

# **The Dental Therapy Curriculum: Meeting Needs and Challenges for Oral Health Care in South Africa**

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## **SUPERVISOR'S AUTHORIZATION**

As the supervisor of the candidate, I agree/ do not agree to the submission of this thesis.

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## **ABSTRACT**

This study reviews the three-year Bachelor of Dental Therapy curriculum, which was introduced at the University of KwaZulu-Natal in 1980. The dental therapist was introduced to the health care system during the apartheid era, to improve access to basic dental services to disadvantaged sectors of the population. However thirty years later, this situation has not improved. Therefore the purpose of this study is to evaluate the dental therapy curriculum offered at this university, to determine whether it is able to produce graduates who are adequately prepared to practice competently, according to the scope of practice prescribed by the regulatory body, and to meet the oral health needs of the population.

To conduct a comprehensive evaluation, it was necessary to evaluate the multiple influences on this curriculum. As a result, the Hicks model called Typical Influences on Curriculum was selected to serve as the theoretical framework. This resulted in the use of the mixed methods research approach. Pragmatism was consequently selected to form the philosophical foundation of this study due to the fact that it allowed for the combination of methodological tools to answer the research questions.

The first question defined the role of the dental therapist in the health care system. Qualitative interviews with all stakeholders who are associated with this profession, in the context of the needs of the country, provided the answer to this question. The second question, on how the curriculum prepared its graduates to perform this role, was conducted by a combination of methods. The evaluation of the form and content of the curriculum, and the training facilities, were combined with the interviews conducted with students, graduates and academics, on their perceptions of the educational process and the competence of graduates. The third question about the perceptions of stakeholders on the appropriateness of training and clinical competence was established by qualitative interviews. This led to the development of the inferences and recommendations for this study.

The overall inference was that the dental therapy curriculum did not produce appropriately-trained graduates to meet the needs and challenges of South Africa. This resulted in the development of a new curriculum evaluation model for health science education, which was considered to be an extension of the Hicks model. Recommendations were also made on how this model could be implemented with respect to the dental therapy curriculum.

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## TABLE OF CONTENTS

<b>Supervisor's Authorization .....</b>	<b>2</b>
<b>Declaration.....</b>	<b>3</b>
<b>Abstract.....</b>	<b>4</b>
<b>Acknowledgements.....</b>	<b>5</b>
<b>Table of Contents .....</b>	<b>6</b>
<b>List of Figures .....</b>	<b>12</b>
<b>List of Tables .....</b>	<b>13</b>
<b>Chapter 1 Introduction to the Study .....</b>	<b>15</b>
1.1 Introduction .....	15
1.2 Background Context.....	17
1.2.1 The Dental Therapy Profession in South Africa.....	17
1.2.2 The Training Institution .....	18
1.2.3 The Regulatory Body.....	20
1.2.4 The Health Service Providers .....	21
1.2.5 The Primary Health Care Approach .....	21
1.3 Problem Statement .....	25
1.4 Purpose of This Study .....	28
1.5 Theoretical Framework .....	29
1.6 Mixed Methodology.....	29
1.6.1 Purpose of Mixing .....	30
1.6.2 Research Design .....	30
1.7 Research Questions .....	31
1.8 Phases of This Study .....	31
1.9 Format of the Thesis.....	33
1.10 Role of the Researcher .....	35
1.11 Ethical Considerations .....	37
1.11.1 Ethical Approval.....	37
1.11.2 Gatekeeper Permission .....	37
1.11.3 Informed Consent .....	37
1.12 Conclusion .....	38
<b>Chapter 2 The Dental Therapy Profession in South Africa.....</b>	<b>39</b>
2.1 Introduction .....	39
2.2 History of South Africa.....	39
2.3 Inequities in South Africa Today .....	41
2.3.1 Demographic Profile.....	41
2.3.2 Socioeconomic Status.....	43
2.3.3 Governance .....	43
2.4 The South African Health Care System.....	44
2.4.1 Health Care in the Apartheid Era.....	44
2.4.2 Transformation of the Health Care System .....	44
2.4.3 The Burden of Disease.....	48
2.4.4 Inequities in Health Status .....	48
2.5 Oral Health Care in South Africa.....	49

2.5.1	History of the Dental Profession.....	49
2.5.2	Training of Oral Health Personnel.....	51
2.5.3	Imbalances in the Oral Health Workforce .....	52
2.5.4	Service Provision in the Public Sector.....	54
2.5.5	Oral Health Status.....	56
2.6	The Dental Therapy Profession.....	60
2.6.1	Origin of the Profession.....	60
2.6.2	Training of Dental Therapists – the New Zealand Experience.....	61
2.6.3	International Extension of This Profession.....	63
2.6.4	Quality of Care and Opportunity Costs .....	66
2.6.5	Job Satisfaction.....	67
2.6.6	A New Concept – the Oral Health Therapist.....	68
2.7	The Dental Therapy Profession in South Africa .....	68
2.7.1	Introduction to South Africa.....	69
2.7.2	Scope of Practice .....	70
2.7.3	Improving Access for Disadvantaged Communities .....	71
2.8	Conclusion .....	73
	<b>Chapter 3 Curriculum Evaluation: Framing the Theory .....</b>	<b>75</b>
3.1	Introduction.....	75
3.2	Definition of Curriculum.....	76
3.3	Curriculum Development.....	80
3.3.1	Curriculum Design.....	80
3.3.2	Curriculum Dissemination.....	81
3.3.3	Curriculum Implementation.....	82
3.3.4	Curriculum Evaluation.....	83
3.4	Curriculum Design Models in Higher Education.....	83
3.4.1	Biggs’s 3P Model of Teaching and Learning .....	84
3.4.2	Barnett and Coate Schema for Curricula .....	85
3.4.3	Van Den Akker Curricular Spider Web.....	86
3.4.4	Higher Education Academy Curriculum Model .....	87
3.4.5	Hicks Typical Influences on Curriculum.....	88
3.5	Approaches to Curriculum Design in Dental Education.....	88
3.5.1	Curriculum Design Models in Dental Education.....	93
3.6	Newer Concepts in Dental Curricula .....	96
3.6.1	Constructive Alignment.....	96
3.6.2	Continuum of Learning and Assessment .....	96
3.6.3	Assessment in Dental Education.....	98
3.6.4	Critical Thinking in Dental Education.....	99
3.7	Curriculum Evaluation .....	101
3.7.1	Definition of Evaluation .....	101
3.7.2	History of Curriculum Evaluation .....	102
3.7.3	Evaluation Ideologies .....	108
3.7.4	Evaluation Models.....	108
3.7.5	Evaluation in Health Science Education.....	113
3.7.6	Evaluation in Dental Education .....	114
3.8	Education in South Africa.....	116
3.8.1	The Schooling System .....	116
3.8.2	The Higher Education System .....	117
3.8.3	Policy Documents and Community Engagement .....	118
3.9	Theoretical Framework .....	120
3.10	Pragmatism as the Philosophical Foundation .....	123
3.10.1	History of Pragmatism.....	124
3.10.2	Influence of John Dewey.....	125

3.10.3 Belief Systems of This Study.....	126
3.11 Conclusion .....	127
<b>Chapter 4 The Mixed Methods Approach.....</b>	<b>129</b>
4.1 Introduction.....	129
4.2 Paradigm Wars .....	129
4.3 The Mixed Methods Approach .....	132
4.3.1 The Case for Mixed Methods Research.....	134
4.4 Research Design.....	135
4.4.1 Typologies of Research Design .....	141
4.4.2 Criteria Used in the Typology of Mixed Methods Research .....	141
4.4.3 Research Design of This Study.....	142
4.5 Phases of This Study .....	145
4.5.1 Context Phase .....	145
4.5.2 Input Phase.....	146
4.5.3 Product Phase.....	148
4.5.4 Process Phase.....	149
4.6 Sampling .....	152
4.6.1 Typology of Sampling Techniques.....	152
4.6.2 Mixed Methods Sampling.....	154
4.6.3 Sample Size in Mixed Methods Research .....	155
4.6.4 Types of Mixed Methods Sampling Strategies .....	156
4.6.5 Mixed Methods Sampling Used in This Study.....	157
4.7 Data Generation .....	161
4.7.1 Qualitative Interviews.....	161
4.7.2 Quantitative Interviews.....	163
4.7.3 Focus Group Discussions.....	165
4.7.4 Observations .....	166
4.7.5 Unobtrusive Measures (Secondary Data) .....	166
4.8 Data Analysis .....	167
4.8.1 Qualitative Data Analysis .....	167
4.8.2 Phenomenology as the Qualitative Research Orientation.....	168
4.8.3 Quantitative Data Analysis .....	169
4.8.5 Mixed Methods Data Analysis .....	170
4.9 Research Inferences and Data Validation .....	171
4.9.1 Research Inference.....	171
4.9.2 Validation of the Data.....	172
4.9.3 Design Quality .....	176
4.9.4 Interpretive Rigour.....	177
4.10 Ethical Issues.....	178
4.10.1 Ethical Approval.....	178
4.10.2 Gatekeeper Permission .....	178
4.10.3 Informed Consent .....	178
4.10.4 Ethical Considerations in Mixed Methods Research .....	179
4.10.5 Pilot Studies.....	179
4.11 Conclusion .....	180
<b>Chapter 5 Contextualizing the Dental Therapy Profession in South Africa .....</b>	<b>181</b>
5.1 Introduction.....	181
5.2 History of the Profession: Stakeholder Perceptions.....	182
5.3 Role of the Dental Therapist .....	184
5.4 The Recruitment Process.....	190
5.5 The Application Profile.....	191
5.5.1 Application by Number .....	191



5.5.2	Application by Racial Group .....	192
5.5.3	Application by Gender .....	192
5.6	The Selection Process .....	193
5.6.1	Entrance Requirements .....	193
5.6.2	Eligibility for the Programme .....	194
5.6.3	The Interview Process .....	194
5.7	The Enrolment Profile .....	196
5.7.1	Enrolment by Number .....	196
5.7.2	Enrolment by Gender .....	197
5.7.3	Enrolment by Age .....	198
5.7.4	Enrolments by Race .....	199
5.8	Demographic Profile of the Final Year Classes of 2009 and 2010 .....	199
5.8.1	Age Profile .....	200
5.8.2	Gender Profile .....	200
5.8.3	First Language .....	200
5.9	Dental Therapy as First Choice? .....	201
5.10	Scope of Practice .....	204
5.11	The Graduate Profile .....	212
5.11.1	Total Number .....	212
5.11.2	Racial Composition .....	212
5.11.3	Gender Composition .....	213
5.11.4	Enrolment vs Graduates Three Years Later .....	214
5.11.5	Practice Patterns .....	215
5.12	Job Satisfaction among Dental Therapists .....	216
5.13	Conclusion .....	228
<b>Chapter 6 Process Evaluation of the Curriculum .....</b>		<b>230</b>
6.1	Introduction .....	230
6.2	Form and content of the curriculum .....	230
6.2.1	General Competencies .....	231
6.2.2	Clinical Competencies .....	239
6.3	Profile of Academics in the School .....	258
6.3.1	Management and Organizational Structure .....	258
6.3.2	Number of Academics .....	259
6.3.3	Type of Academics .....	259
6.3.4	Qualifications of Academics .....	260
6.3.5	Experience and Teaching Styles .....	261
6.4	Institutional Constraints .....	262
6.4.1	The Library .....	262
6.4.2	Lecture Rooms .....	262
6.4.3	Student Common Rooms .....	263
6.4.4	The Clinical Area .....	263
6.4.5	Preclinical Laboratory .....	263
6.4.6	Timetables .....	263
6.4.7	Telemedicine Facilities .....	264
6.5	Accessible Online Resources .....	264
6.6	Appropriateness of Training to Meet the Needs and Challenges of the Health Care System of South Africa .....	265
6.7	Conclusion .....	269
<b>Chapter 7 Discussion, Conclusions and Recommendations .....</b>		<b>271</b>
7.1	Introduction .....	271
7.6	Discussion: Context Phase .....	274
7.6.1	History of the Profession .....	275

7.6.2	Role of the Dental Therapist.....	276
7.7	Discussion: Input Phase .....	278
7.7.1	Student Recruitment and Selection.....	279
7.8	Discussion: Process Phase.....	280
7.8.1	The Discipline-Based Curriculum .....	281
7.8.2	Form and Content of the Dental Therapy Curriculum.....	283
7.8.3	Profile of Academics in the School .....	295
7.8.4	Institutional Facilities and Constraints .....	296
7.8.5	Accessible Online Resources.....	297
7.9	Discussion: Product Phase .....	298
7.9.1	Graduate Profile.....	299
7.9.2	Graduate Perceptions .....	300
7.9.3	Student Perceptions .....	301
7.9.4	Other Stakeholder Perceptions.....	302
7.10	Inferences Obtained from This Study .....	304
7.10.1	General Inferences .....	305
7.10.2	Curriculum Inferences .....	308
7.11	Recommendations for This Study.....	310
7.11.1	General Recommendations .....	311
7.11.2	Curriculum Recommendations .....	314
7.11.3	The Revised Dental Therapy Curriculum.....	321
7.12	Delimitations of This Study .....	333
7.13	Limitations of This Study .....	334
7.14	Significance of This Study .....	334
7.15	My Concluding Statements.....	335
	<b>Reference List .....</b>	<b>337</b>
	Annexure 1: Ethical Clearance.....	366
	Annexure 2: Gatekeeper Permission.....	367
	Annexure 3: External Stakeholder Interview – Gatekeeper Letter .....	368
	Annexure 4: External Stakeholder - Interview Schedule.....	369
	Annexure 5: Academic Interview – Gatekeeper Letter.....	370
	Annexure 6: Academic - Interview Schedule .....	371
	Annexure 7: Graduate Interview – Gatekeeper Letter .....	372
	Annexure 8: Graduate / Student - Interview Schedule.....	373
	Annexure 9: Student Interviews - Gatekeeper Letter.....	374
	Annexure 10: Student Biographical Interview.....	375
	Annexure 11: Student Competency Evaluation .....	376
	Annexure 12: Student Module Evaluation.....	379
	Annexure 13: Consent Form .....	383
	Annexure 14: Key External Stakeholder Interview Schedule.....	384
	Annexure 15: Student Interview Schedule 2009.....	385
	Annexure 16: Focus Group Interview Schedule 2010 .....	385
	Annexure 17: Graduate Interview Schedule 2010 .....	386
	Annexure 18: Dental Therapist Academics Interview Schedule .....	386
	Annexure 19: Other Academics Interview Schedule.....	387
	Annexure 20: Curriculum for Bachelor of Dental Therapy .....	388
	Annexure 21: Clinical Competency 1 – Diagnosis and Treatment Planning.....	390
	Annexure 22: Clinical Competency 2 - Primary Preventive Measures .....	394
	Annexure 23: Clinical Competency 3 - Scaling and Polishing.....	396
	Annexure 24: Clinical Competency 4 - Restorative Dentistry.....	398
	Annexure 25: Clinical Competency 5 - Minor Oral Surgery.....	401

Annexure 26: Clinical Competency 6 - Dental Therapeutics .....	404
Annexure 27: Clinical Competency 7 - Dental Radiography .....	406
Annexure 28: Clinical Competency 8 - Children's Dentistry .....	408
Annexure 29: Clinical Competency 9 - Medical Emergencies.....	409
Annexure 30: Patient Statistics for 2010.....	411

