SCANS report recommended that these competencies be learned in context in the environment in which they will be applied (Ryan and Pritz, 1994: 6). Thus, the need for collaboration between schools, employers and reform became apparent. Guided by these factors, vocational-technical and teacher-training programmes have been redesigned to respond to the SCANS challenge (Meltzer, White and Matheson, 1993: 58).

In the USA two education acts gave impetus to school–industry cooperation. In March 1994 the Goals 2000 Educate America Act was signed. One important aspect was about technical training to meet economic demands (Pitsch, 1994a: 16). It was followed by "The School-to-Work Opportunities Act" (STWOA) passed in the USA in May 1994, designed to revitalise technical education across the USA. This legislation provided for support of school-based career counselling and the creation of study programmes that integrate academic and technical education (White and Medrich, 2002: 292). The work-based part of the programmes provided on-the-job training (Pitsch, 1994b: 1, 24). The following ten vital principles were developed for the successful functioning of STWOA:

1. Involving the school experience

Principle 1: STW promotes high-quality education and training for young people.

Principle 2: STW incorporates industry-valued standards that help inform curricula and lead to respected and portable credentials.

Principle 3: STW provides opportunities for contextual learning.

Principle 4: STW helps to create smaller, more effective learning communities.

Principle 5: STW expands opportunities for young people and exposes them to a broad array of career opportunities.

Principle 6: STW provides programme continuity between K-12 and post-secondary education and training.

2. Expanding and improving work-based learning opportunities

Principle 7: STW provides work-based learning that is linked to classroom learning.

Principle 8: STW helps employers in providing work-based learning opportunities.

3. Building and sustaining public/private partnerships

Principle 9: STW connects young people with supportive mentors and role models.

Principle 10: STW promotes the role of brokering/intermediary organisations (American Youth Policy Forum, 2000: 1-2).

The success of the STW programme is attributed to three elements that have been critical: state policy and funding support, adoption and acceptance by local leadership and communities, and local implementation capacity to bring participants together (Diehl et al., 2002: 286-287). However, some negative aspects also surfaced. For example, the school-to-work programmes have been criticised as educational policies based on the human capital accounting theory which states that schools and learners are only part of corporate efforts to increase profits in free markets. For business people it may be the triumph of corporate thinking over schools (Spring, 1997: 153).

In this regard a World Bank report (1995: 81) mentions the importance of technical education and states that technical education works best when businesses are involved in its delivery programmes. This approach in African countries was encouraged by UNESCO in 1976 already, when African states were requested to establish close ties between school and work. Such an education based on work and with work in mind should break the barrier of prejudice which exists between manual and intellectual labour, between theory and practice. UNESCO promoted education linked with productive practical work, especially at secondary school and tertiary education levels (UNESCO, 1976: 3-5).

4.13 HUMAN RESOURCE DEVELOPMENT (HRD)

There is a growing perception that technical education and HRD should forge a closer relationship because of the common philosophical roots they share. Technical education is perceived as part of career education, and focuses on skills development. These include:

1. Learning as the key to competitiveness and economic progress, namely individual competitiveness through obtaining technical skills for HRD.
2. Learning as a means to an end, namely not only to achieve a broader goal, but the end goal should also be specific and tangible.
3. Preparing learners for the workplace, with the emphasis on providing learners with knowledge, skills and abilities for the workplace.

4. Focus on applied learning, indicating that learners should learn relevant skills and knowledge and apply it in practice (Holton and Trott, 2001: 4).

An assumption underlying many human resource forecasts and development of human resources is that technical education helps to satisfy human resource needs, whereas general education does not (Bacchus, 1988: 36). However, Psacharopoulos and Woodhall (1986: 89) opine that technical education may be less profitable as an investment than general education, since the costs of highly specific vocational education are high, whereas the benefits, measured in terms of earnings, are often low for technical school-leavers in comparison with graduates with a general education. Another problem is that technical school graduates may be less flexible than workers with general education. The uncertainty surrounding human resource forecasts, particularly regarding technological change, means that flexibility in the labour force is very important.

In the USA careers requiring specialised technical skills comprise the largest percentage of available employment in the economy and constitute the majority of job opportunities (Career Tech Update, 2002, March: 1-4). In reality it means that school-leavers have to be trained in specialised technical fields to meet the demands for specific skills and trades. According to Gilpin (2002: 1-4) the new political and economic environment that many countries, including Namibia, find themselves in, such as democracy and capitalism, requires skills training to increase the productivity. She is adamant that the Human Capital Development theory applies which states that there is a positive relationship between training and productivity. This theory implies that development of human capital is the key for individual potential and social efficiency. It implies that technical skill training at different levels is important in a young democracy such as Namibia. The end of the notion of a single career path over a lifetime and the need for frequent “re-skilling” within skill areas both point towards the importance of lifelong learning (UNESCO, 2004: 1-2).

Namibia can learn from the USA, where educators are not afraid to indicate the shortcomings of technical education. At a conference of the National Association of State

Directors of Career and Technical Education (NASDCTEC) in Washington held in 2002, continued dialogue between businesses and education authorities was asked for, seen in the light of current skill mismatches and impending retirements. Changes were asked especially in manufacturing, where technical schools could lay the foundation for further training. Employers looked at education, particularly technical education, to allay the skilled human resource shortages in the USA (Career Tech Update, 2002, May: 1-2).

In Namibia, as in South Africa, technical education and human resource development share the same historical roots in apprenticeship and on-the job-training systems. Iijambo (2001: 253) believes that Namibia can only enable its institutions and systems to function if the state develops its human resources. He argues that a society without skilled human resources lags behind in development. The argument that not enough funds are available for the development of technical education would be irrelevant if the option of School-to-Work is aggressively applied. Namibia can follow the example of other developing countries such as Brazil, where technical education and vocational training are financed jointly by government and employers through payroll taxes or training levies (Psacharopoulos and Woodhall, 1986: 158). Payroll taxes seem to be an efficient financing mechanism since it permits the creation and growth of training institutions that are a workable alternative to more traditional systems of technical education within the schools and on-the-job training (Booysen, 2006b: 8). However, care must be taken in devising a suitable form of payroll tax so as not to discourage small-scale employers from creating employment and training, which could contribute to further unemployment.

4.14 POST-INDUSTRIALISM

In the so-called post-industrial era, large emphasis is placed on technology. It is seen as an instrument, and its power to change aspects such as unemployment depends on the people using it. New technologies demand a quick turnover in skills. To maintain a presence in new technologies, appropriate education practices and policies to produce skills to take advantage of opportunities made available by new technologies have to be developed (UNESCO, 2004: 2). Many Namibians lack the opportunity to be educated in technical skills, resulting in low-tech skills and low earnings (Pupkewitz, 2000: 67). In this regard Hewett (1997: 11) believes that low-tech skills should not be taught, but that skills need to be improved to enable learners to participate in technology. The fact that governments cannot respond quickly enough to technological change has led to the development of the privatisation of technical education, either by private schools taking over existing public technical education facilities or private schools creating new technical education opportunities (Atchoarena and Delluc, 2002: 42).

Postmodernism has fuelled a reaction against the rigid policies and inflexibilities of bureaucracies and education systems to cope with national and international economic development (Murphy, 2001: 20). In educational terms in many developing and developed countries, moves to develop freestanding autonomous schools have been made. Parents redefined themselves as consumers or clients, and schools as businesses, free to market themselves in a competitive economy. By encouraging parental choice, "ownership" and "partnership", the concept of a state system of education in many countries is rapidly breaking down. However, technical education as provided by private institutions lies beyond the scope of this study, but recognises the fact that private educational institutions, such as private schools, also have technical education programmes and contribute to the development of Namibia.

4.15 TECHNICAL EDUCATION AND ENTERPRISE RELATIONSHIPS

At secondary school level, the World Bank stresses the importance of science and technical education. Technical education, the report argues, works best when businesses are directly involved in its governance (World Bank, 1995: 81). The report also states that without business involvement, technical education produces much lower economic returns than does general education. Several approaches to education-business partnerships exist. For example, the career-academy model is a school-business partnership that can be described as a "school within a school". According to the model the curriculum is based on a specific occupational or industry-specific theme such as electronics, manufacturing technologies or business careers. It creates a more supportive learning environment for learners, orienting school syllabi toward relevant and applicable skills, and involving the business and industrial sectors. Learners form cluster groups, with most courses taught by teachers who remain with the learners for their entire secondary school career for the sake of continuity. This model has increased productivity and passing rates (U.S. Department of Education, 1996, February: 3).

Another approach is the so-called "Tech-Prep" model which was developed to cope with the demand of advanced technical skills among school-leavers. It is aimed at linking secondary and postsecondary school programmes and joining the teaching of technical and occupational skills to promote continued education and acquisition of technical skills. Tech-Prep emphasises applied learning and the development of clearly defined academic and technical competencies (Meltzer et al., 1993: 58). Learners are presented with career "pathways" that link their secondary school classes to advanced technical education in apprenticeship programmes (U.S Department of Education, 1996, February: 3).

Several countries use the apprenticeship model which enables secondary school learners to enter apprenticeships conducted jointly by local schools and businesses. Hamilton and Hamilton (1993: 7) describe the learning process of an apprentice as follows: Firstly, attend coaching and mentoring, secondly, try out in practice what is taught, thirdly, process learning to comprehend, apply and transform it, fourthly, produce, or get work done, fifthly, initiate learning by seeking out people who can teach and by noticing opportunities for learning and sixthly, reflect on work experiences. It can thus be argued that, through mentor involvement and observation of and exposure to the apprentice learning process, schools and enterprises may add to the quality and relevance of education.

An example of well-developed apprenticeship and skills training programmes is that of Manufacturing, Engineering and Related Services Seta (Merseta) in South Africa. Such a programme is a win-win situation for stakeholders, because they benefit from it. One of the courses entails the training of unemployed youth at schools and training institutions to master skills such as basic motor mechanics. Enterprises can provide jobs to these apprentices while they, in return, receive tax rebates (Booysen, 2005d: 11). The development of a similar training approach is needed in Namibia. Namibian school-leavers and unemployed youth will benefit from such a structured skill training approach, promoting lifelong education and reducing unemployment.

4.16 CONCLUSION

This chapter has set out the complex international approaches to technical education and revealed the important lessons that Namibia can learn from technical education as found in other countries. Firstly, investment in technical education, with regard to financial and human resources, contributes to the growth and employment goals of developing countries. There is ample evidence that technical education fosters behavioural change that is conducive to personal and national economic growth. The second lesson is that investment must be broad rather than narrowly specialised, and that basic education is important for the development of high-level technical skills. The third lesson is that globalisation points to the importance of learning that develops skills as well as knowledge, and that the conceptual divide between the two notions is unacceptable. Finally, technical education should not only be relevant to national demands, but the conditions and appropriate institutional arrangements for collaboration between industries and schools should also be established.

A study of the education system of the Federal Republic of Germany may provide further useful insight into the structure, administration, financing and policies of technical education. Namibia shares much history with Germany and still has close economic and cultural links with that European country. It is therefore a logical step to research the German education system for common and diverse technical education principles from which Namibia can benefit in order to develop a modern and relevant technical education system.

CHAPTER 5

THE GERMAN EDUCATION SYSTEM WITH REFERENCE TO TECHNICAL EDUCATION AND VOCATIONAL TRAINING

5.1 INTRODUCTION

Namibia's education system had over many decades been influenced by Germany, its former coloniser. In this chapter current technical education trends in the German education model are discussed and analysed with the aim to cultivate an understanding of and an appreciation for the best practices and with the view to adjust them to Namibia.

The German education system is globally recognised as one of the most relevant and finest in the world, bringing together general education and technical education (Banks, 1995: 205). Führ (1996: 144), Vincens (2002: 12, 20) and Reid (2000: 7) believe that it is considered as amongst the best in the world and that no other aspect of the German education system has attracted such international interest as the system of technical education and vocational training. Deissinger (2000: 606) and Dekker (1996: 49) argue that technical and vocational training in the dual system owes much of its reputation to the fact that it has remained one of the most influential and most frequently, though not necessarily successfully, copied training systems in the world. One reason is that technical education and vocational training are not perceived as being an inferior education (Banks, 1995: 205). In this regard Gill and Dar (2000: 485) state that

> [t]he system is believed to be an effective strategy for both keeping youth unemployment low and ensuring an adequate supply of skilled workers.

5.2 HISTORICAL OVERVIEW

According to Deissinger (2000: 606) the German education system, its working principles and its efficiency are shaped by principles that govern the qualification process as a whole. Firstly, there is no doubt that technical education in Germany follows a traditional pattern deeply enshrined in the ancient mode of apprenticeship. This means that education and training are workplace-led and predominantly practical by stressing the importance of work experience during the training period (Noah and Eckstein, 1988:

61). It also means that the system works in accordance with skill requirements defined around the workplace. Secondly, technical education is determined by the involvement of the federal and state administration, which helps make occupational standards and conditions of skilled apprenticeship legally enforceable as well as marketable (German Federal Foreign Office, 2003: 321). Hence, the German training culture is based on the notion that technical education should not only be interpreted as a contractual duty, but also as an educational process (Nijhof and Streumer, 1998: 66). Finally, the fact that the state's function is restricted to securing quality standards in a formal manner makes the principle of consensus one of the long-standing characteristics of dual training in Germany. This means that public, private and semiprivate institutions have established various forms of cooperation within the system and that the social partners normally take the initiative when it comes to defining what kind of training should be done (Pütz, 2003: 58).

5.3 THE GERMAN EDUCATION SYSTEM SINCE UNIFICATION

On 3 October 1990 the former East German political, economic and school systems were largely transformed into the West German systems to form the Federal Republic of Germany (Dekker, 1996: 50; Marsh, Köller and Baumert, 2001: 330). The Germans highly value poverty reduction through education, especially by means of technical education. The German Constitution promises everyone freedom in their choice of study, training, profession and workplace. In this context, education aims to provide each German with the best possible schooling as well as quality technical education that relates to their abilities and interests (German Federal Foreign Office, 2003: 312-313).

Within the framework of its responsibilities, the Federal Ministry of Education and Research (BMBF) has the following tasks, among others:

- Policy and legislation aspects for non-school technical and vocational education.
- Support for gifted learners, apprentices in dual education and university students.
- Support for exchanges with other countries of apprentices, technical personnel, vocational teachers and instructors (Deutscher Bildungserver, 2005a: 1).

The federal government oversees technical education and vocational training (Pütz, 2003: 23). However, the federal government has no power to reform education institutions as this power remains a prerogative of the *Länder* (Deutscher Bildungserver, 2005a: 1; German Federal Foreign Office, 2003: 329).

5.3.1 Standing Conference of Ministers of Education

The Standing Conference of Ministers of Education ensures cooperation and coordination of educational activities in Germany. It brings together the ministers of all the *Länder*, taking decisions by deliberation and consensus (Führ, 1996: 35). It attempts to standardise the school programmes and reduce as far as is practicable the differences in educational arrangements among the provincial systems to ensure the mutual recognition of credentials by the provinces (Deutscher Bildungserver, 2005b: 1; Lehmann, 1993: 16).

5.3.2 Legislative framework

Education in the German federal state is organised by Article 7 of the "BASIC LAW" of the Federal Republic of Germany which gives the *Länder* legislative powers to plan activities such as technical education (Pütz, 2003: 21-23; Von Weizsaecker, 1993: 1; Eckstein, 1994: 8). Detailed regulations are laid down in the constitutions of the *Länder* about the provision of education at all levels (Deutscher Bildungserver, 2005b: 1). The Federal Republic has striven towards achieving a high and uniform degree of academic quality within the various types of schools and at the various grade levels, while according a large measure of autonomy to each of the provinces (Eckstein, 1994: 5).

The school regulations are based on the laws of the German *Länder* and determine the content of technical education, the educational standards and leaving certificates obtainable on completion of secondary education (Ainly, 1990: 104; German Federal Foreign Office, 2003: 314). Legislation allows general and technical schools. Issues such as education standards, contracts and examinations are addressed by the Vocational Training Act of 1969, Handicrafts Act of 1953 and the Vocational Training Promotion Act of 1981 (Pütz, 2003: 21; KMK, 2005: 99).

5.4 DIVISION OF THE SCHOOL SYSTEM

Dekker (1996: 89) illustrates the complexity of the education system shown below by the various school phases and school types:

- School phases
    - Pre-primary school phase
    - Primary school phase (duration four to six years)
    - Orientation phase (duration two years)
    - Junior secondary school phase (duration four years)
    - Senior secondary school phase (duration three years)

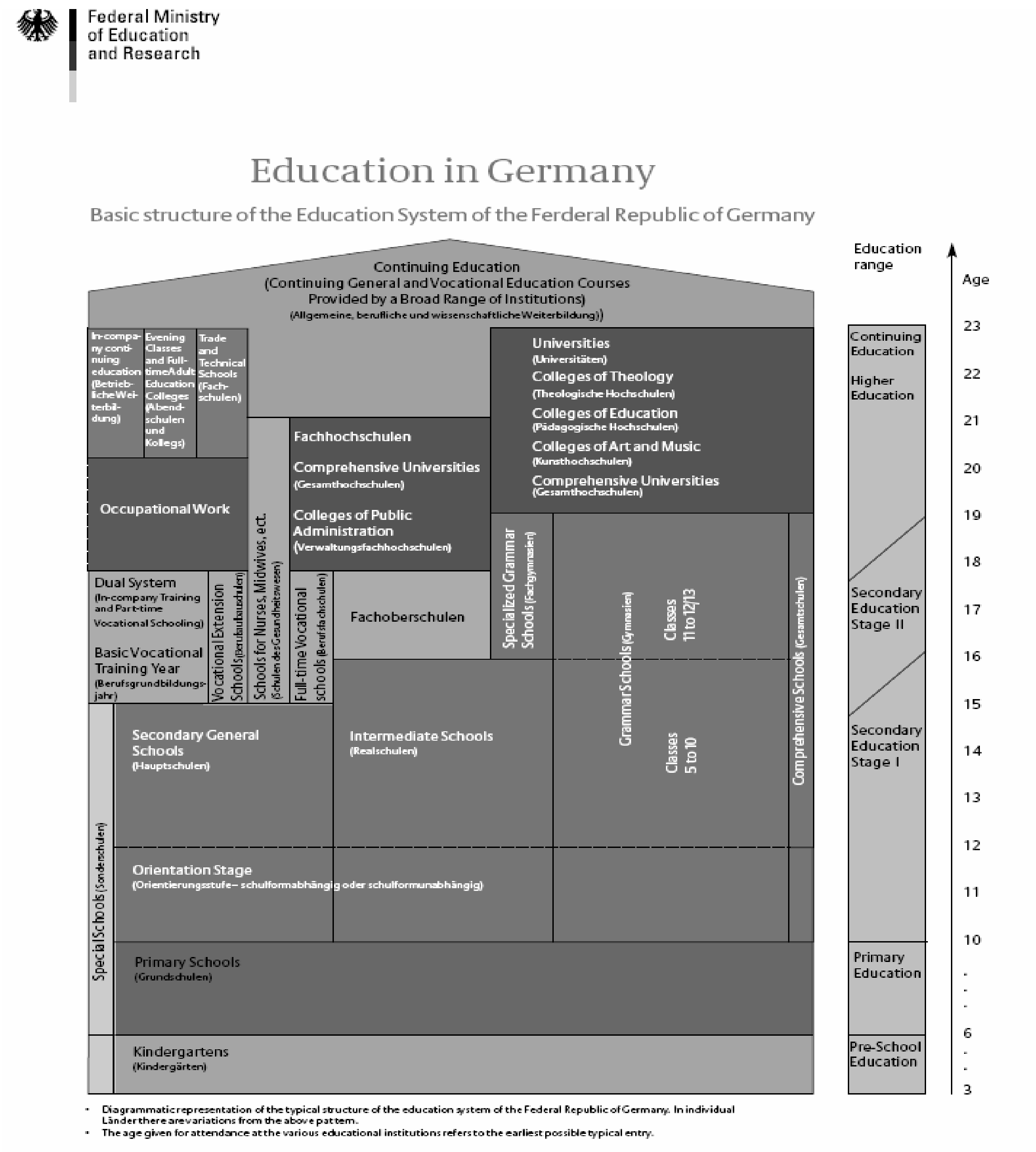
- School types
    - General education secondary schools
        - *Hauptschule* (general secondary school taking five to six years)
        - *Realschule* (semi-academic technical school lasting six years)
        - *Gymnasium* (academic school lasting eight to nine years)
        - *Gesamtschule* (comprehensive school lasting seven to eight years)
        - *Ganztagschule* (day-long secondary school)

    - Vocational secondary schools
        - *Berufsschule* (vocational school for general and vocational training)
        - *Berufsfachschule* (full-time vocational school)
        - *Berufsaufbauschule* (vocational school accessing the senior level)
        - *Fachschule* (full-time technical college)
        - *Fachoberschule* (advanced technical school)
        - *Technische Gymnasium* (technical gymnasium)

    - Sonderschule
    - Privatschule

The school phases and types of the German education system are shown in Diagram 5.1.

Diagram 5.1: Basic structure of the German education system



Source: Bundesministerium für Bildung und Forschung, 2004: 2.

5.4.1 Common paths of education of a German learner

The system provides learners with multiple paths to education, such as:

- Grundschule to Hauptschule. Low income job or apprentice.

- Grundschule to Hauptschule to Realschule to Mittlere Reife.
- Grundschule to Gymnasium to Realschule to Mittlere Reife.
- Grundschule to Gymnasium to 10th grade (Mittlere Reife). Qualified job with average income (bank clerk, secretary, technician, mechanic, cook).
- Grundschule to Gymnasium to "Allgemeine Hochschulreife" (13 years). Either a qualified job like above (better chances) or University / Fachhochschule.
- Grundschule to Hauptschule to Realschule to FOS (12 years).

5.5 THE STRUCTURE OF SECONDARY EDUCATION

Before entering secondary education, German learners are exposed to basic aspects of technical education at primary school level (Theuerkauf et al., 1995: 19). Learners have to complete four years of primary school and six years of secondary education before they can proceed with vocational training. On entering secondary education learners can choose from three types of schools that provide courses offering general education, a combination of general and technical education, or technical education (Wicher, 1990: 50). Secondary education splits into junior secondary level *(Sekundarstufe I)*, which consists of education from Grades 5 to 10, and senior secondary level *(Sekundarstufe II)*. Junior secondary education mostly has a general character whereas technical education predominates at senior secondary level (Theuerkauf et al., 1995: 17). Although secondary schools can differ from *Land* to *Land*, they are so interconnected that eventually they form an open system permitting transfer from one type of school to the other (Resnick and Wirt, 1996: 352). Senior secondary education lays the basis for vocational training through technology awareness (UNEVOC, 1993: 6; Theuerkauf et al., 1995: 23).

5.5.1 Junior Secondary Education

Schools providing general education at junior secondary level build on the foundations laid by the primary schools (*Grundschulen*). The first two years of lower level secondary education, the fifth and sixth school years (ages 10 and 11), are sometimes considered a trial period (*Orientierungsstufe*) in which the match between the student and the school type is assessed (Library of Congress Country Studies, 2005: 1). The orientation period allows for the postponement of the final decision about the student's placement in a particular type of school until the end of the sixth school year, when the student is 12 or 13 years old (Führ, 1996: 116-118; German Federal Foreign Office, 2003: 315).

5.5.1.1 Schools offering a single course of education at junior secondary level

A study of how technical education is presented at German schools may provide guidelines for the future development of technical education in Namibia. The *Gymnasium, Hauptschulen* and *Realschulen* are schools offering one single course of education, which may shed light on how technical education is offered in Germany. The *Gymnasium* is a general secondary type of school which provides an intensified general education upon completion of the *Grundschule* or the orientation grades (Führ, 1996: 131; KMK, 2005: 101). These schools teach technology education that provides learners with a basis for engineering. The following six topics are taught:

1. Introduction to general technology.
2. Transformation of material in technical systems.
3. Transformation of energy in technical systems.
4. Transformation of information in technical systems.
5. The combination of technical systems.
6. Interaction of technical systems and environment (Theuerkauf et al., 1995: 24).

This type of school is popular despite some Germans viewing it as low status education (Theuerkauf et al., 1995: 30; Bundesministerium für Bildung und Forschung, 2004: 4).

The *Hauptschule* is often described as a short-course secondary general school and forms the lowest format of the secondary schools (Führ, 1996: 119). Attendance is compulsory for all learners who decide not to attend any of the other types of secondary schools but wish to prepare for occupations that require training (ThinkQuest Team, 1999: 2). These schools are responsible for establishing a basis for practical vocational training (KMK, 2005: 101). Graduates become apprentices in factories while taking compulsory courses until the age of eighteen (BMBF, 2004: 4; German Culture, 2005a: 1).

This type of school is apprenticeship and vocationally oriented. Learners receive a basic general education and take subjects that include German, mathematics, natural science and *Arbeitslehre* (referred to as pre-vocational education or Education for Work). The subjects are essentially pre-vocational in character because they are not restricted to job-specific training, although it includes a period of work experience (Cantor, 1989: 100). The final certificate from a *Hauptschule* provides access to other types of schools and a variety of vocational institutions (Library of Congress Country Studies, 2005: 1; Deutscher Bildungserver, 2005b: 3). It is required by learners who wish to enter a technical training programme for skilled technicians and craftsmen, combined with classroom instruction at a technical school (ThinkQuest Team, 1999: 2).

Criticism against this type of school is the fact that it is considered second-rate, and is poorly equipped and staffed for providing the support and preparation that its learners are seeking before apprenticeship training (Mallinson, 1980: 243; Behrens, Evans and Kaluza, 1999: 135, 159). The result is that enrolment has dropped, while enrolments in technical schools have increased dramatically (Philips, 1995: 31; Resnick and Wirt, 1996: 358).

The *Realschule* is a semi-academic technical school type (Phillips, 1995: 20; Führ, 1996: 125; ThinkQuest Team, 1999: 1). These schools aim to prepare learners to cope with the technical, economic and social demands of modern societies (Lehmann, 1993: 7; BMBF, 2004: 4). In addition to compulsory courses, learners are required to take compulsory electives that include technical subjects (KMK, 2005: 101; Führ, 1996: 126). A *Realschule* diploma qualifies a learner for entry into a commercial or technical college, or to the last three years of Gymnasium. Upon graduation from a *Realschule* learners can also attend a technical high school (Library of Congress Country Studies, 2005: 1). It is a popular choice among middle class, craft and industrial workers and offers a safe route to technical-oriented jobs (Holmes, 1985: 239; German Culture, 2005a: 1).

The content of technical subjects is linked with science and mathematics and learners are engaged in activities of planning, producing, applying skills and assessing technical processes and work. The content and activities link theory to practical work in order to gain transferable scientific and technical concepts and models. Raizen et al. (1995: 153) identify the following objectives of technical education at school level in Germany:

- to understand technology within the European cultural and historical dimensions;
- to understand how one fits in within the technical and economic work environment;
- to understand the relationship between technology and the economy;
- to understand, identify and apply technical and economic processes;
- to develop technical and economic problem-solving skills; and
- to develop social responsibility and responsibility for the learning processes.

5.5.1.2 Schools offering several courses of education at junior secondary level

Depending on the *Länder*, the schools offering more than one type of course of education include the comprehensive school known as *Gesamtschule* and the *Mittelschule*, *Regelschule*, *Sekundarschule* among others (Führ, 1996: 136).

The *Gesamtschule* is a comprehensive type of school that provides a broader range of educational opportunities for learners than the traditional *Gymnasium* and combines the *Hauptschule*, *Realschule* and *Gymnasium* in various organisational and curricular forms (German Federal Foreign Office, 2003: 215-316; BMBF, 2004: 4; Library of Congress Country Studies, 2005: 7). There are integrated comprehensive schools which provide joint classes for all learners, as well as comprehensive schools accommodating the various types of schools of secondary level that exist side by side on the same premises (Bundesministerium für Bildung und Forschung, 2004: 4; KMK, 2005: 102).

In recent years the academic and technical education programmes have become increasingly popular, despite the low number of learners attending this type of school. These schools also accept learners of all learning abilities (KMK, 2005: 102). Classes in some of the subjects are divided into two or more levels of competency and ability, which are defined in terms of the curriculum covered (Führ, 1996: 137; KMK, 2005: 102).

Learners usually take the most suitable form of technical education according to interests and abilities (German Federal Foreign Office, 2003: 215).

The *Mittelschule* in Sachsen offers different types of education with general and pre-vocational courses and provides the prerequisites for later vocational qualifications (KMK, 2005: 103). Technical education is taught as a compulsory subject for all learners from Grade 7 (Führ, 1996: 135). The *Sekundarschule* in Sachsen-Anhalt is one of the two standard types of schools, the other one being the *Gymnasium*. The classes are divided according to ability in certain specific subjects in the first two grades. From Grade 7 on, learners follow either a *Hauptschule*-type course of education (Grades 7-9) for a basic general education or a *Realschule*-type course of education (Grades 7-10) for general and vocationally oriented education (KMK, 2005: 103).

The *Regelschule* offers general and pre-vocational education and provides learners with the prerequisites that will enable them to perform a skilled occupation. Learners who strive towards obtaining a *Hauptschulabschluss* take classes in economics and technology, such as woodwork or metalwork (Führ, 1996: 141).

5.5.1.3 Occupational orientation and the transition from School-to-Work

The *Hauptschulabschluss* is the first leaving certificate in general education that is usually used for admission to vocational training in the so-called dual system (KMK, 2005: 108). In addition, it qualifies a learner for admission to the *Berufsfachschule*, a type of vocational school, and for a year of basic vocational training or *Berufsgrundbildungsjahr* (Nijhof and Streumer, 1998: 74). Moreover, it is a prerequisite for subsequent admission to technical high schools and institutions offering secondary education for adults, referred to as *Zweiter Bildungsweg* (Führ, 1996: 179). At the end of Grade 10, it is possible in any *Land* to obtain a *Mittlerer Schulabschluss* or *Realschulabschluss* (KMK, 2005: 108). It qualifies a learner for admission to courses of senior secondary technical education, for example at the *Berufsfachschule* and at the *Fachoberschule*, and is also used for entering a course of vocational training within the dual system (Nijhof and Streumer, 1998: 66; KMK, 2005: 108).

An orientation to the professional and working world is a compulsory element of all courses of education at junior secondary level. The orientation is given either in a separate subject, *Arbeitslehre* (pre-vocational studies) or as part of the content covered in other subjects (Cantor, 1989: 100). Work experience placements, especially for learners in the two last grades at *Hauptschule* and *Realschule*, aim to provide first-hand insight into the working world and guidance in choosing an occupation. The *Länder* have continuously to develop their activities in order to convey a basic knowledge of the world of business. This takes place extracurricularly, for example, by means of model businesses set up by learners (*Schülerfirmen*) or partnership projects between the schools and the world of business (Eckstein, 1994: 5; Nijhof and Streumer, 1998: 70; Reuling, 2000: 4). To satisfy the requirement of technical school attendance, learners must attend a *Berufsschule* part-time in parallel with on-the-job training (Reuling, 2000: 4).

The idea of involving learners at school level in business activities such as the making of products through using practical technical skills, and the selling of the products through applying entrepreneurial skills, is unknown to Namibians. However, this approach has proved to be successful in Germany and should be explored by Namibian educators at junior primary level already as done in Germany.

5.5.2 Senior Secondary Education

5.5.2.1 General education schools

The variety of educational programmes, tracks and opportunities available to learners increases at the senior secondary level (German Culture, 2005c: 1). Educational and training institutions on senior secondary level that can be attended by learners after the completion of compulsory education, generally from the age of 15 onwards, comprise full-time and part-time schools providing general or vocational education as well as companies that provide training in the dual system (Pütz, 2003: 32; Eurydice, 2005b: 1).

The syllabi of the Gymnasiale Oberstufe are based on the basics laid at junior secondary level and learners are no longer taught in the class unit, but follow half-year courses on completion of the introductory phase (Führ, 1996: 152; KMK, 2005: 111). The three main subject areas are science and technology, social sciences and mathematics. However, it is possible to replace these three subjects with other subjects to a limited extent on condition that the content is interrelated, showing the flexibility of the education system (Führ, 1996: 156). Learners have extensive scope for individual specialisation and a wider range of subjects to choose from (Phillips, 1995: 20; Eckstein, 1994: 5). Subjects are grouped together under main areas according to correlated traits (Theuerkauf et al., 1995: 20). It seems as if extended apprenticeships are valued. A foundation year has been introduced for those who do not get into the trade of their choice, adding further flexibility to education (Ainly, 1990: 110-111).

5.5.2.2 Full-time technical/vocational schools

Full-time vocational schools include the *Berufsfachschule*, the *Fachoberschule*, the *Berufliches Gymnasium* or *Fachgymnasium*, the *Berufsoberschule*, the *Fachschule* and other types of schools that exist only in certain *Länder*. Information proves that these schools are becoming more popular, while enrolments in academic schools are decreasing (Federal Statistical Office Germany, 2005a: 1).

The *Berufsfachschule* provides basic training and can partially or completely replace apprenticeships in industry (KMK, 2005: 112). Building on the junior secondary programme, the *Berufsfachschulen* are full-time technical schools that prepare learners for a profession (Wicher, 1990: 52; BMBF, 2004: 6). It is also referred to as intermediate technical schools (Führ, 1996: 170). They offer a very wide variety of courses. There are *Berufsfachschulen* for business occupations, occupations involving foreign languages, crafts industry occupations, home-economics-related and social-work-related occupations, artistic occupations and health sector occupations. In cases where such schools do not provide a full career qualification, the period of *Berufsfachschule* attendance may be recognised as equivalent to the first year of dual system vocational training under particular conditions. The length of training at *Berufsfachschulen* varies from one to three years, depending on the intended specialisation area (Führ, 1996: 170). The *Fachoberschule* or higher technical school is another type of school designed to prepare learners for vocational careers (German Culture, 2005b: 31). It covers Grades 11 and 12 and requires a *Mittlerer Schulabschluss* or graduating with an intermediate school certificate from a Realschule or an equivalent school (Library of Congress Country Studies, 2005: 1). It equips its learners with general and specialised theoretical and practical knowledge and skills and leads up to *Fachhochschulreife* (higher education entrance qualification for the *Fachhochschule*). There are *Fachoberschulen* for technology, business and administration, and agriculture among others (KMK, 2005: 113). Much time is spent on practical training and the application of skills. The system is versatile, because completed vocational training can serve as an alternative for the 11th grade of the *Fachoberschule*. Learners with such qualifications can proceed directly to the 12th grade, where the focus falls on technical education (Führ, 1996: 222).

With regard to technical education, the subject *Arbeitslehre* is offered which replaces subjects such as woodwork and metalwork. The actual syllabus varies from *Länder* to *Länder*. It is not tied to one related area of learning, but is taught through several subjects, such as engineering and motor mechanics. In Berlin the subject is very popular and comprises a general course in subjects such as work techniques, electronics and technical drawing, to mention only a few (Cantor, 1989: 101). Aspects which Namibia can learn from this school type are the emphasis placed on practical skills, the versatility to accommodate learners' needs and the adaptation to regional needs. The current Namibian technical education system is too rigid and general in character to be versatile. The *Berufliches Gymnasium* in some *Länder* in the form of the *Gymnasiale Oberstufe* specialises in technical and career education and entails a three-year course of education (KMK, 2005: 113). This school type usually leads to a general entrance qualification for higher education (*Allgemeine Hochschulreife*). Apart from the subjects offered at a *Gymnasium*, these schools have career-oriented subjects like business, engineering, nutrition and information and communication technology which can be chosen in the place of general subjects as the second intensified course, and are examined in the *Abitur* (Kissling, 2005: 3; Führ, 1996: 157).

In some schools learners are offered the opportunity to obtain more than one qualification at the same time through double qualification courses of education, showing once again the German system's versatility (KMK, 2005: 114). This is made possible through a combination of a higher education entrance qualification *(Hochschulreife/ Fachhochschulreife)* and a technical qualification in accordance with *Land* needs. A technical education qualification may also be obtained at schools combining the *Gymnasium* and technical schools (*Oberstufenzentren*) or at a particular type of school such as the *Berufskolleg*e. These double qualification courses of education at senior secondary level take three to four years to complete and provide many career opportunities to school-leavers. In contrast to this, Namibian schools do not provide Namibians with the skills and qualifications to enter various career opportunities. This makes education in Namibia irrelevant to the needs of Namibians and the economy.

Berufsoberschulen have been established in some *Länder* in order to enable those who have completed vocational training in the dual system to obtain a higher education entrance qualification. They provide two years of full-time education that leads to the *Fachgebundene Hochschulreife.* This entitles a learner to admission to a training college or *Fachhochschule*, and to continue postsecondary education in engineering or technical fields (German Culture, 2005c: 1). Acceptance into the *Berufsoberschule* requires the *Mittlerer Schulabschluss* and at least two years' successful vocational training or at least five years' relevant practical experience (Führ, 1996: 168). The first year of the *Berufsoberschule* can be replaced with other study courses leading to the *Fachhochschulreife*. The *Berufsoberschule* covers specialisation subjects such as technology, agricultural economy and design. The learners are assigned a specialisation in accordance with the first vocational training or practical experience they have already completed (Nijhof and Streumer, 1998: 67).

The *Fachschule* is a higher vocational school which builds on a previously completed period of basic vocational training and offers vocational specialisation and improvement of qualifications (Wicher, 1990: 45; BMBF, 2004: 6). The aim is to enable skilled workers, usually with job experience, to take on management functions in firms, enterprises, administrations and institutions, or to independently perform responsible tasks (Führ, 1996: 157). Those learners who complete training at the *Fachschule* figure as intermediaries between the functional sphere of graduates and that of skilled workers. As a rule, a *Fachschule* only takes learners who have completed vocational training in a recognised occupation requiring formal training and have the relevant practical experience (KMK, 2005: 114; Kissling, 2005: 3). Two-year courses are available in about 160 different specialisations in the fields of agricultural business, design, technology, business and social services (German Federal Foreign Office, 2003: 324). The most strongly represented subjects include electrical engineering, mechanical engineering, construction engineering and chemical engineering.

5.6 ADMINISTRATIVE FRAMEWORK

The Namibian education system is known for its bureaucracy (see 6.4.2.1, question 5), affecting quality education negatively, specifically technical subjects. An investigation of Germany's administrative processes regarding technical education may provide guidelines for the effective administering of technical subjects in Namibia.

5.6.1 General educational objectives

The organisation of secondary level schools and courses of education is based on the principle of basic general education, individual specialisation and encouraging learners according to their abilities. Schools in the various *Länder* attempt to gradually increase the degree of specialisation in line with each learner's abilities and inclinations and provide an open system of free interchange that provides opportunities to switch to a different course of education after an orientation stage (KMK, 2005: 104).

At secondary level the courses of education provided lead to a vocational qualification for skilled work as qualified staff, for example in the recognised occupations requiring formal training or the assistant occupations. In the *Berufsoberschule* the knowledge, capabilities and skills acquired by learners during their initial vocational training are taken as the basis for an extended general and in-depth subject-related theoretical education, which will enable learners to pursue a course in higher education (Führ, 1996: 167). The three- to four-year courses of education for double qualification provide a vocational qualification, for example technical qualifications, in a number of recognised occupations requiring formal training (KMK, 2005: 117).

5.6.2 Differentiation of educational programmes

Each type of junior secondary level school offers one or several courses of education. All the courses at schools with a single course of education are related to a certain leaving certificate according to status, with the *Gymnasium* the most valued (Resnick and Wirt, 1996: 356). At schools with several courses of education, the learners are taught in special classes that prepare them for a specific qualification, or they are tracked into at least two levels of competency in some subjects. Only when learners have completed the period of compulsory general education may they pursue courses of education at senior secondary level that provide technical qualifications (Wikipedia, 2005a: 5). Schools and technical institutions provide additional programmes for gifted learners and students to optimise their potential (Pütz, 2003: 23). For example, as a secondary school, the *Hauptschule* gives able learners the opportunity to obtain a more advanced qualification under certain conditions, such as the *Mittlerer Schulabschluss* as part of vocational education (Library of Congress Country Studies, 2005: 1; Deutscher Bildungserver, 2005c: 3). Over 160 specialisations are accessible in vocational training at two-year *Fachschulen* that qualify learners to acquire such occupational titles as state-certified agricultural manager, designer and engineer (KMK, 2005: 117).

Learners with disabilities whose needs cannot be adequately met in general education schools receive instruction at special schools (KMK, 2005: 101). Although there are special schools for various kinds of special needs it is possible for some disabled youngsters to attend classes in general schools. The compulsory education stipulation applies without restriction to the disabled as well. Learners with special needs can attend special programmes to acquire technical skills. One such example is the “bridges into vocational development” programme which provides alternative training opportunities between school and enterprises, based on the dual system (Pütz, 2003: 77). The aims are:

- to provide more technical education that is linked to enterprises;
- to create active learning activities that enhance key practical skills; and

- to link schools with the labour market (European Agency, 2005: 1).

Namibia should take notice of Germany's approach to allow specialisation of technical subjects at school level according to individual interests and differentiation, as well as the integration of technical education in school programmes for learners with special needs. Many Namibian learners with special needs do not partake in technical education, thus being denied access to technical training at higher levels.

5.6.3 Curricula, subjects and teaching hours

The Ministries of Education and Cultural Affairs of the *Länder* are principally responsible for developing the curricula (Resnick and Wirt, 1996: 352). An introduction to the professional and working world is a compulsory component of every course of education and is provided either in a special subject such as *Arbeitslehre* (pre-vocational studies) or as part of the material covered in other subjects. The strategy here is that young people will pass from school to employment, not only with the initial skills, knowledge and experience required, but also with a forward-looking plan for continuing their education and training. Such a strategy does, unfortunately, not exist in Namibia.

The results of international student assessment surveys are taken into consideration in the process of revising the curricula of the various types of schools providing general education on the junior secondary level. In most *Länder* the revision focuses on the following main areas:

- the acquisition of basic competencies in German and mathematics, practical orientation and promotion of social competence;
- the definition of compulsory key areas of learning, provision of scope for measures to activate learners and inspire problem-solving thought processes; and
- the development of nationally binding educational standards that determine the capabilities, skills and knowledge students should be equipped with at a certain point of their school career.

The curricula and syllabi at secondary level and beyond are developed in conjunction with industries according to training regulations. Training regulations for in-plant apprenticeship training are uniform for the entire Germany as it falls under the federal government (UNEVOC, 1993: 6-7). Therefore, detailed training guidelines for each classified skill are uniform. Namibian authorities should take notice of this approach, as Namibian industries are not involved in syllabus design, resulting in inapt syllabi. On the other hand, vocational schools fall under the authority of the individual *Länder*, and curricula show differences from state to state (Pütz, 2003: 54; German Culture, 2005c: 2). In practice, training firms and vocational schools work together with the common goal of providing their students with good vocational qualifications (KMK, 2005: 117). Whilst the compulsory courses are designed to ensure that all the learners receive a common general education, electives, in conjunction with the compulsory syllabus, are intended to enable learners to develop an area of specialisation (Wicher, 1990: 55).

5.6.4 Assessment procedures

In Germany the assessment processes are not standardised. Examinations are set and administered by the learners' own teachers (Resnick and Wirt, 1996: 352). Practical achievements serve as the basis of evaluation, particularly in subjects such as arts, crafts and technical subjects (Holmes, 1985: 240; Raizen et al., 1995: 152). To ensure the quality of the learners' performance, increasingly demanding orientation and comparative tests are held in the *Länder* (Resnick and Wirt, 1996: 352).

Trainees in the dual system take an intermediate examination according to the standards laid down in the training regulations and syllabi before the end of their second year of training (Führ, 1996: 146-147). Competent bodies, such as the chambers of handicrafts or industry, administer the intermediate examinations. These examinations consist of a practical and a written component. The intermediate examination usually covers the knowledge and skills listed in the training regulations for the first and second years of training, as well as the material taught at the *Berufsschule* according to the framework curriculum. After taking an intermediate examination, the trainee receives a certificate showing his/her current level of training. In Namibia the technical subjects are examined by the Directorate of National Examinations and Assessment (DNEA) only (MBESC, 1998b: 16). Thus, institutions such as the Namibian Chamber of Commerce and Industries (NCCI) are denied the chance to assist with assessment and do quality control.

5.6.5 Teacher training

Most teachers, trainers and university lecturers are well trained and have high standing in society although not all teachers have the same status. An example of differentiation in status among higher education institutions is the so-called *Pädagogische Hochschule* (College of Education) in the federal state of Baden-Württemberg, which offers teacher training for primary as well as junior and intermediate secondary schools, but not for employment in vocational or grammar schools, where a university degree is a requirement (KMK, 2005: 1). A big difference can also be seen in the fact that vocational academies and colleges of education require compulsory internships and apprenticeship placement as part of the academic training scheme (Deissinger, 2000: 608).

Many German teachers pursue apprenticeships before enrolling in teachers' studies, and are thus qualified artisans. This German tradition gives them the advantage that they have experience of and access to the world of work, making them highly qualified (Resnick and Wirt, 1996: 187). There are specifically trained teachers for every type and level of school. All must have completed a course of study at a higher education institution, but there are differences in the courses of study (Führ, 1996: 237). Longer courses of study are required for intermediate school, special school, grammar school and technical school teachers. Upon completion of their studies, all teachers must pass an initial state examination (Resnick and Wirt, 1996: 187). This is followed by a period of practical training (usually two years), which includes preparatory seminars and practice teaching in the various types of schools, followed by a second state examination.

5.7 VOCATIONAL TRAINING IN THE DUAL SYSTEM

A study of the German dual system may provide guidelines to develop a system in Namibia according to which technical education could be linked to Namibian industries. The German dual system of vocational education and training is distinguished from most training systems in the world because it involves the voluntary contribution of companies in a co-operative model that supports technical and vocational training in both practical and financial terms (Pütz, 2003: 6; Cockrill, 1997: 1; Behrens et al., 1999: 135). The aim of training in the dual system is to provide a broad-based basic vocational training and impart the competencies necessary to practise a skilled occupation within a structured course of training (Lauglo and Lillis, 1988: 16, 60).

Compulsory full-time schooling must be completed before commencing vocational training. There are no other prerequisites for admission to the dual system and training in the dual system is generally open to everyone (Führ, 1996: 159; Gasskov, 2000: 23). The training is based on a training contract under private law between a training company and the trainee (Middleton, Ziderman and Van Adams, 1991: 192). Trainees spend three or four days a week at the company and up to two days at the *Berufsschule*. The success of the dual system is attributed to the commitment shown by businesses which provide training, as well as the highly legitimate apprenticeship system and its immersion within supportive enterprises (Kraak, 1997: 42; Goethe-Institut, 2005: 1).

By far the greatest majority of youngsters in Germany, around 65% of school-leavers in 2002, learned an official state-recognised trade in what is known as the dual system of vocational training, while 25% enrolled in universities and 10% became unskilled workers (Pütz, 2003: 9). Theoretical knowledge is gained in vocational schools and practical training takes place directly at the place of work or in special training facilities (UNEVOC, 1993: 7; Pütz, 2003: 25; Theuerkauf et al., 1995: 17). This combination of theoretical knowledge and practical expertise guarantees the internationally recognised high level of qualification of German craftsmen and skilled labourers (Bundesministerium für Bildung und Forschung, 2004: 4). The schools and enterprises in the previous GDR experienced many challenges to become integrated in the dual system, such as appropriate quality control and the creation of school-business structures (Deissinger, 1999: 1). However, since the structures and programmes were put into place the dual system has been functioning effectively (Ertl, 2000: 470-475).

To continue the demand and quality of vocational training provided on the job and in the vocational schools known as *Berufsschulen*, the syllabi as prescribed by the state are regularly adapted to the demands of the employment system by reviewing the recognised occupations requiring formal training. The technical schools are increasingly being developed into regional education centres in order to facilitate access to high-quality information and advice for the purpose of lifelong learning. In this way, the technical schools become cooperation partners in regional training and education networks and contribute to the diversity and flexibility of school programmes (Deissinger, 2001: 20; Eurydice, 2005b: 1; Pütz, 2003: 53).

The dual system differs in two respects from the purely academic vocational education customary in many other countries. Theoretical learning usually takes place on 3-4 working days in enterprises and practical training on 1-2 working days in vocational schools (Pütz, 2003: 38). The central government is responsible for on-the-job training, whereas classroom schooling is the responsibility of individual *Länder* (Ulrich, 1995: 1355). Vocational training in firms takes place under controlled conditions and with state-of-the-art machines and facilities. Larger firms provide training in their own training workshops and at the workplace. Trainees in smaller enterprises are trained right on the job. Where firms are too highly specialised to be able to impart all the necessary knowledge, they are supported by inter-company training centres. Certain aspects of training may also be taken over by other firms.

The task of instruction at vocational schools is to support and supplement on-the-job training with specialised theoretical training and to broaden young people's general knowledge. According to Pütz (2003: 26) two thirds of classroom instruction is focused on specialised training (technology, economic fields), and one third on general education (social studies, German, a foreign language and sports/religious studies). Those under the age of 18 who have no traineeship contract in their pocket but are legally required to attend school part-time can also attend vocational schools. In 2003 about 564 500 youths concluded a new apprenticeship contract within the dual system (Federal Statistical Office Germany, 2004: 1). This figure increased to 572 900 new contracts in 2004, an increase of about 1,5%, showing the popularity of technical and vocational training (Federal Statistical Office Germany, 2005c: 1).

The following jobs were particularly popular with male trainees: car mechanic, painter and decorator, electrician and retail trade specialist, whereas female trainees found the following particularly attractive: commercial clerk, retail trade specialist, hairdresser and dentist's assistant (Pütz, 2003: 57). Vocational training is currently provided in approximately 350 recognised occupations by around 643 000 firms in all sectors of business, in the public sector as well as by the independent professions (KMK, 2005: 116). There are quite clearly delineated characteristics because more than 50% of all males and more than 70% of all females chose just 20 of the 370 occupations for which training was required (German Federal Foreign Office, 2003: 321). According to Nijhof and Streumer (1998: 65) only those successfully completing the training are entitled to do skilled work in one of the recognised occupations requiring formal training.

However, some points of criticism are lodged against the dual system. One such complaint is the coordination of supervision and administration of training which is done by the various chambers of commerce. The lack of coordination causes much frustration amongst instructors at the workplace and school teachers. Another criticism is the fact that the dual system does not always adapt fast enough to technical change to raise skill levels. In fact, deskilling has caused unemployment and skill shortages (Ainly, 1990: 112). Another aspect is competition and determination to succeed, causing stress among learners, just as in Japan (German Information Centre, 2002: 1). Other problems include the maintaining of equal standards of technical training in the various *Länder*, the heterogeneity of the learners involved in the system and the issue of educating and training guest workers that takes place, sometimes to the detriment of the German people (Fuchs and Reuter, 2000: 77, 83). Another problem is that the complexity and the abstractness of the tasks to be fulfilled at the worksite have been dramatically increasing, resulting in enterprises leaving the education and training market (Nijhof and Streumer: 136: 1998). High costs of programmes also create problems. A training levy was suggested in the construction sector for all industries, based on the assumption that such a levy would increase the number of training places, raise training quality, balance training opportunities in less economically favoured regions, and even cut the costs of training and continuing training (IG Metall Abteilung Berufsbildung, 1994: 30-39).

5.7.1 Apprenticeship training

Learners who finish school and do not go to university usually seek to get an apprenticeship for a career they want to follow (German Federal Foreign Service, 2003: 320). There is a wide variety of careers for which defined apprenticeships are available. As the legal conditions are equal for all 364 German apprenticeships the entrepreneurs decide on the school level required at entrance (Nijhof and Streumer, 1998: 135). Apprenticeships consist of about 90% on the job training and 10% theory classes in a special kind of school. An apprenticeship can run from 2 to 4 years and state law defines what the apprentice should be taught during this time. The company is required to let the apprentice visit the compulsory classes in *Berufsschule*. Technical schools are also part of the dual system of in-company and school-based vocational training (Reuling, 2000: 3-4).

Educators like Cheek and Campbell (1994: 120) have expressed the belief that Germany's apprenticeship programmes have made significant contributions to that country's economic prosperity and have minimised many youth employment problems with which other countries such as Namibia are currently faced. They point out that Germany's youth unemployment rate has historically been consistently lower than that of most other countries. They also argue that over half of the German apprentices become regular employees in the firms in which they received their training. Frank (2005: 2) confirms that informally acquired skills play a decisive role in the ongoing adaptation of occupational skills to the constantly changing requirements of the world of work. He also opines that they are of key importance for the development of experts and expertise and make a substantial contribution to securing individual employability.

German apprentices welcome the opportunity to continue to work in the organisation in which they were trained because they are accustomed to the culture of that particular workplace and have also developed supportive relationships with many of their co-workers (Cantor, 1989: 104). German employers welcome the opportunity to hire the apprentice as a regular employee because they are already familiar with his capabilities, and it is an opportunity for them to recoup some of their investment. Apprenticeship training takes place under the supervision of the Master Craftsman. This person acts as both mentor and trainer, and also as an example of achievement to which the young apprentice can aspire (Theuerkauf et al., 1995: 19).

Since Germany's unification the school and vocational systems were drastically reformed to bring the former communist region of the reunified country up to the productivity levels of the rest of the country. However, although the former East German workforce was retrained, significant numbers of young people were unable to secure apprenticeship positions due to a shortage of companies participating in such programmes. As a result of these problems, the Federal Government of the unified Germany developed and implemented non-company-based vocational training programmes in the region of the former East Germany, designed to provide additional vocational training options for the youth (Ulrich and Tuschke, 1995: 205).

5.7.2 Training at *Berufsschulen*

The German vocational schools, which constitute one side of the dual system, form part of the overall school system. The *Berufsschulen* are autonomous places of learning in the context of the dual system of vocational education (KMK, 2005: 115). They work together on an equal footing with the companies participating in vocational training. The function of the *Berufsschulen* is to provide learners with general and vocational education, having particular regard for the requirements of vocational training (Nijhof and Streumer, 1998: 66). *Berufsschulen* are also expected to offer courses preparing for vocational education or accompanying professional activities. *Berufsschulen* equip their learners with basic and specialised vocational training, adding to the general education they have already received. The purpose is to enable them to carry out their occupational duties and to help shape the world of work and society as a whole with a sense of social and ecological responsibility (KMK, 2005: 115).

5.7.3 Quality control in the dual system

Central government and the states have agreed to introduce standards of education and training recognised throughout the country. The syllabi are regularly adapted to the demands of the employers (Eurydice, 2005a: 1). Quality control includes the teaching of specific skills in subjects that schools must impart in order for centralised educational aims to be achieved. These must be able to be ascertained by examination so as to determine whether the educational system has fulfilled its duties. Anyone wishing to offer training in Germany must prove that he or she is suitable, not only in technical but also in didactic terms. This is stipulated in the Ordinance on Trainer Aptitude (AEVO). The chambers and the independent providers offer courses as preparation for the corresponding examination (Bethscheider, 2000: 3). The final examination of apprentices consists of three components, namely demonstration of practical skills, a theoretical component and an oral component (Resnick and Wirt, 1996: 347). The qualification of training companies and in-company training personnel is determined and continually reviewed by the competent autonomous chambers of the various occupations and branches of industry. The chambers monitor the training to ensure that it is done properly (Eurydice, 2005a: 1). All apprentices are assessed and evaluated by the German Chamber of Commerce and Industry and the Chamber of Craftsmen (German Federal Foreign Office, 2003: 265). Technical, vocational and apprenticeship assessments lead to certificates that are often a prerequisite for employment (Resnick and Wirt, 1996: 356; Ziebart, 1994: 8).

After the PISA debacle (see 5.9), the German authorities have embarked on a quality control programme in order to improve the quality of teaching (Wikipedia, 2005b: 1). The improvements include:

- the provision of more access to the teaching environment and the coaching of individual learners in additional all-day schools that have been established;
- the introduction of federal education standards;
- teacher training that involves advanced practical training; and
- the reduction of Gymnasium school years and the launching of afternoon classes.

These measures to improve the quality of education seem to be working, as school-leavers from general and technical schools who obtained an entrance qualification at the end of 2004 for study at institutions of higher education increased by 4,5%, to 385 700 learners (Federal Statistical Office Germany, 2005b: 1).

5.7.4 Financing of the dual system

The training companies assume the costs of the on-the-job training and pay the trainee a training allowance in accordance with the collective bargaining agreement in the sector concerned (Pütz, 2003: 67). The amount of the allowance increases with each year of training and is, on average, about a third of the starting salary for a specialist trained in the corresponding occupation. The dual system is financed by the companies involved (trainees' allowances and levies) and by the state (which covers the costs for vocational schools). Costs related to personnel, equipment, materials and examination fees are paid by the companies, while the federal government and the *Länder* pay the salaries of trainers in the technical and vocational schools (Ziebart, 1994: 7).

5.7.5 Benefits of the dual system

According to Nijhof and Streumer (1998: 67) the following benefits are evident:

- The uniform way of certification makes the labour market transparent for both young people looking for a traineeship and employers seeking skilled labour.
- German people are equipped with sufficient mobility not to be restricted to any particular workplace.
- The experience gained by learners in the workplace makes them additionally qualified by virtue of practical experience which they have to gain.
- The number of people without technical and vocational training is very low.
- Competition among employers ensures high standards of education and training.

However, according to Beicht, Krekel and Warden (2005: 3) there are participants whose expectations in terms of benefits are not satisfactorily met. This group mainly consists of self-employed and unemployed learners. They identify poor standards of training or inadequate prior information to the participants about training contents and requirements as possible reasons for failure. A high-quality, target-group-oriented, transparent, continuing training is probably the best guarantee for ensuring that the participants draw major benefits from their involvement. This is the only way of sustaining a high degree of motivation for continuing vocational training.

5.7.6 Unemployment among German youth

German youths have to complete apprenticeship and need to pass an examination successfully to gain access to skilled employment and high status (Behrens and Evans, 2002: 19; Roberts, 1995: 235). If not, they end up as unemployed people. Learners who do not achieve certificates through education have fewer chances of entering the dual system and therefore remain unqualified with a very high risk of unemployment (Nijhof and Streumer, 1998: 136). To curb unemployment, a programme called the "Immediate Action Programme for Training, Qualification and Employment of Young People" (JUMP) was introduced in order to integrate around 100 000 young people every year. The analysis of the operating modes, strategies and goals of JUMP in Germany has revealed that it is a priority to dismantle youth unemployment through qualification and training measures, social support and direct placement activities (Behrens and Evans, 2002: 20). Another strategy was to declare 2003 and 2004 as the Year of Science and the Year of Technology respectively, which increased the interest and enrolments in technical education, mathematics and science (BMBF, 2005: 1).

An important feature is that when it comes to combating youth unemployment, state institutions are to the fore on the regional level too. In Germany there are 181 employment offices with around 600 branches. Approximately 65% of the German employment agencies are involved in networks to combat youth unemployment which include social organisations like churches or charitable organisations as well as chambers and other stakeholders from industry and commerce. One important aspect is the staging of vocational training. In Germany young people are generally placed in training positions first and in jobs only after completing training. Hence, JUMP is oriented towards training, qualification and employment (Kissling, 2005: 2).

Self-employment is considered as one of the strategies to curb unemployment. Employment agencies such as The Federal Institution for Employment have designed a system of "One Person Companies" according to which school-leavers and graduates receive support and subsidies with regard to starting and sustaining own businesses (German Federal Foreign Office, 2003: 268). One aspect is that learners are encouraged to take school subjects which contribute to self-employment, such as technical education. Namibia should learn from the German experience to curb unemployment. Namibians should develop and implement a national employment strategy according to which qualitative, relevant and employable technical skills are taught at school level and beyond which would ensure either self-employment or employment in an industry.

5.8 GERMAN EDUCATION IN THE INTERNATIONAL CONTEXT

Developments in the German education and training system must be put in context with the strengthening of the European Union. In 2000 UNESCO set up an "International Centre for Vocational Training" in Bonn which organises technical education and training worldwide, with the German dual system as premise (Werner and Bellaire, 2000: 1). Against the background of globalisation and internationalisation of education, and particularly in the context of the debate about vocational education and training policy in Europe, there are increasing signs that this process of competition and internationalisation, or at least of Europeanisation, is creating pressures on national VET systems (BMBF, 2000: 201). These pressures are forcing individual member states to adapt their systems to "European" challenges, by considering the following:

- Increasing the status of technical education and vocational training in Europe.
- Training of technical teachers and trainers to cope with European educational frameworks (Maastricht Communiqué, 2002: 1-6).
- Designing modular technical education programmes to be implemented across Germany and European Union member states (Münk, 2003: 40; Degen, 2000: 3).

Many countries experienced problems in adopting and adapting the German dual system training approach. These countries tried to emulate the dual system in order to reap the successes that Germany experienced. However, after experimenting with it, most countries abandoned the dual system because of problems. Many reasons can be attributed to the problems.

The dual system was developed within the unique German context to serve the German people and economy. It can only operate within a political and economical stable country, and political upheavals in developing countries made it impossible for the dual system to be implemented successfully (Banks, 1995: 206). Developing countries' economies were not strong and diversified enough to provide training opportunities and for companies to absorb all the trainees (Lisop, 1995: 136). Industries were limited in numbers and variety and corruption that took place within industries. In some countries the governments interfered in training programmes (Noah and Eckstein, 1988: 63). Most people had a subsistence economy and did not have the education to access apprenticeships. The developing countries struggled to develop proper education systems and provide sufficient schools that could stimulate the rhythm of the workplace. The dual system is an expensive type of training, and countries with limited budgets could not provide the funds to develop own dual systems properly. Many countries did not have the mechanisms in place for incorporating industry in educational planning and practice (Noah and Eckstein, 1988: 64).

Although the dual education system is generally considered to be exemplary, an increasing number of young people are taking vocational education and training (VET) courses at training sites and schools rather than in real companies, as for various reasons, companies are becoming less willing to take on apprentices. The reasons behind the lack of places on dual education courses include:

- companies which take on apprentices have to follow many regulations;
- apprenticeship numbers have fallen as more youths has chosen academic studies;
- many school leavers have only a low level of education and are not able to keep up with the course; and
- industries are often highly specialised and unable to train apprentices in all the required areas (Awad, 2006: 7; Nitsch, 2000: 3).

5.9 DEBATES AND REFORMS IN GERMAN EDUCATION

The main attraction to the German system is that it succeeds in providing relevant education to over 90% of its school-leavers (Ainly, 1990: 105). Currently the main debate centres on measures for the further development and assurance of the quality of school education. The Third International Mathematics and Science Study (TIMSS) raised widespread concerns about the quality of school science education in general in several western countries, including Germany where a “state of emergency” was declared in reaction to the perceived weak performance of German learners on the TIMSS test instrument (Drori, 2000: 32).

The German education authorities are greatly concerned about the national and international competitiveness of German children, especially after the poor performance of German learners who participated in the Programme for International Student Assessment (PISA), organised by the Organisation for Economic Cooperation and Development or OECD (OECD Observer, 2005: 1). PISA assesses learners’ performance in reading, mathematical and scientific literacy, and analyses the factors that promote success in education and best preparing young people for full participation in society (Bracey, 2002: 245). Of all the countries surveyed, Germany had one of the largest gaps between highest and lowest performing learners, and showed below average performance (German Federal Ministry of Education and Research, 2004: 1). The shock of the PISA test results and the dissatisfaction with the normal state schools has unleashed the creation of alternative educational institutions such as Waldorf schools. According to the Goethe-Institut (2004: 1) the reason was that creative, artistic and craft-based subjects like handicrafts are of far greater value at Waldorf schools than at normal state schools.

The apparent failing of the German secondary school system ran the risk of not providing German society and industries with the right quality of learners to meet future challenges (German-British Symposium, 2002: 11; Wender, 2004: 44). For example, the integration of weaker learners and young people in the new federal states and the growing number of leavers from the lower secondary schools who are not capable of meeting employers’ expectations, pose a big problem (Deissinger, 1999: 1). Despite the important role of technology in society, Wender (2004: 44) argues that it is neglected in German schools, contributing to unemployment. One of the reasons stated for this situation is insufficient technical qualifications, which either cause unemployment or the tendency that young people stick to professions due to a lack of vacancies (Schneeberger, 2002: 65). It also seems as if education does not always keep up with the technological demands of a modern economy (German Federal Foreign Office, 2003: 262; Marsh et al., 2001: 341).

Another debate surrounds the use of the apprenticeship system. While many school-to-work reform advocates have enthusiastically endorsed Germany's dual system, others have identified problems with it and suggest that youth apprenticeship enthusiasts have somewhat idealised this form of work-based learning (Bailey, 1993: 6). For example, some educators have contended that Germany's dual system is socially deterministic, thus undemocratic, because it begins tracking at an early age. Consequently, they have been unwilling to conclude that any educational system significantly impacts economic prosperity, youth unemployment rates, and real earnings (Levine, 1994: 35). Many potential apprentices are also lost because learners with *Realschule* and *Hauptschule* leaving certificates choose to stay on in full-time education (Phillips, 1995: 31-33).

The various school types of the German system support one another, and the retention of three tracks of education supports the long duration of formal education. This has only been possible because of the existence of the apprenticeship system, which has provided attractive training and employment options (Vincens, 2002: 29). Families choosing the intermediate track of general education, the *Realschule*, usually weigh up the likelihood of success at that level, the opportunities for apprenticeship, and the prospects for employment. This "low-risk" option is preferred to "high-risk" university studies. The distinct rise in the proportion of holders of the *Abitur* who choose apprenticeship rather than university training can be interpreted in different ways: a) it can be seen as a preference for security in the light of the growing risks of university study, or b) it can be seen as the result of a tendency for families to choose earlier for their children to continue with senior secondary education in the knowledge that this can lead not only to university but also to apprenticeship in more select fields, and this will, in turn, lead to an increase in the proportion pursuing senior secondary education. Critics also mention the duration of programmes at schools and apprenticeships, which is not only costly to the taxpayer, but also to the disadvantage of learners (German Federal Foreign Office, 2005: 1).

5.10 CONCLUSION

Traditionally, the Germans have always relied on their strong technological expertise and education, characteristics that contributed towards Germany's becoming the fifth largest economy in the World (The World Factbook, 2005: 8). The strong economy and manufacturing base requires higher skill and knowledge levels, corporate discipline and dedication from workers. These are taught at both a high level of general pre-vocational education and specific technical training, and employers invest in technical education and vocational training to form a virtuous circle. The long-standing and highly regulated participation of industries in technical education is an outstanding feature of the German system. It is characterised by a clear definition of roles, responsibilities and standards by stakeholders, provision by employers and supervision, evaluation and enforcement of regulations by regional and employer-and-worker boards. It exemplifies the adaptation of a traditional to the requirements of a contemporary society. Unemployment rates of young people in Germany are amongst the lowest in Europe. Dual vocational training programmes have provided a smooth transition from general school into the workforce.

The fact that the state's function in the dual system is restricted to securing quality standards in a predominantly formal manner makes the principle of consensus one of the long-standing characteristics of technical education and dual training in Germany. This means that public and private, as well as semi-private institutions have established various forms of cooperation within the system and, even more importantly, that the private and social partners normally take the initiative when it comes to defining what kind of training should take place and be prescribed when drafting a training ordinance. The German education system truly epitomises pragmatic and effective education, especially with regard to technical education and vocational training, traits from which the Namibian education systems could benefit.

CHAPTER 6

THE INQUIRY: CONSTRUCTION AND ADMINISTERING OF THE RESEARCH INSTRUMENTS, PRESENTATION AND ANALYSIS OF THE RESEARCH DATA

6.1 INTRODUCTION

In the preceding chapters the conceptual and theoretical issues relating to technical education were examined. It is the intention of the researcher to establish further in quantifiable terms what the stakeholders' perceptions of technical education are and whether technical education in Namibia displays some of the pragmatic traits of that of the German education system. In this chapter the survey research method is used in the establishing, investigation and description of the perceptions of learners, teachers and education officials regarding the appropriateness of technical education programmes.

6.2 SURVEY RESEARCH

According to Leedy and Ormrod (2001: 196) survey research describes research that involves administering questionnaires and interviews. The purpose of a survey is to use questionnaires or interviews to collect data from a sample that has been selected to represent a population to which the findings of the data analysis can be generalised. Questionnaires or interviews are used in educational research to collect data about phenomena that is not directly observable, for example inner experience, opinions, values and interests (Gall et al., 2003: 222). In relation to the topic the researcher included both questionnaires and interviews for obtaining relevant data.

6.3. QUESTIONNAIRES

According to Sarantakos (1998: 223) questionnaires are documents that present a set of written questions to which all individuals in a sample respond. The questionnaire is more commonly used in quantitative research, because its standardised, highly structured design is compatible with this approach.

6.3.1 Advantages and limitations of questionnaires

Questionnaires, as methods of data collection, have strengths and weaknesses and thus advantages and disadvantages that the researcher must be aware of. Leedy and Ormrod (2001: 197), Sarantakos (1998: 224) and De Wet et al. (1981: 163), highlight several advantages and disadvantages of using questionnaires. Some of the advantages are:

- Questionnaires are less expensive than other methods and produce quick results.
- They provide distance between the researcher and the respondent and thus offer greater assurance of anonymity.
- They can be completed at the respondent's convenience.
- They provide a stable, consistent and uniform measure, without variation.
- They offer a considered and objective view on the issues, since respondents can consult files and check their facts for correctness.

Disadvantages are:

- They do not allow probing, prompting and clarification of questions.
- Questionnaires do not always provide an opportunity to collect additional information while they are being completed.
- Due to lack of supervision, partial response is quite possible.
- Researchers are not sure whether the right person has answered the questions because the identity of the respondents and the conditions under which the questionnaire was answered are not known.
- Once questionnaires have been distributed, it is not possible to modify the items, even if they are unclear to some respondents.

6.3.2 Validity and reliability of questionnaires

The validity of the questionnaire as a research instrument is the extent to which it measures what it is supposed to measure and reflects the certainty with which conclusions can be drawn (Leedy and Ormrod, 2001: 98). Validity highlights the way in which data is interpreted and therefore requires that the researcher anticipates the potential arguments that sceptics might use to dismiss research results (Gall et al., 2003: 191). The researcher employed the questionnaire as a method to establish learners' and teachers' perceptions regarding technical education. Due to the complexity of the respondents' varying contexts and circumstances, it is difficult to establish whether the questionnaire devised will actually measure what it is supposed to measure. However, from the processes that were used to compile and administer the questionnaires, the results obtained and the certainty with which conclusions could be drawn, the researcher is convinced that, to a great extent, the questionnaires did measure that which it was designed for. Leedy and Ormrod (2001: 99) describe the reliability of a measurement instrument as the extent to which it yields consistent results when the characteristic being measured has not changed. They distinguish between the following types of reliability:

- Interrater reliability: The extent to which two or more individuals evaluating the same product or performance give identical judgements.
- Internal consistency reliability: The extent to which all the items within a single instrument yield similar results.
- Equivalent forms reliability: The extent to which two different versions of the same instrument yield similar results.
- Test-retest reliability: The extent to which the same instrument yields the same result on two different occasions.