## LIST OF FIGURES

Figure 1 : Map of the Republic of South Africa .....	42
Figure 2 : Carl's Conceptualization of the Process of Curriculum Development .....	80
Figure 3 : 3P Model of Teaching and Learning.....	85
Figure 4 : Knowing, Acting & Being Schema for Curricula .....	86
Figure 5 : Curricular Spider Web .....	87
Figure 6 : Higher Education Academy Model of a Curriculum .....	88
Figure 7 : Millers Pyramid for Assessing Clinical Competence.....	97
Figure 8 : Typical Influences on Curriculum.....	121
Figure 9 : Number of Applications for the period 2001–2010 .....	191
Figure 10 : Total Number of Enrolments for 1982–2010 .....	196
Figure 11 : Enrolments for the period 2001–2010, by Gender .....	197
Figure 12 : Percentage Enrolments for the period 2001–2010, by Age.....	198
Figure 13 : Enrolments of Indian and African Students for the Period 2001–2010 .....	199
Figure 14 : Total Number of Graduates 1982–2010.....	212
Figure 15 : Number of Indian and African Graduates per Year 1982–2010 .....	213
Figure 16 : Gender Composition of Graduates 1982–2010 .....	214
Figure 17 : Predictability Chart of Enrolment versus Graduates Three Years Later .....	214
Figure 18 : Practice Patterns of Graduates from 1982–2010 by Percentage Composition.....	216
Figure 19 : Curriculum Evaluation Model for Health Science Education.....	320

## LIST OF TABLES

Table 1 : Oral Health Team of South Africa .....	24
Table 2 : Typology of Curriculum Representations .....	78
Table 3 : PRISMS Model .....	94
Table 4 : SPICES Model.....	95
Table 5 : CELTIC Model.....	95
Table 6 : Conceptualization Stage .....	137
Table 7 : Experiential Stage -Quantitative Data Generation .....	138
Table 8 : Experiential Stage - Qualitative Data Generation .....	139
Table 9 : Inferential Stage - Mixed Methods Data Integration.....	140
Table 10 : Reliability Statistics.....	173
Table 11 : Number of Applications by Race for the Period 2001–2010 .....	192
Table 12 : Number of Applications by Gender for the period 2001–2010.....	193
Table 13 : Grading Points for Selection.....	195
Table 14 : Age Profile of the Final Year Classes of 2009 and 2010.....	200
Table 15 : Gender Profile of the Final Year Classes of 2009 and 2010 .....	200
Table 16 : First Language Speakers in the Final Year Classes of 2009 and 2010.....	201
Table 17 : General and Clinical Competencies .....	231
Table 18 : The Revised Dental Therapy Curriculum.....	331
Table 19 : Differences Between the Old and Revised Curricula .....	332
Table 20 : Content Evaluation - Diagnosis and Treatment Planning.....	390
Table 21 : Student Competency Evaluation - Diagnosis and Treatment Planning.....	393
Table 22 : Student Module Evaluation - Diagnosis and Treatment Planning.....	393
Table 23 : Content Evaluation - Primary Preventive Measures.....	394
Table 24 : Student Competency Evaluation - Primary Preventive Measures .....	395
Table 25 : Student Module Evaluations - Primary Preventive Measures .....	395
Table 26 : Content Evaluation - Scaling and Polishing.....	396
Table 27 : Student Competency Evaluation - Scaling and Polishing .....	397
Table 28 : Student Module Evaluation - Scaling and Polishing .....	397
Table 29 : Content Evaluation - Restorative Dentistry.....	398
Table 30 : Student Competency Evaluation - Restorative Dentistry .....	400
Table 31 : Student Module Evaluation - Restorative Dentistry .....	400
Table 32 : Content Evaluation - Minor Oral Surgery .....	401
Table 33 : Student Competency Evaluation - Minor Oral Surgery.....	403

Table 34 : Student Module Evaluation - Minor Oral Surgery .....	403
Table 35 : Content Evaluation - Dental Therapeutics.....	404
Table 36 : Student Competency Evaluation - Dental Therapeutics .....	405
Table 37 : Content Evaluation - Dental Radiography.....	406
Table 38 : Content Evaluation - Children's Dentistry .....	408
Table 39 : Content Evaluation - Emergencies in the Dental Practice .....	409
Table 40 : Student Competence Evaluation - Emergencies in the Dental Practice .....	410
Table 41 : Student Evaluation: Training mainly conducted in the Training Hospital .....	410
Table 42 : Student Evaluation: Training mainly conducted in Community Clinics .....	410

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# CHAPTER 1

## INTRODUCTION TO THE STUDY

### 1.1 INTRODUCTION

Material conditions have divided our country into two nations, one black, the other white . . . the latter is relatively prosperous and has ready access to a developed economic, physical, educational, communication and other infrastructure . . . The second, and larger, nation of South Africa is black and poor, [and] lives under conditions of a grossly underdeveloped infrastructure. (*Two Nations* address. Mbeki, 1998, p. 72)

South Africa's history of racial segregation and apartheid has resulted in significant levels of poverty and inequality among a large majority of the population has been aptly contextualized by the opening statement of this study (Coovadia, Jewkes, Barron, Sanders & McIntyre, 2009). When the country attained democracy, it underwent some degree of transformation, but the legacy of apartheid has influenced the health care system in general and oral health care in particular.

Oral health means more than sparkly white teeth! The oral cavity allows us to speak, smile, kiss, touch, smell, taste, chew, swallow, and cry out in pain. These are considered to be basic human functions that affect the quality of life (Petersen, 2003). Oral diseases are known to cause severe pain, restrict activities in school, at work and at home. This situation often results in the loss of millions of school and work hours each year. Oral diseases can cause or exacerbate infections throughout the body, particularly among individuals with compromised immune systems (Petersen, 2008).

The Global Congress on Dental Education confirmed, however, that only a small minority of the world's population has access to the most basic forms of oral and dental care (Shanley, Manogue & Valachovic, 2008). This is also true for South Africa. The National Children's Oral Health Survey (van Wyk & van Wyk, 2004) provided evidence of a large backlog in dental care, with over 80% of six-year-old children having untreated dental caries. New epidemiological priorities, such as the oral manifestations of HIV/ AIDS, oral

cancer, and oro-dental trauma caused by high levels of crime and violence, domestic abuse and motor vehicle accidents, have increased the demand for oral health care (Department of Health, 2005).

The literature showed that one of the successful international initiatives to improve access to oral health care was the introduction of dental therapists to the oral health team (Mason, 2005; Nuffield Foundation, 1993). The aim of introducing these mid-level workers was to provide basic dental services to disadvantaged communities and children (Satur, 2003). This initiative has significantly increased access to oral health care for children and disadvantaged communities in more than 53 developing and developed countries (Nash et al., 2008).

Similarly, in 1977, the dental therapist was introduced to the health care system of South Africa, to redress inequities in the provision of oral health care to underserved communities (Prinsloo, 1993). Since then, however, many stakeholders in the dental fraternity consider that there has been no improvement in access to oral health care (Department of Health, 2005; Hugo, 2005; Pick, Nevhatulu, Cornwall, Masuku & Fisher, 2000). Most dental therapists and dentists work in the private sector, serving the needs of a small minority of the population. This results in marked inequities in the provision of oral health care.

As an academic and dental clinician in the public sector for the past twenty years, I believe that there must be a strong correlation between the practice patterns of graduates and the way they are trained. There is evidence that dental therapists have played an important role in reducing disparities in oral health care internationally (Baltutis & Morgan, 1998; Mason, 2005; Nuffield Foundation, 1993). Dental therapists were introduced to the South African health care system over thirty years ago to perform this function. So why are basic oral health services still not accessible, affordable or available to the disadvantaged populations?

To answer these questions, I have framed this study within the four elements that have guided the education and training of this profession in South Africa. These are the profession of dental therapy, the regulatory body that sets the standards for education and training of health professionals, the training institution within which this study is located, and the Department of Health, which is the public sector provider of health care. All these



elements are linked by the primary health care approach, from which the principles of most international health care systems derive.

## **1.2 BACKGROUND CONTEXT**

### **1.2.1 The Dental Therapy Profession in South Africa**

Dental therapists were introduced to the oral health team of South Africa during the apartheid era, to improve access to basic oral health services for disadvantaged communities (Taljaard, 1985). In 1977 the first group of dental therapists qualified with licentiates from the Mmadikoti College in Pietersburg and the Medical University of South Africa (Medunsa) (Prinsloo, 1993). In 1978, Medunsa introduced a three-year diploma, and in 1983, a Bachelor of Dental Therapy degree. This was followed by the introduction of an Honours programme in 1988, which was discontinued after a few years (Prinsloo, 1994). The training of dental therapists was introduced at the University of Durban-Westville in 1980 (Oosthuizen, Clifford-Vaughan, Behr & Rauche, 1981).

At this time, dental therapists were allowed to provide limited dental services, under the supervision of a dentist, in the public sector only (Prinsloo, 1993). However, this profession was not well received in South Africa as dental therapists were perceived to be a product of apartheid (Reddy, 1985), being trained at two of the so-called ethnic universities. The training of dental therapists did not occur at the White dental schools. As a result, over 90% of dental therapists are from the African or Indian racial groups, and it is perceived to be a Black profession.

Up to 1992, dental therapists were generally dissatisfied and frustrated within their profession, due to “lack of posts in the public sector, lack of career pathing, and poor salaries” (Prinsloo, 1993, p. 617). This situation resulted in a high level of attrition among these professionals. The literature showed that up to this period most dental therapists left the profession to pursue other careers, or went on to study dentistry (Hugo, 2005; Pick et al., 2000).

With the advent of democracy in South Africa, the dental therapy profession developed and was recognized as an important stakeholder by the Department of Health (2006). In 1992, dental therapists were allowed to work independently in the public and private sectors. The regulatory body created a separate professional board to regulate the

profession. A policy document of the Department of Health (2006, p. 85) described as dental therapists as being “critical to the provision of primary oral health care.” The policy document recommended that the number of dental therapists trained should be increased, and that training should be extended to all dental schools. Thus the status of dental therapists in the oral health team has grown since its inception.

The next section gives an overview of the training institution within which this study is located.

## **1.2.2 The Training Institution**

### **Training at the University of Durban-Westville (UDW)**

The apartheid-driven Extension of the University Education Act No 45 of 1959 provided for the establishment of separate universities for the various racial groups in South Africa (Union of South Africa, 1959). This Act formed the basis of the establishment in 1961 of the University College, Durban, for people of Indian origin. This institution became academically autonomous in 1972, and was named the University of Durban-Westville (Oosthuizen et al., 1981). However, the idea of a tribal university was widely condemned by political, religious, educational, cultural and social organizations. They believed that this type of university would become a breeding ground for racial conflict, and would increase the frustrations inherent in a racist society (Oosthuizen et al., 1981).

In the 1960s, the University College wanted to acquire a new medical and dental school for the Indian community (Oosthuizen et al., 1981), but the proposal was refused in 1967 by the Minister of Health. The university also wanted to acquire all the new allied health professions in order to play a significant role in the production of health professionals in the province. These developments led to the creation of the Faculty of Health Sciences. Several commissions were conducted to investigate the development of faculties of medicine and dentistry (Oosthuizen et al., 1981). The decision regarding the Medical School was postponed, but in 1979 the Faculty of Dentistry was created at the University of Durban-Westville.

### **The Faculty of Dentistry at UDW**

Following the creation of the Faculty of Dentistry, the Oral and Dental Training Hospital was built in the grounds of the King George V Hospital in 1981 (Oosthuizen et al., 1981).

At that time, only dental therapists and oral hygienists were trained. It was proposed that a fully-fledged dental school, training all cadres of oral health clinicians would be the end-result. Over the past thirty years, despite several efforts to resurrect these plans, they have not materialized. This situation has led to increasing levels of frustration among the various stakeholders in the dental fraternity: graduates, students, academics, the professional associations, the regulatory body, and the Department of Health.

The governance and funding of the Faculty also contributed to the patterns of development of the School (University of Durban-Westville & Natal Department of Health, 1979). For nearly twenty-five years, the Dental Faculty was funded almost exclusively by the Department of Health. Academics were employed as part of the “Joint Health Agreement” between the University and the Department of Health. Due to the uncertainty about the development of a fully-fledged dental faculty, staff numbers decreased to about 50% of capacity. This led to a loss of experienced academics to other universities, and the staff turnover was high for many years.

### **Transformation to the University of KwaZulu-Natal (UKZN)**

On 1 January 2004 the disadvantaged Indian-based University of Durban-Westville merged with the advantaged White-based University of Natal to form the University of KwaZulu-Natal (University of KwaZulu-Natal, 2011a). This merger occurred as a result of the reconfiguration and the restructuring of higher education institutions by the post-apartheid government of South Africa (Department of Education, 1997).

This University commits itself to the principles and values enshrined in the Constitution of the Republic of South Africa (1996), and articulated in the preamble to the Higher Education Act 101 of 1997 (Department of Education, 1997). The declared mission of the University is:

To be a truly South African University that is academically excellent, innovative in research, critically engaged with society and demographically representative, redressing the disadvantages, inequities and imbalances of the past (UKZN, 2011b).

UKZN (2011b) has a student population of approximately 42 000, with a staff complement of just over 4 000. It has adopted a college model as its governance structure

for its academic and administrative systems. It established four Colleges each headed by a Deputy Vice-Chancellor: the College of Agriculture, Engineering and Science; the College of Health Sciences; the College of Humanities; and the College of Law and Management Studies. There are 52 Schools at UKZN; although this number is going to be reduced to 20 in 2012 (UKZN, 2011b).

The College of Health Sciences is made up of two faculties: the Faculty of Health Sciences, based on the Westville campus, and the Nelson R Mandela School of Medicine. Each Faculty is organized into a number of Schools (UKZN, 2011b).

### **The School of Dentistry in 2011**

The School of Dentistry is located within the Faculty of Health Sciences. The programmes offered are the Degree in Dental Therapy and the University Diploma in Oral Health. Teaching in the basic and social sciences and in the preclinical components occurs at the Westville campus. All clinical teaching occurs at the Oral and Dental Training Hospital (School of Dentistry, 2011).

The declared mission of the school is:

To achieve excellence in the provision of education and training programmes aimed at recruiting and developing oral health personnel who are competent to respond appropriately to the oral health needs of the people they serve, with emphasis on the primary health care approach (School of Dentistry, 2011).

This mission has also served to guide the development of the present study.

### **1.2.3 The Regulatory Body**

The Health Professions Council of South Africa (HPCSA) is a statutory body established under the Health Professions Act 56 of 1974 (HPCSA, 2011). It is mandated to regulate all health professions in the Republic of South Africa in aspects pertaining to registration, education and training. These regulations include the setting of healthcare standards for training, ethics and ethical behaviour, ensuring continuing professional development, and fostering compliance with healthcare standards. The mission of the HPCSA (2011) is “Quality healthcare standards for all.” The vision of this body is:

To enhance the quality of health by developing strategic policy frameworks for effective coordination and guidance of its twelve professional boards in setting healthcare standards for training and discipline in the professions registered with the HPCSA; ensuring ongoing professional competence; and fostering compliance with those standards.

Two different professional boards regulate the dental profession. The Medical and Dental Professional Board regulates the dentists and medical doctors. The Professional Board for Dental Therapy, Oral Hygiene and Dental Assistants regulates their designated professions.

#### **1.2.4 The Health Service Providers**

South Africa has a dualistic health care system which is made up of a large well-functioning and affluent private sector and a small, mediocre public service (Coovadia, et al., 2009). Approximately 80% of health professionals work in the private sector, and serve the needs of about 15% of the population (Chopra et al., 2009). This has resulted in an over-burdened public sector, which carries the responsibility of meeting the health care needs of the large majority of the population. This public sector is governed by the Department of Health (1997).

The vision of the Department of Health (2011a), with respect to its strategy for human resource development, is to “develop a workforce through innovative education and training strategies and fit for purpose to meet the needs of the re-engineered health system and measurably improve access to quality health care for all.”

The next section discusses the concept of *primary health care* on which the policy documents that have guided the health system have been founded.