High reliability does not guarantee valid results, but there can be no valid results without reliability. However, the researcher believes that the questionnaires in this investigation were completed with the necessary honesty and sincerity required to render maximum reliability. Frankness in responding to questions was made possible by the anonymity of the questionnaire.

6.3.3 Constructing and administering the research questionnaire

Gall et al. (2003: 224) describe the following eight major steps in carrying out a research study using a questionnaire: (1) defining research objectives, (2) selecting a sample, (3) designing the questionnaire format, (4) pre-testing the questionnaire, (5) pre-contacting the sample, (6) writing a cover letter and distributing the questionnaire, (7) following up with non-respondents, and (8) analysing the questionnaire data.

6.3.3.1 Defining research objectives

According to Gall et al. (2003: 224) it is important to define the research problem and list the specific objectives to be achieved by the questionnaire. In relation to the research topic, namely technical education in Namibia, the main aim was to obtain perceptions from two subgroups (learners and teachers) regarding technical education in secondary schools. The following considerations were taken into account to define the research questions:

1. The respondents' involvement in technical education over a period of years.
2. The classroom experiences of respondents in various technical schools, situated in various educational regions in Namibia.
3. The occurrence of technical education in Namibia in general, based on the respondents' answers.
4. The setting of similar questions in both questionnaires in order to compare responses and ensure consistency of information.
5. The interpretation of information and relating it to a broad social context.

6.3.3.2 Selecting a sample

Learners and teachers of a sample of public technical secondary schools and academic secondary schools offering technical subjects were identified to participate in the study. The schools' actual names are not cited for the sake of anonymity and validity. These schools are situated in different educational regions and were chosen because of their proximity and history regarding the teaching of technical education subjects. However, schools in the northern educational regions were not considered as they participated in the NAMAS pre-vocational project and cannot be compared with other public schools. One reason for not including these schools is that they received much financial support from NAMAS, which changed the status of technical education in those schools from a disadvantaged to an advantaged situation. The industries were not included in the research either, because they had never been involved in technical education at school level. However, this oversight will be rectified in the proposed technological education programme in Chapter eight, which acknowledges the role of the private sector. The sample of schools chosen for processing the questionnaires is as follows:

School A: School Code 7016, Khomas Region
School B: School Code 8543, Khomas Region
School C: School Code 7305, Khomas Region
School D: School Code 8542, Hardap Region
School E: School Code7003, Karas Region
School F: School Code 7224, Erongo Region

All Grade 12 technical subject teachers and learners of the sampled schools, boys and girls, participated in the study. The researcher administered the questionnaires personally in the schools to save time and money and to ensure a maximum return rate. The principals of the schools gave their cooperation and preferred to oversee the process of administering the questionnaires personally. In all the sampled schools the learners and teachers were gathered in suitable but different venues. They were requested not to communicate with each other while answering the question items. A total of 26 technical teachers and 126 learners taking technical subjects answered the questions of the two questionnaires.

6.3.3.3 Designing the questionnaire

Gall et al. (2003: 226) and Sarantakos (1998: 226) state that designing a questionnaire requires careful construction and proper planning. It means that every question should be essential to address the research problem. Leedy and Ormrod (2001: 202-203) opine that a questionnaire should be kept short, employing simple, clear and unambiguous language. Questions should be formulated in ways that do not give clues about preferred responses. The questionnaire should also be attractive and look professional.

The research objectives of this investigation necessitated two different questionnaires, one for learners taking technical subjects, and one for teachers teaching technical subjects. To make it attractive and to avoid confusion when administering the questionnaires, the questionnaire for learners was printed on white paper and the one for teachers on yellow paper. An important aim in the construction of the questionnaires for this investigation was to present the questions as simply and straightforwardly as possible. All the above was taken into consideration by the researcher during the design of the questionnaire. A variety of response systems or questions were used in order to obtain the desired information.

The types of questions contained in a questionnaire vary with respect to a number of criteria, especially those relating to their relevance to the research topic, their approach and structure, content and wording, and with regard to the type of response they require (Gall et al., 2003: 227). For this research it was decided to use both close-ended and open-ended questions. The close-ended questions offered the respondents a choice of alternative answers which made analysis thereof straightforward. Although open-ended questions are more liable to error and are time-consuming (Sarantakos (1998: 231), some open-ended questions were included in order to obtain explanations or information that were excluded and limited by the close-ended questions.

6.3.3.4 Pilot testing the questionnaire

According to Creswell (1994: 121) the pilot test provides an opportunity to establish whether respondents understand the questions posed to them. It prevents wrong interpretation of questions, which may result in unreliable data. The questionnaires were piloted personally by the researcher at Academia Secondary School, situated in Windhoek, to verify their functionality and appropriateness. The Grade 10 woodwork teacher and learners experienced some problems in interpreting and answering the questions. The questions were revised and retested to ensure that they were understood accurately by most of the members of the pilot test sample.

6.3.3.5 Pre-contacting the sample

According to Gall et al. (2003: 231) the researcher should contact the respondents before administering a questionnaire, because it increases the rate of response. Pre-contacting puts a more personal and human face on the research study and alerts respondents to the arrival of the questionnaire. The principals of the schools that represented the sample were telephonically notified about the aim of the study and their cooperation was requested. All principals offered their support and aid, which made the study easier.

6.3.3.6 Writing a cover letter

The cover letter has been recognised as one of the factors that influence the response rate (Gall et al., 2003: 228). The way the questionnaire is presented and introduced and the type of assurances given to the respondents determine to a large extent whether respondents will complete the questionnaire or not, and whether they will answer all the questions. The main aims of the cover letter are to introduce the respondents to the research topic, provide instructions, neutralise any doubt or mistrust respondents might have about the study, motivate them to participate and answer the questions, and assure them of anonymity and confidentiality (Creswell, 1994: 121; Sarantakos, 1998: 240).

The questionnaires in this study did not include a cover letter, but an introductory paragraph (see appendices 1 and 2). The reason for this is that the questionnaires were not mailed, but personally administered. The principals of the schools and the respondents were personally contacted and informed about the objectives of the questionnaire and the instructions for completing it.

6.3.3.7 Following up with non-respondents

According to Gall et al. (2003: 233) it is desirable to contact non-respondents by sending a newly formulated follow-up letter with the aim to motivate non-respondents to respond. However, in this study it was not necessary, as the questionnaires were personally administered and the principals of the sample schools requested all respondents to complete them.

6.3.3.8 Presentation and analyses of questionnaire data

a) Learners' questionnaire

The questionnaire consisted of a total of 28 questions, some with open-ended sub-questions, which had to be answered by Grade 12 learners (see Appendix 1). The learners were representative of all nine technical subjects which are offered in Namibian schools.

Appendix 3 shows a summary of all the responses and is discussed below.

1. Who decided that you should attend a technical school? ***Parents/Guardians/Yourself***

The majority of the respondents took the decision themselves to enrol at a technical school or a school offering technical subjects. It can be attributed to the fact that they see technical education as more important than academic education. A limited number of respondents (27,8%) indicated that the parents decided for them to attend such a school. The low percentage may be because many parents had not realised the importance of technical literacy and skills as yet, especially in the case where learners moved from rural areas to attend urban schools. Only 16 respondents (12,7%) indicated that they consulted their parents/guardians before deciding in favour of attending a technical school or taking a technical subject. It hints at a lack of communication between children and parents. Reasons for that could be the fact that many parents are illiterate and do not know the education system and what technical education is about. The lack of career guidance at primary and secondary school level might have contributed to the fact that parents/guardians did not support their children in choosing the type of school.

2. Do your parents/guardians consider technical schools as valuable? ***Yes No***

The majority of respondents (96,8%) indicated that their parents or guardians consider technical schools as important and that it therefore has an important role to play in the Namibian educational context. The reason for attending a technical school or taking a technical subject, is that it offers the learners a better future. Only a small number of learners' parents (3,2%) saw technical education as not significant.

3. Why do you attend a technical school and not an academic school?

Most of the respondents (32,5%) wanted to acquire technical skills in the various subject areas in order to further specific careers, like electricity, motor mechanics and technical drawing. The data also shows that 23 learners (18,3%) want to work with their hands, and, in fact, implied that they like doing practical work. Nine (7,1%) respondents intended to embark on a professional career, such as engineer and architect. Several learners indicated that they are not good in academic work and would rather do technical, hands-on types of work. One learner respondent thought that technical education was easier than academic education, and two respondents said it was the only school that admitted them.

The data shows that the majority of the learners enjoy technical education and see it as the key to a better future. Interestingly the practical aspect enjoyed much attention, which indicates that learners enjoy and value practical work.

4. Are you happy in the technical school that you attend? ***Yes No***

The majority of respondents (70,6%) indicated that they enjoy technical subjects. There may be several reasons for that. Usually learners look forward to technical education because of the practical work which takes them out of the lecture-dominated and teacher-centred education. Learners enjoy working with their hands. In the practical classroom they can apply theoretical knowledge. Some learners achieve better grades in practical work because of their interest and talents regarding technical education. Teacher-learner relationships are usually also better in a practical subject with the result that learners enjoy it.

The positive reasons from the learners who enjoy technical education clearly indicate the usefulness of technical education. It is obvious that the majority of the respondents enjoy technical education and know that the skills would come in handy at some stage in their lives (61,1%). Of this number, several respondents indicated that they enjoy technical education because of good technical teachers that are currently in the schools and good schools in general. It is also obvious that learners enjoy practical work because several respondents (7,9%) answered positively. Interestingly, another 7,9% of the respondents opined that they are unhappy because they want more practical work.

However, the negative response shows that some learners do not enjoy technical education. The most significant reasons are the lack of equipment and materials, as well as the lack of qualified teachers in the technical subjects. Two respondents felt that the choice of technical subjects at schools is limited and should be broadened.

5. Do you think that going to a technical school will help you to get a job? ***Yes No***

The majority of respondents (96,8%) felt that technical education would help them to get a job, which shows that learners regard technical education very highly in today's society. This is significant, because it means that most learners regard technical subjects as providing employable skills and knowledge.

They indicated that they might get a job more easily because of the shortage of technical people in Namibia. The technical skills and workmanship which technical education provides, are therefore important to the respondents. It is a fact that the nature of practical work, which entails skills, knowledge, values and problem solving, contributes much to the development of balanced characters and personalities in learners. It provides a different perspective on life than academic education. The technocratic society in which we find ourselves needs people with these qualities. Several respondents (23,0%) also felt that technical education provides skills that could be applied in different job scenarios. Only 3,2% of the respondents felt otherwise.

6. What type of job do you want to have after leaving school?

The biggest percentage of the respondents indicated that they intend to become engineers (26,9%), which is what the country needs as envisaged by Vision 2030 of the Namibian government. According to that document, development in Namibia is hampered by a lack of engineers and technicians. In fact, most of the respondents wished to be trained in a technical field which the Vision 2030 document identified as crucial to the development of Namibia (Government of Namibia, 2004: 93, 94). The vast majority of the jobs indicated by the respondents also require a certain level of technical and practical skills, which technical education provides. However, it is unfortunate that only one respondent wants to become a teacher, which is an indication that the teaching profession, especially technical teaching, is not considered.

7. How well do you think does the technical school that you attend prepare you for the job that you want to do? ***Very well Well Not well Poorly***

The majority of the respondents (71,4%) indicated that technical education prepares one better for a job. This is significant, because in real terms it shows that Namibians need technical education.

8. Do you think that the content of the technical subjects is of a high standard? ***Yes No***

Most respondents (59,5%) felt that the content of technical subjects is of a good standard. However, several respondents also felt that it is not good.

9. Which technical subject(s) do you think will help you to get a job?

Interestingly, motor mechanics (32,5%) was identified as the technical subject which would most likely ensure a job, followed by design and communication (21,4%). Electricity (19,0%) also received many votes as well as metalwork and welding (18,3%). Interestingly, it is almost a reflection of the advertisements for technical jobs that are found in newspapers in Namibia. These subjects also make it possible for learners to become self-employed, as they have been exposed to many employable skills and values.

10. Do you think that you will be able to get a job in your town? ***Yes No***

The majority of the students (66,7%) were of the opinion that there are enough opportunities in the hometowns to get jobs, despite the fact that the unemployment rate is high and industries are limited. However, many respondents (23,3%) indicated that it would be impossible to get hold of a job.

11. Which technical subject do you enjoy most?

Design and communication (technical drawing) was the favourite subject of the respondents. It is a compulsory subject in the technical field of study. It also indicates that the teachers are effective and know the content well. The subject can also be taught and learned with limited equipment, which makes it one of the most cost-effective technical subjects in Namibia. The respondents also enjoy electricity and woodwork. Interestingly, only two respondents (1,6%) mentioned fitting and turning. It can be attributed to low numbers of learners in that subject area, teachers that are not well trained and also the lack of equipment and tools that are very expensive. Another interesting aspect is that only five respondents (3,9%) indicated design and technology.

Most of the respondents (96,0%) indicated that they enjoy working with their hands and that the problem-solving nature of practical hands-on activities appeals to them. It was also mentioned that good teachers contribute to the fact that a specific technical subject is enjoyed. In fact, the nature of technical education subjects requires technical teachers to have a different approach when teaching them, which makes technical education more informal.

12. What is the state of the equipment/machines in the classrooms? ***Modern Outdated***

Most of the respondents (74,6%) indicated that the equipment is in a poor state, which correlates with the viewpoint of the teachers in this regard. It reiterates the fact that technical education cannot be taught with outdated equipment.

13. Do the machines/equipment in the technical workshops which are used for your training function properly? ***Yes No***

The majority of the respondents (51,6%) felt that the equipment in the workshops does not function properly, which means in real terms that in most classes it is difficult to teach the syllabus. Despite that, the MOE expects teachers and learners to excel in these subjects.

The majority of the respondents (68,3%) who indicated that the equipment does not function, reason that machines and other equipment are broken. The reason provided was poor maintenance. Vandalism of equipment is also mentioned as a reason for this unfortunate situation. However, several learners indicated that the equipment is not available to do the work as expected by the syllabus. The data correlates with that of the teachers, who also opined that technical education equipment and tools are mostly obsolete (see 6.3.3.8 Teachers Questionnaire, question seven).

Technical teachers are the first line of maintenance of equipment, and they should maintain all equipment and tools. However, to do maintenance, parts and other materials have to be purchased. Much of the equipment is already so outdated that no parts are even available to do maintenance, and if it is available, it is too costly to use funds from the school development fund. It also shows that some teachers do not have control measures of equipment in place, because that would help to prevent vandalism of equipment and tools. It can be attributed to the teacher's inexperience or lack of training.

14. Are there enough tools for all the learners to work simultaneously? ***No Yes***

The vast majority (75,4 %) indicated that they have to share tools when doing practical work, which means that the tools are not sufficient. It also means that practical work cannot be done as supposed to, as learners have to wait for one another to get an opportunity to work with a tool.

15. Are there enough materials to work with? ***Yes No***

Technical education cannot be taught successfully without appropriate materials. It seems as if the situation in technical subject classrooms and workshops has deteriorated to such an extent that very few materials are available, putting the accessibility and quality of technical education at risk. The majority of the respondents (72,2%) are of the opinion that materials are insufficient to work with. The question immediately arises why the materials are not sufficient and how learners can do the practical component of the syllabus. It would be unfair to expect teachers and learners to complete the syllabus successfully without the necessary materials.

The data provides an insight into the dependency on parents with regard to the provision of materials for practical work. The vast majority of respondents (78,0%) indicate that they provide materials for themselves. Experience has shown that in cases where the MOE provides materials, such as wood, the materials are sometimes inferior. Unfortunately the MOE budget procedures do not always allow teachers to do quality control when materials are delivered by the respective providers.

16. Are your parents/guardians expected to pay extra money for the technical education at the school? ***No Yes***

It seems as if several schools acquire materials by means of internal budget procedures, as 59 (46,8%) respondents indicated that they do not have to pay extra money to the school for materials to be bought. However, in real terms it means that all learners in such a school contribute to the acquiring of materials, because it forms part of the overall school budget. It means that learners contribute towards technical education even though they do not take a technical subject, such as in academic schools where a technical subject is presented. This is unfair to these learners, as they do not benefit at all from their contribution to the school development fund. It also means that the MOE is not fulfilling its commitment to provide quality technical education.

On the other hand, the majority of respondents (53,2%) indicated that it is expected of them to contribute to the acquiring of materials. This money is usually paid into a technical fund at the school, which is one of the budget accounts specially created to be used for the support of the different subjects in a school. Once again the MOE is not fulfilling its promises to ensure quality technical education.

17. Do you think that the technical teachers know the content of the technical subjects they teach? ***No Yes***

The majority of the respondents (91,3%) felt that technical teachers know the content of the subjects that they teach well. This can be attributed to several reasons. Firstly, the respondents feel that the current cohort of technical teachers are well trained, and, secondly, that the teachers are good at their work (Items 4 & 11 of the questionnaire).

However, several respondents were of the opinion that teachers do not know the content well. This unfortunate situation may be attributed to firstly, inexperienced teachers, secondly, to unqualified teachers, and thirdly, to academically trained teachers who have to teach technical subjects.

18. Do the technical teachers explain the work well? ***Yes No***

The majority of respondents (66,7%) were of the opinion that the teachers explain the work well, which is a very important aspect because it means that learners understand the content and the application of skills in the particular technical subjects. Unfortunately, many respondents (32,5%) felt that teachers do not explain the work well, which means that learners do not understand the content and application of skills. This can be seen in the poor results of some of the technical subjects, where many learners fail the technical subjects in tests and examinations, specifically the external examinations.

19. Are the textbooks which you use of high quality content? ***Yes No***

The results were even. With a small margin the majority of respondents indicated that the textbooks are not of good quality regarding the subject content. The majority of respondents (49,2%) felt that the content is of a high standard. The respondents who were not impressed (46,0%) with the standard of the content indicated that the textbooks are old and outdated because they are based on old technology which is irrelevant for today's modern technology and work procedures. Textbooks in use are also old and fall apart (12,8%). Several respondents (9,5%) indicated that the content is not well explained, while 11,1% of the respondents felt that the textbooks do not cover the syllabus, resulting in work that is not done. Other respondents (5,0%) pointed to the fact that textbooks are sometimes not available and that only the teacher has the textbooks.

The question arises how technical subjects can be taught without proper and sufficient textbooks. It is unlikely that effective and good study skills can be realised in cases where learners have no books or resources and teachers are untrained in pedagogy other than drill and practice. Another question must be asked: How can teachers teach and learners learn according to the learner-centred approach if textbooks are not accessible or available? Rowell (1995: 3) emphasises the fact that when a particular form of teaching has become embedded in society, "… it has a resilience that is almost independent of changes in government, major curricular reforms or even changes in teacher training". One of the arguments against technical education argued by MOE officials is the fact that few learners are interested in taking technical subjects. However, we have to ask how technical education can be promoted amongst parents, learners and teachers if textbooks, materials and equipment are not sufficient to teach and develop the subjects.

20. Would you attend a technical school elsewhere in Namibia? ***Yes No***

From the respondents' answers it was obvious that the majority of the respondents are happy in the schools they attend. One can assume that the climate and organisation in these schools are good and conducive for good education. However, there were quite a large number of respondents who indicated that they are unhappy in the schools. The motivations of respondents varied from positive to negative. Most respondents (43,6%) reasoned that the standard of teaching at the school which they attend is good. Negative responses included that other schools are better (11,9%), more practical work is done at other schools (11,9%), a limited choice of technical subjects (3,9%) and the lack of materials and equipment (4,8%).

21. Do you think that it is better to attend a technical school than an academic school?

No Yes

The vast majority of the respondents (84,1%) were of the opinion that attending a technical school is better than attending an academic school. Eighteen respondents (14,3%) indicated otherwise. This raises issues such as the benefit of career counselling, aptitude tests as well as learners writing entrée tests before they are allowed to attend technical schools. Learners who do not want to attend a technical school should indicate and make it known to parents and teachers, as they prevent learners who want to take technical subjects from doing so. Good communication between parents, learners and the private sector can prevent this situation. There may also be technical-minded learners in academic schools who cannot attend a technical school because no places are available. Places are filled by these unhappy learners that keep interested learners out of a technical school.

Many of the respondents gave different reasons, such as that it provides practical skills (27,7%), it will be easier to find a job (36,5%) and a technical education provides more options (10,3%). In general, the majority of respondents, 87 (69,1%) in total, indicated that technical education instils skills that contribute to getting employment more easily. Technical education also widens the spectrum of types of jobs, because the nature of technical subjects and combinations thereof make more job options possible.

22. Do you want to become a qualified artisan? ***Yes No***

It is significant that most of the respondents (80,0%) wished to become qualified artisans in various technical fields. It is a positive sign, because Namibia needs technically skilled people to help develop and build the industries of the country and to create jobs by becoming independent business people. However, the respondents who answered negatively, 19 (15,0%) may have done so because they are academically orientated.

23. Do you want to study further after school? ***No Yes***

The data indicated that a culture of further learning has been established amongst learners, as the majority of the respondents (85,7%) showed that they intended to study further. This challenges the perceptions of many people that learners who take technical education do not want to study further at institutions of higher learning. Interestingly, 50,0% of respondents want to study at a Polytechnic (technikon), most probably because of the more technical and hands-on nature of that institution. It also has a more technological orientation than a university. The fact that various institutions were indicated, is an indication that technical education is assumed to open doors for learners to study at various types of institutions.

24. For which degree/diploma/certificate do you intend to study?

The majority of the respondents, 68 (54,0%) indicated that they intend to study further, with B.Sc engineering (21 respondents, 16,7%) and B.Tech (seven respondents or 5,5%) degrees by far the most popular choices. Several learners also intend to enrol at a Vocational Training Centre (VTC) to study for a trade diploma.

25. Does the school take you on excursions to industries? ***Yes No***

The data shows clearly that very little effort is made by schools and industries to share information and technology. The technical teachers at School A have established informal links with businesses, and several of the school-leavers were accommodated by them. However, the majority of learners (92,9%) indicated that they had not been exposed to industry at all. It clearly indicates that there are no formal school-to-work policies at the MOE and at school levels. Another reason may be the fact that there are very few industries in the rural areas such as Rehoboth, resulting in limited opportunities for schools to link with industries.

26. Does the school have links with the industry in order for you to get practical experience in workshops after hours? ***Yes No***

When asked about practical experience after hours at industries, 109 (86,5%) of the learners indicated that there are no opportunities to gain experience after school hours. For learners it would be difficult to establish links with industries independent from the school. If the school organises and administers such links, attachment opportunities for learners to gain vital hands-on experience would be better organised and controlled. Only 13 (10,3%) of the learners had access to industrial attachment after school hours.

This is an indication that job-attachments are done in an unorganised and haphazard way. Stakeholders such as schools, industries and education officers should meet and reach consensus about a proper method of doing job-attachment after school hours. Important aspects that need to be sorted out are the juridical aspects to protect learners and employers from abuse and exploitation as well as safety aspects in practical workshops.

27. Which type of technical periods do you enjoy most? ***Practical Theoretical***

The overwhelming number of 113 out of 126 learners (89,7%) answering that they enjoyed practical work most, is a clear indication of the value of practical work in technical subjects. Many learners choose technical subjects because of the hand skills that are involved. Some learners fare better with their practical hand skills than with theoretical study skills, while other learners enjoy the more informal learning situation in a practical class. In fact, technical education without practical work is not technical education at all.

28. Are you allowed to do practical work after school hours? ***Yes No***

Many learners (60,3%) indicated that they are allowed to work in the practical workshops after school hours. In fact, for learners to complete their practical projects on time, it is important that they are given the opportunity to do so. However, an alarmingly huge number of learners (39,7%) are not allowed to do practical work. The question arises how they can finish their practical work on time for evaluation and assessment. Accruing from this is the quality of the practical work and whether learners are expected to make joints by hand or machine. When making joints by hand, the number of practical periods in a seven-day timetable cycle is usually two for the junior secondary phase and four for the senior secondary phase, which gives too little time to do quality practical work. When allowed to make joints with machines, the safety and supervision aspects come to mind, because learners are not allowed to work with unsafe machines.

The non-availability of technical teachers (50,0%) to supervise practical work after school hours was the main problem identified by the respondents, eight (16,0%) cited theft and vandalism as possible reasons. Two respondents (4,0%) were concerned about safety, while learners sometimes do not show up for extra class (2,0%). All these point to teachers who are not interested in providing extra classes or to poor supervision. Four (8,0%) respondents mentioned that the lack of tools and materials contributes to the fact that no extra classes are offered after hours.

b) Teachers' questionnaire

The questionnaire consisted of 40 questions, some with open-ended subquestions, which had to be answered by 26 technical teachers (see Appendix 2). The teachers taught various technical and academic subjects at the respective schools that were sampled. Appendix 4 shows a summary of all the responses that are discussed below:

1. Do you enjoy teaching technical subjects at school? ***Yes No***

The majority of the respondents (88,5%) seemed to enjoy teaching technical subjects, while only 11,5% of the respondents were not happy teaching technical subjects. In Namibia one finds that technical teachers are special people who excel in practical work and enjoy the challenges thereof. On the other hand, there are technical teachers who teach the subject because they have to, due to a lack of technical teachers. These teachers are usually not trained in the subject and show no interest in the technical subject area, as their interest is in academic subjects. They are the teachers who loathe teaching technical subjects. That may be the reason for the three respondents (11,5%) who indicated that they do not enjoy it.

2. What is your age? ……………………….***years***

The biographical information of the respondents provided some insight into the unequal age distribution of technical teachers. There are only seven respondents (26,9%) who are 30 years and younger, giving an idea of the lack of young teachers in technical education in Namibia. The majority of the respondents were senior teachers.

3. How many years have you been a technical teacher? …………………….***years***

The figures indicated that many of the respondents are still inexperienced technical teachers. Nine (34,6%) respondents indicated that they have between one and five years of experience. Once again the majority of respondents indicated many years of teaching experience among them, which will be harmful to the subject if they leave the teaching profession due to retirement or better offers from the private sector.

4. Did you work in the private sector before you started teaching? ***Yes No***

A considerable number of respondents (42,3%) indicated that they had worked in the private sector before becoming teachers. This can be interpreted in several ways. It may be that they could not make it in the competitive private sector, and therefore reverted to teaching as a last resort. This might mean that they are not qualified teachers, and that they may struggle conveying the content and practical skills because of a lack of methodology. They may also lack the motivation of teachers who see education as a calling and studied education directly after leaving school. These teachers either had to study further for an education diploma, or are still teaching without a professional teaching qualification.

On the other hand, they may be well trained in practical aspects and know what it takes to survive in the private sector, important knowledge that they could convey to the learners who also have to find employment in the private sector. They could find it easier to form links with the private sector because of the contact they might have built up while working there.

The remaining 15 respondents (57,7%) might have seen education as a calling and studied technical education at educational institutions after leaving school. Their motivation may be good and they may be dedicated teachers. On the other hand, the various technical fields of study are not included in the curriculum of these training institutions. It usually provides a generic course in drawing, metalwork and woodwork, where basic technical skills are covered. Specific skills in subjects such as electricity, electronics, fitting and turning, panel beating and spray painting, motor mechanics as well as building, plastering and painting are usually not covered, which may affect the quality of teaching these subjects negatively.

This highlights the important role of subject advisors who have to guide and support technical teachers, as well as the role of NIED that has to provide in-service training opportunities for all teachers.

Most of the respondents indicated that they wanted to become teachers, despite the fact that they qualified in other areas first of all. Seven of the respondents (63,6%) gave noble answers, but the remaining respondents' arguments (26,4%) gave the impression that they had no other option than to become teachers in order to at least have a job. These respondents may see themselves first as qualified artisans and then as teachers. Their motivation may not always be good and they may be on the lookout for jobs in the private sector, leaving the teaching profession when opportunity knocks.

5. Do you get guidance/support in your subject area from subject advisors?

Regularly Sometimes Very seldom Never

It is important that technical teachers need to be informed of changes in the syllabi, assessment and methodology, just like other subject teachers. It is alarming that only four respondents (15,4%) indicated that they receive regular visits from technical subject advisors. A large number of technical teachers have not received any visit and support from a technical education subject advisor, which correlates with the viewpoint of Mr P.

Thom (Personal interview, 26 July 2005), head of department at Windhoek HTS. The matter is further aggravated when one realises that all orders for materials, tools and equipment have to be approved by the subject advisors and that budgets even have to be compiled by them. It is an indication of the low status of technical education in the eyes of MOE officials. In fact, reality shows that several education regions do not even have a subject advisor for technical subjects. Attempts to change this situation were made, but to no avail (see 3.5.2).

The question has to be asked how technical teachers can teach technical subjects qualitatively (one of the four aims of the MOE) without support from the MOE. How can technical education budgets be compiled without knowledge of what the realities are at grass-roots levels? It makes one wonder about the commitment of the MOE.

6. Is the workshop equipment adequate to teach the prescribed syllabus? ***Yes No***

The majority of the respondents (69,2%) answered negatively to this question. This indicates a huge problem, as the prescribed content and skills cannot be taught. Most of the technical schools were built long before independence, meaning that the equipment that was installed in those days is old and outdated or irrelevant to modern content, methods and skills.

7. What is the condition of the equipment in your workshop?

Very good Good Satisfactory Not good Unserviceable

The majority (73%) of the respondents indicated that the condition of equipment is not satisfactory. It raises the question whether budgeting and planning are done at all regarding systematic replacement of outdated and unserviceable equipment. It also creates the impression that technical education is taken for granted and that there are no future perspectives regarding the progressive development of technical education.

It raises concerns about the levels of skills that learners get at school and if any practical work is done. This unfortunate situation also puts pressure on the teacher, who has to teach the content and skills, and whose learners are externally examined. The MOE expects teachers to perform well and to get good results, but is it possible without the relevant equipment?

8. Is the equipment serviced on an acceptable schedule? ***Yes No***

The majority of respondents (92,3%) indicated that the equipment is not serviced regularly. This is why the respondents indicated in Question 7 that the condition of the equipment is not good. Equipment such as machines, drills, lathes, circular saws, etc. need to be serviced regularly as the wear and tear is high. If this equipment is not serviced regularly, it tends to break and become unusable. Eventually this equipment needs to be replaced at vast sums of money, something which could have been prevented through regular service. Technical education is negatively affected by this negligence. The abovementioned statistic is a clear indication that the MOE does not plan and budget for regular servicing of equipment. Two respondents (7,7%) indicated clearly that servicing is paid for by the school development fund, shifting the responsibility to schools, teachers and parents.

Technical teachers are supposed to care well for equipment such as machines, and should do basic maintenance in order to keep the equipment in a good working condition. This presupposes that a training programme in equipment maintenance should be part of a technical teacher-training programme, which is currently not the case. However, maintenance of equipment should be kept to a very basic level, because aspects such as personal safety and warranties of equipment become issues when maintenance is done.

9. Do you have to use your own personal equipment to teach the syllabus? ***Yes No***

The majority of respondents (57,7%) indicated that they have to use personal equipment to teach the syllabus, which shows that the syllabi cannot be taught with the equipment that the MOE provides. It is inexcusable that teachers have to use their own equipment to teach a syllabus! Reality shows that teachers who have to use their own equipment are usually highly motivated and want learners to do well. Reality unfortunately also shows that if this personal equipment breaks or is stolen, the MOE does not replace it. The maintenance of this personal equipment has to be done and paid for by the teachers themselves, which has financial implications. The lecturer at the Windhoek College of Education agrees with this situation, because he also has to use his own equipment from time to time (A. Von Weiss, personal interview, 25 July 2005).

The reasons mentioned by the respondents clearly indicate that teachers get little support from the MOE. Teachers have to innovate and repair state property themselves by using parents' money or teach without equipment or materials. Once again, the commitment of the MOE, or lack thereof, is reflected by the respondents' answers.

10. Have you, regarding your subject, established a link with the industry? ***Yes No***

The majority of the respondents (65,4%) indicated that they link up with the industry. Many of these respondents worked in the private sector (also see Question 4) before becoming teachers, which could make links with industries easier. This is an important aspect, as the majority of school-leavers have to find jobs in the private sector. Therefore, technical education needs to be relevant to the needs of the private sector. School-to-Work approaches and policies can be implemented more easily if such links exist. The private sector also needs to be consulted when syllabi are designed. Equipment, tools and materials can be provided by the private sector, making the teaching of the technical syllabi easier for teachers and saving the MOE and technical schools much frustration and money. The nine (34,6%) respondents who indicated that they have not established links with the industry, are really not doing themselves a favour at all. The benefits of these links to both school and industry are too many to ignore.

However, these statistics contradict with the responses of the learners as the majority of the learners (86, 5%, Learners questionnaire, question 26) indicated that they were not exposed to industry. These conflicting viewpoints add to the fact that the validity of the current delivering mode of technical education is at risk and that it should be revised.

11. Do you take your learners on excursions to the industry? Yes No

Fifteen respondents (57,7%) indicated that they take learners on field trips to industries, which gives an indication that most teachers are aware of the importance of exposing learners to industrial environments. Unfortunately, the trips to the industries seem to be one-off ventures. The number of teachers, 11 representing 42,3%, not exposing their learners to industry, is too high. It means that many learners will be unaware of the realities and challenges that the private sector presents. They will not know the work ethics and virtues that are needed to work successfully in the competitive private sector environment. The link between schools and industries is a vital one as both parties benefit from the cooperation especially in a developing country such as Namibia with scarce resources.

12. Does the industry support your subject area in any way in the school? ***Yes No***

The data clearly shows that schools get little support from industries, despite the fact that learners in technical schools are prepared to be employed by them. Only seven (26,9%) respondents replied affirmatively, while 19 respondents (73,1%) responded negatively. In real terms it means that the majority of the schools have not established links with industries. Industries are important stakeholders in education and can provide schools with the urgently needed assistance to supplement the lack of materials, equipment and moral support. Excess equipment, tools and materials could be provided to schools in order to teach the syllabi properly and qualitatively.

The response to this question shows that, although some schools do get support, the support is not satisfactory, yet it is better than nothing. The respondents indicated that they receive some broken equipment and materials to supplement the meagre support they get from the MOE regarding equipment and materials.

13. Are your learners attached to the industry in any way? ***Yes No***

Only three teachers, constituting 11,5%, indicated that learners are attached to industry in some way. In reality it means that very few learners are attached to the industry. It corresponds with the low number of learners who indicated that they are attached to an industry. Reasons for the large number of teachers' negative replies may be as follows:

Firstly, there is no official policy regarding job-attachment of learners at school level. Schools that have job-attachment do it on their own initiative (see 6.4.2.2, Question 17). Secondly, the limited number of industries in Namibia, especially in small towns, provides few job-attachment opportunities. For example, the total lack of industries in many rural towns would make job-attachment impossible. Thirdly, many industries are not familiar with this practice of attaching school learners to jobs. Fourthly, this approach is still uncharted territory in Namibia and little is known about the administrative, legal and labour implications. Another reason is that the industries in Namibia are already subjected to job-attachment by institutions of higher learning, such as the Vocational Training Centres, and it is not known whether Namibia's limited number of industries could provide more job-attachment opportunities. Lastly, parents may also be against it because they fear that their children are exploited to do cheap labour.