#### **1.2.5 The Primary Health Care Approach**

The International Conference on Primary Health Care was held in Alma-Ata in the USSR in 1978 (World Health Organization, 1996, p. 1). It resulted in the Alma-Ata Declaration which expressed the “need for urgent action by all governments, health and development workers, and the world community, to protect and promote the health of all the people of the world.” The Declaration asserted that primary health care should form an integral part

of each country's health system, and of the overall social and economic development of the community.

At this conference, primary health care was defined as:

Essential health care based on scientifically-sound and socially-acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination (WHO, 1996, p. 1).

The main facets of this approach are that

Health is a state of complete physical, mental and social well-being, and not merely absence of disease. . . . It is a fundamental human right. . . . The gross inequality in the health status of the people between developed and developing countries, as well as within countries is politically, socially and economically unacceptable. . . . The promotion and protection of the health of the people is essential to sustained economic and social development, and contributes to a better quality of life. . . . Governments have a responsibility for the health of their people which can be fulfilled only by the provision of adequate health and social measures (WHO, 1996, p. 1).

Primary health care is considered to be the key to attaining this target.

In an effort to meet the basic needs of the population of South Africa, the Department of Health (1997) recommended that health services should be based on the primary health care approach. These services should be provided within the District Health System.<sup>1</sup> Consequently, primary health care packages were designed to provide basic health services to disadvantaged communities by primary health care teams. These concepts will be discussed hereunder.

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<sup>1</sup> District Health System – It is a more or less self-contained segment of the national health system, comprising of a well-defined population, living within a clearly delineated area, including all institutions and individuals providing health care in the district (WHO, 1988, p. 7).

## **The Primary Oral Health Care Package (POHC)**

The policy documents of the Department of Health (1997; 2005) recommend the provision of the basic oral health care package to all state-dependent patients to improve access to oral health care. The Department of Health (1997, p. 144) lists this package as being made up of:

Oral examination and charting of dental status, intra-oral radiographs, scaling and polishing of teeth, promotive and preventive oral health services, basic curative services, the emergency relief of pain and sepsis, and dental extractions, simple fillings, the treatment of traumatic injuries to teeth, and the treatment of post-extraction bleeding.

The successful implementation of similar packages has improved access and affordability to the disadvantaged communities in several developing countries (Petersen, 2003; 2008). It must be noted that all the procedures contained in this package are within the scope of practice of the dental therapist. The literature has demonstrated that the opportunity cost of training dental therapists in the three-year degree are greater than training dentists in five years (Addo, Batchelor & Sheiham, 2006). This fact is considered to be noteworthy, in light of the over-burdened public health system of South Africa (Coovadia et al., 2009).

## **The Primary Health Care Team (PHCT)**

The Department of Health defines the primary health care team as

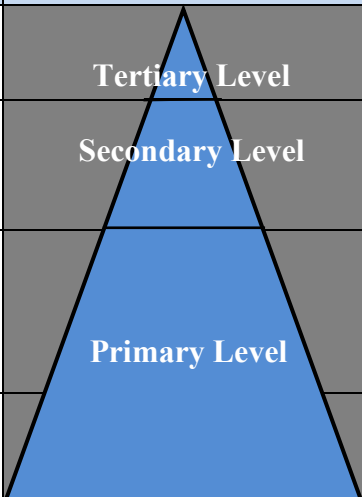
A mix of health personnel with appropriate skills to deal with common conditions and execute prompt and appropriate referral to the next level of care. Each PHCT should include community health nurses, midwives, doctors, primary health care nurses, oral hygienists, dental therapists, clerical and support staff and rehabilitation personnel. Problems that cannot be dealt with at the primary level must be referred to the secondary level. At each of these levels, an appropriate health personnel mix will be available. The referral team should consist of medical and nurse practitioners, dentists, . . . according to the needs of the community. Specialist personnel will be stationed at secondary and tertiary levels for referral care (Department of Health, 1997, p. 55).

The clinicians in the oral health team thus comprise oral hygienists, dental therapists, dentists and dental specialists. The oral hygienist provides health education, promotion and preventive care at the primary health care level. The dental therapist provides basic curative procedures (extractions, fillings and cleaning of teeth) in addition to the promotive and preventive functions. The dentist works at the secondary level, and provides basic dental treatment as well as selected specialized services. The specialist provides specialized procedures at the tertiary level.

According to the primary health care approach, the number of oral health personnel should reflect the level of care at which they practice. This translates into location of the highest number of oral health personnel at the primary level where most patients present themselves. The numbers should decrease with progression to the secondary and tertiary levels.

However, the oral health team of South Africa does not reflect this pattern, as demonstrated in Table 1. This table shows the number, years of training and scope of practice of each category of oral health personnel in South Africa (HPCSA, 2010). Dentists account for the highest number of personnel in the health care system, while dental therapists comprise the lowest. This can be attributed to many factors.

**Table 1 : Oral Health Team of South Africa**

Category	Number in SA	Years of Training	Scope of Practice	
Dental Specialists	409	5+4 years	Specialized dental care	
Dentists	4 830	5 years	Basic dental treatment + selected specialized dental procedures + health promotion + preventive care	
Dental Therapists	457	3 years	Basic dental treatment (extractions, fillings, scaling and polishing, radiographs + health education & promotion + preventive care	
Oral Hygienists	967	2 years	Health education & promotion + preventive care	

Dental therapist training has existed for just over thirty years, while training for dentists dates back to 1927. Only two dental schools train dental therapists, while four train



dentists. The number of dentists trained by each dental school is significantly higher than the number of dental therapists. The high attrition rate among dental therapists has been attributed to dissatisfaction and frustration among these professionals.

This background information on the dental therapy profession, the way in which it is regulated, and its role within the health care system, will assist in the formulation of the problem statement, purpose, critical questions and methodology of this study.

### **1.3 PROBLEM STATEMENT**

Dental therapists were introduced to the health care system of South Africa by the Department of Health in 1977 (Prinsloo, 1993). Their role was to improve access to basic dental services to disadvantaged sectors of the population. They would work under the supervision of a dentist in the public sector only. At this time, the dental therapy curriculum at this institution was designed and implemented to meet this role.

In 1992 the regulatory body amended this role to allow dental therapists to work independently in the private and public sectors (HPCSA, 1993) and requested the training institution to include additional subjects in the curriculum.

Over the years, the form and content of the dental therapy curriculum has changed considerably. Academic freedom allowed lecturers to alter the depth and breadth of the curriculum according to their own judgment (Barnett & Coate, 2005). This has resulted in a bloated curriculum, overcrowded with the inclusion of large amounts of insignificant material in all aspects. To accommodate this additional information, other areas that were deemed to be less important, such as children dentistry, ethics and community health, were watered down.

Another problem identified with the dental therapy curriculum was the traditional format, which was indicative of dental curricula internationally at that time (Hendricson & Cohen, 1999). This situation was exacerbated by the initiative to modularize all curricula at this university. This modularization exercise resulted in the individual disciplines being encapsulated into modules and taught as such. Students were thus taught by a traditional subject-based curriculum. When students passed each module, they graduated and were deemed to be competent clinicians.

Students and graduates have also expressed dissatisfaction with their profession. They were frustrated with the limited scope of practice, and many of them expressed the desire to be dentists. There were also high levels of discord among the various members of the oral health team. This situation was due to the fact that two similarly-functioning oral health professionals, dentists and dental therapists, were working in parallel environments. Both of them could practice in the private and public sectors. Both cadres were providing basic dental treatment such as extractions, fillings and cleaning of teeth. In addition, dentists performed specialized procedures such as root canal treatment and dentures.

However there were complaints from dentists that some dental therapists also provided these specialized procedures for which they were not trained (Campbell, 2006). The dentists argued that these dental therapists worked beyond their scope of practice, thereby impinging on their turf (HPCSA, 2009). This animosity has prevailed in the dental profession for over twenty years, resulting in a dysfunctional oral health team.

These problems within the dental fraternity have propagated the problem of lack of access to disadvantaged populations. The first National Oral Health Survey of South Africa (Department of Health, 1994) revealed a large backlog in dental services among these communities. The more recent National Children's Survey (van Wyk & van Wyk, 2004) showed that over 80% of dental caries in children were untreated, and only 39% of six-year-old children were caries-free.

These findings clearly demonstrate that the introduction of dental therapists to the health care system has not improved access to oral health services for disadvantaged communities and children. As a result, there has been no improvement in the oral health status of the population.

Similar circumstances regarding the provision of basic oral health services to children and disadvantaged communities have prevailed in many countries around the world (Fulton, 1951; Nuffield Foundation, 1993). One of the solutions to this problem has been the introduction of the dental therapist to the oral health team (Baltutis & Morgan, 1998; Dunning, 1972).

This cadre of oral health professional was first introduced to New Zealand in the 1920s to redress the problems of access to children and underserved communities (Mason, 2005). More than 1 300 dental therapists currently work in the School Dental Service (SDS) of

this country, which has achieved a 95% utilization rate since its inception (Nash et al., 2008). Due to the success of this initiative, the training of dental therapists had by 2007 spread to over 53 developing and developed countries, producing a total of more than 14 000 dental therapists globally (Nash et al., 2008).

In light of the international literature on the success of the dental therapy profession, why has the introduction of dental therapists to the South African health care system not produced the same results? As an experienced academic and clinician, the researcher believes that this may be attributed to the lack of relevance between the dental therapy curriculum, and the needs and resources of the country.

This curriculum was developed over thirty years ago. The profile of the country has evolved significantly over this period. The Global Congress on Dental Education clearly articulated that the new graduate in the dental field must have the knowledge and clinical competence for independent practice, but also the “standards and diversity of competence appropriate to the needs of the local population” (Shanley, Manogue & Valachovic, 2008, p. 167 – 175).

The dental therapy curriculum was developed in an ad hoc manner, by accumulating a non-selective mass of knowledge as was customary in dental schools at that time (Hendricson & Cohen, 1999). The literature on curriculum clearly demonstrates that its development should be a complex dynamic process that goes through the phases of design, dissemination, implementation and evaluation as an ongoing process (Barnett & Coate, 2005; Carl, 2010).

It can be assumed that the first three phases of curriculum development at this School were conducted when it was introduced over thirty years ago. However, since the researcher started working at this institution, over twenty years ago, no formal comprehensive evaluation has been conducted. This fact served as one of the key motivations for conducting this study.

Another motivating factor was the recent introduction of the National Health Insurance (NHI) by the Department of Health (2011b), regarded as a mechanism to improve universal coverage to health care for the population of South Africa. This policy has recommended the re-engineering of the primary health care system into three new streams:

the district-based service delivery model, the school-based primary health care programme and a municipal ward-based model.

The researcher believes that the oral health team in general, and the dental therapist in particular, can play a significant role in the NHI. However to create the optimal oral health team, several processes have to be implemented. Firstly, the role and scope of practice of the oral health team needs to be reviewed and redefined. From these definitions, the development of new training and career paths, and referral patterns needs to be established (Department of Health, 2011b).

In this study, the role of the dental therapist will therefore be redefined within the context of the health care system. The dental therapy curriculum will be evaluated to determine whether this curriculum was indeed serving the national interest. It would ascertain what changes are being produced by the curriculum, and what aspects needed to be revised (Cronbach, 1982).

However this evaluation is not restricted to the form and content of the curriculum. It also takes into account multiple influences on curriculum (Barnett & Coate, 2005; Hicks, 2007) which include the perceptions of students, graduates, academics and other key stakeholders, together with the historical precedent in pre-existing programmes within and external to the university, the professional and industry requirements, and the logistical constraints and available facilities at the training institution (Hicks, 2007).

In this way, a comprehensive evaluation will be able to determine whether the dental therapy curriculum trains graduates appropriately to meet the needs and challenges of the health care system of South Africa.

#### **1.4 PURPOSE OF THIS STUDY**

The purpose of this study is to evaluate the dental therapy curriculum offered at the University of KwaZulu-Natal, to determine whether it is able to produce graduates who are adequately prepared to practice competently according to the scope of practice prescribed by the HPCSA, and meet the oral and dental health care needs of the population of South Africa.

## 1.5 THEORETICAL FRAMEWORK

For a comprehensive evaluation of the dental therapy curriculum it was necessary to define the term *curriculum* within the context of this study. Many experts believed that the term curriculum can no longer be defined as just the “content, standards, or objectives” of a programme (Barnett & Coate, 2005; Posner, 2004). Bruner (1996, p. 116) asserted that “the curriculum is like an animated conversation on a topic that can never be fully defined.” Pinar et al. (1995, p. 848) described the curriculum as “an extraordinarily complicated conversation.”

From these definitions, it is clear that the conversation is complicated by the multiple influences on the curriculum. The curriculum model, entitled *Typical Influences on Curriculum* (Hicks, 2007), espouses the view that multiple influences play a role in shaping the curriculum. It will therefore form the theoretical framework of this study.

The influences described in the Hicks (2007) model cover a wide range of subjects:

- historical precedent from within and external to the university
- industry requirements as determined by the employer (Department of Health) and the regulatory body (HPCSA)
- institutional influences which included documents of the university, faculty and school, accessible online resources and logistical constraints
- perceptions of students, graduates and academics
- views of the professional association that represents dental therapists
- insight of two dental deans (from this institution and from another university)
- observations of two employers from the public sector
- viewpoints of the professional association representing dentists in South Africa (although this association refused to be interviewed in the present study)

These multiple influences will enable the researcher to undertake a comprehensive evaluation of the curriculum.

## 1.6 MIXED METHODOLOGY

Because this curriculum evaluation took into account the multiple influences on the curriculum, it necessitated inclusion of both qualitative and quantitative research methods.

Consequently, pragmatism (Biesta & Burbules, 2003) was selected to serve as the research paradigm of this study, which led to the selection of the mixed methods research approach. The rationale behind the use of multiple methods in this study was to take into account the pragmatic nature of this type of research. The use of multiple qualitative and quantitative methods enabled the researcher to maximize the interpretations of the data. It ensured enrichment of participant data by optimizing the views of all stakeholders. Mixing also enhanced instrument fidelity by improving the appropriateness and utility of the different types of instruments used in this study.

### 1.6.1 Purpose of Mixing

In this study, the purpose of mixing was to achieve complementarity, triangulation and expansion (Cresswell, 2003). Complementarity was achieved when the data analyzes from the two research methods were juxtaposed to generate complementary insights. Triangulation enabled the researcher to find convergence and corroboration of the research findings from the different methods studying the same phenomenon (Cresswell, 2003). Expansion of the breadth and range of the research occurred by using different methods for the different research components. These aspects will be discussed in greater detail in the chapter on methodology.

### 1.6.2 Research Design

The research design of this study was based on the seven criteria used to create typologies of mixed methods design in this field of research (Cresswell, Plano Clark, Gutmann & Hanson, 2003). The design used in this study can be described as **Concurrent QUAL + quan**, where the QUALITATIVE component was considered to be the dominant method, and the quantitative component was non-dominant. *Concurrent* implies that the different phases occurred within the same time period.

The research design was divided into three stages: conceptualization stage, experiential stage and inferential stage (Teddlie & Tashakkori, 2006). In the conceptualization stage, the selection of the theoretical framework and the creation of the research design led to the formulation of the critical questions.

In the experiential stage, qualitative data generation occurred by means of interviews, focus group discussions, unobtrusive measures and observations. Quantitative data was

generated by the use of interviews and unobtrusive measures. The qualitative data was analyzed using thematic analysis, while the quantitative data was analyzed using descriptive analysis.

The inferential stage encompassed integration of the qualitative and quantitative data to maximize the interpretations of the data. The integration of all the components of this study led to the creation of a meta-inference. The quality of this meta-inference was evaluated by the concepts of design quality and interpretive rigour.

## **1.7 RESEARCH QUESTIONS**

In mixed methods research, it is necessary for the research questions to be aligned with the underlying paradigm and methods used (Burke Johnson, Onwuegbuzie & Turner, 2007). Therefore the research questions were developed to be open-ended and non-directional in nature. They sought to describe or explore the participant and the context. Four research questions will be answered in this study:

1. What is the role of the dental therapist in the health care system of South Africa today?
2. How does the dental therapy curriculum offered at the University of KwaZulu-Natal prepare its graduates to fulfil this role?
3. What are the perceptions of internal and external stakeholders regarding the professional competence of these graduates to practice within the health care system of South Africa?
4. Why do these stakeholders have these perceptions?

To answer these critical questions, this study was divided into four phases, which will be described in the following section.

## **1.8 PHASES OF THIS STUDY**

This curriculum evaluation study was based on the concept, input, process and product (CIPP) model of Stufflebeam (2000). It was therefore conducted in four phases: *context*, *input*, *product* and *process*, in order to answer the research questions effectively.

In the context phase, the dental therapy profession was contextualized within the health care system of South Africa. This phase used only the qualitative research method, and was based on the following influences of the Hicks model: *historical precedent* and *industry requirements*. This led to the answer of the first critical question of this study which was:

*What is the role of the dental therapist in the health care system of South Africa today?*

The second research question, on how the dental therapy curriculum offered at this university prepared its graduates to fulfil this role, was answered by the combination of the input and process phases. The input phase considered two other influences on the Hicks model, which were the University curriculum documents (prospectus) and the views of students. The University prospectus provided insight on the recruitment and selection processes used by the school. The students provided insight on their reasons for choosing this profession, satisfaction with their educational experience, and whether they would practice their profession on graduation. This phase used a combination of both the qualitative and quantitative methods.

In the process phase, the form and content of the curriculum was evaluated. This was achieved by analyzing the content of the faculty handbooks and school module portfolios. The perceptions of academics on the competence and academic preparedness were gained by qualitative interviews. All final year students evaluated their modules and clinical competence by means of quantitative interviews.

This information was combined with data obtained from the evaluation of the accessible online resources and the institutional facilities and constraints. The profile of the academics in this school also formed part of this phase. As a result, the data obtained in the input and process phases enabled the researcher to answer the second critical question: *How does the dental therapy curriculum offered at the University of KwaZulu-Natal prepare its graduates to fulfil this role?*

The product phase of this study described the views of all stakeholders regarding the professional competence, practice patterns and job satisfaction of this profession, within the context of the South African health care system. In this phase, a combination of both the qualitative and quantitative methods was used. This phase, in combination with



information obtained from the other phases, enabled the researcher to answer the third critical question of this study:

*What are the perceptions of internal and external stakeholders regarding the professional competence of these graduates to practice within the health care system of South Africa?*

The fourth critical question – *Why do these stakeholders have these perceptions?* – was answered by theorizing about the qualitative, quantitative and mixed data inferences derived from this study. In the next section, the format of this thesis will be presented.

## **1.9 FORMAT OF THE THESIS**

To create a comprehensive and logical study, it was deemed necessary to present this thesis in seven chapters.

### **Chapter 1: Introducing the Study**

The first chapter has contextualized the background of this curriculum evaluation study. It introduced the elements that guide the education and training of the dental therapy profession in South Africa. From this information, the purpose of this study was developed. The theoretical framework and the methodology were introduced, which led to the formulation of the research questions. The four phases of the CIPP evaluation model provided the framework upon which all the data would be generated and analyzed.

### **Chapter 2: The Dental Therapy Profession in South Africa**

In this chapter, the international and South African literature on the dental therapy profession, within the context of the South African health care system, will be reviewed. It will trace the effects of South Africa's history of racial segregation and apartheid on the health care system in general, and on oral health care in particular. The dental therapy profession in South Africa will be compared to the international literature. Therefore this chapter serves as the starting-point of this study. It will provide depth and breadth to the discussions on the first critical question on the role of the dental therapist within the health care system of South Africa.

### **Chapter3: Curriculum Evaluation – Framing the Theory**

In this chapter, the evolving definitions of the term *curriculum* are examined. This is followed by an overview of the field of curriculum development. The recent models of curriculum design, within the context of higher education and dentistry are presented. This leads to the selection of the theoretical framework of this study.

In the next section, the field of curriculum evaluation is critically examined, taking into account the origins and ideologies of this domain. Curriculum evaluation models are scrutinized to utilize their strengths and eliminate their weaknesses in this study. Curriculum evaluation studies in the fields of health sciences and dentistry are traced back from the work of Flexner (1910) to the present day.

The final part of this chapter discusses the problems identified in the schooling and higher education sectors within the South African context. Policy documents of the Department of Education are examined with special reference to health science education.

### **Chapter 4: Methodology of this Study**

This chapter traces the history of the paradigm wars which led to the development of the mixed methods approach. The choice of pragmatism, as the philosophical partner of this approach, is discussed within the context of this study. This is followed by a motivation for selecting the mixed methods approach in this study.

The research design, sampling methods, data generation, research inferences and data validation are provided to achieve a comprehensive overview of the methodology used in this study. The ethical considerations are also discussed.

### **Chapter 5: Results on the Role of the Dental Therapist**

In this chapter, all results with respect to the dental therapist and the profession are presented. The first two elements of the Hicks model (*historical precedent* and *professional/industry requirements*) provide information on the role of the dental therapist in the South African health care system. This data, combined with information obtained in the literature, provides answers to the first critical question of this study.

The results on the role of the dental therapist are compared to the profile of the students and graduates of this institution. The recruitment and selection processes of the University

are also critically evaluated against the application and enrolment profiles of the School. The views of the final year students of the classes of 2009 and 2010 are appraised in relation to the experience of dental therapists from other countries.

## **Chapter 6: The Process of Evaluation**

In this chapter, the results of the evaluation of all the other components of the Hicks model are presented. They include University and School documents to determine the form and content of the curriculum. It also evaluates the profile of the academics, taking into consideration their number, cadre, qualifications and experience. Institutional constraints and accessible online resources are explored to establish whether these factors had any effects on the curriculum. This information provides an answer to the second critical question about *how* the dental therapy curriculum offered at this university prepared its graduates to fulfil their role.

The next part of this chapter presents the findings on the perceptions of internal and external stakeholders regarding the professional competence of graduates.

## **Chapter7: Discussion, Inferences and Recommendations**

In this chapter, the results obtained in the previous two chapters are discussed in relation to the critical questions. These discussions lead to the formulation of inferences and recommendations with regard to the dental therapy curriculum, in the context of its ability to produce graduates that were adequately prepared to practice competently within the health care system of South Africa.

### **1.10 ROLE OF THE RESEARCHER**

I am a dentist, and have been jointly employed by the Department of Health and the University for over twenty years. My dual responsibilities entail being an academic involved in the training of dental therapists and oral hygienists, and I have also worked as a clinician providing dental services in the public sector. I therefore consider myself to be a community-oriented oral health professional. However, during this study, I made an effort to distance myself from the curriculum and its stakeholders, to conduct an unbiased evaluation.

In my role as an academic, I identified several problems with regard to the training of dental therapists. Students often expressed frustration with their educational experience. Training was focused mainly on the mastery of clinical skills. The emphasis on primary health care in the training programme appeared to be lacking. This curriculum did not focus on the development of caring, ethical, critically-thinking health practitioners.

Many graduates appeared to be dissatisfied with their profession. Some of them wanted to study dentistry. Even the professional association which represented dental therapists has requested the School to provide additional courses to expand their scope of practice.

In my role as a dental clinician in the public sector, I have noticed that the main type of treatment provided was dental extractions for the relief of pain and sepsis for adult patients. Very few children presented for treatment unless they were in pain. Health education, promotion and preventive care were rudimentary or non-existent.

As a member of the dental fraternity, I noted that there was great discord and distrust among the different members of the oral health team in the public and private sectors. This situation compromised the provision of comprehensive patient care according to the primary health care approach.

When I was planning this study, three questions came to mind:

- Why has access to basic dental services not been achieved thirty years after dental therapists were introduced to perform this function, in spite of international success in this field?
- Why are the dental therapy students and graduates from this institution dissatisfied with their profession?
- Why is there such a high level of discord among the different members of the oral health team?

All these questions could be linked, directly or indirectly, to the education and training of these health professionals. I therefore believed that an evaluation of the dental therapy curriculum could provide answers to these questions.

When I embarked on this study, my goal was to produce research that would be “useful, practical and applicable” to my profession (Barnett & Coate, 2005, p. 82). To achieve this goal, the research was conducted in the real-world situation (Plomp, 2010). The concept of

being a “cultural stranger” in this study (Thijs, 1999) was not regarded as a problem due to the fact that I have worked within this profession for over twenty years.

As the dental therapy curriculum at this institution has not been evaluated for the past twenty years, the results of this study will provide baseline information for further evaluations in the school. In this way, the mission of the university and school will be reached, thereby improving the health of the population of South Africa.

## **1.11 ETHICAL CONSIDERATIONS**

### **1.11.1 Ethical Approval**

Ethical approval (No. HSS/0867/2009: Faculty of Education) was obtained from the Humanities and Social Sciences Ethics Committee of the University of KwaZulu-Natal on the 5<sup>th</sup> December 2009 (Annexure 1).

### **1.11.2 Gatekeeper Permission**

Gatekeeper permission was obtained from the Dean of the Faculty of Health Sciences (Annexure 2).

### **1.11.3 Informed Consent**

Informed consent was obtained from all stakeholders by sending a letter to all interviewees. Each letter introduced the interviewer to the interviewees. It included information on the reasons for conducting this study, background of the researcher, the type of data being collected, and the reason for the selection of the interviewee. This information was detailed on the type of interview to be conducted. Emphasis was placed on the voluntary nature of participation, the significance of anonymity and confidentiality, and the ability of the interviewee to withdraw from the study at any stage. Information was provided on how the information would be disseminated and stored on completion of the study. The contact details of the researcher’s supervisor were included in the letter. The details on how consent was obtained, as well as samples of the letters and consent forms will be discussed in detail in the chapter on methodology. In the next section, the concluding remarks of this chapter will be discussed.

## **1.12 CONCLUSION**

It is evident that there are inequities in the provision of oral health care in South Africa. This curriculum evaluation study has been conducted at this university to facilitate the appropriate training of dental therapists for their role in the health care system of South Africa. In the next chapter, the literature on the dental therapy profession is evaluated within the context of the history of South Africa and compared to the international literature on this profession.

## **CHAPTER 2**

### **THE DENTAL THERAPY PROFESSION IN SOUTH AFRICA**

#### **2.1 INTRODUCTION**

“... of all the forms of inequality, injustice in health care is the most shocking and inhumane” (Martin Luther King, Jr.).

Before the literature on curriculum is examined, it was deemed necessary to explore the evolution of the dental therapy profession within the context of the apartheid history of South Africa in general, and on the health care system in particular. The effects of this legacy have also spread to the training of oral health professionals, which has resulted in workforce imbalances, inequities in service provision, and poor oral health status. Therefore in the first part of this chapter the history of racial segregation and apartheid, and its consequences on the health care system will be examined.

However, it must be noted that these workforce and service provision problems have also been experienced by other countries. The problems have been addressed, in part, by the introduction of the dental therapist into the health care system. These successful international initiatives will be discussed to inform the recommendations of this study. In addition, the dental therapy profession within South Africa will be compared to these successful international initiatives.

#### **2.2 HISTORY OF SOUTH AFRICA**

The Republic of South Africa is situated at the southern tip of Africa. From the late 15<sup>th</sup> century, European seafarers used the southern coast of Africa as a half-way house on its sea route to India (Burger, 2011). In 1652, the Dutch East India Company set up a station at the Cape of Good Hope, to provision passing ships. Grobler (1977) claimed that Jan van Riebeeck, the first Commander of the Cape from 1652, was in fact a dentist.

The European settlers began trading with the Khoisan people, which soon resulted in raiding and warfare. They started farming in the arable areas around Cape Town. As a result, many of these indigenous inhabitants were dispossessed and employed as servants

to these settlers (Burger, 2011). The discovery of diamonds and gold transformed the country from an agricultural to an industrial economy (Coovadia et al., 2009). Consequently, the demand for cheap, black male labour increased significantly. The male members of the African population were drawn away from their land and used extensively in the mines. Land dispossession, taxation and pass laws were designed to force black people off the land and channel them into labour markets to meet the needs of the mines (Worden, 2000). Cheap migrant labour became the mainstay of social, economic, and political developments (Coovadia et al., 2009). These were the roots of poverty and inequality in South Africa.

The principles of apartheid were laid down by the government in 1905 in a report by the South African Native Affairs Commission (Terreblanche, 2002). The seminal Natives Land Act of 1913 promulgated the creation of reserves or *homelands* for black people (Terreblanche, 2002). These homelands comprised only 13% of South Africa's land surface. Other laws included the job colour bar where skilled work was reserved for Whites only, denying African workers the right to organize (Terreblanche, 2002). Pass laws were introduced which controlled the mobility of African people. This created the concept of the white citizen and black non-citizen (Terreblanche, 2002). In response, a growing awareness and anger among the educated African elite resulted in the formation of the African National Congress (ANC) in 1912 (Terreblanche, 2002). It became a powerful black organization which drew together traditional authorities and the educated African élite in common causes.

In 1961, the government declared South Africa to be a republic after winning a Whites-only referendum. A new flag, national anthem, currency and coat of arms were formally introduced (Burger, 2011). However apartheid continued relentlessly in a more organized systematic form. The creation of a population register that required every South African to be assigned to one discrete racial category was described in the Population Registration Act of 1950 (Union of South Africa, 1950). Even universities were segregated by the Extension of University Education Act of 1959 which made provision for the establishment of racially exclusive universities for Black South Africans (Union of South Africa, 1959). The ANC and other Black political movements rejected this white domination. They intensified their mass action in the form of protests, strikes and demonstrations and mustered support from the international community. In 1990, the



liberation movements were unbanned, and political prisoners were released (Burger, 2011).

South Africa held its first democratic elections in 1994. Due to its unique history, a new diverse nation was borne, with a wide variety of languages, cultures and religious beliefs (Burger, 2011). However, the legacy of apartheid has resulted in a country divided into two nations, aptly described by past-President Thabo Mbeki in the introduction to Chapter One. These inequities will be discussed in the following section.

## **2.3 INEQUITIES IN SOUTH AFRICA TODAY**

### **2.3.1 Demographic Profile**

Seventeen years after the end of apartheid, similar inequities still prevail in South Africa today. The mid-year population estimates for the year 2011 is 50,5 million (Statistics South Africa, 2011). Approximately 52% of this population is female. The population has historically been classified into four racial groups according to the Population Registration Act of 1950 (Union of South Africa, 1950). The racial groups and percentage composition in South Africa are: African (79,4%), White (9,2), Coloured (8,8%) and Indian (2,6%). Even though the use of these groups is considered to be abhorrent, it has been used in this study to identify patterns and redress inequities among the population.

South Africa is divided into nine provinces, which are represented in Figure 1 (Bhayat, Yengopal, Rudolph & Govender, 2008).



**Figure 1 : Map of the Republic of South Africa**

Gauteng is the smallest province geographically, but has 22,4% of the population (Statistics South Africa, 2010). It is also recognized as the economic powerhouse of South Africa. KwaZulu-Natal has 21,4% of the population, followed by the Eastern Cape with 13,5%, Limpopo with 10,9%, the Western Cape with 10,4%, Mpumalanga with 7,2%, North West with 6,4%, and the Free State with 5,7%. The Northern Cape, with just 2,2% of the total population, is the largest province.

Age distribution differs significantly according to population group. Nearly one third (31,3%) of the population is aged younger than 15 years. Almost 7,7% of the population is 60 years or older. Of those younger than 15 years, approximately 23% live in KwaZulu-Natal and 19,4% live in Gauteng (Statistics South Africa, 2011).