14. Is the availability of materials adequate for achieving syllabus objectives? ***Yes No***

Only 15,4% of the respondents indicated that materials are available for teaching the syllabus. It means that 22 (84,6%) of the respondents are of the opinion that the syllabus cannot be taught with the materials at hand. This has serious negative implications for quality education and the preparation of learners to enter the job market after school. The fact that some schools have materials and some schools do not, as indicated, also means that the educational goal of equality of learning opportunities is not met by the very same MOE that constituted the goals. The question that one can raise is how the MOE can expect teachers to achieve these goals if the MOE itself does not abide by them.

15. Do you receive materials in time to do practical work? ***Yes No***

The majority of the respondents (76,8%), as in Question 14, indicated that materials are not available and those who receive materials from the MOE or other sources, receive it late. There have been instances where schools had to wait in vain for materials to do the prescribed practical work. These schools had to buy materials from the school development fund or rely on the local industry. One such example is School D (Q. Green, personal interview, 24 September 2005).

16. Do you have a technical qualification (e.g. as an artisan)? ***Yes No***

According to the response, six (23,1%) of the respondents are qualified artisans. It means that these respondents are well qualified to handle practical work, which is a major aspect in the training of artisans. These teachers specialised in a specific trade and therefore have high levels of subject-specific skills and knowledge. However, they may struggle to teach, as some of them may not be professionally trained as teachers. Currently [2006] there is no opportunity for artisans to qualify as teachers, which has a major negative impact on the availability of technical teachers.

On the other hand the majority of respondents indicated that they had not been trained as artisans, which means that they received a generic type of training, consisting of basics of several technical subjects. It may mean that the subject-specific knowledge and skills of these teachers are not as good as those of artisans. However, these teachers may have more skills and therefore they can teach a broader array of technical subjects.

17. Do you have a professional teaching qualification (e.g. a teaching diploma/degree)?
Yes No

The 17 (65,4%) respondents who indicated that they have a professional teacher's qualification, create the expectation that high standards of teaching prevail. It also means that they receive salaries according to the salary-scale applicable for all qualified teachers.

Nine (34,6%) respondents indicated that they do not have a professional qualification. This number is quite high as the standards of teaching can be negatively affected. These teachers are at risk as the MOE policy dictates that all teachers have to become qualified teachers or they stand the chance to lose their jobs. Due to the lack of study opportunities, the only option they have is either to go to South Africa or other countries to qualify, or to embark on academic studies. These teachers will then be lost to technical education. The Namibian artisan training system has localised since independence and artisans find it difficult to be allowed at South African institutions of higher education since Namibian artisans are accredited at levels lower than the minimum entrée requirements. This is one of the reasons why several Namibian educational institutions are in the process of reverting to the South African Technical National Trade Certificate (NTC) courses, which are of a high standard.

Another negative impact is the fact that these teachers do not receive the salary of a qualified teacher. In fact, they receive very low salaries. This unfortunate situation causes insecurity for these teachers, and they are usually lost to the private sector that offers them better salaries. They could also benefit from in-service training programmes.

When the data was analysed, it became clear that many respondents have a Higher Education Diploma (HED), which means that they qualified in other fields of study before becoming teachers. Most respondents (64,7%) either studied academic programmes or became qualified artisans before studying education. These respondents most probably enrolled at South African educational institutions, as the HED has not been offered in Namibia for several years. The two respondents who acquired the Basic Education Teacher's Diploma lack many of technical skills and knowledge, due to the little time that is spent on technical subjects in the programme. Unfortunately the standard of training of technical teachers is below par. The BETD programme is aimed at training teachers to teach up to Grade 10 level, but reality (the lack of technical teachers in Namibia) dictates that these teachers sometimes have to teach up to Grade 12 level.

The reasons that the respondents mentioned are obvious. The policy of the MOE and lack of technical teachers make it almost impossible for technical teachers to get study leave. The policy states that a teacher or school has to pay the relief teacher, which makes it impossible for interested teachers to take full-time study leave for one year.

18. Do you wish to study further in your subject area? ***Yes No***

The majority of the respondents (73,1%) indicated that they wish to become better qualified in their respective subject areas, which is an indication of the motivation and dedication of these technical teachers. These teachers may aspire to become more effective teachers, to serve on the school management or to qualify for better salaries.

Some of these respondents may include artisans who wish to become professionally qualified.

The respondents who indicated no intent for further study gave clear reasons. One respondent is on the brink of retirement, one is going to quit teaching soon and two respondents cannot visualise any positive development in technical education in the near future.

19. Do you want to study in subject areas other than technical subjects? ***Yes No***
The majority of respondents (61,5%) indicated that they would enrol in further technical education studies, if given the opportunity. Once again it shows that the majority of technical teachers are loyal to technical education despite the problems experienced. However, the large percentage of respondents (38,5%) who indicated that they would not, also means that almost four out of ten technical teachers would rather study other subjects than technical subjects, if given the chance. In reality it means that technical teachers may become even scarcer in future, as there are technical teachers who will leave the profession if given the opportunity.

The reasons stated by the respondents are clear. Six respondents (23,1%) wish to become better qualified and gain broader knowledge. As a result of the fact that there are no opportunities for further studies in technical education in Namibia, they would rather study another subject area. One respondent intends to study remedial education and another one indicated that technical people are not well paid in Namibia. This once again reflects the poor status of technical education in the Namibian society.

20. Have you attended any ministerial workshops in your subject area? ***Yes No***
According to the data, 65,4% of the respondents have attended workshops in the subject area. However, the reality is that these workshops were conducted by the National Institute for Educational Development (NIED) in the middle nineties and since then no workshops for technical teachers have been held. It means that changes in syllabi, which take place in five-year cycles at NIED when syllabi are revised, have not been

communicated in practical terms during workshops. The number of respondents who indicated that they have not attended workshops at all, is unusually high (34,6%). A reason for this situation may be the fact that no workshops have been held recently and that these teachers have joined the MOE after the last workshops were held. One of the reasons why no workshops were held is that NIED's budget was cut to such an extent that no money is available for presenting workshops.

21. What is the average number of learners in your class? ***…..Number***

It is a known fact that it is difficult to teach technical subjects when there are many learners in a technical class. The ideal number is 15 learners, and most practical classrooms were designed to accommodate 15 learners at a time. The data shows that 15 (57,7%) respondents indicated classes of between one and fifteen learners. It means that 42,3% of the teachers have more than fifteen learners per class, making the teaching of technical subjects extremely difficult. Especially the class size of 26-30 learners, indicated by four respondents, makes teaching very difficult, especially for the unqualified teacher. However, reality indicates that many technical subject class groups consist of a few learners, to such an extent that the MOE considers technical education as too costly and labour-intensive as the MOE wants to eliminate small classes (MEC, 1993b: 142; Clegg, 2001: 103; T.W. De Swart, personal interview, 23 September 2005).

22. Do you generate extra funds for your subject through additional projects? ***Yes No***

Only 11 respondents (42,3%) indicated that they generate extra funds, which is a small figure if one thinks about the shortage of materials and inadequate equipment schools have. The majority of respondents therefore do not engage in generating funds.

*23. Does the school board allow you to do extra work in the workshops**?*** ***Yes No***

It seems as if the major reason for teachers not doing extra work is that they are not allowed to do so by the school board. Eleven respondents (42,3%), the same number as in Question 22, indicated that the school board does not allow extra work. Reasons for that may be as follows: Firstly, these teachers might have generated money for themselves and not for the benefit of the school and are therefore disallowed to do extra work.

Secondly, the members of the school board are ignorant about the needs of technical teachers regarding equipment and tools, and, lastly, the community is too small or poor to sustain extra work, as there is no market for manufactured goods.

24. Do you think that the syllabi for technical subjects are well developed? ***Yes No***
The majority of the teachers (53,8%) indicated that they are satisfied with the quality of the syllabi. It may be because many technical teachers serve on the NIED curriculum committee or have made some contribution to syllabus development. However, a large number of teachers (46,2 %) are not happy with the syllabi.

25. Do you think that the subject content links up with the needs of industry? ***Yes No***
Fourteen respondents (53,8%) felt that the subject content is relevant to the needs of the industry. It seems as if some politicians agree with this problem (De Bruyn, 2005: 4). However, the question must be raised how the content could be relevant if industry was not involved in the syllabus development. In fact, since the curriculum committee for technical subjects started with syllabus development just after independence, no links with the industry have been formed.

The reason for so many respondents answering positively may be that they think they know the needs of industry. Also, no market research was done by NIED to find out what the needs of the private sector are in order to link school content with the knowledge and skills that are needed for employment (L. Moller, personal interview, 28 July 2005). In this regard Hewett (1997: 11) believes that a combined approach between schools, companies and employees is the only workable solution to identify and teach relevant technical skills.

26. Do you get support from any non-governmental organisation (NGO)? ***Yes No***
There are many NGOs operating in Namibia, and some subject areas are supported by them. However, it seems as if the NGOs do not support technical education very much, as only three respondents indicated that they receive some kind of support. NAMAS is the only NGO that supports technical education in Namibia substantially. However, NAMAS

is only involved in certain schools in northern Namibia, the other schools receive no support. As from 2005, NAMAS also stopped their support to technical education (V. Korff, personal interview, 29 January 2003).

The little support that schools get is limited to materials and expertise from the National Institute of Mining and Technology (NIMT) and local communities. The reason for this may be the fact that the Namibian government made mathematics and science subjects priority areas. The development of these subject areas receives much attention, resulting in huge financial and human resource support by NGOs and the MOE. However, technical education was not considered as a priority area and therefore received little attention from the government and NGOs.

27. Do you have appropriate textbooks to teach the subject content? ***Yes No***

Half of the respondents indicated that they have appropriate textbooks, which means that 50% of the teachers do not have appropriate textbooks. In practical terms teachers cannot teach qualitatively, as learners do not have textbooks to study from.

28. Are you satisfied with the quality of prescribed technical textbooks? ***Yes No***

Most of the respondents indicated that they are satisfied with the quality of the technical textbooks that are available. The South African developed textbooks and textbooks for the British GCSE and IGCSE programmes are used and are scrutinised by the NIED curriculum committee panel before they are approved. However, in some technical subjects where suitable books cannot be found, teachers have to compile class notes from various books. As a result of the small number of learners in technical education in Namibia, it is not financially viable to develop Namibian textbooks as such.

29. What is the attitude of the principal regarding the teaching of technical subjects at the school? ***Positive Apathetic Negative***

It is a positive sign that the majority of respondents (69,2%) indicated that the principals are positive towards technical education. However, the data shows that some principals (30,8%) are not positive towards technical education, which puts its future at risk.

Most principals do not have a technical qualification or background (A. Von Weiss, personal interview, 25 July 2005). This factor as well as the struggle that principals have to acquire materials and equipment may cause principals to have a negative attitude towards technical education. Eventually the sustainability of technical subjects will be influenced by the attitudes of principals towards the technical field of study.

30. Does the school management support the technical teachers in matters such as ordering materials, curriculum support, etc.? ***Yes No***

School management and administration dictate that the school managers (principal and heads of departments) in consultation with the various departments and the school board finalise the school budget. The school management committee usually compiles the budget and orders the materials and equipment needed by the school. It is therefore vital that technical teachers should receive support from the school's top management structure to ensure that a fair amount of money from the budget is spent on technical education. It is therefore a positive sign that the majority of the respondents (84,6%) indicated that they receive support from the school management. Unfortunately, the data also indicates that in some cases (15,4%) technical teachers do not get this support. Surely, the educational goal of equality should also mean that all subjects should be treated with equal importance.

31. Do you know of learners who have a job as a result of attending a technical school? ***Yes No***

The majority of the respondents (88,5%) indicated that technical education ensures job-security to a large extent. Technical education provides knowledge, skills and virtues such as values, hard work and ethics, not only for employment by employees, but specifically also for self-employment. The small number of respondents who answered negatively may be attributed to the fact that learners are sometimes forced to take a specific field of study because of the limited number of subjects offered at a school and therefore may not like the technical subject he/she is taking or even the technical field of study.

32. Do you know of learners who struggle to get a job despite attending a technical school? ***Yes No***

According to the data, 42,3% of the respondents indicated that they know of learners with a technical education who struggle to get jobs. The struggle to get jobs is closely linked with the relevancy of technical education programmes (knowledge and skills) at school level. It is a clear indication that technical education in future has to be qualitative in nature and market-driven, rather than quantitative.

33. If you were offered a better salary package elsewhere, would you resign as a technical teacher? ***Yes No***

The large number of respondents (76,9%) indicating that they would resign as a technical teacher if given the opportunity should be a big source of concern to technical education and the MOE. It means that only 23,1% of the respondents really enjoy technical education and would stay loyal to the subject despite low salaries. In real terms it means that technical education could lose many of its qualified and experienced teachers to the private sector. The variety of answers presented by the respondents boils down to the status of technical education in the Namibian society. It seems as if promotion opportunities are limited and that better salaries are paid outside the teaching profession. This is true especially for artisans teaching without a professional teaching qualification.

34. Which problems need urgent attention in technical education?

The biggest source of concern seems to be the outdated and obsolete equipment and tools as well as the lack of materials in the workshops. With regard to accreditation problems, the Polytechnic does not consider the Grade 12 technical field of study when credits are given to subjects. It means that these learners have to repeat all technical training at Polytechnic level, despite the fact that they have already done it at school. For example, in the previous system Standard 10 was equal to the NTC 3 level, and students studying at technikons could start with NTC 4 immediately. The problems of support from the MOE and salaries were once again mentioned. The total lack of teacher-training opportunities for potential technical education teachers is also highlighted.

35. Which aspect(s) of technical education do you regard as positive?

The respondents' answers boil down to the fact that learners and teachers enjoy to work with their hands and this practical hands-on training provides a wider spectrum of job opportunities to school leavers. An important aspect mentioned is the fact that teachers and learners are challenged with problems that require creative and critical thinking. These skills are important life skills that are already honed in the practical classrooms.

36. Would you encourage learners to become teachers in technical schools? ***Yes No***

The majority of respondents (65,4%) felt that they would encourage learners to become technical teachers. However, it means that 34,6% respondents indicated that they will discourage learners to follow that profession. The majority of the respondents felt very positive about becoming technical teachers, as most answers are positive. For example, five (19,1%) respondents felt that technical education is the backbone of the economy and needs to be extended, three (11,5%) of the respondents reckon that Namibia needs more qualified technical teachers, and three respondents (11,5%) want to see more teachers in the system. However, there are also negative answers. Four respondents (15,3%) were of the opinion that technical teachers' salaries are too low. Another three respondents (11,5%) indicated that the private sector offers better opportunities and that they would not motivate learners to become technical teachers.

37. Do you think that technical education finds itself in a crisis in Namibia? ***Yes No***

Technical education is facing a crisis. This is clearly illustrated by the fact that of the 26 respondents, 21 (80,8%) believe that technical education is experiencing a crisis.

Several reasons are cited. Five (23,7%) respondents reason that technical education is not considered as important in Namibia. This can be related to the general low status of technical education in Namibia. Another three (14,2%) respondents mentioned the new approach to technical education, which moves away from practical work. It is an indication that technical teachers regard the practical component as an important part of technical education. A further four (19,0%) blame the lack of materials and equipment for the crisis, while several other answers were also provided such as irrelevant syllabi, lack of accreditation and the shortage of teachers.

38. Do you think that the subject committee for technical subjects at the National Institute for Educational Development (NIED) is doing enough for the curriculum development of technical subjects? ***Yes No***

Several respondents (38,5%) considered the technical subject committee as successful in its capacity of curriculum development, but the majority respondents disagreed with that viewpoint.

39. Do you think that the so-called "Schools of Excellence" will be to the benefit of technical education in Namibia? ***Yes No***

The general opinion was that the comprehensive schools of excellence may be a good option and that technical education will benefit from it. Of the 26 respondents, 15 (57,8 %) considered this step as beneficial to technical education. However, several respondents felt otherwise and disagreed with that viewpoint.

The general feeling is that more funds will be allocated towards technical education. Some respondents (15,3%) felt that the practical workshops will be upgraded to handle the "students of excellence", learners will be better prepared for further study and jobs because of the updated curriculum and workshops (11,5%), and the quality of technical education will improve (3,9%). Not all respondents shared this optimism. Some of the respondents felt that if current technical education fails, there is little hope for the new approach to succeed (7,7%). Another view is that the slow learners will not be able to cope, putting pressure on resources (11,5%) and there is also a belief that the curriculum will be more academic than technical (3,9%).

40. Do you think that technical education has the same status as other subjects such as mathematics and science in the eyes of the Ministry of Basic Education and Culture (MBESC)? ***Yes No***

The statistics show that the vast majority of respondents (84,6%) are of the opinion that technical education does not have equal status with science and mathematics. In other countries the three subjects are linked and integrated, but in Namibia there is little evidence of it. The MOE does not view technical education as of importance in practical and real terms, despite saying that it is important. Policies and development plans exclude technical education in most cases, creating the impression that the MOE does not want technical education in schools any more (Booysen, 2006c: 3).

6.3.4 Critical synthesis of questionnaires

The learners opine that technical education is a useful subject. They support the view that the economic usefulness of technical education needs to be considered in light of the realistically available employment opportunities that learners have after school, for work and further training. However, the learners also identified serious shortages with regard to the delivering programmes of technical education, especially about the quality and status of the subject. In view of the information, it seems reasonable to infer that technical education has created interest among learners in technical or practical work as a future career, but that the current system does not enable learners to realize their ambitions.

Most of the technical teachers are not satisfied with their profession which affect their morale negatively. Teachers lament the lack of status of technical education as well as the lack of equipment and progress within the subject area. Competent teachers are difficult to recruit and train and to keep, if their competence is better paid in other jobs. The quality and availability of facilities, equipment and materials they have at their disposal to teach also pose greater demands in terms of managing logistics requirements and the initial establishment of these subjects, demands that cannot not be met. The teachers opine that learners are denied access to technical education due of the lack of technical education opportunities as well as a decreasing number of qualified teachers. They also indicate that the quality of technical education will be compromised if the practical skills component of technical subjects is allowed to weaken. They eventually agree with the learners that the future of technical education is at risk if it is not revised.

6.4 INTERVIEWS

According to Leedy and Ormrod (2001: 196) a survey research employs mostly a face-to-face interview or a telephone interview. They regard the structured face-to-face interview as yielding the highest response rates in survey research, because of its distinct advantage of enabling the researcher to establish rapport with respondents and therefore gain their cooperation. According to De Wet et al. (1981: 163) the interview can be used to identify variables, formulate hypotheses and provide guidance to other phases in the research. It can be used either as the major medium through which data is compiled or in support of other research methods.

Each interview was recorded on a cassette tape recorder. Further selection through personal contacts, suggestions from colleagues, and other participants took place in order to have as many broad-based, experienced and knowledgeable interpretations as possible.

6.4.1 Advantages and limitations of interviews

De Wet et al. (1981: 162) highlight flexibility and adaptability as advantages of using interviews in educational research. Personal interviews allow the researcher to clarify ambiguous answers and, when appropriate, seek follow-up information. However, the advantages are offset by some limitations. One is that it is difficult to standardise the interview situation so that the interviewer does not influence the respondent to answer questions in a certain way. Interviews also do not allow for anonymity for the respondents and are time-consuming (Gall et al., 2003: 237).

Questionnaires have two advantages over interviews for collecting research data. One is that the cost of sampling respondents over a wide geographic area is lower. Another advantage is that the time to collect data is much less. However, questionnaires cannot probe as deeply into respondents' beliefs, attitudes and inner experience as interviews do (Leedy and Ormrod, 2001: 197). That is the reason why the researcher, in addition to questionnaires, conducted interviews.

The interviews were conducted according to instruments consisting of structured open-ended questions. A total of five recorded interviews were held, as well as three unrecorded interviews. The actual names of the interviewees are not revealed for the sake of anonymity and validity. Four different interview questionnaires were compiled, as each of the interviewees had a different interface with technical education.

6.4.3 Presentation and analysis of interview data

6.4.2.1 Interview questions put to the lecturer responsible for the training of technical teachers at a Namibian College of Education

The following questions were put to Mr A. Von Weiss:

1. How many lecturers are there for the training of technical teachers at the College?

The respondent stated that there is one lecturer, namely Mr Von Weiss himself. The reality is that the respondent has to train potential teachers in all aspects of technical education.

2. Are you able to train the student teachers in all aspects of the syllabus?

The respondent replied that he is able to train students in all aspects of technical education. However, the researcher finds the answer difficult to accept. The reason is that technical education is multi-faceted and includes theory, practical work and drawing from examples from industry. It is unlikely for one lecturer to train students qualitatively in all aspects of technical education, because of the broad scope thereof.

3. Do you get support from your colleagues with regard to teacher training in the technical field of study?

The respondent implied that his colleagues are not interested in the subject area and do not support him. He has to organise all activities on his own, with little support from colleagues. This is an unfortunate situation, as the respondents should be part of a team of educators, sharing all information. It may point towards the low status of technical education in Namibia.

4. Do you think that the current [2005] training syllabus prepares the teachers well for teaching technical education?

The answer was positive. This shows that the College syllabus used for the training of technical teachers is based on the technical education syllabi used in schools.

5. Do you have sufficient materials to train the practical part of the syllabus?

According to the respondent the materials are sometimes sufficient. However, it mostly arrives late, usually at the end of the year, making training difficult. Although some materials are provided for training, it indicates the lack of urgency towards the training of technical teachers, as well as the bureaucracy involved to order materials, which wastes time.

6. Do you receive materials regularly from the Ministry of Education?

His answer was negative, which creates problems regarding practical work. It is impossible to train technical teachers in practical work if materials are not available.

7. Are the equipment, tools and machines suitable for the training of teachers?

The respondent answered negatively. The equipment is unfortunately not suitable, because it is outdated and old. Some of the consequences of this situation are that not all competencies and skills can be taught as prescribed by the College and MOE technical education syllabi, the safety of the teachers is at risk, and eventually it leads to poor quality teaching of technical subjects, especially the practical work. It also means that modern approaches to woodwork and metalwork cannot be taught, which leaves a gap in the skills and professionalism of the student teachers when they graduate.

8. Is the equipment regularly serviced?

Mr Von Weiss explained that the procedure to apply for servicing the equipment is time-consuming and subjected to bureaucracy, and eventually the services are not carried out. Although maintenance of basic equipment is the responsibility of the particular lecturer and student teachers, some equipment such as radial-arm saws and metal lathes are precision machines which should be serviced by specially trained technicians. The problem points to improper structures and procedures that are in place to get equipment serviced. Once again, it shows that unrealistic results are expected of the respondent to train technical teachers with old, unsafe and outdated equipment.

9. Do you have to use your personal tools and equipment in training teachers?

The respondent answered that he sometimes has to use his personal tools. This practice is unacceptable, because the MOE is supposed to provide decent training and education, as promised in the Namibian Constitution. It shows the apathy towards technical education. The question arises whether his personal tools will be replaced if they are stolen or broken.

10. Does the Ministry of Education (MOE) visit you regularly?

The respondent indicated that officials of the MOE do not visit him at all. The absence of MOE officials is unacceptable, because it means that there is no communication between the respondent and the MOE, which may be the reason why materials are late and equipment is outdated. This may result in poor quality training of technical teachers.

11. Do you have any links with the private sector?

The respondent indicated that no links exist with the private sector. He approached NIMT, but to no avail. This is very problematic because it means that the private sector has no say in the development of syllabi and does not contribute in any way to the training of teachers. It seems as if the channels and procedures to involve the private sector have not been put in place as yet, which contributes to poor quality training.

12. How many student teachers are you training currently [2005] in the technical education field of study?

There are six students in the programme. There is an intake of new students every second year. It means that too few teachers are trained, which may be one of the reasons why there is a shortage of technical teachers in Namibia.

13. Where do these students come from?

According to the respondent most students are from northern Namibia. Firstly, it means that they will most probably return to northern Namibia after graduation and will not teach in schools in the other regions. Secondly, the fact that in most of the northern regions no technical subjects are taught at school level means that these student teachers have no technical education background or perceptions and need to be trained in technological skills and know-how in a short time, adding to the poor quality of education.

14. Did all of them have technical education as a subject while they attended school?

The respondent indicated that students taking the technical education option usually studied a technical subject at school level, but most students have only basic technical skills. In real terms it means that the students' skills levels are not acceptable. The question must be raised whether they will be able to teach technical skills qualitatively.

15. At what level do the teachers teach technical subjects at schools, for example primary, junior secondary or senior secondary level?

The respondent stated that some teachers teach at junior secondary level, although most of the graduates teach at primary level, and not necessarily technical education. This indicates a waste of time and finances and points toward poor planning by the MOE regarding employment of teachers, despite the fact that there is a shortage of teachers.

16. Are you involved in the design of the syllabi regarding technical education to replace the current technical education syllabi with one generic syllabus?

The respondent answered affirmatively. It shows that the respondent is motivated to provide important inputs with regard to the development of technical education.

17. Would you be able to train teachers for the new generic syllabi according to the College syllabus that you are currently [2005] using?

The respondent stated clearly that it would be difficult to train teachers to teach the new generic syllabus because of the lack of information about it and unsuitable tools. The question must be raised how the MOE can expect teachers to teach the new syllabi if no teachers have yet been trained in the new approach to technical education.

18. Should technical teachers have practical skills?

The respondent answered in the affirmative, because teachers have to be skilled in order to teach skills. Despite the respondent's answer, the new generic syllabi will have less practical work requiring less practical and technical skills, which creates the impression that the demands of the people for practical work is negated by the MOE.

19. Do the teachers that graduate from the College teach technical subjects at school?

The respondent stated that some teachers choose to teach other subjects. This means that the efforts and expenses to train the teachers are fruitless and wasted. This may also point to the fact that the student teachers in technical education are not subjected to selection.

20. What are the problems you experience as a lecturer training technical teachers?

According to the respondent the students have very basic technical skills when they start the teachers' training programme and that they are not properly motivated to work hard.

21. Do you receive any support from schools?

According to the respondent the Pionier Boys' School supports the teachers training, in the sense of providing practical teaching opportunities. However, more technical schools should be required to get involved in teachers' training and not only one school.

22. Do you think that technical education in Namibia has a very high status?

The respondent replied negatively. The respondent reasons that the educational planners and policy makers of the MOE are not oriented towards technical education. From this it is clear that technical education has a low status in Namibia.

6.4.2.2 Interview questions put to members of school management at technical schools

The following two respondents were interviewed:

Mr P. Thom, Head of Department, School A; and
Mr Q. Green, Principal of School D.

1. What is the status of technical education in Namibia?

Both respondents replied that technical education has a low status and that the future of the technical education field of study is unsure. One respondent felt that technical education is too fragmented, because of technical schools and academic schools providing technical education. From the answers it is clear that technical education is not highly rated among Namibians.

2. Are the technical teachers in your school well trained in the technical subjects?

Both respondents felt that the technical teachers are well trained. The reason given was that all the teachers are qualified artisans in various trades, and most of them hold professional qualifications as well. One respondent indicated that two posts are vacant.

3. Do you think that children benefit from taking technical subjects?

Both respondents answered positively and explained that some learners are interested in technical and not academic careers. They also stated that children should be given the opportunity at school level to enrol in technical education programmes, because the training at VTCs are aimed at school-leavers and adult training. It means that opportunities should be created for younger children if they do not already exist, and it definitely means that existing technical education programmes should not be terminated.

4. Are the materials at your school sufficient to teach technical subjects?

Both respondents stated that the materials are insufficient for teaching technical subjects. The respondent from School A indicated that they had received materials from the MOE in 1993 and since then some materials for woodwork only. Both respondents indicated that the schools utilise a technical education fund from which materials, textbooks and tools are bought.

This may indicate that technical education is not a priority for the MOE. Technical education, as part of the Namibian education curriculum, should receive the same budgetary benefits as other subjects. Although the MOE expects technical schools to teach technical subjects, little material support is provided in order to teach technical subjects qualitatively.

5. What is the condition of the equipment in the technical workshops?

Both respondents made it clear that the equipment was installed when the schools were built and since then equipment has not been updated. For example, the equipment in one school is already 36 years old. They stated that the equipment is outdated, not serviceable any more and therefore not suitable for qualitative technical education at all.

6. Are there teachers who have to use personal equipment to teach the syllabus?

One respondent answered negatively, while the other respondent stated that in some subjects, such as welding, the learners use the teacher's equipment which is modern and allows the skills to be taught as prescribed in the welding syllabi.

7. Are the machines serviced regularly?

Both respondents stated that minor maintenance is done by the schools, but that major maintenance and servicing are arranged by the schools themselves at specialised firms, which have to be paid from the school development fund. This statement clearly shows that either the procedures to maintain equipment do not exist, or the correct procedures are not applied. The fact that technical schools have to budget and pay for major maintenance indicates the ignorance of the MOE regarding technical education.

8. Has the Ministry of Education informed you that technical education at school level is going to change? How do you feel about the new approach to technical education?

Both respondents indicated that they had heard about changes in the syllabi, but that they had not received any official information at that stage. This is an indication of poor communication between the schools and the MOE. It affects technical education negatively, because technical school principals cannot do proper long-term planning. The

MOE also neglects its responsibility towards the parents of learners who wish to enrol at technical schools, affecting their career choices negatively.

9. Are the teachers at your school involved in the design of the new technical education syllabi?

Only one respondent indicated that a technical teacher of his school is involved in the design of the new technical education syllabi. But both stated that their views regarding the new syllabi were ignored. Although the MOE allows participation in the new technical education programme, all technical schools should be directly involved in order to develop a new system which conforms to all stakeholders' needs.

10. Does the Ministry of Education communicate with you about changes in policy?

Both respondents stated that no communication was received about the new technical education policy, which means that the MOE does not communicate with schools in that regard. The question must be raised why technical schools are not informed, as it affects planning, budgeting, enrolment figures and the future existence of technical education.

11. Have any technical teachers at your school attended workshops in technical subjects recently?

Both respondents stated that recent workshops had not been held, the last workshop that a technical teacher could attend was presented in 2004. One respondent indicated that technical teachers are sent to workshops organised by industries in order to get information about the latest trends and developments in technology.

12. Do the technical teachers at the school get regular support from subject advisors?

The respondents answered negatively. No technical education subject advisor has visited the schools or supported technical teachers about technical subjects in any way in recent years. Both respondents pointed to the unavailability of the technical education subject advisors as well as their insufficient technical education background to act as subject advisors. This may be an important explanation for the demise of technical education.

13. Have you introduced extra technical courses in your school recently?

Both respondents answered negatively, although one respondent stated that the learners are also provided opportunities to enrol unofficially in the now defunct National Technical Certificate (NTC 1-NTC 3) programme, because the private sector values the course highly.

14. If "yes", what is the attitude of the Ministry of Education in this regard?

The respondent stated that the MOE was not consulted because of the fact that the extra technical course is taught separately and in addition to the MOE curriculum. It was implemented because of its high standards in trade theory and to meet local demands because Namibian employers have been familiar with the NTC courses for many decades.

15. Does the community want technical education at school level?

Both respondents made it very clear that technical education is in high demand, because it teaches employable skills and values, especially the practical component of technical education. It therefore raises the question why the MOE wants to sacrifice the practical component in the new generic technical education syllabi.

16. Does the Ministry of Education organise links with the private sector for schools?

The respondents stated that there is no official MOE programme for technical schools to link with the private sector. The schools organise links with the private sector themselves. One respondent indicated that some VTCs do not even know of the existence of technical schools, which is an indication of the level of ignorance about technical education.

17. Is there an organised programme at your school according to which you form links with the private sector?

Both respondents indicated that an official programme according to a set timetable does not exist, but that individual teachers have formed links with industries. However, it seems as if the idea of official job-attachment according to a school timetable does not exist in Namibia. The MOE could have promoted the concept of the involvement in industries officially, as much needed expertise and finances could be provided.

18. Are there any learners at your school who are attached to private enterprises?

One respondent indicated that learners are taken on field trips and sometimes given the opportunity to get work experience in a technical job environment during weekends and school holidays.

19. Do you think that technical education officials such as school principals and technical education planners should have a technical background?

Both respondents emphasised that technical education officials should have technical education training. Without proper technical education background these officials do not have the passion and understanding for the unique challenges facing technical education.

20. What are the major challenges to technical education in Namibia?

Both respondents highlighted the following challenges:

a) Shortage of finances
b) Shortage of technical teachers
c) Relevant syllabi that address unemployment among school-leavers
d) The unfounded and unfavourable comparison that the MOE makes between technical education and academic education in order to promote generic technical education syllabi which are less practically oriented.

6.4.2.3 Interview questions put to an Education Officer at the National Institute for Educational Development (NIED)

The following questions were put to Mr L. Moller :

1. What is your responsibility as Education Officer at NIED?

The respondent indicated that he is responsible for the development of technical education syllabi from Grade 5 to Grade 12, and that he is the convenor of the Technical

Education Curriculum Panel at NIED. He is also part of the working group responsible for the design of the new syllabi for technical subjects.

2. How do you see the role of NIED in technical education?

According to the respondent NIED is responsible for the development of all technical education syllabi at school level, as well as for presenting training workshops for teachers. However, no recent workshops have taken place because of a lack of funds.

3. Do you think that Namibian learners can benefit from taking a technical subject?

The respondent opined that the current technical education makes it difficult for learners to get any benefit, as the technical subjects are not accredited by the VTCs, while the new technical education syllabi will be accredited and therefore may provide more benefits. The researcher finds it difficult to understand why the Namibian academic subjects of the Cambridge system receive accreditation, but not the technical subjects. If the Namibian Cambridge system was judged and approved by UCLES as meeting satisfactory international standards, why don't the VTCs accept the standard of technical subjects? This is an indication of the inconsistency regarding value and understanding that most MOE education planners have towards technical education.

4. Do you think that technical education has a high status in Namibia?

The respondent stated that technical education has a low status. It proves that the value of technical education is underestimated by the MOE and that nothing is done to address it.

5. If answered "no", how can technical education be promoted amongst Namibians?

The respondent stated that technical education should be accredited at the NQA in order to have a better status. But now the question arises why technical education was accepted and accredited by training institutions before independence, but lost its accreditation after independence. The researcher opines and agrees with the respondents that the education planners have not had the technical education insight to put structures in place since independence.

6. Do you think that the new generic technical subjects which are in the process of development will answer better to society's needs than the current syllabi?

The respondent stated that the new technical education syllabi will require fewer skills and materials with the result that it will cost less. Apparently the rationale is that the MOE could budget less money for practical work, as it will be more cost-effective.

7. What is the rationale behind changing the current technical education subjects?

The respondent replied that the new syllabi will be less equipment-intensive. Existing equipment will be utilised, but new equipment and tools will have to be acquired as well.

8. Is the private sector, e.g. industries, involved in the design of the new subjects?

The respondent stated that the private sector is not involved. This shows that the subject content will not be demand-driven and relevant to the needs of industries. The question arises why a new technical education syllabus should be developed if it is not according to the needs of the private sector. In reality it means that school-leavers may struggle to get employment or receive accreditation as the technical education content of the new syllabi will not meet the demands of the private sector.

9. Was there a market research survey amongst enterprises and industries before the design of the new syllabus commenced?

The respondent answered negatively. The researcher opines that without market research the needs of the community will not be established and that the process of designing new syllabi will be a waste of effort, money and time as it will not meet the demands of the Namibian society.

10. When will the new generic technical subjects be implemented?

The respondent stated that the due date for implementation is January 2007, and that the syllabi will be implemented over several years at various levels.

11. What will the new generic technical subjects be called?

According to the statement it will be called design and technology. This approach seems to be in line with international trends.