The age pyramid of the African population thus resembles that of a developing country, with the highest number present in the lowest age groups, whereas the White group resembles a highly industrialized nation, with the highest number present in the aging groups. The age distributions of the Coloured and the Indian groups fall between these two extremes ((Statistics South Africa, 2011).

The next section considers the prevailing socioeconomic inequities in the South African population.

### 2.3.2 Socioeconomic Status

South Africa is commonly classified as a middle-income country, with modern infrastructure and relatively well-developed financial, legal, energy and communication systems (Chopra et al., 2009). It also has a well-developed private sector and a stable macro-economy (Burger, 2011).

In 2009, however, leading academics informed the parliament of South Africa that this country had “the widest gap between rich and poor, and is now considered to be the most unequal society in the world” (Pressly, 2009). This briefing showed that the Gini Coefficient Index<sup>2</sup>, which demonstrates the level of income inequality, stood at 0,679.

Currently the richest 10% of the population accounts for 51% of income and the poorest 10% accounts for just 0,2% of income (Coovadia et al., 2009). Results of a recent survey by Statistics South Africa (2010) showed that in 2006, the percentage of the population living below the food poverty line of R209 per month was 24,8%.

The racial distribution of poverty showed that interracial inequality was also high. In 2006, the Black population constituted 79,4% of the population, but earned just 41,2% of the country’s income. In contrast, 45,3% of the country’s income was earned by White persons who constituted only 9,2% of the population (Coovadia et al., 2009).

The next section discusses the governance principles used by the new government to overcome these inequities.

### 2.3.3 Governance

To recognize and overcome the injustices of the past, the post-apartheid government set in place the new Constitution of the Republic of South Africa (1996), founded on the values of human dignity, the achievement of equality and the advancement of human rights.

The Bill of Rights (Republic of South Africa, 1996) is considered to be the cornerstone of democracy. It enshrines the rights of all people and affirms the democratic values of human dignity, equality and freedom. With regard to health rights, it affirms that everyone has the right of access to basic health care, sufficient food and water, and social security. It

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<sup>2</sup> Gini Coefficient Index - a value of one reflects complete inequality while a value of zero reflects complete equality. A value above 0.5 is considered to be “unacceptably high.”

maintains that the state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realization of each of these rights.

The next section discusses the health care system of South Africa, with special emphasis on the legacy of apartheid, the transformative policy documents, and the burden of disease.

## **2.4 THE SOUTH AFRICAN HEALTH CARE SYSTEM**

### **2.4.1 Health Care in the Apartheid Era**

The health care system was also governed by the principles of the apartheid government (Coovadia et al., 2009). The establishment of racially-based departments of health and the creation of ethnic homelands for the African population resulted in the fragmentation of the health care system into 14 different departments of health (van Rensburg & Harrison, 1995). Each of these departments had the responsibility to provide health services to the communities they served. This situation resulted in a poorly organized, inefficient and ineffectively-managed health service which failed to provide adequate medical and public health care to the population (van Rensburg & Harrison, 1995).

There was a shortage of human resources in the public service and inequitable distribution of human resources between the public and private sectors (Coovadia et al., 2009). There were also deficiencies in facilities, equipment and infrastructure in the public sector, which resulted in greater inequities in health care. There was even segregation in the provision of curative and preventive services (van Rensburg & Harrison, 1995).

The Gluckman Commission of Enquiry (1942–44) was appointed by the government of the Union of South Africa to evaluate the health care system of South Africa (Coovadia et al., 2009). To overcome the effects of fragmentation of health services, the Commission recommended that a chain of community health centres, based on the primary health care approach, should be created.

### **2.4.2 Transformation of the Health Care System**

In an attempt to redress the inequities created by the apartheid system, the post-apartheid government developed several new transformative policy documents. Three of these documents that have particular relevance for this study will be discussed.

## **White Paper for the Transformation of the Health Care System of South Africa (Department of Health, 1997, p. 14)**

The object of this paper was to present a set of policy objectives and principles upon which the National Health System would be based. This health system should be capable of efficiently delivering quality health care to all citizens, based on the primary health care approach. The health sector would be restructured to:

- unify the fragmented health services at all levels into a comprehensive and integrated National Health Service
- promote equity, accessibility and utilization of services
- extend the availability and ensure the appropriateness of health services
- develop health promotion activities
- develop the human resources available to the health sector
- foster community participation across the health sector
- promote equity, accessibility and utilization of health services.

This document served as a founding document in the post-apartheid health care system, upon which other policies were developed. In the context of oral health services, this document defined the oral health team and the basic oral health package, within the context of primary health care. However, due to the fact that the inequities in health status persisted in the post-apartheid era, a subsequent policy document was promulgated in the National Health Act of 2003.

## **National Health Act No 61 of 2003 (Department of Health, 2004)**

This policy document legislated for a National Health System incorporating the public and private sectors, thereby providing equitable health services to all people of South Africa. It legislated for the establishment of a district health system to implement primary health care throughout South Africa. These policies recommended the promotion of universal access to quality, equitable, responsive, and efficient health care services that are accountable to the communities they serve. One of the significant recommendations of this document was to fulfil the rights of children in regard to basic services. In addition, pregnant women and children would be entitled to free health care throughout the public sector if they were not on a medical aid scheme. This document gave rise to the policy on National Health Insurance which will be discussed in the next section.

## **National Health Insurance (Department of Health, 2011b)**

The aim of the policy on National Health Insurance was to improve *universal coverage* to health care for the population of South Africa. The WHO defined universal coverage as

the progressive development of a health system including its financing mechanisms into one that ensures that everyone has access to quality, needed health services and where everyone is accorded protection from financial hardships linked to accessing these health services (WHO, 2008, p. 25).

The WHO (2008, p. 25) also defined three dimensions of universal coverage: population coverage, service coverage and financial risk protection. Population coverage refers to the proportion of the population that has access to health services. Service coverage represents the extent to which a range of services necessary to address health needs of the population are covered. This coverage includes the comprehensive health care package, and includes the prevention of disease and the promotion of health. It also includes the treatment of diseases where prevention has failed, and rehabilitation services. Financial risk protection includes the extent to which the population is protected from catastrophic health expenditure. It also incorporates the extent to which individual households are protected from exposure to the financial risks associated with health.

The NHI is seen as an innovative system of health financing to improve access to appropriate, efficient and quality health services for the population of South Africa (Department of Health, 2011b). This policy asserts that equity can be achieved by moving away from an “unsustainable, destructive, costly, and highly curative hospi-centric system” (Department of Health, 2011b, p. 9). It recommends that primary health care should serve as the “primary mode of health care delivery” focusing on the prevention of disease and the promotion of health.

The objectives of the NHI (Department of Health, 2011b, p. 21) are detailed in the policy document as follows:

- To provide improved access to quality health services for all South Africans
- To pool risks and funds so that equity and social solidarity will be achieved through the creation of a single fund

- To procure services on behalf of the entire population and efficiently mobilize and control key financial resources
- To strengthen the under-resourced public sector in order to improve health systems performance.

This new policy recommends that the primary health care system should be re-engineered according to three new streams, comprised as follows:

- (i) A district-based service delivery model will focus on priority health care programs at the district level. The district health teams will consist of specialist clinicians and nurses
- (ii) A school-based primary health care programme will deal with basic health issues such as eye care, oral health care, hearing problems, as well as immunization programs. The services will address the basic health needs of children at schools, and will include health promotion and prevention, and curative care. School health services will be delivered to all schools in a district, from Pre-Grade R to Grade 12.
- (iii) A municipal ward-based model will deploy at least ten well-trained primary health care workers per ward, who will be allocated to a specified number of families. These personnel will attempt to identify problems within the local context, and implement appropriate interventions to address these problems.

These recommendations will necessitate a revision of the requirements for human resources for health. This can be achieved by reviewing the role and scope of practice of health professionals, the development of new training and career paths, and the detailing of referral patterns among health teams (Department of Health, 2011b). All these factors have been addressed with respect to the dental therapy profession later in this study.

Coovadia et al. (2009) have argued that while the policy documents of the Department of Health are considered to be very good, the burden of disease has in fact increased. They attribute this situation to several factors, including failure in leadership and weak management, primary health care not being in place, a human resource crisis in the health sector, and the HIV/ AIDS epidemic. In addition, they state that macro-economic policies which foster growth rather than redistribution have led to the persistence of disparities between races.



### **2.4.3 The Burden of Disease**

The burden of disease is a comprehensive measure of the health status of the nation arrived at by assessing ill-health and causes of death. It includes fatal and non-fatal outcomes, and is considered important for monitoring the health of the nation (Chopra et al., 2009). The National Minister of Health Dr A Motsoaledi (2010, p. 1) has stated that in the progress of stability of a country it was common to speak of an epidemiological transition from communicable (infectious) diseases to non-communicable diseases, referred to as the “double burden of disease”; but this transition has not happened in South Africa because both communicable and non-communicable diseases have increased significantly:

South Africa not only suffers from high prevalence of communicable and non-communicable diseases, but from high rates of maternal and child health problems and from impacts of high levels of violence and injuries... hence we don't just suffer from the double burden of communicable and non-communicable diseases that health experts predicted for us, but from a quadruple burden of disease.

Due to the quadruple burden of disease, many other conditions, such as oral health, have received low priority. To discuss this problem, a summit on Non-Communicable Diseases was held in Gauteng in September 2011 by the Department of Health (2011c). It resolved that the priority areas of this department were the diseases which fell within the quadruple burden. Oral health (which also falls within the domain of non-communicable diseases) was defined as “low mortality, high burden”, along with other conditions such as eye and mental health. The participants at this summit acknowledged that even though oral disease did not cause many deaths it placed a significant burden on the health care system. However it was not considered to be a high priority area for the government.

### **2.4.4 Inequities in Health Status**

Significant inequities in health status have been described in the present health care system of South Africa. This situation has been attributed to the fact that between 55 to 60% of health expenditure occurred in the private sector, on 15% of the population (Chopra et al., 2009). Over 80% of health professionals work in the private sector, resulting in an inequitable distribution of skilled health professionals between the private and public



sectors, and between urban and rural areas (Chopra et al., 2009). Consequently, there are gross inequities in the health status of the population.

South Africa is one of twelve countries in the world where child mortality has increased since the baseline was set in 1990 (Statistics South Africa, 2010). Life expectancy has reduced by almost twenty years since 1994, mainly because of the rise in HIV-related mortality. The average life expectancy at birth is now 55 years for men and 54 years for women (Statistics South Africa, 2010).

There are also marked inequities in the rates of disease and mortality between races (Coovadia et al., 2009). These inequities have been attributed to the lack of access to basic health services. In 2002, infant mortality rates varied between 7 per 1000 in the white population, and 67 per 1000 in the black population (Statistics South Africa, 2010).

There are also significant inequities in health status among provinces. This can be demonstrated by differences in mortality rates for children under five years. The Western Cape recorded a mortality rate of 46 per 1000 live births; while KwaZulu-Natal recorded a rate of 116 per 1000 live births. Similar inequities were also prevalent within provinces. In the Cape Town metropolitan area, there is a three-fold difference in infant mortality between the middle-class areas and informal settlements (Statistics South Africa, 2010).

The problems identified in this section are replicated in the oral health care system of South Africa. The next section describes the history of the dental profession and the resultant inequalities in oral health service delivery, and analyzes the recommendations made by the Department of Health to overcome these issues through developing the most appropriately-trained health professionals to meet the needs of the population.

## **2.5 ORAL HEALTH CARE IN SOUTH AFRICA**

### **2.5.1 History of the Dental Profession**

The apartheid legacy in the health care system of South Africa has created similar challenges in the provision of oral health care in this country (Reddy, 1985). The history of the dental profession in South Africa can be traced back to the early 1900s (Grobler, 1977). The first dental school was established to train white dentists in 1927 (Dreyer, 1988; Reddy, 1985). In 1967, the *De Villiers Commission of Enquiry into Dental Services*

*and the Training of Non-White Dentists* proposed, inter alia, that non-white dentists should be trained to meet the needs of the non-white population (Reddy, 1985).

Many problems were identified with regard to oral health service provision at this time. As a result, several commissions of enquiry were instituted to evaluate problems in the oral healthcare system of South Africa. The Gluckman Commission of 1944 identified a lack of dental services in general, especially in Black and rural areas (Dreyer, Rossouw & Chikte, 1997). It also found that oral health services in the public and private sectors were predominantly curative in nature. A landmark recommendation of this report was for the development of a national health service, with emphasis on community-based primary health care (Coovadia et al., 2009). This recommendation was never implemented, but is now considered to be a major initiative within the Department of Health (2011b).

The National Oral Health Policy was formulated in 1975 under the leadership of Dr Leon Taljaard (1985) who was the Head of Oral Health Services in South Africa, and later became a dean of a faculty of dentistry. This document served as the official oral health policy document for the next fifteen years, and was responsible for shaping the oral health team as we know it today. One of the recommendations of this document was the introduction of dental therapists into the health care team to redress inequities in oral health service provision.

In response to the findings of these commissions, the Committee of Dental Deans conducted a series of seminars from 1988 to 1991 (Dreyer, de Vries, du Plessis, Moola, Naidoo, Preston, van Rensburg & Zietsman, 1992). The recommendations of these seminars can be summarized as follows:

- the oral health team should comprise the oral health educator, dental assistant, oral hygienist, dental therapist, dentist, dental specialist and the dental technician
- minimum training requirements should be formulated for each category
- the number of dentists should be decreased, and the number of dental therapists should be increased
- training of community health workers should be introduced to perform emergency dental care
- compulsory community service (CCS) for oral health personnel should be instituted

Almost twenty years later, many of these recommendations have not been implemented due to the fact that the various stakeholders in the dental profession have conflicting perceptions. The views of the various stakeholders will be discussed in greater detail later in this study. The apartheid legacy has also impacted on the training of oral health personnel, which will be discussed in the next section.

## **2.5.2 Training of Oral Health Personnel**

Gross inequities in the training of oral health personnel existed during the apartheid era. Initially, three dental schools were established, for Whites only, in 1927, 1950 and 1972 respectively (Dreyer, 1988; Reddy, 1985). Two were located in Gauteng, and one in the Western Cape. On the recommendation of the De Villiers Commission of Enquiry, one of the schools in Gauteng opened its doors to Black students in 1967 (Reddy, 1985).

Following up on the recommendations of the De Villiers Commission, three new dental schools were established in 1973, 1977 and 1979 respectively. These were set up under the apartheid regime's Extension of University Education Act of 1959 which made provision for the establishment of racially exclusive universities for Black South Africans (Christopher, 1994). One of these dental schools was established in the Western Cape for the Coloured population, one was in Gauteng for the African group, and one was in KwaZulu-Natal for people of Indian origin. The aim was to train non-white oral health personnel to serve the oral health needs of the disadvantaged communities (Reddy, 1985).

In the Western Cape, the White dental school and the Coloured dental school were located in the same building. As this was patently absurd, both were merged to form a single dental school, giving a total of five dental schools in the country: three in Gauteng, one in the Western Cape and one in KwaZulu-Natal. The schools in Gauteng and the Western Cape train specialists, dentists, and oral hygienists. The dental school in Gauteng, established as part of the apartheid regime's Extension of University Education Act, also trains dental therapists. The fifth dental school, in KwaZulu-Natal, trains only dental therapists and oral hygienists; no dentists or specialists are trained in this province, and this has an important bearing on the present study in the context of the university to which it relates.

Apartheid policies in the training of oral health personnel created inequities geographically, racially and by cadre trained. A study conducted over fifteen years ago, by

van Wyk, Kroon and Cleaton-Jones (1994) showed that the highest number of dentists worked in provinces where dental schools were located: Gauteng (45,9%) and Western Cape (22,1%). A recent study by Lalloo (2007) confirmed these findings. Almost two-thirds of dentists are located in these two provinces, and 40% of all oral health personnel are based in Gauteng.

The geographical location of dental schools has also impacted directly on the provision of specialized care in the public sector, the reason being that most specialist treatment in this sector has been provided by the training institutions. As a result, the geographic location of the dental schools has led to a skewed distribution in the provision of specialized dental care, where most services are provided in only two of the nine provinces.

Thorpe (2006) identified several challenges with regard to the training of oral health personnel in Africa. He argued that training was focused on specialized urban-based curative care, with little exposure to the realities of life in Africa. He believed that training was too technical, ignored the community, and was not based on real health needs. He also argued that training modelled on approaches used by affluent countries creates imbalances in the oral health workforce.

### **2.5.3 Imbalances in the Oral Health Workforce**

Imbalances in the oral health workforce have been identified as one of the main challenges of the oral health care system. The literature identifies several different reasons for these imbalances (Fritzen, 2007; Pascal, Dal Poz, Stilwel & Adams, 2004):

#### **Maldistribution between provinces**

The influence of apartheid on the training of oral health personnel resulted in geographic imbalances in the distribution of personnel. This created significant challenges in the provision of oral health care to the disadvantaged population (Lalloo, 2007).

#### **Shortage of oral health personnel**

Human resource studies calculating optimal personnel numbers for providing the basic oral health package show that there is a significant shortage of all cadres of oral health personnel (Booyens, Rossouw & Snyman, 1996; Kisson-Singh, 2001; van Wyk, 1996). Existing personnel do not have the capacity to provide the entire package to the state-

dependent population. Therefore innovative methods need to be developed to ensure that oral health services are provided to areas in greatest need.

### **Inequitable Distribution between the Private and Public Sectors**

Oral health services are provided by the two clearly demarcated private and public sectors. Studies by Rossouw (1995) found that only 13% of oral health personnel worked in the public sector, providing treatment to 80% of the population, whereas 78% of oral health personnel worked in the private sector, serving just 13% of the population. In most public dental clinics oral health service provision is limited to the relief of pain and sepsis. A recent study by Lalloo (2007) confirmed that over 80% of oral health personnel work in the private sector. Users of this sector pay directly or indirectly to the dental provider (Naidoo & Stephen, 1997). Consequently dental treatment in the private sector is sought to treat specific problems, thereby neglecting the socioeconomic and preventive factors affecting health.

### **Distribution between urban and rural areas**

Urban bias is considered to be a common feature of health care systems around the world amongst doctors, dentists and allied health personnel (Abuzar, Burrow & Morgan, 2009; Henry, Edwards & Crotty, 2009). According to Rourke (2010), difficulty in the recruitment and retention of health personnel into rural areas was a well-established phenomenon. This author cites some the reasons for leaving rural areas as the lack of career pathing, personal and social isolation, low career satisfaction, inadequate remuneration and the lack of task variety.

Several South African studies have also demonstrated an imbalance in the distribution of oral health personnel between urban and rural areas (Lalloo, 2007; van Wyk et al., 1994). The severity of this situation has been demonstrated by van Wyk et al. (1994), where the operator: population ratios within the province of KwaZulu-Natal ranged from 1:1 880 in the urban area of Durban to 1: 458 129 in rural Ntuzuma.

### **Migration**

A study by Padarath, Chamberlain, McCoy, Ntuli, Rowson and Loewenson (2005) suggested that health care workers in many developing countries are underpaid, poorly motivated and increasingly dissatisfied with their professional careers, and that migration

flows of health personnel follow a hierarchy of wealth: health personnel move from remote rural areas of low-income countries, via urban areas and the private sector, into underserved areas in high income countries.

A study by Holtshousen and van Wyk (1997) showed a steady increase in the number of South African-qualified dentists registered with the General Dental Council in the United Kingdom. In 1995, only 49,3% of South African-qualified dentists had addresses in South Africa, while 45,6% had addresses in the United Kingdom. There are no studies regarding migration patterns among the dental therapy profession in South Africa, but the quantitative data obtained in this study in regard to the question “Where are they (graduates) now?” may give further insight into this problem.

### **Opportunity costs of training auxiliary personnel**

It has been shown in the public health literature that health systems often under-invest in the production of auxiliary personnel, relative to the expensive production of doctors or dentists (Pascal et al., 2004). A study conducted in Ghana (Addo et al., 2006) demonstrated that the opportunity cost of training different categories of personnel needed consideration when planning human resources for health. This study also showed that the costs involved in training dentists were far greater than those for dental therapists.

The literature indicates that the training of the health workforce should be determined by evidence-based objectives, taking into account the health care needs and demands of the country (Fritzen, 2007; Pascal et al., 2004). Therefore, when evaluating the dental therapy curriculum in this study, the various factors regarding the dental workforce will also be considered.

## **2.5.4 Service Provision in the Public Sector**

### **Dental Facilities**

Rossouw (1995) has shown that there is a shortage of dental facilities at the primary, secondary and tertiary levels of care in all provinces. He demonstrated that, of a total of over 5 000 state and prison health care clinics in the public sector, only 15% have dental facilities; dental clinics in rural areas were often non-existent, and when they did exist, were “understaffed or unserviceable” (p. 248).

### **Emphasis on curative care**

The historical imbalances in the provision of preventive and curative care also have its roots in the apartheid policies, where health education and promotion was relegated to local authorities while the provincial administration was responsible for curative care (van Rensburg & Harrison, 1995). Even though policy documents of the Department of Health (1997; 2005) are based on the principles of primary health care, oral health services in the public sector have focused on extraction of teeth for relief of pain and sepsis. There is little evidence to show that any significant amount of health promotion and prevention occur in either the private or public sectors.

### **Cost of dental treatment**

Petersen (2004) argued that oral and dental diseases are considered to be the fourth most expensive health condition to treat in most countries. In developing and developed countries, oral diseases are treated primarily by curative care in the private and public sectors. This type of care is very expensive and has been considered to be a significant economic burden. However in many developed countries, a reduction of dental disease had been noted due to the emphasis on health promotion and prevention. This has resulted in a reduction in oral health expenditure.

In most developing countries, including South Africa, investment in oral health care is low (Petersen, 2004). Financial resources are allocated for the provision of relief of pain and sepsis, with minimal or no allocation to health prevention and promotion (Petersen, 2004). The WHO has argued that it is not possible to treat dental caries in every affected child. If treatment was to be made available to treat dental caries alone for every child, the costs would exceed the total health budget of the country (Yee & Sheiham, 2003).

The WHO recommends that innovative dental programmes should be developed to incorporate effective, simple and cheap preventive methods (Sheiham & Watt, 2000). It has argued that the involvement of local people is more likely to lead towards self-reliance and self-management. Sheiham and Watt (2000) point out, however, that oral health development cannot be achieved through the unmodified transfer of skills to underserved communities, and that the guiding principle should be the adaptation to local populations. Therefore, to develop and evaluate appropriate health plans, epidemiology should be the

fundamental tool to measure social, economic and health impacts (Sheiham, 1988) and should form an important component of the dental therapy curriculum.

### **2.5.5 Oral Health Status**

The World Oral Health Report argued that the burden of oral diseases was particularly high for the disadvantaged population groups in both developing and developed countries (Petersen, 2003). This report showed that dental caries (decayed teeth), periodontal (gum) disease, tooth loss, oral mucosal lesions, oral cancers, the oral manifestations of HIV/AIDS, and oro-dental trauma are global public health problems, affecting general health and quality of life. The experience of pain, problems of eating, chewing, smiling, and communication have a major impact on people's daily lives and well-being (Petersen, 2003).

This report also found that socio-behavioural and environmental factors had a major impact on oral health and disease. These factors included poor living conditions, unhealthy lifestyles, and the limited availability and accessibility of oral health services. Unhealthy lifestyles have been defined by poor diet, nutrition and oral hygiene, the use of tobacco, and the excessive consumption of alcohol (Petersen, 2003).

The report also noted that oral diseases are linked to several non-communicable chronic diseases such as diabetes and hypertension, primarily because of common risk factors (Petersen, 2003). In addition, many general diseases, such as HIV/ AIDS and diabetes, have oral manifestations. All these conditions are similarly reflected in the oral health status of the South African population (Department of Health, 2010).

### **The South African Situation**

In South Africa, the oral health status of the population is based on the findings of two national oral health surveys (Department of Health, 1994; Van Wyk & van Wyk, 2004). The first National Oral Health Survey was conducted in 1988 to 1989, to determine the oral health status of adults and children in the five major metropolitan areas (Department of Health, 1994). The subsequent National Children's Oral Health Survey was conducted between 1999 and 2002, and was restricted to children aged 4–5, 6, 12, and 15 years (van Wyk & van Wyk, 2004).



These surveys concluded that dental caries (decayed teeth) and periodontal (gum) disease are the two most common dental diseases affecting the South African population.

### **Dental Caries**

Dental caries was evaluated in both surveys by the use of the Decayed, Missing and Filled (DMF) Index. Both surveys showed that the *decayed* component, which indicated untreated decayed teeth, was highest in all age groups. This value is an indicator of the large backlog in dental services that has existed over many years (Reddy, 1985). It can be attributed to the history of inequitable oral health service provision and lack of awareness about dental services among the majority of the population (van Wyk & van Wyk, 2004).

The *missing* component described the number of teeth that were lost due to extractions. This high level of missing teeth among adults (van Wyk & van Wyk, 2004) corroborated the evidence that extractions have been the main type of dental services provided to the population. There is a negligible level of *filled* teeth recorded in all age groups. This could be due to a shortage of oral health personnel or facilities in the public sector, or it could be due to a lack of awareness about oral health services (van Wyk & van Wyk, 2004).

These findings have been aptly contextualized in the Draft National Oral Health Strategy (Department of Health, 2010, p. 2) which stated that “of those who have experienced oral health problems in the public sector, very few received treatment,” and that “extractions remain the main form of treatment offered in the public sector.”

The recent National Children’s Oral Health Survey (van Wyk & van Wyk, 2004) revealed that over 80% of dental caries in children were untreated, and only 39,7% of 6-year-old children were caries-free. This was below the goal of 50% set by the Department of Health for 6-year-old children in South Africa for the year 2000.

### **Periodontal Disease**

The national oral health surveys also showed that periodontal (gum) disease was common across all age groups (Department of Health, 1994; van Wyk & van Wyk, 2004). The findings were that severity of this disease increased with age, and that the main etiological factor in children was poor oral hygiene. The relationship between health and social inequality has been discussed in previous sections, and Gugushe (1998) described a similar association between poor oral health and low social class in both children and

adults. He argued that poor oral hygiene practices of low socioeconomic groups contributed to the prevalence and severity of periodontal disease. He also found that these groups had limited access to dental services, which was often restricted to the relief of pain and sepsis.

### **The Need for Dental Care**

The national oral health survey (Department of Health, 1994) also assessed the need for dental care among children. The greatest need was for basic dental services such as extractions, fillings and prevention. The need for specialist services such as crown and bridge, root canal treatment and aesthetic dentistry was very low. This is considered to be significant, as all these procedures are within the scope of practice of the dental therapist (HPCSA, 1993). It can be provided as part of the basic oral health package as proposed by the policy documents of the Department of Health (1997, 2005).

### **Changing Oral Health Priorities**

The quadruple burden of disease, as described by the Minister of Health (Motsoaledi, 2010) has also impacted on the oral health status of the population. The National Oral Health Strategies (Department of Health, 2005, 2010) described new epidemiological priorities in South Africa which include conditions such as the oral manifestations of HIV/ AIDS, oro-dental trauma, NOMA and oral cancer.

**HIV/AIDS:** The estimated prevalence rate in the general population for HIV/AIDS in South Africa is approximately 10,5% (Statistics South Africa, 2010). The total number of people living with HIV is approximately 5,24 million. An estimated 17% of the 15–49-year age group is HIV-positive (Statistics South Africa, 2010). The oral manifestations of HIV/AIDS are seen in 40–50% of people who are infected with the disease, and usually occur early in the course of the disease (WHO, 2004). Dental personnel often observe the first clinical signs of the disease (Darling, Arendorf & Samaranayake, 1992). It is therefore imperative that all oral health clinicians should be knowledgeable about the disease process, its oral manifestations and the modes of transmission (Chikte & Naidoo, 2000; Darling et al., 1992).

It has also been found that some dental professionals are reluctant to treat HIV-infected patients (Lapidus & Sandler, 1997). These negative responses of dental personnel to

patients with HIV can be attributed to several factors – that dentists fear contracting the disease, that they do not trust the honesty of patients, and that they believe that there are additional costs involved in treating such patients. These studies also showed that there were gaps in knowledge in regard to the dental management of these patients (Darling et al., 1992).

**NOMA:** This severe condition occurs mainly in developing countries, and is directly related to poverty. The key risk conditions for the development of this disease are severe malnutrition and growth retardation, and infectious diseases such as tuberculosis, HIV/AIDS and malaria. NOMA affects predominantly the 1–4-year age group, and approximately 70–90% of these cases are fatal (Petersen, 2004).

**Oro-Dental Trauma:** This condition has been identified as one of the priority areas for the Department of Health (2005). The high prevalence of motor vehicle accidents, domestic violence, and crime in South Africa contribute to these statistics. Reliable data on the severity and frequency of oro-dental trauma is not available in most countries (Petersen, 2003).

**Oral Cancer:** This disease is considered to be the sixth most common malignancy in the world (Patton, 2003). It is also very common in developing countries, where lifestyle factors such as smoking and the excessive consumption of alcohol have been associated with the disease (Petersen, 2004).

The literature described in this section has demonstrated the large backlog in oral health care among both children and adults. The new epidemiological priorities, the socio-behavioural, environmental and lifestyle factors, and the close link between oral health and general health, should all form part of South African dental curricula.

The new epidemiological priorities, coupled with the need to provide the basic oral health package, thus clearly demonstrate that the dental therapist can play an important role in the provision of oral health care to the population of South Africa. This study accordingly attempts to define this role within the context of the health care system, as the first critical question of this study.

It is also clear that there are many needs and challenges within the health care system of South Africa in general, and in the oral health care system in particular. This can be

attributed in part to the apartheid history of South Africa, with its resultant inequities in education and training, oral health status, human resources and service provision.

From the literature, it can be concluded that the racially-segregated first-world education and training models used in South Africa have produced wealth-driven oral health professionals who practice predominantly in the private sector, providing curative care to a small minority of the population. This has resulted in a significant backlog and lack of access to basic oral health services to rural and disadvantaged communities.

However, this situation is not exclusive to South Africa. Many developed and developing countries have experienced similar problems in the provision of oral health care (Nash et al., 2008). One successful international initiatives to improve access to oral health care to children and disadvantaged communities has been the creation of the dental therapy profession. In the next section, the history and international success stories of this profession will be discussed, followed by a detailed narrative of the dental therapy profession in South Africa.

## **2.6 THE DENTAL THERAPY PROFESSION**

### **2.6.1 Origin of the Profession**

The origin of the dental therapy profession can be traced back to Great Britain during World War I (Satur, 1993). Dental therapists, known at that time as *dental dressers*, carried out dental examinations and treatment for children in parts of England during this period (Satur, 2003). However, opposition by dentists led to their elimination by the Dentists Act of 1921 (Fulton, 1951).

This ideology was resurrected in 1913, when the President of the New Zealand Dental Association, Dr Norman K Cox, proposed a system of school clinics, operated by the state and staffed by oral hygienists, to address the dental needs of children between the ages of 6 and 14 (Satur, 2003). This proposal was considered to be too unconventional at that time, and was therefore rejected by the Dental Association. In 1920, at a special meeting of the New Zealand Dental Association, 16 members voted for the adoption of school dental nurses, with seven opposed to the proposal (Satur, 2003). As a result, school dental nurses were introduced to provide diagnostic and restorative services to children “in a

rigidly structured set of methods and procedures which spare her the anxiety of making choices” (Satur & Moffat, 2010, p. 5).