12. Will the current technical teachers in the schools be able to teach the new generic subject without retraining or in-service training?

The respondent stated that current teachers will have to be retrained and that new teachers will have to be trained according to the new design and technology, especially the teachers teaching the senior secondary phase who will require specialised knowledge.

13. Do you think that new technical teachers will have to be trained differently from the current training approach in order to teach this subject?

The respondent answered affirmatively. He stated that current teachers teaching the design and communication (technical drawing) option will not need retraining, as the new syllabus will be almost the same as the current syllabus. However, teachers will have to be trained from scratch to teach the other two options, which are still to be finalised.

14. At which institution of higher learning should technical teachers be trained?

The respondent stated that training should be done at the Polytechnic and UNAM. The researcher opines that a teacher-training programme cannot be designed before the school syllabi have officially been approved. The implementation of the new syllabi should therefore be done gradually over several years, starting at the lower grades, in order to provide sufficient time for the design and implementation of teacher training.

15. Will the new technical subjects require different textbooks than the books that are currently [2005] used?

The respondent stated that different textbooks will be required. He added that the members of the working group responsible for developing the design and technology syllabi are in the process of identifying and writing textbooks and study materials. The question that arises is whether the development of new textbooks will not be too expensive, especially seen in the light of the relative small number of learners who will take the subject.

16. Why are so few schools in Namibia offering technical education?

The respondent admitted that the number of schools offering technical schools is small, but described the situation as a remnant from the South African educational dispensation. He specifically mentioned the absence of technical schools in the eastern and southern parts of Namibia, where no technical schools exist. The researcher opines that the fact that no technical schools have been established after 16 years of independence can be attributed to the misconception among Namibians regarding the value of technical education.

17. How can technical schools link with private institutions?

The respondent stated that private institutions can assist with practical training and some kind of job-attachment, although current procedures and logistics do not make it viable. This information shows that the concept of a formal job-attachment programme is still unknown in Namibia and should be made known to industries to make it possible.

18. Do you think that technical education will benefit from the unification of the previous two education ministries?

The respondent answered affirmatively and stated that the much-needed cooperation between the education and training sectors will be able to take place.

19. Do you think technical schools will continue to exist in Namibia?

The respondent opined that technical schools will continue to exist and that there is a possibility that the number of technical schools will increase, because of a more cost-effective approach. However, the researcher differs from this viewpoint, as the philosophy behind the new design and technology syllabi is to increase accessibility to it by offering it in academic schools. This may cause the demise of technical schools and fragment the teaching of design and technology, one of the arguments against the current [2006] system where technical subjects are taught in several academic schools.

20. What are the main challenges facing technical education in Namibia today?

The respondent highlighted the shortage of funds, outdated and non-availability of equipment and materials, and the unavailability of relevant textbooks. From the response it is clear that the challenges have not appeared overnight, but have accumulated over many years without being addressed properly, resulting in poor quality technical education. It points to a lack of interest in and neglect of technical education by education authorities.

21. How can unemployed Grade 10 school-leavers be trained?

The respondent stated that they can be trained at the VTCs and the Namibian College for Open Learning (NAMCOL). However, the current policy at the VTCs is to give precedence to Grade 12 school-leavers for training, leaving Grade 10 school-leavers without study options. Secondly, NAMCOL offers only correspondence courses to school-leavers. It is difficult to teach hands-on technology practically by means of a part-time correspondence course, leaving Grade 10 school leavers without training options.

22. Does it mean that more schools need to be equipped to do practical work?

The respondent said that the new design and technology syllabi will be taught in practical laboratories, which will have to be built and equipped at the schools. According to him it will cost approximately N$120 000 to equip each laboratory. The researcher opines that if money is not available to equip existing technical education workshops and service and update tools and machines, money will not be available to establish new practical laboratories at schools in all educational regions and maintain the equipment either.

23. When will the syllabi be implemented, because it means that teachers will have to be trained as soon as possible?

The respondent stated that the syllabi are still in the process of development and approval by the various MOE committees, but the final syllabi will be released soon.

6.5.2.4 Questions put to a previous principal of a Namibian school

The following questions were put to Ms T. de Swart, previous principal of a secondary school in Windhoek:

1. *What was the standard of technical education before independence compared to after independence?*

The respondent replied that the standard of technical education was higher before independence than after independence. Before independence materials were supplied on time, equipment and tools were serviced regularly and proper practical work could be done. However, after independence the system of ordering and providing equipment and other services failed, for example, it became difficult to get quality wood. Broken equipment was not replaced and it was expected of parents to donate materials and funds to subsidise technical education. The extent of practical work was downscaled, which in time curbed the application of skills and knowledge in making practical models.

2. *What were the reasons for scaling down technical education at the school?*

The respondent stated that MOE policies prescribe a minimum of 15 learners per class to make education financially viable, while the Labour Act prescribes a practical class of no more than 15 learners. This eventually resulted in technical education classes to be closed down as interest in technical subjects dwindled due to the low status thereof. Another reason mentioned by the respondent was the continuous struggle to get hold of properly trained teachers in the subjects, specifically woodwork and technical drawing.

3. *Did the technical teachers receive any support from advisory teachers?*

The respondent answered that subject advisors visited the school regularly, but after independence visits by subject advisors became irregular, eventually only once a year when the practical work of Grade 12 learners was moderated.

4. *Did the technical teachers attend any workshops or in-service training to familiarise themselves with aspects regarding technical education such as changes in syllabi?*

The respondent stated that during her years as a principal, no workshops or training opportunities for technical teachers were organised by the MOE.

5. *Do you think that technical education is an important subject area that should be taught at school level?*

The respondent answered affirmatively. She claimed that not all learners are academically oriented and that the training of employable technical skills can ensure employment after leaving school, unlike academic education.

6. *What type of learner usually chose technical subjects?*

The respondent opined that the learners who struggled in academic subjects were usually advised to take technical subjects, except for taking technical drawing, which requires higher thinking skills. She added that the perception that learners who struggle with academic subjects should be tracked into technical education could have contributed to the low status of technical education. In many cases these "struggling" learners do no fare well in technical education either because of the difficulty levels of technological know-how and skills, contributing further to the poor status of technical education.

7. *Do you think that technical education is a viable and sustainable option at private schools?*

As the co-manager of a private school in Windhoek, the respondent stated that it will be expensive for private schools to offer technical subjects, because of the small number of learners that attend private schools and the absence of government subsidies.

6.5.3 Critical synthesis of interviews

The results of the study suggest that technical schools operate to a great extent in isolation of the Ministry of Education and that the views of consumers (learners, parents, teachers and employers) are largely ignored. From the interviews it is clear that most Namibians have a high regard for academic education and a low esteem for technical education. Many people have credited academic subjects with a superior status to the practical ones. It also became evident that there is a lack of a technological culture amongst Namibians, especially among the MOE officials who perceive technical education at school level as too costly to provide and maintain. Another factor that inhibits the status and development of technical education is the absence of a maintenance culture which impedes the infrastructure, resulting in difficulties to teach the technical subjects' syllabi qualitatively. The respondents agree that the current format of technical education has to be reformed as the subject area does not come to its right as supposed to be.

CONCLUSION

In this chapter the researcher provides an overview of the research design, explains the research methodology used for the study and gives a brief description of each method. The preparation of the research instruments, administration of the questionnaire and interviews are presented. The research data collected from the questionnaires and interviews is also presented and analysed.

The research data shows overwhelming proof of neglect of technical education in Namibia. The vast majority of participants in the research indicated that technical education in Namibia is poorly planned, managed and administered. During the past few years the Namibian educational authorities placed and conducted technical education on the same level as academic education, a policy that allowed the status and standards of technical education to degrade. The research results clearly show that Namibia's technical education system forces its learners and teachers away from many of the real work experiences and activities, while supposedly preparing them to be part of it, thereby contradicting itself.

Chapter seven offers a summary and findings of this chapter about the national and international manifestation of technical education as discussed in previous chapters. It also includes recommendations, based on the summary and findings, which should be considered in the designing of a new model for technical education in Namibia.

CHAPTER 7

SUMMARY, FINDINGS AND RECOMMENDATIONS

7.1 INTRODUCTION

This chapter summarises the development, provision and characteristics of technical education as found in the previous chapters. The major findings that apply to this study are indicated and recommendations are made in order to improve the design and implementation of technical education in future.

7.3 TECHNICAL EDUCATION BEFORE INDEPENDENCE

7.2.1 Summary and findings

The missionaries pioneered formal technical education in Namibia. They introduced modern tools, equipment and construction techniques to the people and taught them suitable skills to use to their own benefit. The white settlers who came to Namibia modified the internal dynamics of the pre-colonial society and converted a subsistence economy into a capitalistic economy. They demanded a different, specialised type of education that could serve the needs of white communities, although black communities also benefited from it. The “Scramble for Africa”, which overshadowed European politics during the late 19th century, and the consequent colonialism directly determined the character of education, therefore also technical education, in Namibia.

Education developed much under the security of the German colonial administration. Rudimentary technical education was aimed at training Namibians to manufacture and maintain the colonialists’ cultural products. In the process acculturation took place and many Namibians benefited skillswise from technical education. However, the German colonial administration did not succeed in developing an education system that developed all people equally and technical education did not develop progressively.

The South African administration inherited the weaknesses of the German colonial administration and specifically those of education. They not only inherited the complexity of the problems of ethnic and racial division which affected societal development negatively, but also continued to divide and rule Namibians along racial lines. On the one hand numerous advantages at educational level were evident, such as the provision of technical education and programmes that ensured entrée to national and international institutions of higher learning. On the other hand the political system caused unequal and inequitable provision of education services and resources, resulting in education becoming inaccessible to many Namibians. Technical subjects were developed, but it did not always keep up with the economic growth and needs of the Namibians as such. It favoured certain ethnic groups and limited opportunities of other ethnic groups. It did not always meet the economical challenges and realities that Namibia faced.

The educational disparities were reflected in a lack of technical education facilities in most schools, poor teaching quality, irrelevancy of syllabi and different budget allocations to different ethnic groups. Large numbers of children from deprived communities were left out, and those who managed to get access to technical education were left behind and struggled to compete in the economy. The successive colonial administrations prevented the majority of the population from receiving quality and relevant technical education that would enable them to compete in the labour market. Attitudes of people towards technical education in general were negative and it was considered either for training people to serve the white masters, or a type of education for learners who struggled at school. These perspectives were not rectified and contributed towards slow development in technical education. The implementation of Bantu education and its lower quality programmes frustrated many Namibians who struggled to compete economically with the white, coloured and baster communities. This resulted in many Namibians leaving their country to look for a better education.

In theory and practice two education systems for Namibia came into being in the late 20th century. Neither system provided appropriate technical education programmes because it was not designed according to Namibia's needs. Both systems had many subdivisions and programmes, resulting in Namibians being scattered all over the world in search of better education. Both systems excluded the majority of Namibians regarding input in the planning thereof and both systems were enforced on Namibians.

The technical education system that was created by SWAPO outside the Namibian borders was very elementary and was not developed according to the needs of the Namibian society. It was rather developed around a future independent Namibia and based on cultural, political and economic structures and principles that still had to be developed. Technical education within the Namibian borders was unequal and based on the needs of the South African society. Despite that the standard of technical education was high. Education, specifically technical education, developed progressively and the policies, infrastructure and programmes were of a good standard, equal to that of South Africa and recognised all over the world because of its quality, despite old equipment and shortages of materials in the late 1980s. The two education systems that existed in the late 1980s were both planned outside Namibia's borders but allowed only small inputs from Namibians at grass-roots level. It was based on politics and foreign technical education principles and practices, and did not serve the personal and economic growth of Namibians as it should have.

7.2.2 Recommendations

From the summary and findings the following recommendations can be made:

- Technical education should be relevant to the demands of the Namibian society.
- The design and implementation of technical education programmes should be initiated and managed by Namibians who are knowledgeable about local realities.
- Technical education policies should be based on educational and economic criteria and must not be determined by politics as had been the case for decades.
- The technical education curriculum and syllabi should reflect Namibian realities.

7.3 TECHNICAL EDUCATION AFTER INDEPENDENCE

7.3.1 Summary and findings

Since independence a major education policy of the Namibian government has been to consider education as a basic human right and consequently to provide education for all. This policy has led to unprecedented quantitative educational expansion, except for technical education which stagnated due to a lack of interest and uncoordinated planning. While access to academic subjects and schools was promised and successfully taken care of, access to technical education was limited despite promises to improve the situation. While academic schools flourished and increased in numbers, technical schools had to suffer and even close down workshops as a result of lack of funds, materials, equipment and professionally trained teachers. The result is that technical education has not progressed in Namibian schools since currently virtually no technology is taught in the school system. Failure to implement appropriate technical education policies and structures successfully has been blamed on a number of factors including lack of facilities and equipment, insufficient funds, poor management and lack of organisational and technical support. A worrying aspect is that government is always arguing that resources are limited and that spending needs to be curbed at all levels of technical education, although ineffective policies and inappropriate structures continue to exist. In addition, there is an acute shortage of qualified technical teachers, and only one institute of higher learning that offers technical training. No serious effort has been made to link the rate of job creation with the turnover of school-leavers. Many school-leavers are therefore unemployable and unemployed because they lack the requisite technical skills that are needed for both formal and non-formal employment.

Namibia has an enormous problem in that there is almost no political call for technical education at school level. There is almost nobody who lobbies for technical subjects except those who are responsible for teaching these subjects. There is also little public awareness of the importance of teaching technology at school level. Educational policy in Namibia since independence has represented something of a double-edged sword. An educated population is an acknowledged prerequisite for national development, at the macrolevel to cope and adapt to change, and on a microlevel to provide the human capital necessary to successfully integrate technology transfer, to manage, operate and maintain new technologies and methods of production. Education also implies empowerment, employment and socio-economic status. An educated person has the capability to make reasoned judgments and to question the actions of those in authority, while their intrinsic and extrinsic expectations are heightened. Also, while it seems that politicians, businessmen, educators and industrialists all agree about the importance of technical education, little progress is made at grass-roots level to change the situation for the better.

In fact, where the South African education system was accused of providing relevant and high standards of technical education to a small minority only, the current [2006] Namibian education system can be accused of not providing relevant and quality technical education at all, not even to a small minority of learners.

The MOE, through its expansion policies, has broadened the provision of education significantly and must be praised for doing that. However, today's schools were designed to create good citizens in a democratic era dominated by physical capabilities and by bureaucratic, command-and-control organisations. The unfortunate result is that schools are now educating and preparing young people for a workplace that does not exist, a practice that society should vigorously question so that new forms of work and organisation can more easily evolve. Two and a half decades of transforming the economy and education have produced large numbers of unemployed school-leavers with higher education levels than ever before. In this regard Gawaxab (2005: 15) comes to the conclusion that "there would seem to be an admission that the current education system has failed and did not deliver the desired results". The expansion of the school system exceeded by far the ability of the economy to create jobs. Circumstances and situations change both nationally and globally and the need to review the Broad Curriculum and subsequent technical education syllabi to be more responsive to the needs of Namibia remains very important (NIED, 2002: 1).

The MOE policy of removing technical education from formal general education would once again only raise the educational level of the school-leaver but will not lead to employment, because expansion of the school system will still exceed the ability of the economy to create jobs. Perhaps the advocates of removing technical education from the basic education system and the proponents of comprehensive technical education at school level should have an open dialogue. Such a dialogue seems to have been missing in the past. Filling the vacuum in the skills development for thousands of young Namibians in rural areas by providing theoretical, practical and on-the-job training has become overdue. Development is driven primarily by production and job creation, and this means that education, and specifically technical education and training, must be aligned to the requirements of the economy. If Namibia is to compete successfully in the new global economy, science and technology must flourish. Namibia should strive to become a regional hub of innovation, underpinned by a robust scientific and technological culture which should start at school level.

7.3.2 Recommendations

From the summary and findings, the following recommendations are made:

- The MOE should reconsider the academically generic technical education model that is to be implemented in 2008 and rather consider a balanced technical education model which is founded on technical skills and knowledge.
- The MOE should reconsider the closing down of technical schools. Technical subjects at academic schools should be shifted to technical schools and the number of technical schools should be reduced in order to streamline the administration of technical education.
- Technical education should fall under the jurisdiction of a separate MOE department so that technical education experts are allowed to plan, budget and administer technical education properly.
- A market survey should be done before technical education syllabi are designed in order to establish the demands and requirements of stakeholders.
- Links should be established with all stakeholders in order to design a relevant technical education system and to get support from the private sector.
- The training of technical teachers should be a priority.

7.5 INTERNATIONAL PERSPECTIVES ON TECHNICAL EDUCATION

7.5.1 Summary and findings

Literature reveals that the First World countries, which are mainly the industrialised countries, are critical of their technical education systems in terms of efficiency and effectiveness. It seems as if the modern school must be oriented towards life in an industrialised, technological society and should therefore be pragmatic in its approach. There should be a strong emphasis on mathematics, natural science and technical education. As a result of the changes that have taken place in global economics, industry, government and society in the last decade, education must move to design programmes that reflect these changes and their implications for the future. This means that education has to typify the current technological culture, skills and values.

Technical education moves towards the teaching of broad skills, covering generic knowledge and skills. The rationale behind this is that learners may change jobs several times in their lifetime and they need to be multiskilled. However, many modern technical education systems show strong links with enterprises such as industry and businesses to make provision for specialist training at these institutions. There are many benefits to these partnerships, but the crux of the matter is that school-leavers must have employable skills that are needed by the industries and businesses.

In Namibia the situation is different from that in developed and other developing countries. The high unemployment rate and the high HIV/Aids prevalence figure, change the training and employment situation. There are indications that the quality of and access to education are negatively affected by the HIV/Aids pandemic (MBESC, 2004: xiv). This, together with the lack of technically skilled people, results in a dependency on expatriates, which contributes further to the unemployment figure. It makes one wonder whether the training of technical self-employment skills would not be the answer to Namibia's needs.

7.4.2 Recommendations

The following recommendations are suggested, based on the summary and findings:

- Technical education should be rationalised in order for the technical subjects to become generic in character, to be cost-effective and to provide multiskilled education, without compromising the skills component which characterises technical education. A balance should be kept between theory and practical work.
- Technical education should embrace school-to-work principles, which means that technical schools should plan and administer job-attachments deliberately.

- Links should be established with the private sector to ensure continuity of the technical skills between schools and industries and to get moral and material support.

7.5 THE GERMAN EDUCATION PERSPECTIVES: IMPLICATIONS FOR NAMIBIA

7.5.1 Summary and findings

Germany forms one of the pillars of the European Union and plays a crucial role in determining current and future educational policies in Europe. It has taken up its responsibility in establishing a strong European economy and recognised the role of educational cooperation in this regard. The results are, firstly, several European and African countries' education systems show strong resemblance to that of Germany, and secondly, Germany influences current thinking about technical education and vocational training not only in Europe, but worldwide.

There is much to learn from the vibrant German education system. It reflects a pragmatic, relevant and skills-based approach to the education of its people, which is consistent with high technology levels. The dual vocational training has proven to be beneficial to both young persons and employers in Germany. Youth unemployment rates in Germany are low compared to other European countries. In addition, non-college bound learners are provided with viable career options which have kept drop-out rates to a minimum. It also seems logical that schools and industry should develop a stronger mutual basis for the development of dual training programmes. While industry provides the bulk of practical training, schools could play a major role in delivering the underlying theoretical structures related to specific skills.

7.5.2 Recommendations

The success of the German education system is based on the active involvement of stakeholders who realise the value of technical education. They are the state, the private sector, citizens and regional participants. Namibia could benefit from knowledge of the German example, especially with regard to the mentioned stakeholders.

7.5.2.1 The Namibian state

The Namibian government and statutory institutions must realise that they are the custodians of technical education and should establish a user-friendly and effective technical education system that provides multiple paths to educational success. The Namibian state should therefore consider the following aspects from their German counterparts with regard to technical education:

- Address the low status of technical education. The status and value of technical education at school level and vocational training at post-school level must be improved continuously.
- Provide relevant curricula and syllabi. The state must become more responsive to personal, industrial and economic needs and develop and implement technical education programmes as these needs occur.
- Provide well-equipped and maintained technical education classrooms and workshops that reflect the personal needs and requirements of industry.
- Initiate teacher-training programmes that are based on the latest international pedagogy and methodology with regard to technical education, at certificate, diploma and degree levels.
- Create regional and international cooperation across national borders and cultures with regard to qualitative technical education programmes.
- Develop an accreditation system that ensures upward mobility of Namibians that does not only satisfy Namibian accreditation needs, but also takes notice of regional accreditation systems.
- Provide market-related remuneration packages for technical and other teachers.
- Involve the private sector more with regard to developing subject content, providing physical support and job creation.
- Encourage the growth of the private sector, as they have to support the state with regard to skills training and providing jobs.
- Encourage the involvement of the private sector by means of tax benefits.
- Downscale its role as educational initiator and educate Namibians about the importance of the private sector with regard to educational initiatives based on a capitalistic economy in a democracy.

7.5.2.3 The Namibian private sector

The private sector in Germany plays a vital role in providing educational directives and job opportunities, something that is lacking in Namibia to a great extent. Namibians should therefore implement the following aspects that are obvious in Germany:

- Support the establishment and growth of private industries and businesses.
- Encourage stakeholders to support the state with regard to advice, guidance and quality control measures to ensure appropriate and relevant technical education.
- Support technical schools regarding expertise, finance, equipment and materials.
- Support the School-to-Work approach as well as in-service training of learners and students by making apprenticeships available.
- Serve on the administrative and subject committee coordinative bodies to ensure technical education programmes that are relevant and qualitative.

7.5.2.3 Namibian citizens

There should be a mind shift amongst Namibians with regard to technical education. The success of the pragmatic German education system is obvious when the low unemployment figure and strong economy are considered. Namibians should therefore employ the following guidelines, which are apparent in Germany:

- Education structures which provide multiple paths to technical education.
- Active stakeholder involvement in schools through coordinative structures.
- Becoming more critical of state education policies that neglect skill-based education in favour of knowledge-based and irrelevant education.
- Demanding technical education and training that provide skills and knowledge for various types of employment.

7.5.2.4 Regional educational participants

Namibia must take note of the benefits of regional cooperation, especially with regard to:

- Influencing perspectives, sharing knowledge and gaining expertise regarding technical education.
- Becoming knowledgeable about recent international technical education trends.

- Identifying challenges and solutions to develop appropriate technical education models, curricula and syllabi.
- Participating in educational symposiums and conferences about technical education in the SADC region.
- Reforming technical education to conform to SADC educational initiatives.

7.5.2.6 The dual system

The successes of the dual system in Germany, where the private sector prepares learners of secondary school age for employment, are widely known (see 4.5.3 and 5.7). It exemplifies the adaptation of a traditional apprenticeship and technical education system to the requirements of a contemporary economy. The absence of Namibian industries and the unwillingness of enterprises to provide training as a long-term investment in human resource management, limit learners in developing essential technical, practical and entrepreneurial skills. Namibians should be open to different forms of employer involvement, because a single model for employers to follow will not be open to all Namibians due to the various training levels. The state should promote and establish the following principles amongst Namibians:

- More emphasis must be placed on quality educational programmes at school and tertiary levels, specifically regarding technical education, science and mathematics and the underlying personal values and morals.
- The link between these subjects as well as with industries should be clearly established and subject content should be developed, not only for the average learner, but also for the very able learners and learners with special needs, groups that are currently marginalised.

7.6 EMPIRICAL RESEARCH RESULTS

7.6.1 Summary and findings

The responses from the questionnaires and interviews clearly show that technical education is facing a crisis in Namibia. The Namibian education authorities and society do not realise the utility value of technical education, especially the eradication of unemployment and poverty through the teaching of employable practical skills and problem-solving skills. Many school leavers are unemployed because of improper knowledge and skills that are taught. Since independence the technical field of study at school level has been allowed to slump to its lowest levels of popularity among learners and teachers due to poor administration, management and career guidance opportunities by non-technical minded educationists. The education authorities use the high expenses as an argument against technical education, but actually it is not properly planned, structured and managed in a cost-effective manner.

The data shows that the Namibian education authorities consider technical education as a burden that needs to be eradicated from the school system in order to save money and effort. For example, most learners have to learn technology and skills without appropriate textbooks and tools. Technical teachers have to teach technical subjects mostly without relevant materials, equipment and tools and subject advice. Several school principals want to close down their schools' technical workshops due to the unavailablity of teachers, tools and materials. The information also shows that no official school-to-work policy exists, although some schools arrange such activities on their own.

The information indicates that qualified technical teachers are becoming a scarcity in Namibia due to retirement and the lure of the private sector, which is further strengthened by the lack of appropriate training opportunities for teachers. Principals, teachers, officials, parents and learners are kept in the dark about the new technical education approach, which affects short-term and long-term planning processes negatively at the schools and other educational institutions. This policy of neglect is illogical and incomprehensible in the new millennium where technical skills are viewed as paramount in the development of a country, especially a developing country such as Namibia.

7.6.2 Recommendations

Based on the empirical research results, the following recommendations can be made:

- Technical education should be promoted by and valued at all levels of society.
- Technical education should comply with recognised educational principles first of all, but should also be demand-driven and allow participation of stakeholders.

- Technical education should add to learners' skills, ethics and employability.
- Technical education must be taught in technical schools by well-trained and informed teachers according to national demands and international tendencies.
- Technical education should be managed separately from other subjects by well-trained and knowledgeable technical education personnel.
- Different exit and entrée-points should be provided to learners taking technical education in order to improve employment and training opportunities.
- Appropriate and adequate equipment should be supplied and maintained, and sufficient materials should be provided to teach technical subjects qualitatively.
- A different and innovative approach to past and current approaches regarding planning, administering, financing and teaching of technical education is needed.

7.7 CONCLUSION

I am convinced that the new approach of the MOE to the teaching of technical subjects will contribute further to unemployment. The only way to curb this would be to return to the teaching of technical practical skills, because this is the only effective way in which people can obtain employable skills and become self-employed in a country with limited job opportunities. A new technical education system has to be developed that is cost-effective, streamlined and involves the private sector. This study therefore provides a window of opportunity to establish a new, relevant and well-structured technical education system in Namibia. The next chapter discusses the new model of technical education based on the information and research results in the aforementioned chapters.

CHAPTER 8

FRAMEWORK AND STRUCTURE OF THE PROPOSED TECHNOLOGICAL EDUCATION MODEL FOR NAMIBIA

8.1 INTRODUCTION

This chapter deals with the general framework and broad outlines of a strategy and structure for the new proposed model of technological education in Namibia at basic education level. The deficiencies and blemishes of technical education in Namibia accruing from the literature review and research results indicate that the following issues need to be addressed seriously in a new technological education model in order to normalise technical education in Namibia:

- The term “technical education” is too narrow in its meaning and should change to “technological education” which is more expansive and significant and marks an attempt to break out of the low status of technical education.
- Technological education should be taught in specialised technical schools.
- In order to restore technological education to and establish it in its rightful place among other school subjects, the status of technology and technical schools needs to be uplifted.
- Technological education should be planned and conducted by knowledgeable people who have experience in the practising and teaching of technology.
- Syllabi are only relevant if all stakeholders are considered, and a scientific market survey should be undertaken to establish technological needs of societies and enterprises.
- Technological teachers should be trained as a matter of urgency.
- Technological education should be linked to real life experiences and work situations.
- Technological education can only be relevant and effective in Namibia if modern tools and equipment are provided and maintained.
- Technological education is a vital prerequisite to nation building but only if it is professionally planned, managed and administered.

Why should technological education be different today from what it was 16 years ago when Namibia became independent? The answer is simple. Today's workplace and economic realities are quite different. Secondary school technological education must have a changed strategy if the goal is to help learners become productive employees (Bottoms and Phillips, 1998: 27). It is being realised that such a strategy should be based on the changing Namibia with its many demands and the need for a relevant technological education system to meet these demands. The Namibian society demands at least intermediate technology levels at school level that require the teaching of appropriate technical skills and knowledge (see Table 4.1). There are two complementary issues. Firstly, in periods of economic change, what balance needs to be struck between alternative forms of schooling, namely technical schools as opposed to general, academic schools, at secondary level. In this regard the Presidential Commission (Presidential Commission Report, 1999: 169) recommends that

> [a] clear track should be developed for persons pursuing technical education as a viable option and not as a default choice.

Secondly, and this represents the other side of the coin, what forms of skill preparation serve the individuals and the economy best, particularly in facilitating personal development, employment and industrial awareness. In this respect, the Presidential Commission (Presidential Commission Report, 1999: 57) recommends

> ...the pre-vocational and vocational subjects at secondary schools should be rationalised and made more generic in nature.

Both abovementioned recommendations are adhered to in the proposed technological education model in a sensitive way in order to strike a balance between the issues at hand. In this regard Blakemore and Cooksey (1982: 200, 213) cite the work of Zymelman who linked productivity to skill training and not necessarily to the level of formal education. Zymelman also found that on-the-job training, apprenticeship and in-service courses were the best ways of improving the skills and productivity of the workforce even further. He felt that academic education adopted from models of developed countries must be abandoned. Instead, one option is for schools to relate education to practical work. On reviewing the issue regarding the role of the school and the enterprise in technological education in Chapter four, alternatives were mentioned: the school solution with its variations, the enterprise solution, the dual system solution, and the integrated solution (see 4.5.1). In this regard Watson et al. (2003: vii) argue that success in developing technology capacity was the greatest when it was linked to an explicit integrated national science and technological strategy. The proposed model is therefore based on a special variation of the integrated solution that includes some elements of the dualistic approach which is a unified system from the point of view of policy making.

8.2 CHARACTERISTICS OF THE PROPOSED TECHNOLOGICAL EDUCATION MODEL

In the proposed model, Namibia's technological education programme will form part of the current structure as explained in Diagram 3.1. However, it is to be re-engineered into formal and informal networks in which skills learning is linked to meaningful situations and environments. The current technical education practices are to be replaced by a vibrant and relevant model that initiates a totally different mind shift towards technological education in Namibia. The model is based on the combination of the best of technological and academic education, a model that draws on the pedagogical and structural approaches found in School-to-Work programmes. This will provide technological education that is more responsive to local demand for skills and employment, specifically self-employment.

8.2.1 Vision statement of technological education

The new model requires technological education to be demand-driven, characterised by relevant skills and knowledge, performance measures, expected outcomes and occupational information. Namibia will have the most relevant technological education programme in Africa based on the most user-friendly public-private system for stakeholders (learners, teachers, students and employers) to access the resources they need for the teaching, learning and application of technological skills and knowledge. The new model recognises that economic vitality is dependent on the ability of technological education to provide an educational experience based on labour market information relating to the needs of citizenship, business, industry and the private sector.

Technological education will be provided in main centres in a seamless environment, using both school-based and work-based teaching and learning. Technological education will be developed collaboratively with business, industry and other curricular areas such as mathematics and natural science. Learners are to be educated according to the latest methods of instruction and learning materials while using up-to-date technology and equipment. Quality, accessibility, responsiveness and commitment to continuous improvement are to be the trademarks of the new technological education model.

8.2.2 Mission statement of technological education

The mission of the proposed technological education structure and policies is to teach qualitative personal and occupational theoretical and practical skills that will provide access to job opportunities and lifelong learning prospects to young Namibians.

8.2.3 Overall goal of technological education

Van Schalkwyk (1988: 163) asserts that the goal of education is not to educate as such. The goal should be qualified, namely that education should be aimed at providing skills and knowledge to individuals to use significantly in a job environment. Therefore the goal of the proposed model is to prepare Namibians for qualitative lives, employment and further education in a relevant learning system which is easy to enter, exit and re-enter.

8.2.4 Objectives of technological education

The model envisages that Namibia will have a relevant technological education programme that will:

- continuously develop the technological education system to stay relevant;
- provide sufficient resources for technological education;
- prepare learners for further education and careers through an appropriate School-to-Work programme; and

- prepare learners for employment, either self-employment or at an enterprise, with the necessary academic and practical skills in the context of economic indicators and career objectives.

8.2.5 Priorities of technological education

While discussing the challenges and values of technical education in Namibia in Chapter three, it was stated that technical education was neglected due to a lack of priorities. The new model therefore embraces the following priorities that will alter the course of technological education in Namibia:

Priority 1

Improve the status and popularity of technological education among all stakeholders on a par with mathematics and science.

Priority 2

Assure access to and opportunity for everyone who is interested and talented to succeed in technological education, training and employment.

Priority 3

Increase the levels of technological skills of Namibia's current and future workforce.

Priority 4

Evaluate and accredit all technological education programmes continuously to ensure that the standards are internationally acceptable and that they are demand-driven.

Priority 5

Improve the competencies of technological education teaching personnel by providing professional development through pre-service and in-service training opportunities.

Priority 6

Establish direct links between learners, businesses, industry, labour, parents and the community to support technological education.

Priority 7

Provide resources to ensure that all interested and talented Namibians have access to qualitative technological education courses that underline a balance between theory and practice.

Priority 8

Provide appropriate career guidance to learners in order for them to:

- evaluate their abilities and interests;
- provide guidance on education requirements for occupations of interest;
- provide learners with up-to-date market information;
- use guidance, academic and professional personnel for counselling;
- inform parents about course requirements for studies at institutions of higher learning or employment; and
- provide job placement opportunities and assistance.

8.2.6 Strategies of technological education

The lack of strategies for qualitative technical education has already been identified in Chapters two and three as the main contributor to the neglect of the subject area. The following strategies are to be implemented in the new model to ensure that the abovementioned vision, mission statement, objectives and priorities are accomplished:

1. Design a quality improvement system for technological education within the overall development visions of the state and its development plans.
2. Develop a new technological education programme within the parameters of the existing Namibian school system.
3. Develop, implement and utilise state-recognised skills standards and other approved systems of accreditation and certification.
4. Provide professional and curricular development, including: a) teaching the relevant competencies that learners require; b) integrating occupational, employability, practical and academic skills based on industry and business-identified skill standards; and c) reducing gender bias and stereotyping.
5. Create a support system that contributes to qualitative technological education.

8.3 TECHNOLOGICAL EDUCATION POLICIES

The future model is to induce changes in present Ministry of Education (MOE) policies, which are as follows:

8.3.1 A suitable technological education system

The only solution to Namibia's increasingly high unemployment rate is to establish a suitable technological education programme within the current education system. Namibian youths need to acquire the skills, knowledge and attitudes that will allow them to find work and to cope with unpredictable labour market changes throughout their working lives. Completing the Junior Secondary Certificate, or even Grade 12, is not sufficient for stable entry into Namibia's labour market. The policy will focus on ensuring that young Namibians receive employable skills from a young age without negating personal development. Generic technological subject knowledge and skills will be taught in the primary and junior secondary school phases, as suggested by UNESCO and the Walters Report (see 4.2.2). In the senior secondary phase a compromise between specialised and generic technological knowledge and skills will be found through combining current [2006] technical subjects that share common knowledge and skills. This approach will meet the demands of Namibian education authorities and adhere to international trends for the rationalisation of a too diversified technological education system. On the other hand the technical skills and knowledge required by the Namibian society and needed for employment will also be recognised and taught at technical schools.

8.3.2 Work orientation through School-to-Work policies

Namibia does not have a strong corporatist tradition based on close links between learners, educators, employers and employers' organisations due to ignorance among stakeholders (Smit, 2000: 70-71). Consequently there is no basis for very high levels of stakeholder cooperation coupled with a strong sense of responsibility felt by employers regarding the involvement in quality technological education programmes. Although a policy of linking part-time employment with classroom studies may prove difficult to design and activate, and is a new paradigm to Namibians, it is crucial to have such a policy. The many spin-offs will benefit all stakeholders. Namibian learners will become work oriented as from secondary school level (see 4.12.2). In this regard Hoppers (1996: 72) identifies three strategies for the improvement of work orientation in basic education:

- make adjustments to the academic core curriculum;
- develop appropriate practical subjects with a general purpose; and
- work out a feasible pre-vocational programme.