There was, however, considerable opposition to this profession from dentists. Dental therapists were perceived as “a danger to the public, a threat to the dental profession, and unfair to those seeking to enter the dentistry profession by recognized means” (Leslie, 1971, pp. 201–209). Despite this opposition, the first group of 30 young women entered a two-year training programme in Wellington, New Zealand, in 1921, which gave rise to the School Dental Nurse (Nash et al., 2008). The slogan of the programme was “we train first-rate technicians, not second-rate dentists” (Satur & Moffat, 2010, p. 5). In 1923 the School Dental Services (SDS) was established, with small clinics on primary school grounds (Coates, Kardos, Moffat & Kardos, 2009).

## **2.6.2 Training of Dental Therapists – the New Zealand Experience**

The New Zealand example in regard to the training of dental therapists is a significant instance for consideration in the present study because it was the first country to formally introduce this cadre of oral health worker and its success has led to emulation in many countries around the world.

As previously noted, the training of dental therapists started in Wellington, New Zealand in 1921 (Fulton, 1951). After the Second World War, training was extended to Auckland and Christchurch. By 1970, there were three dental schools training dental therapists (Nash et al., 2008). Training started as a two-year diploma at dental therapy schools run by the Department of Health. The curriculum was based on experiential learning (Coates et al., 2009).

In 2001, training, now run by the Department of Education, was transferred to universities, “which led to an emerging understanding of professional practice” (Coates et al., 2009, p. 1001). Factors that influenced the transfer to universities were new legislative requirements for registration, human resource shortages, and enhanced educational and clinical practice requirements (Coates et al., 2009).

In 2007, the dental therapy programme was combined with the oral hygiene programme, extending it to a three-year degree. It resulted in a qualification for dual-trained oral health professionals (Coates et al., 2009). These graduates could register with the Dental Council

of New Zealand as dental therapists and/or oral hygienists. They could work in both the private and public sectors, and could perform activities as prescribed under both scopes of practice (Coates et al., 2009).

The scope of practice embraced the treatment of children and adults. It included examination and diagnosis, radiographs, preventive treatments, scaling, local anaesthesia, amalgam and composite fillings, extractions, preformed crowns, and pulp therapy on deciduous teeth (Nash et al., 2008). The first year of study included the basic biomedical sciences (anatomy, biochemistry, oral biology) and the clinical dental sciences (dental caries, periodontal disease, preventive dentistry, patient management, radiography, local anaesthesia, restorative dentistry, dental materials, and dental assisting). The second year of study comprised extraction of primary teeth, pulpal pathology, trauma, clinical oral pathology, developmental anomalies, health promotion and disease prevention, New Zealand society, the health care delivery system, and record-keeping, as well as administrative and ethical issues. Approximately 760 hours of the 2 400-hour curriculum has to be spent in the clinic treating children. As part of this education programme, graduates had to serve for one year with another dental therapist who provided support, assistance and supervision (Nash et al., 2008).

Currently over 1 300 dental therapists are working in the SDS for pre- and primary school children. It has achieved a utilization rate of 95% (Nash et al., 2008). The health care system has been devolved to district health level, and operates under the supervision of the principal dental officer (Baltutis & Morgan, 1998). Even though dental therapists were allowed to practice independently under the supervision of a dentist, many still worked within the public sector (Nash et al., 2008). A survey of dentists within New Zealand (Pack, Bradley & Kennedy, 1991) showed that only 1% was opposed to this profession, 16% were already employing dental therapists in their practices, and 42% wished to employ them in the future. A survey conducted on the dental therapy labour force in Australia in 2003, showed that 78% of dental therapists worked within the SDS, and only 10% worked in the private sector (Coates et al., 2009). However, Satur, Gussy, Marino and Martini (2009) have argued that the number working in the private sector has doubled in the period from 2003 to 2006. They believed that this number will increase further as dental therapists become accepted by dentists and the public.

### **2.6.3 International Extension of This Profession**

Due to the success of the New Zealand initiative, the dental therapy profession had been extended to 53 developing and developed countries by 2007 (Nash et al., 2008). This has resulted in the production of over 14 000 dental therapists internationally. The training period varies from six months (Cambodia) to three years (South Africa, United Kingdom and Canada).

In this section, the role and scope of practice of dental therapists will be discussed in selected developed and developing countries. Australia and Great Britain were selected because their initiatives were modelled on the New Zealand experience. Malaysia was selected because only females were trained as dental therapists in this country. Canada and the United States are discussed because these countries introduced dental therapists to work only in rural and underdeveloped areas. Even though there is a dearth of literature on the dental therapy profession in African countries, it would be remiss not to discuss the experience of at least two countries. I have therefore discussed the experiences of Botswana and Tanzania.

#### **Australia**

The employment of New Zealand-trained dental therapists in Australia started in 1966 (Satur & Moffat, 2010). Training in Australia first began in Tasmania and South Australia. There are seven dental schools training dental therapists, and approximately 200 graduates were produced annually by 1979 (Nash et al., 2008). A combined Dental Therapy/Oral Hygiene Degree in Oral Health Therapy has been offered in a university setting since this time.

By 1996, there were 1 773 dental therapists in Australia (Satur et al., 2009). Of this number, 72,7% were practising the profession. Only 19 of the total number were male, and only four were of Aboriginal or Torres Strait descent. The dental therapist: population ratios were low, and varied from 2.9:100 000 population in Victoria to 12.8:100 000 population in Western Australia (Spencer, Brennan & Szuster, 1994).

Even though most states allowed dental therapists to work independently in private practice, about 95% still worked in the SDS (Satur et al., 2009). Their scope of practice was similar to the New Zealand graduate. In 2000, additions to the scope of practice have been implemented by new regulatory frameworks (Satur et al., 2009). Dental therapists

can now provide dental care to clients up to 18 years. They can treat adults from 19 to 25 years upon prescription of a dentist. They can also provide orthodontic treatment to clients of all ages under the supervision of a dentist (Satur et al., 2009).

## **Great Britain**

The training of dental therapists was restarted in Great Britain in 1960. It had extended to 15 programmes attached to dental schools (Nash et al., 2008). These programmes were offered as a two-year Dental Therapy diploma; or a combined three-year Dental Therapy/ Oral Hygiene B.Sc. Degree in Oral Health Sciences. These graduates can work in the government sector, or in private practice, under the supervision of a dentist. The scope of practice was the same as for New Zealand (Nash et al., 2008).

## **Malaysia**

In Malaysia, this cadre of oral health personnel is called a dental nurse, and training occurs in dental therapy schools (Ministry of Health, 2005). These schools have trained over 2 000 dental therapists, including students from other parts of the world. This profession is exclusively female in Malaysia. They work in preschool, primary and secondary school dental services, and provide treatment to 90% of children up to the age of 17 years. They cannot work in private practice, but their scope is the same as for New Zealand (Nash et al., 2008).

## **Canada**

The dental therapist was introduced to Canada in 1972 at Fort Smith in the North West Territories (Keenan, 1975). The mission was to train dental nurses in a two-year programme to provide care for the remote First Nation (Aboriginal Indians) and Inuit (Eskimo) villagers of the Canadian North where dental care is considered to be inaccessible (Nash et al., 2008). This area was considered to be the only country in the western hemisphere to train dental therapists. Training occurred in the dental therapist school, and there are currently 300 therapists working in this country (Keenan, 1975). They work mainly in the public sector in prevention programmes, community clinics, First Nation Organizations and training institutions (Nash et al., 2008). They also work in the private sector as clinicians in the province of Saskatchewan under the direct supervision of



a dentist. Their scope of practice includes all procedures described for New Zealand, but may also include orthodontic treatment with additional training.

## **Alaska**

Dental therapists were not introduced to the United States as a whole because of opposition from practising dentists, “deploring the programme” (Nash, 2005, p. 50). A further attempt to introduce dental auxiliaries resulted in a report by Nash (2005, p.51) which stated that:

there is little doubt that dental treatment needs for most New Zealand children have been met. However the public would probably not accept the New Zealand type of school dental service, as it would be perceived as a second class system.

The introduction of dental therapists to Alaska was initiated in the year 2000 because of the high prevalence of dental disease and the shortage of dentists. The first cohort was trained in New Zealand, but they returned to practice in Alaska in 2004. They are known as Dental Health Aide Therapists (DHAT). In addition to formal training, they also need to complete a 400-hour preceptorship. Currently there are 11 DHATs working in Alaska (Nash et al., 2008). The training was conducted through a programme called DENTEX, which is a partnership between the Alaska Native Tribal Health Consortium and the University of Washington. They work only in rural Alaska, and serve federally-recognized Alaska Native beneficiaries (Nash et al., 2008).

## **Tanzania**

Beginning in 1955, dental assistants performed functions similar to dental therapists in Tanzania. The training of dental therapists started in 1981, and occurred at two dental therapy schools (Poulsen, Fubusa, Gember, Lemak, Mosha & Ntabaye, 1999). Dental therapists also functioned as assistant dental officers, where a minimum of five years of professional experience was required (Mosha & Mgalula, 1996). Training was conducted in the local environment to accustom them to community conditions (Mosha & Mgalula, 1996). Even though they were trained to provide comprehensive care, shortage of human and financial resources meant that most of them only provided emergency extractions, for all ages (Mosha & Mgalula, 1996.) This was similar to the South African situation.

Atypically there are more men than women dental therapists in Tanzania, and they are allowed to work in both the private and public sectors (Nash et al., 2008).

## **Botswana**

The dental therapy programme in Botswana is also based on the primary health care approach (Croucher & Hall, 1990). It focused on health promotion and the prevention of diseases. The scope of practice was similar to that of the New Zealand therapist. However, when opinions of students and graduates regarding their scope of practice were investigated, it was found that they showed less interest in primary health care. They had a greater interest in curative care and the development of advanced restorative dentistry skills (Croucher & Hall, 1990). This was also similar to the South African situation.

### **2.6.4 Quality of Care and Opportunity Costs**

University-based dental education is considered to be the most expensive professional degree in the entire university portfolio (De Paola, 2004). Dentistry training is therefore very expensive to the state and to the community. Baltutis and Morgan (1998) reviewed the literature on dental therapists internationally in the light of changing disease patterns and service delivery. They established that the shorter training time (three years in Dental Therapy versus five years in Dentistry) was less expensive, and provided good quality basic dental treatment. A similar cost-benefit trend was seen with the introduction of the mid-level worker concept in the medical and nursing professions (Mason, 2005).

A ten-year study by Douglass and Cole (1979) showed no difference in the quality of procedures performed by dental therapists and dentists. Three other studies showed that there was a higher quality in low-technology service such as extractions, fillings and cleaning of teeth, all of which are within the scope of practice of the therapist (Roder, 1974; Ryge & Snyder, 1973). This is especially important in South Africa's struggling health care system, as lower wage and medical aid rates charged by dental therapists could lessen the out-of-pocket cost to patients. It could also result in greater availability and accessibility to dental services, without compromising the quality of care (Baltutis & Morgan, 1998).

In the next section, the concept of job satisfaction within the dental therapy profession will be discussed, since the literature showed that many dental therapists in South Africa expressed dissatisfaction with their profession (Hugo, 2005; Prinsloo, 1993).

### **2.6.5 Job Satisfaction**

Job satisfaction is defined as the “positive emotional state resulting from the appraisal of one’s job or job experiences” (Locke, 1976, p. 1297). It has been characterized by three factors, namely, work characteristics, worker attributes and non-work factors. Work characteristics include actual and perceived features of the job. Worker attributes embraced demographic characteristics, emotional well-being, and personality factors. The non-work factors take account of social interactions, family life, and general life satisfaction.

Among dentists, job satisfaction increased when they felt they had more opportunity for development within the profession, increased income and improved status, but satisfaction decreased with stress (Locke, 1976). Dental therapists seem to follow similar trends internationally.

In several studies conducted internationally dental therapy has been considered to be a potentially rewarding career in terms of job satisfaction (Gibbons, Corrigan & Tim Newton, 2000; Tim Newton & Gibbons, 2001). A comparative study across the three health care systems of the United Kingdom, New Zealand, and Trinidad and Tobago (Naidu, Tim Newton & Ayers, 2006) showed that Trinidad and Tobago had the lowest levels of job satisfaction, while the other two countries had significantly higher levels. The reasons for this dissatisfaction were lack of career structure, narrow scope of practice and inadequate remuneration. In these studies, only questionnaires were used, in postal surveys, and satisfaction was determined by a single question: respondents were asked to rate their overall satisfaction on a ten-point scale. This aspect will be explored in greater detail later in the study.

Many countries have tried to develop innovative models in regard to this profession, one example being the concept of the oral health therapist.

### **2.6.6 A New Concept – the Oral Health Therapist**

In some countries the integration of the dental therapy and oral hygiene qualifications has resulted in a new cadre of oral health professional called the oral health therapist (Nash, 2005; Satur et al., 2009). This model was based on the primary health care approach (WHO, 1996), with the aim of reducing costs and improving access to care (Nash, 2011). In this model, dental therapists would provide basic preventive and restorative treatment, and dentists would treat more complex procedures and medically-compromised patients (Nash, 2005).

In Australia, the Universities of Queensland, Adelaide and Melbourne, all offer programmes that graduate a single practitioner with both skills, referred to as an *oral health therapist* (Satur et al., 2009). In the Netherlands, the oral health therapist is also regarded as a significant member of the oral health team (Nash et al., 2008). Approximately 300 oral health therapists are being trained each year in this country. At the same time, the number of dentists had been reduced by 20% (Nash et al., 2008). This literature could prove to be valuable in describing whether the dental therapist and oral hygienist should be trained as separate professionals, or whether the concept of a single-category oral health therapist is more appropriate to the needs of the country.

## **2.7 THE DENTAL THERAPY PROFESSION IN SOUTH AFRICA**

The international literature has described how the dental therapy profession has improved access to oral health services for children and underserved communities in several developed and developing countries. However, lack of basic oral health care that is available, accessible and affordable to the population of South Africa has been identified as a problem since the 1970s by the major stakeholders in the dental profession, these being the Department of Health, the South African Dental Association and the Committee of Dental Deans (Dreyer et al., 1992; Rossouw, 1996).

As a consequence, dental therapists were introduced to the oral health care team by the Department of Health to redress inequities in oral health service provision among disadvantaged communities (Taljaard, 1985). The training of dental therapists started at two historically disadvantaged universities (Prinsloo, 1994). However, disparities in

access to basic oral health care have continued, despite successful initiatives recorded in over 50 countries around the world.

### **2.7.1 Introduction to South Africa**

Dental therapists were introduced to the health care system of South Africa by the Department of Health in 1977. Their function was to serve “as an auxiliary in the dental manpower team” to redress inequities in dental services in underserved and rural areas (Prinsloo, 1993, p. 624). They were employed to work in the public service, to render limited clinical dental procedures, under supervision of a dentist (Prinsloo, 1993). Taljaard (1985), one of the protagonists of the dental therapy profession, envisioned that at least a hundred dental therapists would be trained per year, within the next ten years. However by 1992, there were only 92 dental therapists occupying state posts.

There was growing dissatisfaction and frustration among the dental therapy profession due to “lack of posts in the public sector, lack of status and promotion potential, and poor salaries” (Prinsloo, 1993, p. 624). Attrition increased significantly from 32% and 43% to 61% in 1985, 1988 and 1992 respectively. Consequently, the South African Medical and Dental Council which was the regulatory body at that time, decided in October 1992 to “liberate the profession from state authorities sole employment” (Prinsloo, 1993, p. 617). Dental therapists were allowed to work unsupervised in independent private practice.