The proposed model adopts a mixed system of vocational preparation whereby both the school and the enterprise have prominent roles within the integrated approach. Work orientation will therefore be dealt with by the School-to-Work system. The following principles guide the School-to-Work programme in the proposed model:

1. The school should be the main delivery system for academic and technological skills.
2. The school and enterprise must reach consensus regarding each other's role in the development of technological skills during a School-to-Work programme.
3. Consensus should be reached with respect to the responsibility for the evaluation of achievement and mastery of technological skills.
4. The role that employability skills will play in a School-to-Work transition programme needs to be clarified.
5. Quality control must take place, for example, enterprises have to comply with certain criteria addressing safety, mentoring and recording documentation.

Work orientation is embedded either "vertically" or "horizontally" into a curriculum. "Vertically" in the sense that it can be added as a separate subject which is the most common practice, or "horizontally" in the sense it can be inserted across the whole curriculum in a holistic way. The latter approach seems to be the most appropriate where theory and practical application are integrated (Hoppers, 1996: 77). The new model will include a policy of work orientation through job-attachment to ensure quality and efficiency. Schools should budget for expenses regarding transport of learners and official visits by teachers.

The School-to-Work programme will take place as follows:

Junior Secondary Education Programme

Grade 8: Attachment takes place during one period per seven-day cycle, preferably to an enterprise very near to the schools to make logistics easy.

Grade 9: Attachment to an enterprise takes place one period per cycle during the morning session, as well as one afternoon as an extracurricular activity.

Grade 10: Attachment to an enterprise takes place one period per cycle during the morning session, as well as two afternoons as an extracurricular activity.

Senior Secondary Education and Trade Diploma Programmes

Grade 11: Attachment to an enterprise takes place once per seven-day cycle during two practical periods set aside during the morning session.

Grade 12: Attachment to an enterprise takes place once per seven-day cycle during two practical periods set aside in the morning, as well as one afternoon as an extracurricular activity.

Attachment will take place according to a suitable timetable as determined by the schools and enterprises to ensure smooth attachment sessions (see 8.7.3 and 8.7.4). Transport will be shared by the schools and the enterprises.

8.3.3 Relevancy of technological education

The syllabi of the technological education model need to be demand-driven and relevant to the needs of society. In the history of technological education in Namibia, no market research was done prior to syllabus development (see 1.4 and 6.4.2.3, Question 8). The fast-changing requirements in the labour market in a globalised environment of rapid technological innovation, economic restructuring and keener competition are to be met with a policy of more frequent reviewing of syllabi, involving all stakeholders. Technological education syllabi will be reviewed in two-year cycles to stay relevant, rather than the five-year cycle that is the present practice.

8.3.4 Vocational and career guidance

Namibia cannot afford to neglect this aspect any longer. Both labour market information (LMI) and vocational guidance help learners in their choice of vocations and will save the country much money and time. It is vital to the youth, especially in the rural areas where the majority of Namibians live, whose knowledge of and exposure to the world of work is limited (see 3.8). A policy of vocational guidance and LMI will help increase the quantity and quality of job matches between employers and job seekers, reduce spells and duration of unemployment and increase the efficiency of labour market operations.

According to the proposed model, guidance in technological education as preparation for an occupational field will be based on:

- informing learners about the various fields of study in technological education;
- informing learners of the various possibilities open in a particular field of study;
- the educational background required and the possibilities for continuing education and further training;
- assisting learners and their parents/guardians in making a correct choice based on their aptitude, interest and future study opportunities;
- encouraging learners to choose the technological field of study that will not limit their later employment options;
- following the learner's progress through the educational programmes; and
- identifying personal and learning problems and providing professional remedial support whenever needed.

The current system shows a lack of vocational guidance (see 3.4.3). Therefore vocational guidance will be one of the periods on the timetable. Professionally trained psychologists will present vocational guidance in conjunction with other professionals in the private sector. Vocational guidance teachers will combine their professional skills with the religious and moral education (RME) teachers in order to teach the appropriate values, norms and good virtues found in the technological education paradigm and workplace environment.

8.3.5 Employment-intensive education

School-leavers looking for employment usually have two options: whether to become self-employed or to be employed. The proposed model makes access to technological education and exposure to work environments more readily available, thereby providing a sound base to learners for taking the appropriate option. However, a balance between the number of learners taking technological subjects and the number of technological oriented jobs available is important, because it has implications for job creation programmes. The private sector will have to create more jobs for school-leavers who choose the employment option. Alternatively, the Namibian government should motivate and support the private sector aggressively to expand and create jobs in the manufacturing and industrial spheres.

8.3.6 Learning materials

Technological change has necessitated a paradigm shift with regard to learning material. The new model will prescribe appropriate high-technology materials and textbooks that reflect the practices and standards applied in enterprises. In subjects where textbooks are difficult to acquire in the new technological subject format, textbooks will have to be developed. In this regard an integrated approach is to be followed, meaning that qualified and experienced teachers must combine their efforts with employees from private enterprises and colleagues at the VTCs and National Training Authority to produce textbooks.

8.4 TECHNOLOGICAL EDUCATION AS HUMAN RESOURCE DEVELOPMENT

Namibians need core (key) skills for creating, getting and holding jobs, taking part in culture and citizenship and skills for further study. This presupposes conditions and powerful learning situations for lifelong learning and employability. Technological education can help alleviate labour shortages by means of skill training. Therefore the new technological education model recognises that Namibian human resource development starts at school level and is based on the following four major goals:

1. The provision of broad basic technological education that makes the human resources scientifically and technologically literate, teaching both everyday skills and intellectual abilities needed for an informed citizenship.

2. The stimulation of interest and preparation of adequate numbers of young Namibians to pursue careers in science and technology as well as providing opportunities for lifelong learning and skill revival.

3. The education of a diverse labour force and development of skills for various purposes at various levels of sophistication.

4. The encouragement of the conduct of research and advanced training that creates the knowledge and skills needed by highly trained specialists to advance the frontiers of knowledge and applications.

Human resource development commences with the integration of science, mathematics and technological (SMT) education at the primary and secondary levels. Of course, many of the problems of technological education cannot be separated from the more generalised challenges in basic education, such as teacher training, availability of teaching materials and suitable finances. Other challenges are specific to the domain of technological education. These include curricula that are appropriate and technological programmes that are tailored to the developmental needs of learners and their communities, the provision of equipped laboratories, currently [2006] known as practical workshops, and competitive salaries for teachers.

As learners progress in technological education, technological skills and scientific knowledge deepen and differentiate within the context of lifelong learning. Between the general scientific literacy that is part of secondary education and the advanced programmes pursued by university-bound learners, a critical middle level of technological skills needs to be developed. According to the proposed model, secondary level technological education will stimulate learners to pursue careers in SMT, whether as scientists, technicians, engineers or SMT teachers.

8.5 RATIONALISATION OF TECHNOLOGICAL EDUCATION

The Presidential Commission Report (1999: 57) clearly states that technical education should be rationalised to form a generic subject. The Namibian policy makers and syllabus writers adopted the rationalisation approach (see 3.10). This is because they were attempting to rectify the criticism that their separately tracked technical and academic systems were producing school-leavers who had no understanding of workplace issues and tradespeople who had no general education. Another relevant point is the argument that these technologies and work patterns need well-rounded workers who can solve problems as well as having other competencies. However, one must not rationalise just for the sake of it. Rationalisation should be balanced between the two opposite extremes, namely total diversification as the current broad curriculum prescribes and total rationalisation of technical subjects that is in the process of design to satisfy the MOE demands. Reality should determine the rationalisation process. The following real issues became obvious in Chapters three and four:

- technical education has limited funds which should be utilised effectively and optimally (see 3.5.1);
- the current number of technical subjects is too high and should be reduced (see 3.2.2.1, 3.2.2.2 and 3.10);
- technical education is too fractured and diverged between technical schools and academic schools offering technical subjects (see 3.2.2.1);
- the availability of equipment and materials to teach technical subjects is problematic (see 3.9.8);
- the possibility of technical schools combining efforts with public and private institutions in order to provide School-to-Work opportunities (see 3.9.2); and
- the number of technical teachers is decreasing, and in several cases technical teachers have to teach academic subjects where technical subjects are not offered (see 3.7).

As indicated in Chapters four and five the core emphasis of the poverty eradication approach is a focus on the technical skills necessary to lift people out of poverty (see 4.81 and 5.3). The integration of the GDR into the Federal Republic of Germany in 1990 is a good example of how technological education can be utilised to eradicate poverty. The strategy to address poverty in Namibia will include the teaching of some generic skills for employability and lifelong learning, as well as specific technical skills for self-employment and income generation. In the proposed technological model the choice of technical skills and the division and clustering of technical subjects are to be decided by criteria such as:

- employability skills of individual Namibians;
- relevant theoretical, practical and problem-solving skills;
- the theoretical and practical needs of society (public and private institutions);
- the optimal utilisation of resources in order to provide relevant and qualitative technological education; and
- subjects that show common elements such as methods and practical application.

The proposed technological education model therefore takes a balanced standpoint between total diversification and total rationalisation of technical subjects. The decision to strike a "golden mean" is based on realities that became evident in the research such as the high cost of equipment and tools, the current lack of technological teachers, the small number of technical schools that offer the subjects, and then, in conclusion, the fact that subjects are too specialised and School-to-Work opportunities are limited in Namibia (see 6.3.3.8(a), learners' questionnaire, Questions 12-14 and 6.3.3.8(b), teachers' questionnaire, Questions 6-9). In practice it means that metalwork and welding converges with woodwork to form Design and Realisation: Metalwork and Woodwork. Bricklaying, plastering and painting combines with electricity to form Design and Realisation: Building and Electricity. Motor mechanics joins with panel beating and spray painting to form Design and Practice: Automotive Repair. Two of the traditional nine technical subjects that are taught in Namibian schools will be discarded, namely electronics and fitting and turning. The reasons for this are the low demand for the subjects among learners, the unavailability of teachers and the high costs of equipment and machines.

8.6 ADMINISTRATION OF TECHNOLOGICAL EDUCATION

No longer can the Namibian society afford to neglect technical education by taking a *laissez faire* attitude. The sophisticated, relevant and transparent administrative procedures and processes of the German education system (see 5.6) are good examples of the way in which a developed country deals with technological education. For example, despite the fact that the German educational administration is centralised in many aspects to ensure strict control over quality education and economic growth, it is also decentralised enough to recognise and promote the individual's technological and vocational needs in the *Länder.* The new proposed model for technological education is based on a more structured and streamlined administration which deals with challenges and problems effectively and proactively. It will therefore include various administrative and organisational bodies, fulfilling vital tasks to ensure a user-friendly and effective technological education system.

8.6.1 Directorate of Technological Education

A Directorate of Technological Education is to be established in the Ministry of Education. Its structure can be based on the structure of the Directorate of Special Education Programmes (SEP), which has functioned effectively since the middle nineties (MBESC, 1996a: 26-28; MBESC, 1999a: 6-8). This division has a highly efficient and specially trained staff responsible for eight special schools. The rationale behind such a directorate is that the personnel employed should be specialists in technology, and be technically orientated and trained. These people will be sensitive to the needs of technological education and the industry, because they will be knowledgeable about the technical field of study. The present scenario where decisions about technical education are made by education officials with little or no technological background, especially with regard to practical work, will be eliminated (P. Thom, personal interview, 26 July 2005). This Directorate of Technological Education will have the responsibility to:

- promote technological education amongst Namibians and improve its status as a matter of national urgency and pride;
- administer the technical schools under its jurisdiction according to MOE statutes;
- coordinate technological education with regard to all stakeholders; such as

  - directorates within the MOE, for example the Directorate of Vocational Training, and the Vocational Training Board;
  - other line ministries, such as the Ministries of Labour and Finance;
  - the private sector, such as the Chambers of Commerce and Crafts;
  - local enterprises, industries and businesses;
  - private education institutions; and
  - communities.
- budget for technological education in the schools under its authority;
- oversee the quality of technological education; and
- link with all stakeholders across national borders at regional level and beyond with regard to the exchange of expertise, teacher training and mutual cooperation.

8.6.2 Financing of technological education

There are usually three main sources of financing technological education at basic level. The first source is based on the assumption that technological education is an individual responsibility and, therefore, should be solely financed by the learner or the parents. According to the Namibian Education Act (Act No. 16 of 2001), a limitation is put on the school fund contribution of N$500,00 for a secondary school, and N$250,00 for a primary school, per learner per year (Republic of Namibia, 2002: 9). This approach is partly rejected in the new technological education model that I propose, as technological education is part of the formal education system which is budgeted for by the MOE.

The second assumption is that technological education prepares learners for the world of work and should therefore be financed by the stakeholders that benefit directly from it, namely employers (Hangala, 2000: 62). However, should the private sector assume total responsibility for the financing of technological education, there is a possibility that the enterprises would claim more control over technological education, which is in the first place the responsibility of the state (MOE) as part of general education. Another aspect is whether private enterprises will contribute if they are not consulted when syllabi are developed, thereby negating their right to quality education. The third assumption is that technological education is the responsibility of the state, and that the nation finances technological education indirectly through taxes paid to the state (Presidential Commission Report, 1999: 75).

However, financing the new model of technological education will be based on the integrated approach where all stakeholders contribute to some extent. It presupposes that the technological education is funded by the combined responsibility of the private sector and the nation, with a small contribution by the learner (Hangala, 2000: 61). For example, private enterprises will sponsor materials or provide schools with excessive equipment and provide opportunities for learners to experience the world of work first-hand. This is important, as the respondents' answers on the questionnaires, as indicated by Appendices 1 and 2, show the problems that technical subjects currently endure, such as the lack of materials, tools and equipment.

Another way to generate funds for technological education is to expect enterprises to pay a special technological education levy, which will be a nominal amount per year to industries but vital in the process of ensuring up-to-date technological education materials, tools and equipment. In Germany the levy system has been hailed as successful, making funds available for the provision of quality education which would otherwise not be available (see 5.7 and 5.7.4). The nation will contribute by paying income tax to the government. Parents will have to contribute school development funds. The government is to contribute by providing school facilities, equipment and materials, technological teacher training and certifying of learners and teachers. The government will also have to allocate more funds to every learner in technical schools than is currently allocated in order to ensure quality education.

In reality it means that the MOE will budget for technological education through the newly established Directorate for Technological Education and motivate other stakeholders to contribute finances, physical and human resources and expertise. This means that technological education will have a budget that makes a separate allocation for consumable items and tools. This will enable schools to acquire materials and tools according to their budgets, which differs from the current practice where the technical education budget is misused by educational regional offices to finance shortages in general education (see 3.9.8).

The proposed model suggests that a biannual Technological Education Summit takes place at which aspects relating to funding, syllabus development, School-to-Work opportunities, quality teacher training and job creation are to be discussed. Education should be developed parallel to the private sector and vice versa. It is no use to educate people without their getting jobs. On the other hand it is useless to create jobs without educating and training people to fill them. The Namibian government should not ask only for development funds from developed countries, as the current practice dictates, but should rather invite their manufacturing expertise and investment in manufacturing companies that provide work-based prospects and jobs for school-leavers.

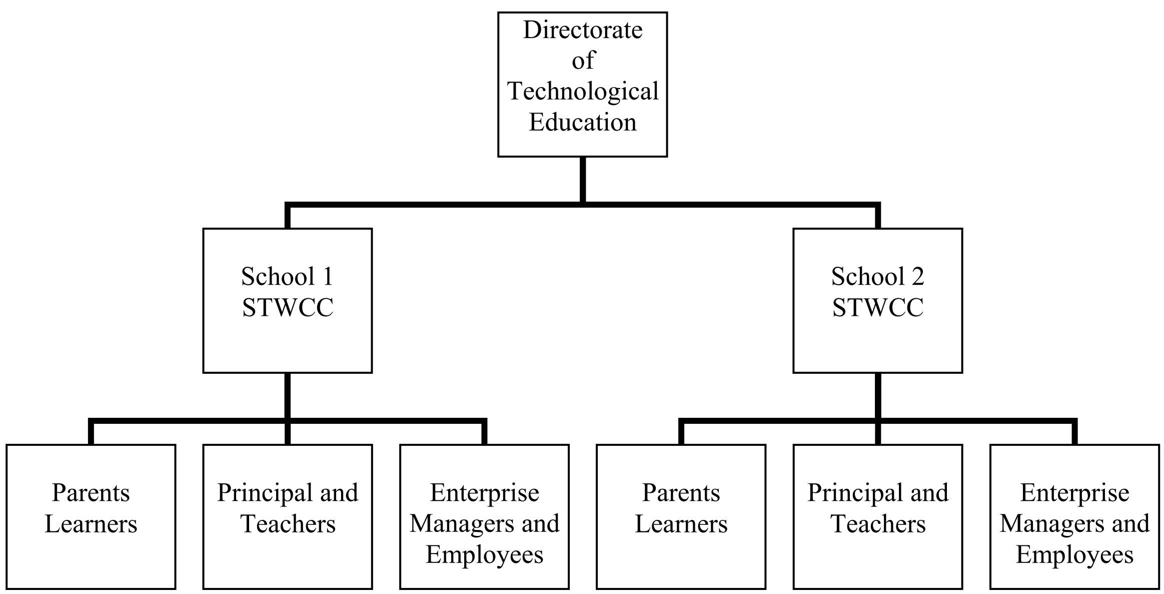
8.6.3 School-to-Work Contact Committee (STWCC)

The proposed model has elements of the sophistication of the German dual system, which is the result of a remarkable and longstanding partnership between the schools and employers (see 4.5.3 and 5.7). It also shows principles of the School-to-Work system as suggested by the U.S. SCANS report, promoting the integration of schools and workplaces (see 4.12.2). The proposed technological education model is therefore a combination of the two systems, but is adapted to the unique Namibian educational and economic realities.

It prescribes a School-to-Work Contact Committee at each technical school which is responsible to the School Boards of the various schools. Members of this committee will be responsible for initiating and establishing links between the technical schools and local private enterprises. They will plan integrated school-site and work-based learning that will help learners blend academic and technical, technological thinking and personal skills. One responsibility of this committee will be to identify and assess industries and businesses which can accommodate learners on an attachment basis according to set criteria. Members of this committee have to commit themselves to technological education and strive towards school-workplace integration as far as possible. They will meet regularly with employers to address problems that may arise, such as practical arrangements, safety measures and standards of practical tasks that learners have to fulfil.

According to the proposed model, the committee comprises of the school principal and the human resource manager of the enterprise, as well as the representative teachers, learners and parents and employees of the enterprise who are involved in the work-based training. The principle of stakeholder involvement is recognised and will therefore be an important aspect of the new model and the relevancy and quality of its programmes will be determined by the vigour of the stakeholders. This committee reports to the Director of the Directorate for Technological Education (DTE), who will also assist with and monitor the School-to-Work process. Communication of this committee with the various stakeholders is very important, which means that appropriate communication channels need to be established. The following diagram applies:

Diagram 8.1: Structure of the School-to-Work Contact Committee (STWCC)



8.7 STRUCTURE OF TECHNOLOGICAL EDUCATION

Technological education will be offered in its various forms in primary and secondary schools in the proposed model. Diagram 8.2 shows the structure of technological education, indicating the various levels and technological subjects.

Diagram 8.2 Structure of technological education

Tertiary level	Employment University Polytechnic	Employment VTCs/COSDEC Polytechnic	19 years +
School level Grade 12 Grade 11	**Technological education (Namibia Senior Secondary Certificate-NSSC)** Core subjects and any two of: Design and Realisation: Metalwork & Woodwork Design and Realisation: Building & Electricity Design and Practice: Automotive Repair	**Trade diplomas (National Training Authority-NTA)** Motor Mechanics Bricklaying & Plastering Welding Electricity	18 years 17 years
Grade 10 Grade 9	**Technological education (Junior Secondary phase)** Core subjects and any two of: Design and Realisation: Metalwork & Woodwork Design and Realisation: Building & Electricity Design and Practice: Automotive Repair		16 years 15 years
Grade 8	**Technological education (Junior Secondary phase)** Basic Engineering I & II (Junior Secondary phase)		14 years
Grade 7 Grade 6 Grade 5	**Technological education (Senior Primary phase)** Craft and Technology		13 years 12 years 11 years

In the proposed model, technological education consists of three main components:

1. General education.
2. Theoretical education that relates to knowledge that includes trade theory, graphic skills, economics of production, safety and hygiene, values.
3. Practical skills education that relate to employable skills.

8.7.1 Primary schools

Currently technical education is offered at senior primary level by means of a generic subject, called craft and technology. The new model proposes that the subject should continue but that the number of schools that offer this subject should be limited. Existing textbooks can be used. These schools will serve as feeder schools for the technical high schools. The reasons for restricting the number of primary schools are:

- only a limited number of teachers are trained in this subject;
- schools have very few resources for presenting the subject qualitatively; and
- a smaller but qualitative target group is preferred instead of involving many learners with a poor quality of basic technological skills.

8.7.2 Technical high schools

Technical education currently shows a dualistic character. On the one hand there are pure technical schools and on the other hand there are academic schools offering technical subjects. The dualistic nature has caused many problems as identified in Chapters three and four, such as staffing, budgeting, quality of programmes and the provision of equipment and materials. According to the Presidential Commission Report there should be one technical school per educational region, meaning that thirteen technical schools have to be established (Presidential Commission Report, 1999: 167). This will unfortunately be too costly in reality, resulting in the same financial and human resource deficiencies as those of the present model. Another reason is that job-attachment will not be possible due to the lack of appropriate enterprises. The rationalisation process that is to end up in a generic technological education approach, as suggested by the MOE, is also too radical. The future of technical schools under the MOE rationalisation process is unsure. Some of the consequences of the technical education rationalisation process are, for example, demotivated technical teachers and the closure of technical schools in Namibia. This feeling of insecurity has surfaced among the technical teachers who are currently [2006] in the system, because they do not know whether they will still be employed by the MOE, despite promises in that regard (P. Thom, personal interview, 26 July 2005).

The new technological education model will be based on technical schools and will employ current technical teachers. It will therefore adopt a more streamlined and coordinated technological education programme, suggesting that technical subjects at academic schools should be abolished and offered at technical schools only. The exception is technical drawing (design and communication) which can continue at academic schools, because of its low financial impact on any school budget, academic-theoretical content and sufficient number of teachers qualified to teach the subject.

The proposed model will be flexible, allowing learners at the JSE and SSE level to move between technical schools and even to continue vocational training elsewhere. For example, the German education system allows learners to move between schools in various *Länder* because schools are so interconnected that they eventually form an open system permitting transfer and progression from one subject to the other (see 5.5). The flexibility of the German education system makes provision that similar qualifications can also be obtained in adult education centres in cases where learners have to leave school. Based on the German example of flexibility, the proposed model will offer multiple paths in the curriculum to provide more learners access to technological education. For example, learners who wish to study further can enrol in the localised Namibia Senior Secondary Certificate (NSSC) programme (see 3.2.2.2), while learners who intend to become qualified artisans will be allowed to study a different technical education programme which will lead to studies at VTCs or similar technical institutions. Learners who follow the Trade Diploma programme will be able to switch to the NSSC programme without repeating a school year, thus acquiring access to university studies.

The new model proposes eight technical schools in Namibia. The following criteria serve as guidelines for establishing the eight technical schools:

- the schools must be situated in the bigger Namibian towns, which would enable schools to form links with private enterprises, as well as to purchase materials;
- hostel facilities should be available to enable learners from far to attend a technological school;

- schools must have at least one technological laboratory which could be enlarged and equipped;
- housing should be available for technological teachers; and
- transportation of resources should be easy and effective to curb excessive costs.

The following schools in the various regions meet most of these criteria:

1. Windhoek Technical High School
2. Cosmos Technical High School, Windhoek
3. Hermann Gmeiner Technical High School, Swakopmund
4. Mweshipandeka Secondary School, Oshakati
5. Noordgrens Secondary School, Rundu
6. P. K. de Villiers Secondary School, Keetmanshoop
7. Caprivi Secondary School, Katima Mulilo
8. Lüderitz Secondary School, Lüderitz

The abovementioned schools are to be the technical high schools in the new technological education model. All the schools are ideally situated and well established with a suitable infrastructure and experienced staff. The provision of hostel accommodation is an important strategy for learners in rural areas to get access to technological education. The schools in Rundu, Katima Mulilo and Lüderitz do not have hostels. However, learners from rural areas who currently attend these schools make use of alternative accommodation, a practice which could be continued until hostel facilities are built.

The reduction of the number of schools offering technological education will have several benefits. Firstly, the administration of technological education will be more streamlined and cheaper. Secondly, subject advisors will be able to provide continuous and quality support to teachers. Thirdly, current technical teachers will be clustered at eight technical schools, which means that teachers will be utilised more effectively. Fourthly, it will be easier to coordinate educational activities and subject assessment between the schools, especially with regard to the integration of science, mathematics and technology as well as practical skills. Fifthly, much money will be saved on the transport of equipment, tools and materials as all efforts will be aimed and concentrated at the eight technical schools. Lastly, all efforts will be focused on providing technological education in more than the current [2006] number of technical schools. This is also in line with local demands for more technical schools (Gurirab, 2006: 3).

8.7.3 Junior Secondary Education (JSE) Level

Learners at JSE level will graduate with a Grade 10 (Technical Education) Certificate, enabling them to continue with Senior Secondary Education or to attend a Vocational Training Centre. There are to be nine compulsory subjects in this phase, as prescribed by the Namibian Broad Curriculum (MBESC, 1996b: 19). This means that the new model will adhere to the structures as determined by the Namibian Broad Curriculum.

8.7.3.1 Grade 8 technological education programme

Grade 8 is considered to be a bridging and foundation year, covering three trimesters and nine subjects. The nine compulsory subjects will be:

- English (Eng.);
- any local language, e.g. Afrikaans (Afr.);
- Mathematics (Maths);
- Physical Science (Phys. Sc.);
- Life Science (Life Sc.);
- Geography (Geo.);
- Technical Drawing (Tech. Dr.);
- Basic Engineering I & II (Basic E. I & II); and
- Trade Theory (Tr. Theory).

All nine subjects will be compulsory as prescribed by the Namibian Broad Curriculum. However, the technological subjects offered will not be the same as suggested by the Broad Curriculum, thus showing a deviation from the Broad Curriculum (MBESC, 1996b: 17; NIED, 2005: 2). Additional periods and subjects that supplement the core subjects and allow for the teaching of cross-curriculum themes as required by the MOE, will be as follows:

- Computer Practice (Comp. Pr.);
- Enterprise Attachment (Enter. Att.);
- Entrepreneurial Skills (Entr. Sk.);
- Vocational Guidance (Voc. Gui.); and
- Religious and Moral Education (RME).

Five periods are to be allocated to each subject in a seven-day timetable. The Grade 8 technological education programme in the proposed model will, in principle, be the same as the current approach, showing a generic character (see 3.2.2.1). However, it differs in so far that the current generic basic engineering subject is divided into two subjects, namely basic engineering I and II. These two subjects will lay the foundation that is needed for technological education in the following grades.

Learners will be able to experience the various modes of technological education which will form part of the two generic subjects in order to make a choice between the subjects in higher grades. Basic engineering I and II will consist of basic engineering principles which will be taught theoretically and practically. Two periods are to be allocated to theoretical aspects (trade theory) and three periods to practical work in each of the two basic engineering subjects, applying the theory in practice. The subjects will consist of:

1.	Electricity	
2.	Woodwork	Basic Engineering I
3.	Bricklaying and Building	
4.	Metalwork	
5.	Motor Mechanics	Basic Engineering II
6.	Panel Beating and Spraypainting	

A typical timetable, based on the prescribed 7-day roster, may look as follows:

Day	Period 1	Period 2	Period 3	Period 4	B	Period 5	Period 6	Period 7
1	Phys. Sc.	Eng.	Maths	Life Sc.	**R**	Basic E. I	Basic E. I	Basic E. I
2	Maths	Afr.	Life Sc.	Comp. Pr.	**E**	Tr. Theory	Geo.	Enter. Att.
3	Maths	Eng.	Tech. Dr.	Tech. Dr.	**A**	Life Sc.	Afr.	Geo.
4	Geo.	Tr. Theory	Phys. Sc.	Eng.	**K**	Maths	Comp. Pr.	Afr.
5	Basic E. II	Basic E. II	Basic E. II	Eng.	**B**	RME	Geo.	Phys. Sc.
6	Geo.	Afr.	Entr. Sk.	Maths	**R**	Life Sc.	Voc. Gui.	Phys. Sc.
7	Life Sc.	Tech. Dr.	Tech. Dr.	Tech. Dr.	**E**	Afr.	Phys. Sc.	Eng.

According to the proposed model the prescribed number of periods allocated to the subjects per 7-day cycle is as follows:

English:	5
Any local language (e.g. Afrikaans):	5
Mathematics:	5
Physical Science:	5
Life Science:	5
Geography:	5
Technical Drawing:	5
Basic Engineering I:	3
Basic Engineering II:	3
Trade Theory:	2
Enterprise Attachment:	1
Computer Practice:	2
Entrepreneurial Skills:	1
Vocational Guidance:	1
Religious and Moral Education:	1
Total number of periods:	49

8.7.3.2 Grades 9 and 10 technological education programme

Technological education in the proposed model is different from the present system. According to the current system, learners have to take technical drawing and only one of seven technical subjects as explained in 3.2.2.1. It also differs substantially from the envisaged curriculum that is planned by the MOE to be implemented in 2007. According to the MOE curriculum the various technical subjects will be replaced by one generic subject called design and technology (NIED, 2005: 6).

However, in the proposed model Grades 9 and 10 will continue with and build on the subjects offered in Grade 8, but the various technological subjects are to be clustered together, showing a generic character to an extent, without negating the variety of technological subjects and practical work. Subject names will also be renamed to comply with the Cambridge System that starts in Grade 11. Technical drawing, according to the new model, becomes design and communication, referring not only to specific types of technical drawing, but also to the design aspect of it. Learners will have the following core subjects:

- English;
- any local language;
- Mathematics;
- Physical Science;
- Entrepreneurial Skills;
- Life Science;
- Geography; and
- Design and Communication.

The timetable and number of periods allocated to each subject are exactly as in 8.7.3.1, except that basic engineering I & II are to be substituted by a choice of any two of the following three technological subjects:

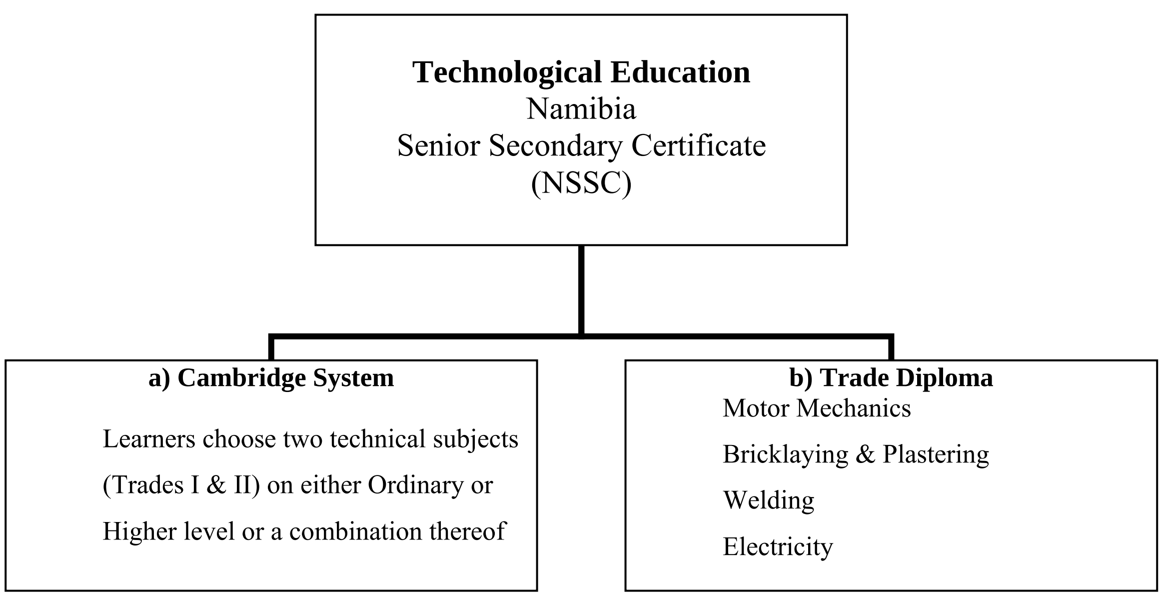
- Design and Realisation: Metalwork & Woodwork.
- Design and Realisation: Building & Electricity.
- Design and Practice: Automotive Repair.

The rationale behind this approach is twofold: firstly, to adhere to the principle that early technological specialisation is not advisable due to the fact that modern economies need multiskilled workers (see 4.10.4 and 4.11), and, secondly, the fact that many Namibians leave school after Grade 10 (see 1.2).

8.7.4 Namibia Senior Secondary Certificate (NSSC) Education Level

Technological education at this level in the proposed model also differs considerably from the current system. Currently learners have to choose two subjects from a total of nine technical (see 3.2.2.2) in only one path, which will change to only one generic subject as from 2007 (NIED, 2005: 6). However, according to the proposed model technological education at Senior Secondary level will be divided into two paths. Firstly, the curriculum that will lead to internationally recognised certificates presenting subjects at Ordinary and Higher levels, and, secondly, the curriculum that will lead to qualified artisan certificates. The qualifications at this level should not be considered as an end in themselves, but the courses will be flexible so that learners taking technological education will be able to continue into higher education. Grade 12 school-leavers will be able to continue their studies either at universities (or similar institutions) or receive accreditation at the Vocational Training Centres to qualify as artisans. Diagram 8.3 shows the structure of technological education at this level.

Diagram 8.3 Structure of technological education at Senior Secondary Level



8.7.4.1 The Cambridge System pathway

The Senior Secondary Curriculum, according to the proposed model, leads to internationally recognised certificates provided in conjunction with the University of Cambridge Local Examination Syndicate (UCLES). This curriculum will be relevant to learners who intend to study at universities. The curriculum options will be as follows:

- The curriculum and examination leading to the Namibian Senior Secondary Certificate (NSSC) at Ordinary level.
- The curriculum and examination leading to the Namibian Senior Secondary Certificate (NSSC) at Higher level.

Learners will have to take a minimum of six subjects as prescribed by the Namibian Broad Curriculum (MBESC, 1998b: 10). Core subjects that will be compulsory are:

- English First or Second Language (Eng.);
- Mathematics (Maths);
- Physical Science (Phys. Sc.); and
- Design and Communication (Des. & Co.).

Learners will have to choose any two subjects (Trades I & II) from the following technological field of study:

- Design and Realisation: Metalwork & Woodwork;
- Design and Realisation: Building & Electricity; and
- Design and Practice: Automotive Repair.

Trades I & II

To provide for differing abilities, the abovementioned subjects will be offered at both Ordinary and Higher level. Learners will be allowed to take subjects in either the Ordinary or Higher mode, or a combination thereof. This depends on the career path of each learner. Differentiation amongst learners is further recognised by means of ordinary and advanced levels. Ordinary level syllabi cover theoretical foundations and basic skills and learners who are expected to achieve grades C to G are targeted. Higher level syllabi include the ordinary and are supplemented by advanced theoretical and practical skills in the particular subjects. In order to comply with teaching of cross-curriculum themes, the following subjects and periods are to be scheduled on the timetable:

- Trade Theory (Tr. Theory);
- Enterprise Attachment (Enter. Att.);
- Computer Practice (Comp. Pr.);
- Vocational Guidance (Voc. Gui.);
- Religious and Moral Education (RME); and
- Entrepreneurial Skills (Entr. Sk.).

A typical timetable for Grades 11 to 12 Ordinary/Higher levels may look as follows:

Day	**Period 1**	**Period 2**	**Period 3**	**Period 4**	**B**	**Period 5**	**Period 6**	**Period 7**
1	Comp. Pr.	Phys. Sc.	Tr. Theory	Eng.	**R**	Entr. Sk.	Phys. Sc.	Des. & Co.
2	Des. & Co.	Des. & Co.	Des. & Co.	Maths	**E**	Phys. Sc.	RME	Tr. Theory
3	Phys. Sc.	Maths	Eng.	Eng.	**A**	Trade I	Trade I	Trade I
4	Eng.	Phys. Sc.	Voc. Gui.	Maths	**K**	Eng.	Trade I	Trade I
5	Comp. Pr.	Eng.	Phys. Sc.	Tr. Theory	**B**	Maths	Enter. Att.	Enter. Att.
6	Eng.	Maths	Maths	Phys. Sc.	**R**	Trade II	Trade II	Trade II
7	Des. & Co.	Des. & Co.	Des. & Co.	Tr. Theory	**E**	Maths	Trade II	Trade II

The set number of periods allocated to the subjects per 7-day cycle will be as follows:

English First or Second Language (Eng.):	7
Mathematics (Maths):	7
Physical Science (Phys. Sc.):	7
Design and Communication (Des. & Co.):	7
Trade I:	5
Trade II:	5
Trade Theory (Tr. Theory):	4
Enterprise Attachment (Enter. Att.):	2
Computer Practice (Comp. Pr.):	2
Vocational Guidance (Voc. Gui.):	1
Religious and Moral Education (RME):	1

Entrepreneurial Skills (Entr. Sk.):	1
Total number of periods:	49

8.7.4.2 The Trade Diploma pathway

The rationale behind this school-based trade-training programme is to provide Grade 10 learners an alternative pathway in order to achieve a qualification. Although the majority of VET places in the Vocational Training Centres (VTCs) are reserved for learners who have successfully completed Grade 10, reality dictates that learners who have completed Grade 12 displace most of the Grade 10 learners, resulting in massive unemployment amongst Grade 10 school-leavers (P. Thom, personal interview, 26 July 2005; Heita, 2000: 43). Due to the current MOE policy of allowing only learners who scored a specific number of points in the Grade 10 examinations to continue with Grade 11, thousands of Grade 10 school-leavers find themselves out in the streets without any qualification (MBESC, 1996b: 6). The Trade Diploma pathway will therefore provide Grade 10 learners with an alternative option to qualify as artisans or to continue with Grade 11 at a later stage, keeping many learners in the school system and preparing them for employment.

The trade diploma programmes are to be presented at school level in conjunction with the newly created Namibia Training Authority (NTA), the Directorate of Vocational Education and Training in the Ministry of Education, the Trade Advisory Committee (TAC) and the Namibia Qualifications Authority (NQA). The technical schools will offer the same trade areas, standards, modular curriculum, subject content and learning materials as are presented by the out-of-school institutions such as the VTCs. The only difference between the school-based trade diploma and the out-of-school trade diploma will be the type of learner. Where the out-of-school trade training is aimed at the thousands of unemployed and unqualified school-leavers, the school-based training will be aimed at learners whose marks are not sufficient to continue with Grade 11 at Ordinary level, but who wish to get a formal qualification at school level. The following trade diplomas, offered by the NTA, will be presented of which a learner has to take one:

- Motor Mechanics;

- Bricklaying & Plastering;
- Welding; and
- Electricity.

According to the proposed model, learners will have to take the following academic subjects and additional periods that are all aimed at trade training:

- English (Eng.);
- Mathematics (Maths);
- Physical Science (Phys. Sc.);
- Technical Drawing (Tech. Dr.);
- Enterprise Attachment (Enter. Att.);
- Entrepreneurial Skills (Entr. Sk.); and
- Religious and Moral Education.

The courses will be based on competency based curricula, making a modular approach possible. The timetable of a typical Trade Diploma course may look as follows:

Day	**Period 1**	**Period 2**	**Period 3**	**Period 4**	**B**	**Period 5**	**Period 6**	**Period 7**
1	Trade	Trade	Trade	Trade	**R**	Entr. Sk.	Phys. Sc.	Eng.
2	Trade	Trade	Trade	Trade	**E**	Phys. Sc.	Tech. Dr.	Tech. Dr.
3	Phys. Sc.	Math.	Eng.	Trade	**A**	Trade	Trade	Trade
4	Eng.	Phys. Sc.	Entr. Sk.	Maths	**K**	Eng.	Trade	Trade
5	Trade	Trade	Trade	RME	**B**	Enter. Att.	Enter. Att.	Enter. Att.
6	Eng.	Maths	Maths	Phys. Sc.	**R**	Trade	Trade	Trade
7	Maths	Tech. Dr.	Tech. Dr.	Tech. Dr.	**K**	Enter. Att.	Enter. Att.	Enter. Att.

The prescribed number of periods allocated to the subjects per 7-day cycle is as follows:

Motor Mechanics (Motor Mec.):
Bricklaying & Plastering (Brick & Plast.): 20 (block periods for each trade
Welding: include theory and practice)
Electricity (Electr.):

Enterprise Attachment (Enter. Att): 6

English (Eng.):	5
Mathematics (Math.):	5
Physical Science (Phys. Sc.):	5
Technical Drawing (Tech. Dr.):	5
Entrepreneurial Skills (Entr. Sk.):	2
Religious and Moral Education:	1
Total number of periods:	49

8.8 ADMITTANCE OF LEARNERS

Any learner who wishes to attend a technical school will be requested to complete a questionnaire and take an enrolment test. The enrolment test is a strategy to ensure quality control so that only learners who are interested in technological education with the required abilities will be allowed to enrol in the technical schools (Bottoms and Phillips, 1998: 28). The functions of this test are to assess a learner's technological aptitude and compare it with the learner's academic aptitude, secondly, to assess the aptitude for a specific technological field of study and, thirdly, to verify whether the learner complies with the personality requirements of technological education.

The reasons for an enrolment test are threefold: firstly, technological education is expensive and cannot allow the waste of limited resources. Secondly, the status of technological education will improve by means of quality control measures and by conveying the message that technological education is an integral part of the total education system (Ries, 1998: 15). Thirdly, the chances that learners will drop out of technological education and/or revert to academic education will be limited, making technological education more effective regarding finances and sustainability. Learners will be able to move between technical schools in Namibia should it be necessary, as the technical schools will follow the same curricula and schemes of work.

8.9 ASSESSMENT OF LEARNERS

The major purpose of assessment will be to give learners and teachers a clear understanding of progress toward achieving course standards. Another purpose will aim to assign course grades reflecting the extent to which learners have met course standards. Overall a mixture of technical, intellectual, academic and personal skills are to be assessed through a range of problems, projects and issues typical of those found in a technological career field.

8.9.1 Junior and Senior Secondary School phases

Assessment will take place according to the Directorate of National Examinations and Assessment (DNEA) and the Examination Board of Namibia regulations and procedures stipulated in the Broad Curriculum. Formative assessment will be done continuously throughout the year by means of marks given for class activities, homework, tests, course work (practical work) and projects (design portfolios). Ongoing assessment is necessary to gauge learners' progress in understanding concepts and skills within technological subjects. The assessment is to be based on the academic, practical and employability areas that represent the knowledge, skills and attitudes needed for employment. Teachers will use strategies such as checklists, work plans, tests, demonstrations and work site evaluations. Formative assessment includes the tasks that learners have to complete at enterprises and a practical project as prescribed by the syllabi.

The model proposes that summative assessment take place at the end of the year by means of formal examinations. There will be two external examinations. On completion of the Junior Secondary Course a learner will be admitted to the external Grade 10 examinations. Learners who have completed the Namibia Senior Secondary Certificate Course will be admitted to the external Ordinary level and Higher level examinations. The marks achieved in both the continuous and the summative assessment will count towards the final mark that determines whether the learner has reached the level of achievement to qualify for certification. Because both modes of assessment are of equal importance, each assessment mode will count 50% of the total mark achieved.

8.9.2 Trade diploma programmes

Assessment will have to take place according to the National Training Authority's regulations. The model proposes that training be based on competency, which will enable assessment to take place at various points in the modules, but specifically at the end of each module. The purpose will be to determine whether the learners have achieved the competencies identified in the modules. Learners can only proceed to the next module if a previous module has been completed successfully. External assessors from the Namibia Training and Testing Centre, whose responsibility it is to assess technical apprentices nationally, will evaluate the learning outcomes according to national assessment criteria.

8.10 CURRICULUM DEVELOPMENT

The technological education curriculum will become part of the Namibian Broad Curriculum for Basic Education and will therefore enjoy the same status as other subject areas in schools. Continuous development of the curriculum will take place to ensure relevancy and accreditation.

8.10.1 Syllabus development

According to the proposed model the existing curriculum committee for technical subjects at the National Institute for Educational Development (NIED) has to continue with its responsibility to develop secondary school technological subjects. With regard to the primary and junior secondary school phases, the syllabi are to be approved by the various ministerial committees before implementation. The syllabi at senior secondary level are to be approved by the University of Cambridge Local Examinations Syndicate (UCLES).

The development of modules for the trade diplomas should be done by the relevant committee at the Namibian Training Authority. However, a representative of the NIED curriculum committee for technological subjects has to be involved in the development of modules. The technological curriculum revision cycle will be shortened from five to two years to make the curriculum and syllabi more responsive to Namibia's needs.

Syllabus and modules content will be based on the results of a market survey, which is to be done scientifically involving all stakeholders, as well as adhering to the latest international trends and developments in technological education. Teachers and other interested parties will continuously be updated about the syllabus content in order to ensure correct interpretation of aspects such as the learning content, skills and assessment principles. Officials from the Directorate of Technological Education will visit the technical schools to provide subject advice and support to individual subject teachers whenever it is needed and to monitor the availability of tools, equipment and materials.

8.10.2 Subject content

The proposed model assumes a mixed system of technological education whereby both the school and the private sector have major roles within the integrated approach (see 4.5.4 and 4.12.4). The integrated approach of the new model implies firstly, that mathematics and science have to be integrated with technological principles and, secondly, that school-based and work-based education have to be integrated to help learners blend academic, technical, thinking and personal skills. To achieve this goal the respective education officers at NIED responsible for syllabus development in Technological Education and Natural Sciences and stakeholders from the private sector will form a Curricular Committee for Technological, Mathematics and Science Education.

Technological education consists of three main components in the new model: firstly, general education in the form of core subjects, secondly, theoretical knowledge including trade technology, mathematics, science and entrepreneurial skills, and thirdly, associated practical skills. The subjects in the new technological education model may not be irrelevant to society’s needs, but it is imperative that they are demand-driven and relevant. The content will therefore be driven by what learners need to know, understand and be able to do before they can enter and advance in a career area. This means that the industry has to be consulted in future while syllabi and content are developed, and continuously thereafter, unlike the current scenario (L. Moller, personal interview, 28 July 2005). This school-industry link is the same approach as that of Germany, where technical education and vocational training subject content are identified and developed according to society’s needs and national educational and training goals. For example, all apprentices are assessed and evaluated by the German Chamber of Commerce and Industry and the Chamber of Craftsmen (see 5.7.3).

The subject content will initially be determined by a market survey which will be followed by a biannual Technological Education Summit, attended by all stakeholders to verify the theoretical and practical content that should be included in the syllabi. In this regard Tikly (2003: 555) is adamant that technological education requirements cannot be based on generalisations but must be based on research to match technical knowledge and skills to specific career paths. It is therefore only on the basis of such analysis that syllabi can be made more relevant and funding priorities can be identified. The DTE and NIED will continuously communicate with the private sector in order to include new relevant technology in the syllabi. Direct communication channels will enable industries to advise the DTE and NIED about changes in content.

8.11 ACCREDITATION OF PROGRAMMES

At present, the NQA and Namibian Board of Examinations have to accredit all the technology education programmes at the various levels for learners to enter the employment market at appropriate levels and for prospective students to enrol at institutions of higher learning inside and outside Namibia. In this regard the NQA, Namibian Board of Examinations and SAQA will also be asked to accredit the programmes to enable learners, teachers and programmes to get accreditation across SADC borders. The proposed technological education model's programmes such as syllabi will also be developed in such a way as to stay within the parameters of quality education as determined by the Southern Africa Consortium for Monitoring Educational Quality (SACMEQ). In order to fulfil the requirements of these institutions, the technological education syllabi will be of a high standard as explained earlier.

8.12 TEACHING STAFF

On reviewing the research results of the Teachers' Questionnaire, Item 17, regarding the training opportunities of technical teachers, it became obvious that technical education suffers because of the lack of qualified technical teachers. Technological subjects cannot be taught by teachers who are academically trained, except for the parts of the syllabus where mathematical and natural science principles are integrated with technology. It means that appropriate training programmes for technological teachers are vital to the successful implementation of the new technological education model in Namibia. To fill the number of technological vacancies at the newly established technical schools, technological teachers at academic schools are to be offered teaching positions at the technical schools. Market-related salaries will be offered to teachers not only to keep them in the technological education programme, but also to lure technological teachers who have left the teaching career due to poor salaries, back from the private sector.

The Presidential Commission Report (1999: 178) identified the shortage of technological teachers as one of the challenges faced by technological education and vocational training. Before a pool of trained technological teachers is available, it will not be possible to teach technological subjects at the required standards. Both pre-service and in-service training modes will have to be utilised. As long as teachers see themselves in a vocational rather than a professional role, all the educational training and the new approach will be a waste of time. When technological teachers become professionals, it will be the mastery of subject matter and skills that will first of all matter, and secondly, the mastery of teaching methods, that will drive teaching of technological subjects. This approach will ensure that the current theoretical approach will be compromised to have a balance between theoretical and practical skills. The teaching method that will be used is the learner-centred education (LCE) method, for two reasons: Firstly, LCE is the official policy of the MOE, and, secondly, the nature of technological education is such that no other method can be used to teach technological skills (Edwards, 2002: 1-2).

The proposed model necessitates that technological teacher-training programmes meet the following requirements:

1. It should be offered on both diploma and degree level.
2. It should be based on the school's technological education syllabi.
3. It should be on the same status level as mathematics and science teacher- training programmes.

4. It should make provision for ample theoretical and practical course work.
5. Teachers should be prepared with technological education and industry-specific specialities as their only teaching areas.
6. Pre-service programmes should include training in key competencies that are related to specific industry areas, and competency-based teaching and assessment strategies.
7. Appropriate teaching methods should support the subject content.

There are three groups of teachers that need to be trained. The first group is the existing cohort of technical teachers who will have to be retrained to teach the new integrated technological syllabi. The second group is qualified tradesmen who teach technical subjects without a professional teaching qualification. The third group is school-leavers who will be trained as technological teachers.

8.12.1 Pre-service teacher training

The time has come to design a pre-service training programme for technological teachers up to Grade 12 level. Currently there is no such programme in Namibia. The new model requires that teacher training takes place through an integrated approach, as teachers are to teach integrated science, mathematics and technology (SMT) syllabi.

Teachers will be able to enrol for degree and diploma programmes in the pre-service training programme. The B Ed (Technological Education) degree will be offered by the University of Namibia (UNAM), in collaboration with the Polytechnic of Namibia (PON), the Windhoek College of Education (WCE) and the Windhoek Vocational Training Centre (WVTC). UNAM is to be responsible for teaching the professional educational subjects, trade theory will be taught at the PON and practical training will be done at the technological laboratories of the WVTC. This broad structure of teacher training does not affect aspects such as teaching staff, equipment and materials much, as existing structures and expertise will be utilised. The particular degree programme will slot in with the already existing B Ed degree programme offered at UNAM which is already accredited by the NQA. As it takes time to develop and accredit a specialised technological education training programme, interim training of technological teachers will take place at institutions for higher education in South Africa, such as the University of the Free State (Bloemfontein) and the North-West University (Potchefstroom).

The WCE teacher-training programme continues, although the training syllabus will be altered to comply with the new generic Basic Engineering school syllabus and the newly structured technological subjects in Grades 9 and 10. Students who have graduated at the WCE will be able to enrol for the B Ed (Technological Education) degree. They will receive credit for some of the subjects of the Basic Education Teachers' Diploma (BETD) and will be allowed to join the academic BETD graduates in the B Ed degree programme offered at UNAM.

8.12.2 In-service teacher training

In the proposed technological education model the technical schools will support all forms of teacher access to the upgrading of teaching qualifications or retraining, including post-graduate studies, to facilitate career development and contribute to overall technological teacher morale. School authorities are to identify teachers in their current workforce who have industry experience, and are interested in being trained to teach technological subjects but who do not meet the professional or subject training standards.

The main focus area will be the qualified artisans who teach technological subjects in technical schools. These teachers receive very poor salaries and will not stay in the school system very long (P. Thom, personal interview, 26 July 2005). It is imperative that UNAM accredit technical trade qualifications on the same level as other three-year diploma programmes such as the BETD course. In the proposed model these artisan-teachers will be motivated to enrol either in the current Higher Education Diploma (HED) or the B Ed degree programme at UNAM.

8.13 INTERNATIONAL COOPERATION

The new technological education model is to be tested against criteria that apply to similar programmes in neighbouring and other countries in order to improve. Teachers are to be encouraged to do research and attend conferences worldwide to build links and relationships with colleagues. Strong links have to be formed with South African institutions, because of historical, economic and academic considerations. Namibian technological teachers can only benefit from attending programmes at South African institutions of higher learning. Exchange programmes of teachers and learners between Namibian and South African technical schools will be initiated in order to expose people to new learning and teaching experiences. Cooperation with influential international organisations such as the ILO, UNICEF and SADC committees for education and training are to take place. For example, advantage will be taken from the services rendered by the International Centre for Vocational Training in Bonn, which was created to help developing countries such as Namibia to develop relevant technological education and vocational training systems (Werner and Bellaire, 2000: 1).

8.14 CONCLUSION

The new model breaks with the view that education should contribute to a "knowledge-based economy" which has the implication that education should be academically oriented only (see 3.6.2). Academic knowledge and technical skills are of equal importance in the new technological education model, and should be integrated and contribute to a "knowledge and skill based economy", rather than only a "knowledge-based economy". Besides promoting knowledge and skills, cognitive and practical, and qualities and values essential to full and gainful working lives, whether in paid jobs or self-employment, the proposed model will help learners gain experience and confidence, both vital to creating their own jobs.

The new model for technological education in Namibia will serve the people of Namibia in both extremes: on the one hand the demands of the private and public sector will determine the content, skills and methodology, and on the other hand the system will be user-friendly and provide the average Namibian citizen access to technological education more easily. For the first time in Namibia's history, technological education will reflect the real present trends and future prospects of its inhabitants without negating local and international tendencies.

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Appendix 1

Research Questionnaire: Learners

Would you please assist me in completing this important questionnaire? Unless requested to answer, please circle what you consider to be the most appropriate answer. Please be honest in all answers.

1. Who decided that you should attend a technical school? **Parents/Guardians Yourself**

2. Do your Parents/Guardians consider technical schools as valuable? **Yes No**

3. Why do you attend a technical school and not an academic school?

………………………………………………………………………………………………

4. Are you happy in the technical school which you attend? **Yes No**

Motivate your answer briefly. ……………………………………………………………

5. Do you think that going to a technical school will help you to get a job? **Yes No**

State the reason: ………………………………………………………………………

6. What type of job do you want to have after leaving school?

………………………………………………………………………………………………

7. How well do you think does the technical school that you attend prepare you for the job that you want to do? **Very well Well Not well Poorly**

8. Do you think that the content of the technical subjects is of a high standard? **Yes No**

9. Which technical subject(s) do you think will help you to get a job?

i) ………………………………….. ii) ………………………………………

10. Do you think that you will be able to get a job in your town? **Yes No**

11. Which technical subject do you enjoy most? ………………………………………

Motivation: ………………………………………………………………………………

12. What is the state of the equipment/machines in the classrooms? **Modern Outdated**

13. Are the equipment/machines in the technical workshops which are used for your training functioning well? **Yes No**

If no, state reason: ………………………………………………………………………

14. Are there enough tools for all the learners to work simultaneously? **No** **Yes**

15. Are there enough materials to work with? **Yes** **No**

<u>If no</u>, where do you get materials to work with? : ……………………………………

16. Are your parents/guardians expected to pay extra money for the technical education at the school? **No** **Yes**

17. Do you think that the technical teachers know the content of the technical subjects which they teach? **No** **Yes**

18. Do the technical teachers explain the work well? **Yes** **No**

19. Are the textbooks which you use of high quality content? **Yes** **No**

If no, state reason: ………………………………………………………………………

20. Would you attend a technical school elsewhere in Namibia? **Yes** **No**

State the reason: ………………………………………………………………………

21. Do you think that it is better to attend a technical school than an academic school?
No **Yes** State the reason: ……………………………………………………………

22. Do you want to become a qualified artisan? **Yes** **No**

23. Do you want to study further? **No** **Yes**

If yes, indicate which institution:
i) University ii) Polytechnic iii) Vocational Training Centre iv) Other: ………………

24. Which Degree/Diploma/Certificate do you intend to study? ………………………

25. Does the school take you on excursions to industry? **Yes** **No**

If yes, which industry? **……………………………………………………………**

26. Does the school have links with the industry in order for you to get practical experience in workshops after hours? **Yes** **No**

27. Which type of technical periods do you enjoy most? **Practical** **Theoretical**

28. Are you allowed to do practical work after school hours? **Yes** **No**

If no, why not? ………………………………………………………………………

Thank you very much for completing the questionnaire!

Appendix 2

Research Questionnaire: Teachers

Would you please assist me in completing this important questionnaire? Unless requested to answer, please circle what you consider to be the most appropriate answer. Try to be objective and honest as far as possible.

1. Do you enjoy teaching technical subjects at school? **Yes No**

2. What is your age? ……………………**years**

3. How many years have you been a technical teacher? …………………**years**

4. Did you work in the private sector before you started teaching? **Yes No**

   If yes, why did you become a teacher? ……………………………………………..

5. Do you get guidance/support in your subject area from subject advisors?
   Regularly Sometimes Very seldom Never

6. Is the workshop equipment adequate to teach the prescribed syllabus? **Yes No**

7. What is the condition of the equipment in your workshop?
   Very good Good Satisfactory Not good Unserviceable

8. Is the equipment serviced on an acceptable schedule? **Yes No**

   If yes, who pays for it? **MBESC School fund Other**

9. Do you have to use your own personal equipment to teach the syllabus? **Yes No**

   If yes, state the reason. ……………………………………………………………

10. Have you, regarding your subject, established a link with the industry? **Yes No**

11. Do you take your learners on excursions to the industry? **Yes No**

12. Does the industry support your subject area in any way in the school? **Yes No**
    If yes, how does the industry support you? ……………………………………...

13. Are your learners attached to the industry in any way? **Yes No**

    If yes, indicate how. ……………………………………………………………………

14. Is the availability of materials adequate for achieving syllabus objectives? **Yes No**

15. Do you receive materials on time to do practical work? **Yes No**

16. Do you have a technical qualification (e.g. an artisan)? **Yes No**

17. Do you have a professional teaching qualification (e.g. a teaching diploma/degree)? **Yes No**

    If yes, mention the qualification. ……………………………………………

    If no, why not? ……………………………………………………………

18. Do you wish to study further in your subject area? **Yes No**

    If no, state the reason. ……………………………………………………………

19. Do you want to study in subject areas other than technical subjects? **Yes No**

    If yes, state the reason. ……………………………………………………

20. Have you attended any ministerial workshops in your subject area? **Yes No**

21. What is the average number of learners in your class? ………………………

22. Do you generate extra funds for your subject through additional projects? **Yes No**

23. Does the school board allow you to do extra work in the workshops? **Yes No**

24. Do you think that the syllabi for technical subjects are well developed? **Yes No**

25. Do you think that the subject content links up with the needs of industry? **Yes No**

26. Do you get support from any Non-Governmental Organisation (NGO)? **Yes No**

    If yes, specify the support. ……………………………………………………

27. Do you have appropriate textbooks to teach the subject content? **Yes No**

28. Are you satisfied with the quality of prescribed technical textbooks? **Yes No**

29. What is the attitude of the principal regarding teaching of technical subjects at the school? **Positive Apathetic Negative**

30. Does the school management support the technical teachers in matters such as ordering of materials, curriculum support, etc.? **Yes No**

31. Do you know of learners who have a job as a result of their attendance in a technical school? **Yes No**

32. Do you know of learners who struggle to get a job despite their attendance in a technical school? **Yes No**

    If yes, why do they struggle to get a job? ……………………………………

33. If you were offered a better salary package elsewhere, would you resign as a technical teacher? **Yes No**
    If yes, why? ……………………………………………………………………

34. Which problem(s) needs urgent attention in technical education?
    ……………………………………………………………………………………

35. Which aspect(s) of technical education do you find as positive?

    ……………………………………………………………………………………

36. Would you encourage learners to become teachers in technical schools? **Yes No**
    Motivate your answer. ……………………………………………………………

37. Do you think that technical education finds itself in a crisis in Namibia? **Yes No**
    If yes, why ……………………………………………………………………

38. Do you think that the subject committee for technical subjects at the National Institute for Educational Development (NIED) is doing enough for the curriculum development of technical subjects? **Yes No**

39. Do you think that the so-called 'Schools of Excellence' will be to the benefit of technical education in Namibia? **Yes No**
    Motivate your answer. ……………………………………………………………

40. Do you think that technical education has the same status as other subjects such as mathematics and science to the Ministry of Basic Education and Culture (MBESC)? **Yes No**

Thank you very much for completing the questionnaire!

Appendix 3
Respondents' answers to questionnaire: Learners

1. Who decided that you should attend a technical school? Parents/Guardians Yourself

Who	Number	percent
Yourself	75	59,5
Parents/Guardians	35	27,8
Both	16	12,7
Total (n)	126	100,0

2. Do your Parents/Guardians consider technical schools as valuable? Yes No

Valuable	Number	percent
Yes	122	96,8
No	4	3,2
Total (n)	126	100,0

3. Why do you attend a technical school and not an academic school?

Reason for attending technical school	Number	percent
Acquire technical skills in a specific subject area	41	32,5
Want to do practical work with hands	23	18,3
Improve job opportunities	19	15,1
Want to become a professional (e.g. engineer)	9	7,1
Not good in academic work	8	6,3
Want to study in a technical field	5	4,0
Could not get a place in an academic school	2	1,6
Want to start own technical business	1	0,8
Thought that a technical school was easier	1	0,8
Provides mental and physical growth	1	0,8
No answer	16	12,7
Total (n)	126	100,0

4. Are you happy in the technical school which you attend? Yes No

Happy	Number	percent
Yes	89	70,6
No	37	29,4
Total (n)	126	100,0

Motivate your answer briefly:

Motivation	Number	percent
Valuable to life, better work opportunities	27	21,4
Good teachers	19	15,1
It is a good school	15	11,9
Not enough tools and equipment	15	11,9
Enjoy doing practical technical subjects	10	7,9
We do not do practical work	10	7,9
Lack of qualified teachers	3	2,4
Equipment are enough	2	1,6
Provides motivation in life to work hard	2	1,6
Choose the wrong technical subjects	2	1,6
Shorten studies to become an artisan	1	0,8
I am a girl and it open up doors for me	1	0,8
Lack of effort from the teachers	1	0,8
Everything	1	0,8
Not treated equally	1	0,8
No girls	1	0,8
Limited choice of technical subjects	1	0,8
Irrelevant reasons	12	9,5
No reason	2	1,6
Total (n)	126	100,0

5. Do you think that going to a technical school will help you to get a job? Yes No

Get a job	Number	percent
Yes	122	96,8
No	4	3,2
Total (n)	126	100,0

6. What type of job do you want to have after leaving school?

Type of job	Number	percent
Engineer	34	26,9
Mechanic (petrol & diesel)	17	13,4
Any technical job	13	10,3
Architect	10	7,9
Electrician	9	7,1
Fitter and turner	5	4,0
I T System analyst	5	4,0
Woodworker/carpenter	4	3,2
Electronic technician	4	3,2
Computers	4	3,2
Welder	3	2,4
Office work/administrator	3	2,4
Pilot	3	2,4
Welder	3	2,4
Pilot	3	2,4
Welder	3	2,4
Pilot	3	2,4
Tourism	2	1,6
Draughtsman	1	0,8
Miller	1	0,8
Boilermaker	1	0,8
Nature conservationist	1	0,8
Technical instructor	1	0,8
Builder (houses, constructions)	1	0,8
Teacher	1	0,8
Auditor	1	0,8
Psychologist	1	0,8
Study further	1	0,8
Total (n)	126	100,0

7. How well do you think does the technical school that you attend prepare you for the job that you want to do?
Very well Well Not well Poorly

Preparation	Number	percent
Very well	21	16,7
Well	69	54,8
Not well	28	22,2
Poorly	8	6,3
Total (n)	126	100,0

8. Do you think that the content of the technical subjects is of a high standard? Yes No

Content standard	Number	percent
Yes	75	59,5
No	47	37,3
No answer	4	3,2
Total (n)	126	100,0

9. Which technical subject(s) do you think will help you to get a job?

Subject(s)	Number
Motor mechanics	41
Design and Communication	27
Electricity	24
Metalwork and Welding	23
Technical drawing	22
Fitting and Turning	17
Woodwork	16

Electronics	13
Mathematics	9
Bricklaying, Plastering and Painting	7
Design and Technology	5
Computer studies	5
Sheet metalwork	2
Physical studies	2
English	1

10. Do you think that you will be able to get a job in your town? Yes No

Get job in town	Number	percent
Yes	84	66,7
No	41	32,5
No answer	1	0,8
Total (n)	126	100,0

11. Which technical subject do you enjoy most?

Subject	Number	percent
Design and Communication	31	24,6
Electricity	19	15,1
Woodwork	16	12,7
Motor mechanics	12	9,5
Metalwork and Welding	12	9,5
Technical drawing	9	7,1
Electronics	8	6,3
Design and Technology	5	4,0
Bricklaying, Plastering and Painting	4	3,2
Computer studies	3	2,4
Fitting and turning	2	1,6
No answer	5	4,0
Total (n)	126	100,0

12. What is the state of the equipment/machines in the classrooms? Modern Outdated

Equipment	Number	percent
Outdated	94	74,6
Modern	30	23,8
No answer	2	1,6
Total (n)	126	100,0

13. Are the equipment/machines in the technical workshops which are used for your training functioning well? Yes No

Functioning	Number	percent
Yes	65	51,6
No	60	47,6
No reason	1	0,8
Total (n)	126	100,0

If no, state reason:

Reason	Number	percent
Machines are not working, broken	41	68,3
Not available at all, cannot do practical work	7	11,7
Poor maintenance	6	10,0
Vandalism	5	8,3
Unsafe	1	1,7
Total (n)	60	100,0

14. Are there enough tools for all the learners to work simultaneously? No Yes

Enough tools	Number	percent
No	95	75,4
Yes	31	24,6
Total (n)	126	100,0

15. Are there enough materials to work with? Yes No

Enough materials	Number	percent
Yes	35	27,8
No	91	72,2
Total (n)	126	100,0

If no, where do you get materials to work with?

Materials	Number	percent
Buy and bring from home	78	85,7
From teachers	3	3,3
No practical work	3	3,3
Recycle materials	2	2,2
Donated by industry	1	1,1
No reasons	4	4,4
Total (n)	91	100,0

16. Are your parents/guardians expected to pay extra money for the technical education at the school?
No Yes

Pay extra money	Number	percent
Yes	67	53,2
No	59	46,8
Total (n)	126	100,0

17. Do you think that the technical teachers know the content of the technical subjects which they teach?
No Yes

Know content	Number	percent
Yes	115	91,3
No	10	7,9
No answer	1	0,8
Total (n)	126	100,0

18. Do the technical teachers explain the work well? Yes No

Work well explained	Number	percent
Yes	84	66,7
No	41	32,5
No answer	1	0,8

19. Are the textbooks which you use of high quality content? Yes No

Quality of textbooks	Number	percent
Yes	62	49,2
No	63	50,0
No answer	1	0,8
Total (n)	126	100,0

If no state the reason:

Content is outdated	29	46,0
Old textbooks that disintegrate	8	12,7
Textbook content does not correlate with syllabus	7	11,1
Content not well explained	6	9,5
Textbooks not available	5	8,0
No reason stated	8	12,7
Total (n)	63	100,0

20. Would you attend a technical school elsewhere in Namibia? Yes No

Attend technical school elsewhere	Number	percent
Yes	48	38,1
No	78	61,9
Total (n)	126	100,0

21. Do you think that it is better to attend a technical school than an academic school? No Yes

Technical school better than academic school	Number	percent
Yes	106	84,1
No	18	14,3
No answer	2	1,6
Total (n)	126	100,0

State the reason:

Reason	Number	percent
It will be easier to find a job	46	36,5
Provides practical skills	35	27,7
Technical education provides more options	13	10,3
I like academic work more	7	5,6
There is a shortage of technical people	4	3,2
Depend what job you wish to have	3	2,4
Technical schools provide limited subjects	2	1,6
Technical subjects are difficult	2	1,6
Provides more self-confidence in life	1	0,8
Do not have to study further	1	0,8
Supports the reconstruction of Namibia	1	0,8
Academic qualifications make one rich	1	0,8
Academic work provides more jobs	1	0,8
No or irrelevant reasons	9	7,1
Total (n)	126	100,0

22. Do you want to become a qualified artisan? Yes No

Become qualified artisan	Number	percent
Yes	101	80,2
No	19	15,0
No answer	6	4,8
Total (n)	126	100,0

23. Do you want to study further after school? No Yes

Study further	Number	percent
Yes	108	85,7
No	17	13,5
No answer	1	0,8
Total (n)	126	100,0

If yes, indicate which institution:
i) University ii) Polytechnic iii) Vocational Training Centre iv) Other

Type of Institution	Number	percent
Polytechnic	63	50,0
University	25	19,8
No or irrelevant answer	18	14,3
Vocational training centre	17	13,5
Other (NIMT)	3	2,4
Total (n)	126	100,0

24. Which Degree/Diploma/Certificate do you intend to study?

Study course	Number	percent
B. Sc Engineering	21	16,7
NTS 3-6	15	11,9
Trade diploma	9	7,1
B. Arch	4	3,2
B. Tech	7	5,5
Computers	2	1,6
B.Com	2	1,6
Medical Doctor	1	0,8
B. A. Degree	1	0,8
Technical certificate	1	0,8
Journalism	1	0,8
Pilot	1	0,8

Auditor	1	0,8
B. Sc	1	0,8
Tourism	1	0,8
No indication	58	46,0
Total (n)	126	100,0

25. Does the school take you on excursions to industry? Yes No

Excursions to industry	Number	percent
Yes	9	7,1
No	117	92,9
Total (n)	126	100,0

If yes, which industry?

Type of industry	Number	percent
Diesel electric	6	66,7
No indication	3	33,3
Total (n)	9	100,0

26. Does the school have links with the industry in order for you to get practical experience in workshops after hours?
Yes No

School-industry links	Number	percent
Yes	13	10,3
No	109	86,5
No answer	4	3,2
Total (n)	126	100,0

27. Which type of technical periods do you enjoy most? Practical Theoretical

Periods mostly enjoyed	Number	percent
Practical	113	89,7
Theoretical	10	7,9
Not answered	3	2,4
Total (n)	126	100,0

28. Are you allowed to do practical work after school hours? Yes No

Practical work after school	Number	percent
Yes	76	60,3
No	50	39,7
Total (n)	126	100,0

If no, why not?

Reason	Number	percent
Teachers not available	25	50,0
Theft and vandalism	8	16,0
Not enough tools & materials	4	8,0
Safety reasons	2	4,0
Learners do not show up	1	2,0
Irrelevant reasons	10	20
Total (n)	50	100,0

Appendix 4

Respondents' answers to questionnaire: Teachers

1. Do you enjoy teaching technical subjects at school? Yes No

Enjoy teaching	Number	percent
Yes	23	88,5
No	3	11,5
Total (n)	26	100,0

2. What is your age? . . .. . …………years

Age group	Number	percent
20-25 years	5	19,2
26-30 years	2	7,7
31-35 years	4	15,4
36-40 years	5	19,2
41-45 years	4	15,4
46-50 years	3	11,5
51-55 years	2	7,7
56-60 years	1	3,9
Total (n)	26	100,0

3. How many years have you been a technical teacher? …………………years

Experience	Number	percent
1-5 years	9	34,6
6-10 years	5	19,2
11-15 years	4	15,4
16-20 years	4	15,4
21-25 years	3	11,5
26-30years	1	3,9
Total (n)	26	100,0

4. Did you work in the private sector before you started teaching? Yes No

Private sector	Number	percent
Yes	11	42,3
No	15	57,7
Total (n)	26	100,0

If yes, why did you become a teacher? …………………………………………..

Reason becoming a teacher	Number	percent
Convey knowledge to the benefit of the nation	4	36,3
To teach children	1	9,1
It was a calling by God	1	9,1
Qualification as teacher	1	9,1
The company went bankrupt	1	9,1
Contract with company expired	1	9,1
Bursary commitments	1	9,1
No answer	1	9,1
Total (n)	11	100,0

5. Do you get guidance/support in your subject area from subject advisors?
Regularly Sometimes Very Seldom Never

Guidance/support	Number	percent
Regularly	4	15,4
Sometimes	3	11,5
Very seldom	8	30,8
Never	11	42,3
Total (n)	26	100,0

6. Is the workshop equipment adequate to teach the prescribed syllabus? Yes No

Equipment adequate	Number	percent
Yes	8	30,8
No	18	69,2
Total (n)	26	100,0

7. What is the condition of the equipment in your workshop?
Very good Good Satisfactory Not good Unserviceable

Condition of equipment	Number	percent
Very good	1	3,9
Good	2	7,7
Satisfactory	2	7,7
Not good	19	73,0
Unserviceable	2	7,7
Total (n)	26	100,0

8. Is the equipment serviced on an acceptable schedule? Yes No

Equipment serviced	Number	percent
Yes	2	7,7
No	24	92,3
Total (n)	26	100,0

9. Do you have to use your own personal equipment to teach the syllabus? Yes No

Use personal equipment	Number	percent
Yes	15	57,7
No	11	42,3
Total (n)	26	100,0

10. Have you, regarding your subject, established a link with the industry? Yes No

Link with industry	Number	percent
Yes	17	65,4
No	9	34,6
Total (n)	26	100,0

11. Do you take your learners on excursions to the industry? Yes No

Excursions to industry	Number	percent
Yes	15	57,7
No	11	42,3
Total (n)	26	100,0

12. Does the industry support your subject area in any way in the school? Yes No

Support from industry	Number	percent
Yes	7	26,9
No	19	73,1
Total (n)	26	100,0

If yes, how does the industry support you? ……………………………………...

Support from industry	Number	percent
Sponsor materials	3	42,8
Provide computers and broken machines to get components from	1	14,3
Get extra tuition at vocational centre	1	14,3
No answer	2	28,6
Total (n)	7	100,0

13. Are your learners attached to the industry in any way? Yes No

Learner's attached to industry	Number	percent
Yes	3	11,5
No	23	88,5
Total (n)	26	100,0

If yes, indicate how. ………………………………………………………………

Ways of attachment	Number	percent
Some learners work during holidays at the business	1	33,3
Help in welding workshop as sheet metal worker	1	33,3
No answer	1	33,4
Total (n)	3	100,0

14. Is the availability of materials adequate for achieving syllabus objectives? Yes No

Availability of materials	Number	percent
Yes	4	15,4
No	22	84,6
Total (n)	26	100,0

15. Do you receive materials on time to do practical work? Yes No

Materials on time	Number	percent
Yes	5	19,2
No	20	76,9
No answer	1	3,9
Total (n)	26	100,0

16. Do you have a technical qualification (e.g. an artisan)? Yes No

Technical qualification	Number	percent
Yes	6	23,1
No	20	76,9
Total (n)	26	100,0

17. Do you have a professional teaching qualification (e.g. a teaching diploma/degree)? Yes No

Professional teaching qualification	Number	percent
Yes	17	65,4
No	9	34,6
Total (n)	26	100,0

If yes, mention the qualification. ………………………………………………

Type of professional teaching qualification	Number	percent
Higher Education Diploma	11	64,7
B. Ed	3	17,6
Basic Education Teachers Diploma	2	11,8
No answer	1	5,9
Total (n)	17	100

If no, why not? ………………………………………………………………

Why no professional teaching qualification	Number	percent
Could not get leave for studies	1	11,1
No study opportunity in Namibia	2	22,2
Did not need the qualification	1	11,1
Busy studying	1	11,1
No answer	4	44,5
Total (n)	9	100,0

18. Do you wish to study further in your subject area? Yes No

Wish to study further in subject	Number	percent
Yes	19	73,1
No	7	26,9
Total (n)	26	100,0

If no, state the reason. ………………………………………………………………

Reason for no study intentions	Number	percent
Going to quit teaching	1	14,3
Retire in 3 years	1	14,3
Do not see any future in subject area	1	14,3
Would rather pursue in another area	1	14,3
No answer	3	42,8
Total (n)	7	100,0

19. Do you want to study in subject areas other than technical subjects? Yes No

Wish to study other subject areas	Number	percent
Yes	10	38,5
No	16	61,5
Total (n)	26	100,0

If yes, state the reason. ………………………………………………………

Reason for studying other subject areas	Number	percent
To become better qualified	5	50,0
Because of the financial costs	1	10,0
To have broader knowledge	1	10,0
Study in remedial education	1	10,0
Technical people are not well paid	1	10,0
No answer	1	10,0
Total (n)	10	100,0

20. Have you attended any ministerial workshops in your subject area? Yes No

MBESC workshops attended	Number	percent
Yes	17	65,4
No	9	34,6
Total (n)	26	100,0

21. What is the average number of learners in your class? ………………………

Average number of learners in class	Number	percent
1 -15	15	57,7
16-20	3	11,5
21-25	4	15,4
26-30	4	15,4
Total (n)	26	100,0

22. Do you generate extra funds for your subject through additional projects? Yes No

Extra funds generation	Number	percent
Yes	11	42,3
No	15	57,7
Total (n)	26	100,0

23. Does the school board allow you to do extra work in the workshops? Yes No

Does school board allow extra work	Number	percent
Yes	11	42,3
No	14	53,8
Answer not applicable	1	3,9
Total (n)	26	100,0

24. Do you think that the syllabi for technical subjects are well developed? Yes No

Technical subject syllabi well developed	Number	percent
Yes	14	53,8
No	12	46,2
Total (n)	26	100,0

25. Do you think that the subject content links up with the needs of industry? Yes No

Subjects' content relevant to industry	Number	percent
Yes	14	53,8
No	12	46,2
Total (n)	26	100,0

26. Do you get support from any Non-Governmental Organisation (NGO)? Yes No

NGO support	Number	percent
Yes	3	11,5
No	23	88,5
Total (n)	26	100,0

If yes, specify the support. ………………………………………………………

Type of support	Number	percent
Material from S.O.S.	2	66,7
Support from NIMT	1	33,3
Total (n)	3	100,0

27. Do you have appropriate textbooks to teach the subject content? Yes No

Appropriate textbooks	Number	percent
Yes	13	50,0
No	13	50,0
Total (n)	26	100,0

28. Are you satisfied with the quality of prescribed technical textbooks? Yes No

Qualitative of text book	Number	percent
Yes	14	53,8
No	12	46,2
Total (n)	26	100,0

29. What is the attitude of the principal regarding teaching of technical subjects at the school?
Positive Apathetic Negative

Attitude of principals	Number	percent
Positive	18	69,2
Apathetic	6	23,1
Negative	2	7,7
Total (n)	26	100,0

30. Does the school management support the technical teachers in matters such as ordering of materials, curriculum support, etc.? Yes No

Support from school management	Number	percent
Yes	22	84,6
No	4	15,4
Total (n)	26	100,0

31. Do you know of learners who have a job as a result of their attendance in a technical school?
Yes No

Job as a result of technical education	Number	percent
Yes	23	88,5
No	3	11,5
Total (n)	26	100,0

32. Do you know of learners who struggle to get a job despite their attendance in a technical school?
Yes No

Do learners struggle to get a job	Number	percent
Yes	11	42,3
No	15	57,7
Total (n)	26	100,0

If yes, why do they struggle to get a job? ………………………………………

Reason for struggling getting a job	Number	percent
Quality of technical education too low	2	16,7
Syllabi not job-market oriented	2	16,7
Blatant laziness	1	8,3
Lack of motivation in technical field	1	8,3
Few industries, high competition	1	8,3
Job opportunities are limited	1	8,3
Status of technical education poor	1	8,3
Accreditation problems	1	8,3
No answer	2	16,8
Total (n)	12	100,0

33. If you were offered a better salary package elsewhere, would you resign as a technical teacher?
Yes No

Resign as technical teacher	Number	percent
Yes	20	76,9
No	6	23,1
Total (n)	26	100,0

If yes, why? ……………………………………………………………………

Why resign as technical teacher?	Number	percent
Cannot support a family on a teachers' salary, better living conditions	12	60,0
Salary not market related	1	5,0
To get promotion	1	5,0
Technical education not regarded as important	1	5,0
Less work stress	1	5,0
Not really interested in technical education	1	5,0
No answer	3	15,0
Total (n)	20	100,0

34. Which problem(s) needs urgent attention in technical education?
………………………………………………………………………………………

Problems(s) in technical education	Number
Workshops need to be upgraded-tools & equipment	15
Learners are forced to take technical subjects due to a lack of places in schools in academic fields of study	11
MBESC funding and support of technical education should be better	4
Syllabi content should be relevant to job-market	3
Salaries of teachers should be competitive	3
Accreditation of technical education, Gr. 12 & N3	3
Materials	3
Links with private sector - practical work & materials	1
MBESC officials should realise importance of technical education	1
Teacher training opportunities	1
Promotion opportunities for technical teachers	1
Discipline of learners	1
Support and guidance from subject advisors	1
Class sizes too big, should be reduced to 15 maximum	1

35. Which aspect(s) of technical education do you find as positive?

………………………………………………………………………………………

Positive aspects(s) of technical education	Number
Learners can get work easier & self-employment	6
Enjoy practical work	4
I enjoy & appreciate all aspects of technical education	4
Technical education is hands-on training	3
To work with children & help them	2
Problem solving skills that learners acquire	2
No answer	2
Nothing positive	2
Enjoy teaching theory	1
Satisfaction when learners complete projects	1

36. Would you encourage learners to become teachers in technical schools? Yes No

Encourage learners to become teachers	Number	percent
Yes	17	65,4
No	9	34,6
Total (n)	26	100,0

Motivate your answer. ………………………………………………………

Motivation for encouraging learners	Number	percent
Technical education is important, the backbone of the economy, need more technical people	5	19,1
Teachers are not well paid	4	15,3
Namibia need qualified technical teachers & trainers	3	11,5
Technical education need more teachers in the system	3	11,5
Private sector offer better opportunities	3	11,5
Technical education can reduce unemployment	2	7,7
To plough back expertise, skills and knowledge	1	3,9
Technical education is good, enjoyable and nice	1	3,9
To keep technical education alive	1	3,6
Too few vacancies in technical education	1	3,9

MBESC officials not doing their work	1	3,9
No answer	1	3,9
Total (n)	26	100,0

37. Do you think that technical education finds itself in a crisis in Namibia? Yes No

Is technical education in a crisis	Number	percent
Yes	21	80,8
No	5	19,2
Total (n)	26	100,0

38. Do you think that the subject committee for technical subjects at the National Institute for Educational Development (NIED) is doing enough for the curriculum development of technical subjects? Yes No

Is NIED subject committee doing enough	Number	percent
Yes	10	38,5
No	15	57,6
No answer	1	3,9
Total (n)	26	100,0

39. Do you think that the so-called 'Schools of Excellence' will be to the benefit of technical education in Namibia?
Yes No

Schools of excellence beneficial	Number	percent
Yes	15	57,8
No	9	34,6
No answer	2	7,8
Total	26	100,0

40. Do you think that technical education has the same status as other subjects such as mathematics and science to the Ministry of Basic Education and Culture (MBESC)? Yes No

Status of technical education	Number	percent
Yes	4	15,4
No	22	84,6
Total (n)	26	100,0

Appendix 5

Learner enrolments in technical subjects in secondary schools

Bricklaying and Plastering

Year	1994	1996	1997	1998	1999	2000	2001
Gr. 8	17	26	19	50	78	111	57
Gr. 9	69	48	31	43	77	72	128
Gr.10	121	56	106	47	39	71	73
Total	**219**	**153**	**156**	**140**	**194**	**254**	**258**
Gr.11	12	10	7	12	4	4	8
Gr.12	0	13	9	7	12	4	3
Total	**12**	**23**	**16**	**19**	**16**	**8**	**11**

Electricity

Year	1994	1996	1997	1998	1999	2000	2001
Gr. 8	36	45	138	79	86	69	70
Gr. 9	76	83	55	101	99	98	93
Gr.10	57	60	43	48	84	92	77
Total	**169**	**252**	**236**	**228**	**269**	**259**	**240**
Gr.11	50	31	40	20	24	23	39
Gr.12	9	33	25	32	22	26	21
Total	**59**	**64**	**65**	**58**	**46**	**49**	**60**

Electronics

Year	1994	1996	1997	1998	1999	2000	2001
Gr. 8	-	-	-	179	30	-	-
Gr. 9	-	-	-	-	38	30	19
Gr.10	-	-	-	-	15	2	-
Total	**-**	**-**	**-**	**179**	**83**	**32**	**19**
Gr.11	6	9	8	14	8	22	15
Gr.12	-	14	5	8	12	10	18
Total	**6**	**23**	**13**	**22**	**20**	**32**	**33**

Fitting and Turning

Year	1994	1996	1997	1998	1999	2000	2001
Gr. 8	18	9	9	29	-	7	8
Gr. 9	11	26	14	10	24	8	27
Gr.10	11	19	23	16	13	21	7
Total	**40**	**54**	**46**	**55**	**37**	**36**	**42**
Gr.11	7	9	699	17	11	9	17
Gr.12	6	8	413	15	15	12	5
Total	**13**	**17**	**1112**	**32**	**26**	**21**	**22**

Metalwork

Year	1994	1996	1997	1998	1999	2000	2001
Gr. 8	31	48	43	42	88	62	80
Gr. 9	32	45	11	76	89	58	108
Gr.10	54	67	66	6	75	24	164
Total	**117**	**160**	**120**	**124**	**252**	**144**	**352**
Gr.11	-	16	28	62	17	14	24
Gr.12	56	40	1	6	29	4	11
Total	**56**	**56**	**29**	**68**	**46**	**18**	**35**

Motor Mechanics

Year	1994	1996	1997	1998	1999	2000	2001
Gr. 8	210	140	87	117	118	115	90
Gr. 9	135	151	124	101	132	123	144
Gr.10	84	117	148	110	95	115	69
Total	**429**	**408**	**359**	**328**	**345**	**353**	**303**
Gr.11	67	80	71	113	40	40	37
Gr.12	37	66	59	66	74	87	37
Total	**104**	**146**	**130**	**179**	**114**	**127**	**74**

Panel Beating and Spray Painting

Year	1994	1996	1997	1998	1999	2000	2001
Gr. 8	-		-		-		
Gr. 9	7		2		-		
Gr.10	0		4		-		
Total	**7**		**6**		**-**		
Gr.11	8		-		18		
Gr.12	-		-		22		
Total	**8**		**-**		**40**		

Technical Drawing

Year	1994	1996	1997	1998	1999	2000	2001
Gr. 8	605	486	573	652	805	746	609
Gr. 9	433	488	440	557	608	645	625
Gr.10	302	369	429	337	468	456	442
Total	**1593**	**1343**	**1442**	**1546**	**1881**	**1847**	**1676**
Gr.11	140	168	177	218	140	118	132
Gr.12	113	97	155	196	170	111	82
Total	**253**	**265**	**332**	**414**	**310**	**229**	**214**

Welding and Metalwork

Year	1994	1996	1997	1998	1999	2000	2001
Gr. 8	69	37	59	78	52	95	67
Gr. 9	87	61	71	34	45	74	43
Gr.10	47	26	37	60	49	37	16
Total	**203**	**124**	**167**	**172**	**146**	**206**	**126**
Gr.11	65	10	14	13	7	15	9
Gr.12	3	12	23	33	14	15	16
Total	**68**	**22**	**37**	**46**	**21**	**30**	**25**

Woodwork

Year	1994	1996	1997	1998	1999	2000	2001
Gr. 8	994	586	695	717	760	717	663
Gr. 9	710	558	550	594	613	593	651
Gr.10	545	554	462	441	486	459	453
Total	**2249**	**1861**	**1707**	**1752**	**1859**	**1769**	**1767**
Gr.11	110	84	113	82	53	68	83
Gr.12	167	79	74	77	72	54	66
Total	**277**	**163**	**187**	**159**	**152**	**122**	**149**

Appendix 6
Junior Secondary technical subject examination results

Bricklaying & Plastering and Painting

Year	Learners	A	B	C	D	E	F	G	Ungr.	Incompl.
1996	58	0,0	0,0	5,2	27,6	22,4	39,7	5,2	0,0	0,0
1997	109	1,8	2,8	6,4	27,5	19,3	22,0	12,8	7,3	0,0
1998	48	2,1	2,1	20,8	14,6	27,1	18,8	6,3	8,3	-
1999	39	2,6	15,4	12,8	20,5	15,4	15,4	12,8	5,1	0,0
2000	71	1,4	7,0	14,1	25,4	29,6	19,7	2,8	0,0	0,0
2001	72	4,2	4,2	16,7	22,2	33,3	12,5	6,9	0,0	0,0

Electricity

Year	Learners	A	B	C	D	E	F	G	Ungr.	Incompl.
1996	61	11,5	11,5	9,8	8,2	13,1	9,8	11,5	23,0	1,6
1997	42	9,5	4,8	16,7	14,3	16,7	17,7	14,3	7,1	0,0
1998	48	2,1	8,3	20,8	18,8	8,3	8,3	14,6	16,7	2,1
1999	86	2,3	5,8	11,6	12,8	9,3	7,0	10,5	34,9	5,8
2000	98	3,1	6,1	16,3	12,2	2,0	7,1	16,3	36,7	0,0
2001	82	1,2	6,1	15,9	11,0	20,7	12,2	6,1	22,0	4,9

Fitting and Turning

Year	Learners	A	B	C	D	E	F	G	Ungr.	Incompl.
1996	19	0,0	0,0	21,1	15,8	15,8	10,5	15,8	21,1	0,0
1997	23	4,3	4,3	13,0	17,4	8,7	30,4	17,4	4,3	0,0
1998	16	6,3	6,3	12,5	18,8	12,5	6,3	25,0	12,5	-
1999	13	7,7	0,0	15,4	23,1	0,0	0,0	7,7	46,1	0,0
2000	21	4,8	1,4	4,8	23,8	14,3	0,0	4,8	33,3	0,0
2001	7	14,3	0,0	14,3	28,6	14,3	28,6	0,0	0,0	0,0

Motor Mechanics

Year	Learners	A	B	C	D	E	F	G	Ungr.	Incompl.
1996	116	1,7	2,6	6,9	12,9	12,1	24,1	26,7	12,1	0,9
1997	145	3,4	2,8	6,2	13,8	13,8	25,5	23,4	10,3	0,7
1998	109	0,9	3,7	8,3	8,3	6,4	13,8	18,3	39,4	0,9
1999	93	3,2	8,6	5,4	8,6	10,8	4,3	11,8	45,2	2,2
2000	87	3,4	9,2	8,0	14,9	9,2	4,6	13,8	36,8	0,0
2001	90	3,3	8,9	10,0	14,4	5,6	18,9	7,8	31,1	0,0

Technical Drawing

Year	Learners	A	B	C	D	E	F	G	Ungr.	Incompl.
1996	366	1,9	4,1	16,1	23,0	15,0	15,0	12,0	12,3	0,5
1997	436	3,9	8,3	9,9	20,6	17,0	12,6	12,8	14,0	0,9
1998	357	5,6	12,6	9,8	14,3	9,8	7,8	11,5	28,0	0,6
1999	482	3,5	6,0	18,0	16,6	11,6	15,6	11,4	15,4	1,9

2000	468	4,7	7,9	17,7	13,2	11,8	14,1	13,7	16,7	0,2
2001	509	6,3	9,0	13,0	13,6	13,9	14,5	12,4	14,9	2,4

Metalwork and Welding

Year	Learners	A	B	C	D	E	F	G	Ungr.	Incompl.
1996	93	0,0	3,2	11,8	18,3	19,4	11,8	12,9	22,6	0,0
1997	105	0,0	1,9	10,5	12,4	11,4	23,8	19,0	19,0	1,9
1998	67	3,0	-	10,4	13,4	9,0	10,4	19,4	31,3	3,0
1999	96	2,1	5,2	3,1	12,5	13,5	24,0	15,6	20,8	3,1
2000	60	0,0	1,7	6,7	18,3	16,7	11,7	21,7	23,7	0,0
2001	110	3,6	8,2	11,8	11,8	15,5	11,8	15,5	20,9	0,9

Woodwork

Year	Learners	A	B	C	D	E	F	G	Ungr.	Incompl.
1996	514	1,6	5,3	16,9	33,1	15,8	13,8	7,2	4,7	1,8
1997	463	2,6	6,3	21,0	27,9	21,0	12,7	5,2	0,4	3,0
1998	455	5,1	9,2	15,6	23,1	17,1	11,6	11,0	5,5	1,8
1999	457	6,1	12,7	13,8	21,0	9,0	11,6	11,4	13,6	0,9
2000	472	3,4	10,6	13,8	17,8	20,6	16,9	11,9	4,7	0,4
2001	453	1,8	6,2	16,8	18,3	13,5	15,2	16,1	11,5	0,7

Appendix 7

Senior Secondary technical subject examination results

International General Certificate of Secondary Education (IGCSE) examination results

Design and Realisation: Bricklaying & Plastering and Painting

Year	Learners	A	B	C	D	E	F	G	Ungr.	Incomp.
1996	13	-	-	-	23,1	15,4	53,8	7,7	-	-
1997	10	-	-	10,0	30,0	30,0	20,0	-	10,0	-
1998	7	-	-	85,7	14,3	-	-	-	-	-
1999	12	-	-	25,0	25,0	25,0	16,7	-	-	8,3
2000	5	-	-	-	40,0	40,0	-	-	-	20,0
2001	4	-	-	25,0	50,0	25,0	-	-	-	-

Technology and Practice: Electricity

Year	Learners	A	B	C	D	E	F	G	Ungr.	Incomp.
1996	15	-	-	13,8	12,9	6,6	20,0	26,7	20,0	-
1997	25	-	-	4,0	12,0	12,0	16,0	32,0	24,0	-
1998	37	-	-	10,8	10,8	21,6	29,7	16,2	10,9	-
1999	20	5,0	10,0	20,0	20,0	15,0	-	15,0	15,0	-
2000	26	-	3,8	15,4	11,5	23,1	26,9	11,5	7,7	-
2001	21	-	-	19,0	14,3	19,0	19,0	14,3	9,5	4,8

Technology and Practice: Electronics

Year	Learners	A	B	C	D	E	F	G	Ungr.	Incomp.
1996	14	7,1	28,6	35,7	14,3	7,2	-	7,1	-	-
1997	9	-	11,1	44,4	33,3	11,1	-	-	0,1	-
1998	8	12,5	50,0	25,0	-	12,5	-	-	-	-
1999	15	-	40,0	26,7	20,0	6,7	-	6,7	-	-
2000	10	10,0	10,0	30,0	30,0	10,0	10,0	-	-	-
2001	11	-	54,5	27,3	18,2	-	-	-	-	-

Design and Realisation: Fitting and Turning

Year	Learners	A	B	C	D	E	F	G	Ungr.	Incomp.
1996	8	-	25,0	37,5	25,0	12,5	-	-	-	-
1997	7	-	-	25,5	14,3	-	28,6	26,6	5,0	-
1998	15	-	-	26,7	20,0	33,3	13,3	6,7	-	-
1999	15	13,3	6,7	-	6,7	53,3	6,7	13,3	-	-
2000	13	0,0	15,4	23,1	23,1	-	7,7	30,8	-	-
2001	5	-	20,0	40,0	-	40,0	-	-	-	-

Technology and Practice: Motor Mechanics

Year	Learners	A	B	C	D	E	F	G	Ungr.	Incomp.
1996	55	1,8	3,7	10,9	12,7	34,7	18,0	10,9	7,3	-
1997	53	1,9	3,8	7,5	15,1	20,5	26,4	17,0	7,8	-
1998	58	1,7	5,2	6,9	6,9	5,2	20,7	29,3	24,1	-

1999	69	2,9	5,8	13,0	8,7	10,1	10,1	11,6	11,6	26,1
2000	48	6,3	2,1	12,5	14,6	14,6	25,0	12,5	4,2	8,3
2001	35	2,9	5,7	8,6	17,1	11,4	31,4	14.3	8,6	-

Design and Communication: Technical Drawing

Year	Learners	A	B	C	D	E	F	G	Ungr.	Incomp.
1996	134	1,5	1,5	3,7	8,2	35,8	20,2	19,4	9,7	-
1997	140	-	-	22,6	22,5	24,8	10,9	3,1	0,6	-
1998	174	0,6	2,3	5,2	12,6	20,1	24,7	23,6	10,9	-
1999	201	0,5	2,5	6,5	11,4	19,9	28,9	16,9	7,0	6,5
2000	123	-	3,3	4,9	11,4	17,1	30,1	17,1	6,5	9,8
2001	94	1,1	6,4	10,6	17,0	22,3	25,5	12,8	2,1	2,1

Design and Realisation: Metalwork and Welding

Year	Learners	A	B	C	D	E	F	G	Ungr.	Incomp.
1996	52	-	-	17,8	13,0	50,0	13,4	2,5	3,3	-
1997	24	-	-	29,2	33,3	12,5	16,7	4,2	4,1	-
1998	40	-	5,0	27,5	27,5	25,0	12,5	2,5	-	-
1999	36	-	11,1	11,1	25,0	27,8	11,1	2,8	11,1	-
2000	22	4,5	-	40,9	22,7	13,6	13,6	-	-	4,5
2001	26	-	19,2	34,6	11,5	15,4	3,8	15,4	-	-

Design and Realisation: Woodwork

Year	Learners	A	B	C	D	E	F	G	Ungr.	Incomp.
1996	66	3,0	3,1	25,4	35,2	24,2	7,6	1,5	-	-
1997	65	4,5	15,4	32,3	24,6	16,9	4,6	1,5	0,2	-
1998	54	7,4	20,4	29,6	14,8	13,0	14,8	-	-	-
1999	74	1,4	24,3	33,8	24,3	5,4	2,7	2,7	1,4	4,1
2000	53	3,8	20,8	43,4	24,5	5,7	-	1,9		
2001	65	1,5	9,2	43,1	35,4	10,8	-	-	-	-

Higher International General Certificate of Secondary Education (H)IGCSE examination results

HIGCSE subjects are graded from 1 to 4, where a 1 indicates the best achievement. Ungraded candidates have been listed in the column “U”, and those who did not complete all papers of the examination under “I”.

Design and Technology

Year	Learners	1	2	3	4	Ungr.	Incomp.
1996	17	-	17,6	47,1	23,5	11,8	-
1997	22	-	4,5	22,7	31,8	41,0	-
1998	17	11,8	23,5	41,2	23,5	-	-
1999	18	16,7	38,9	27,8	16,7	-	-
2000	31	22,6	48,4	19,4	9,7	-	-
2001	33	18,2	24,2	27,3	30,3	-	-

Appendix 8

Qualifications of technical teachers

Craft and Technology

Year	Total	Less than Gr. 12	Gr. 12	Gr. 12 + 1 or 2 years	Gr. 12 + 3 or more years
1998	571				
1999	557	266	68	127	96
2000	498	225	45	94	134
2001	470	190	57	79	144

Motor Mechanics

Year	Total	Less than Gr. 12	Gr. 12	Gr. 12 + 1 or 2 years	Gr. 12 + 3 or more years
1999	12	4	-	2	6
2000	12	2	-	4	6
2001	13	1	1	4	7

Technical Drawing

Year	Total	Less than Gr. 12	Gr. 12	Gr. 12 + 1 or 2 years	Gr. 12 + 3 or more years
1999	46	8	6	4	28
2000	40	7	2	5	26
2001	36	4	-	5	27

Woodwork

Year	Total	Less than Gr. 12	Gr. 12	Gr. 12 + 1 or 2 years	Gr. 12 + 3 or more years
1999	43	4	3	3	33
2000	40	2	1	3	34
2001	41	5	-	2	34

Appendix 9

Interview questions put to Mr. A. Von Weiss (Lecturer at the Windhoek College of Education, responsible for the training of technical teachers)

1. How many lecturers are there for the training of technical teachers at the College?
2. Are you able to train the student teachers in all aspects of the syllabus?
3. Do you get support from your colleagues with regard to teacher training in the technical field of study?
4. Do you think that the current [2005] training syllabus prepares the teachers well for teaching technical education?
5. Do you have sufficient materials to train the practical part of the syllabus?
6. Do you receive materials regularly from the Ministry of Education?
7. Are the equipment, tools and machines suitable for the training of teachers?
8. Is the equipment regularly serviced?
9. Do you have to use your personal tools and equipment in training teachers?
10. Does the Ministry of Education visit you regularly?
11. Do you have any links with the private sector?
12. How many student teachers are you training currently [2005] in the technical education field of study?
13. Where do these students come from?
14. Did all of them have technical education as a subject while they attended school?
15. At what level do the teachers teach technical subjects at schools, for example primary, junior secondary or senior secondary level?
16. Are you involved in the design of the syllabi regarding technical education to replace the current technical education syllabi with one generic syllabus?
17. Would you be able to train teachers for the new generic syllabus according to the syllabus that you are currently [2005] using?
18. Should technical teachers have practical skills?
19. Do the teachers that graduate from the College teach technical subjects at school?
20. What are the problems you experience as a lecturer training technical teachers?

Appendix 10

Interview questions put to Mr. A. Moller (Education Officer at the National Institute for Educational Development responsible for technical education)

1. What is your responsibility as Education Officer at NIED?
2. How do you see the role of NIED in technical education?
3. Do you think that Namibian learners can benefit from taking a technical subject?
4. Do you think that technical education has a high status in Namibia?
5. If answered 'no', how can technical education be promoted amongst Namibians?
6. Do you think that the new generic technical subjects which are in the process of development will answer better to society's needs than the current syllabi?
7. What is the rationale behind changing the current technical education subjects?
8. Is the private sector, e.g. industries, involved in the design of the new subjects?
9. Was there a market research survey amongst enterprises and industries before the design of the new syllabus commenced?
10. When will the new generic technical subjects be implemented?
11. What will the new generic technical subjects be called?
12. Will the current technical teachers in the schools be able to teach the new generic subject without re-training or in-service training?
13. Do you think that new technical teachers will have to be trained differently than what is the current training approach in order to teach this subject?
14. At which institution of higher learning should technical teachers be trained?
15. Will the new technical subjects require different textbooks than the books that are currently [2005] used?
16. Why are so few schools in Namibia offering technical education?
17. How can technical schools link with private institutions?
18. Do you think that technical education will benefit from the unification of the previous two education ministries?
19. Do you think technical schools will continue to exist in Namibia?
20. What are the main challenges facing technical education in Namibia today?
21. How can unemployed Grade 10 school-leavers be trained?

Appendix 11

Interview questions put to members of school management at technical schools

1. What is the status of technical education in Namibia?
2. Are the technical teachers in your school well trained in the technical subjects?
3. Do you think that children benefit from taking technical subjects?
4. Are the materials at your school sufficient to teach technical subjects?
5. What is the condition of the equipment in the technical workshops?
6. Are there teachers who have to use personal equipment to teach the syllabus?
7. Are the machines serviced regularly?
8. Has the Ministry of Education informed you that technical education at school level is going to change? How do you feel about the new approach to technical education?
9. Are the teachers at your school involved in the design of the new technical education syllabi?
10. Does the Ministry of Education communicate regularly with you about changes in policy?
11. Have any technical teachers at your school attended workshops in technical subjects recently?
12. Do the technical teachers at the school get regular support from subject advisors?
13. Have you introduced extra technical courses in your school recently?
14. If ‘yes’, what is the attitude of the Ministry of Education in this regard?
15. Does the community want technical education at school level?
16. Does the Ministry of Education organise links with the private sector for schools?
17. Is there an organised programme at your school according to which you form links with the private sector?
18. Are there any learners at your school who are attached to private enterprises?
19. Do you think that technical education officials such as school principals and technical education planners should have a technical background?
20. What are the major challenges to technical education in Namibia?

Appendix 12

Interview questions put to previous principals of schools

1. What was the standard of technical education before independence compared to after independence?
2. What were the reasons for scaling down technical education at the secondary schools?
3. Did the technical teachers receive any support from advisory teachers?
4. Did the technical teachers attend any workshops or in-service training to familiarise themselves with aspects regarding technical education such as changes in syllabi?
5. Do you think that technical education is an important subject area that should be taught at school level?
6. What type of learner usually chose technical subjects?
7. Do you think that technical education is a viable and sustainable option at private schools?
8. Will technical education benefit in any way from the ETSIP project?

Appendix 13

INTERVIEWS

Interviews (recorded):

1. De Swart, T.W. Previous principal of a secondary school in Windhoek. Personal interview, 23 September 2005.

2. Green, Q. Principal of School D. Personal interview, 24 September 2005.

3. Moller, L. Education Officer at the National Institute for Educational Development (NIED), Okahandja. Personal interview, 28 July 2005.

4. Thom, P. Head of Department, School A. Personal interview, 26 July 2005.

5. Von Weiss, A. Lecturer at a Namibian College of Education. Personal interview, 25 July 2005.

Interviews (non-recorded):

1. Greef, B. Previous principal of a secondary school in Windhoek. Personal interview, 23 September 2001.

2. Korff, V. Project Manager, NAMAS Pre-Vocational Education Project. Personal interview, 29 January 2003.

3. Van Wyk, A. Head of Department: Technical Teacher Training, Graaff-Reinet Teacher Training College. Personal interview, 9 February 2003.