This legislation created great dissatisfaction among the dental fraternity in South Africa and raised concerns about the quality of care provided by dental therapists (Pick et al., 2000). Dentists also perceived dental therapists to be a threat to their professional existence (Pick et al., 2000). This attitude of dentists was in stark contrast to the attitudes of dentists in New Zealand (Pack et al., 1991), where only 1% were opposed to this profession. It must be noted that when the KwaZulu-Natal branch of the South African Dental Association was requested to be interviewed for this study, it refused.

In South Africa, dental practitioners are regulated by different regulatory boards within the HPCSA. Dental therapists and oral hygienists are regulated by the Professional Board of Dental Therapy, Oral Hygiene and Dental Assistants. Dentists are regulated by the Medical and Dental Professional Board. There are discussions between the two boards to look at collaboration and the possible creation of a single board for all oral health professionals (Hugo, 2005).

### 2.7.2 Scope of Practice

The scope of practice of dental therapists in South Africa (HPCSA, 1993) is considered to be more extensive than in most other countries. They can treat adults and children, and do not require any supervision from dentists or dental therapists once they have completed their mandatory service, which is discussed below.

The scope of the profession of dental therapy in South Africa is defined in terms of Section 33(1) of the Medical, Dental and Supplementary Health Service Professions Act, 1974 (Act 56 of 1974), on the recommendations of the HPCSA (1993). The scope includes:

- i. the examination of patients and the charting of their dental status,
- ii. the scaling and polishing of teeth to prevent periodontal diseases and to treat reversible tissue change, where the only treatment necessary to reverse such tissue change is scaling and polishing,
- iii. direct conservative procedures, except restorations which are prepared outside the mouth on models or from impressions taken in the mouth,
- iv. the removal of teeth under local anaesthesia,
- v. the treatment of post-extraction bleeding and the local treatment of alveolar osteitis, including the placement of sutures,
- vi. the application of primary preventive measures,
- vii. the treatment of minor traumatic injuries of the teeth and surrounding tissues, and
- viii. the taking of intra and extra- oral radiographs for the purpose of performing those acts that pertain to the profession of dental therapy.

A registered dental therapist may practice his/ her profession subject to the following conditions (HPCSA, 1993):

- i. S/he may not practice independently unless s/he has practiced for at least one year under the control and supervision of a dentist or another dental therapist approved by the Council for the purpose of these regulations.
- ii. S/he shall refer to a dentist for treatment all cases of pulpal exposure, excluding the emergency treatment thereof; impacted teeth; and oral

diseases and dental abnormalities, such as tumours, mucosal diseases, developmental defects and infections, requiring systemic treatment.

- iii. S/he may remove the roots of teeth only by means of hand instruments, without any incision into the soft tissues.
- iv. S/he shall not construct or repair dentures or other dental appliances involving the taking of impressions.

From this information, the scope of practice of dental therapists was considered to be more extensive than in most other countries. However the literature has demonstrated that the introduction of dental therapists to the health care system of South Africa has not improved access to oral health care for disadvantaged communities.

### **2.7.3 Improving Access for Disadvantaged Communities**

#### **Early Initiatives**

The two national oral health surveys revealed that there was a backlog in oral health services, with an Unmet Treatment Need of over 80% in children (van Wyk & van Wyk, 2004). In addition, the literature showed that there was a shortage of oral health personnel, and inequitable distribution of such personnel between urban and rural areas and between the private and public sectors (Lalloo, 2007; van Wyk et al., 1994). Service delivery was also lacking among disadvantaged communities (Rossouw, 1995).

A document by Rossouw (1996) encompassed the views of the Committee of Dental Deans, the Department of Health and the South African Dental Association. The Committee of Dental Deans recommended that the current annual increase of 200 dentists per year should be reduced to 100 over the next five to ten years. In addition, the number of dental auxiliaries should be increased to 250 per annum, provided that sufficient posts were created in the private and public health sectors. In this document, the Dental Association of South Africa and the Department of Health reaffirmed the views of the Committee of Dental Deans.

However, a report on mid-level worker training in South Africa argued that, of the 418 dental therapists registered with the HPCSA in 2001, only 137 were employed by the public service. There were 314 vacant posts in this sector (Hugo, 2005). In 2010, the

HPCSA had on its register 464 qualified dental therapists and 175 student dental therapists (HPCSA, 2010).

The Pick Report (Pick et al., 2000), which is a human resource planning document of the Department of Health, took the Primary Health Care package as its point of departure. It recommended that a single dental auxiliary should be created in South Africa. This could be achieved by expanding the scope of practice of the dental therapist by including the care of wounds, the placement of sutures and the placement of pre-activated orthodontic appliances. This was in line with developments in other countries such as New Zealand, Australia and the United Kingdom (Nash et al., 2008).

This report also found that many therapists could not get jobs in rural areas, and therefore drifted to the urban centres. This situation was exacerbated when compulsory community service was introduced for dentists, as all public sector posts were reserved for dentists only (Pick et al., 2000). Hugo (2005) argued that almost 80% of dental therapists lived in urban areas; 70% of them went on to become dentists; and several of them went into health management positions. This does not appear to be the position currently, and will be further explored later in this study.

### **Recent Initiatives**

In an attempt to accelerate the production of mid-level workers, the Department of Health (2006, p. 85) proposed a human resource plan in 2006. This plan stated that,

as dental therapists were critical to the provision of primary oral health care, training must be extended to all dental schools. The number trained should be increased from 25 (in 2005) to 600 by 2009. The number of dentists should be decreased from 200 to 120 by 2008.

A similar recommendation was made in Ghana (Addo et al., 2006), where the number of dental therapists trained was increased and the number of dentists trained was decreased. This decision was based on the fact that the opportunity cost of training dental therapists was considered to be far greater than that of dentists.

In response to the proposal of the Department of Health (2006), concern was expressed by the South African Dental Association (Campbell, 2006). They called for an immediate moratorium on the training of dental therapists until all stakeholders had debated these



issues (Campbell, 2006). In a paper commissioned by the Committee of Dental Deans, some universities expressed concern about the quality and number of applicants being received, especially for the dental therapy and oral hygiene programmes (Lalloo, 2007). One university expressed concern about the declining number of applicants and registered students over the last eight years (Lalloo, 2007). However this does not appear to be the status quo at the university in this study. Therefore a critical evaluation of these aspects will be conducted later in this thesis.

## **2.8 CONCLUSION**

This chapter has shown that South Africa's history of racial segregation and apartheid has resulted in poverty and inequality among the large majority of the population. The age pyramid in the general population presents a profile of a developing country with a significant number of young people. Despite being described as a middle-income country, there are huge inequities between rich and poor. When the country attained democracy, the government made a commitment to the implementation of the primary health care approach. However this has not occurred and the inequities have continued.

The review of the literature has identified several needs and challenges affecting the health care system in general, and the oral health system in particular. A significant challenge for the health care system was inequitable distribution of human resources within the public service, as well as between the public and private sectors (Coovadia et al., 2009). There was also a lack of properly functioning health facilities, equipment and infrastructure in this sector. Contrary to the primary health care approach, the health services concentrated on curative care, with disregard for health promotion and prevention. The large backlog in oral health care, coupled with new epidemiological priorities, has added to the burden of disease.

The greatest need for oral health services was to provide equitable and accessible basic oral health care among the large underserved and rural populations of South Africa. In line with the primary health care approach, health promotion and preventive care should form the pivotal point around which oral health services should revolve. This must be viewed with consideration to the high number of children in the population. In order for services to become self-reliant and efficient, it should be appropriate to local conditions, and developed in tandem with the local community (Thorpe, 2006). Fully-functional dental

facilities should be available in both urban and rural areas, and be affordable to the general population.

The literature showed that the training of dental therapists is significantly cheaper (Addo et al., 2006), but of equal quality (Douglass & Cole, 1979), compared to the training of dentists. Due to the high costs involved in dental education (de Paola, 2004), it makes sense to train a larger number of dental therapists compared to dentists. This concept is in line with the primary health care approach, where dental therapists and hygienists should form the largest number at the primary level (Department of Health, 1997).

Therefore the starting-point of this study should be to clearly define the role of the dental therapist within the health care system of South Africa. This information will provide an answer to the first critical question of this study. It will also contextualize the factors that need to be considered during the evaluation of the curriculum.

## CHAPTER 3

### CURRICULUM EVALUATION: FRAMING THE THEORY

#### 3.1 INTRODUCTION

For South Africa to have any hope of competing in the same league as the global economic society, education will have to be more relevant to employment and the quality of both education and the work force will have to improve (van Rensburg, 1992, p. 5).

The opening statement of this chapter reinforces the fact that higher education must become more relevant to the needs and challenges of the country. The previous chapter demonstrated how the history of racial segregation and apartheid has shaped all aspects of South African society (Coovadia et al., 2009). It has resulted in high levels of poverty and inequality, and huge inequities between rich and poor (Pressly, 2009). A similar situation prevails in the health sector in general, and in oral health care in particular. A lack of access to basic dental services has been identified as a problem for over thirty years.

The literature in the field of dental education has clearly demonstrated that one of the most influential factors in determining the type of professional produced has been the curriculum (Hendricson & Cohen, 1999). Therefore curricula need to be evaluated on an ongoing basis to determine whether they are relevant to the needs and challenges of the country (Carl, 2010). However, from the time the researcher started working at this institution almost twenty years ago, no formal evaluation of the dental therapy curriculum has been conducted.

The present curriculum was developed over thirty years ago, to train dental therapists for practice during that period. Since then, several factors have produced changes to the form and content of the curriculum. The scope of practice was expanded by the regulatory body, which resulted in the addition of extra modules. Changes were made to the form and content according to the personal perceptions of academics. The modularization exercise conducted by the university exacerbated the traditional nature of the dental therapy curriculum. As a result, students find difficulty in integrating the general and clinical

competencies required of them to become ethical, caring, critically-thinking health professionals. This situation has resulted in dissatisfied students, frustrated graduates, and perpetuation of the lack of access to basic oral health care.

A review of the literature on curriculum in general, and on evaluation in particular, accordingly provides the researcher with in-depth knowledge to conduct this study. The definition of the term *curriculum* within the context of higher education is discussed and the field of curriculum development is examined, together with the relevant design models. This guides the selection of the theoretical framework for this study.

In the next section, a review of the field of curriculum evaluation is conducted. This section includes the origins of this field, the ideologies behind evaluation, and the models commonly described in the literature. Curriculum evaluation studies in the field of health sciences and dentistry education are traced back from the work by Flexner (1910) to the present day.

This is followed by an examination of the problems identified in the schooling and higher education sectors within the context of South Africa. A critical appraisal is made of the policy documents of the Department of Education with special reference to health science education.

## **3.2 DEFINITION OF CURRICULUM**

When the literature on the definition of the term *curriculum* was reviewed, the researcher found many widely divergent interpretations. The etymological origin of this term arose from the chariot tracks of Greece in the early nineteenth century (Smith, 2000). It was derived from the Latin noun *curere* which means a *racing chariot*, a *racecourse* or the *race* itself (Flinders & Thornton, 2009). Experts in the field of curriculum studies have reconceived the term as deriving from the verb *currere*, which means *to run* (Pinar et al., 1995). Pinar et al. argue that the definition of curriculum covers the official policy, prescribed textbooks and standardization, but also has evolved further to become “an extraordinarily complicated conversation” (Pinar et al., 1995, p. 848).

The definition of the term *curriculum* varies according to the views of the different curriculum theorists. Taba (1962, p. 413) defined curriculum concisely, as a “plan for learning.” On the other hand, Print (1987, p. 4) defined this term as “all the planned

learning opportunities offered to learners by the educational institution and the experiences learners encounter when the curriculum is implemented.” This definition takes into account all the planned published offerings (such as syllabi, course and subject design, course development and approval, content, teaching and assessment strategies, facilities, timetabling and access to information), as well as the experiences of learners during implementation.

Posner (2004, p. 5) argued that the definition of curriculum can vary from “the content, standards, or objectives for which schools hold students accountable” to “a set of instructional strategies teachers plan to use.” Posner (2004) stated that the conceptual difference between these two definitions is based on the distinction between a curriculum as the expected *ends* of education (intended learning outcomes); and as the expected *means* of education (instructional plans). However, pragmatic philosophers argued that it was not possible to decide on ends independently of means. They rationalized that intended outcomes are fully understood only in retrospect as teaching unfolds (Posner, 2004).

Van den Akker (2010, p. 37) has shown that curriculum can also be differentiated by the *levels* at which it occurs. He argued that this differentiation can be useful when describing the various curricular activities such as policy-making, development, design and evaluation. He has described the levels of curricular activity as:

- International or *supra-level*
- System, society, nation, state or *macro-level* (national syllabi or core objectives)
- School, institution or *meso-level* (school-specific curriculum)
- Classroom or *micro-level* (textbooks, instructional materials)
- Individual, personal or *nano-level*

Van den Akker also described the levels of curriculum as *intended*, *implemented* and *attained*. The intended curriculum refers to the influence of policy-makers and curriculum developers. The implemented curriculum refers to the role of the schools and academics. The attained curriculum takes into consideration the issues related to students. The various levels of the curriculum as described by Van den Akker (2010, p. 38) are illustrated in Table 2.

**Table 2 : Typology of Curriculum Representations**

INTENDED	Ideal	Vision - rationale or basic philosophy underlying a curriculum
	Formal/ Written	Intentions as specified in curriculum documents and/ or materials
IMPLEMENTED	Perceived	Curriculum as interpreted by its users (especially teachers)
	Operational	Actual process of teaching and learning (Curriculum-in-Action)
ATTAINED	Experiential	Learning experiences as perceived by learners
	Learned	Resulting learning outcomes of learners

Posner (2004, p. 12) argued that the boundaries of curriculum were considered to be unstable. He questioned whether discussions should be confined to the intended educational experience, or whether it should include the concepts of the five concurrent curricula. These five concurrent curricula have been described by Posner, (2004, p. 12–14) as the *official curriculum*, the *operational curriculum*, the *hidden curriculum*, the *null curriculum*, and the *extra curriculum*.

The *official curriculum* functions as a guide to planning lessons and for evaluating students. It consists of syllabi, curriculum guides, course outlines, standards and lists of objectives.

The *operational curriculum* comprises what is actually taught by the teacher, and how its importance is conveyed to the learner. It is made up of two components. The first one is the *taught curriculum*, which covers what content is included by the teacher in the lecture room. This can be identified by the time assigned to different topics and types of learning by teachers. The second feature is the *tested curriculum*, where the learning outcomes or standards for which students are actually held accountable are tested.

Posner (2004) questioned whether there was adequate curriculum alignment between the *official*, *taught* and *tested* curricula. The operational curriculum may be presented to learners according to the knowledge, beliefs and attitudes of the teachers. He argued that teachers may also “bargain away the substance of the official curriculum” (p. 13) with students by the “transformation of meaningful challenging tasks into routine risk- free tasks” (p. 13). This resulted in the rote memorization of facts, thereby replacing the learning of critical thinking skills (Boyd, 2002).

The *hidden curriculum* includes those aspects not included in the curriculum which are considered to be a kind of rulebook in which the “rules are written between the lines” (Barnett & Coate, 2005, p. 33). Barnett and Coates argue that the hidden curriculum is pervasive and powerful, and that students need to learn it if they are to become successful. It has been found to have a more profound and long-lasting impact on students, and includes issues such as race, class and gender. Barnett and Coate (2005) assert that the rules of this type of curriculum can be deciphered more easily by some students than others. This results in the hidden curriculum being regarded as a gatekeeper, thereby ensuring that only certain types of students would be able to use it to their advantage. Barnett and Coate (2005, p. 34) refer to this type of curriculum as *curriculum as social reproduction*.

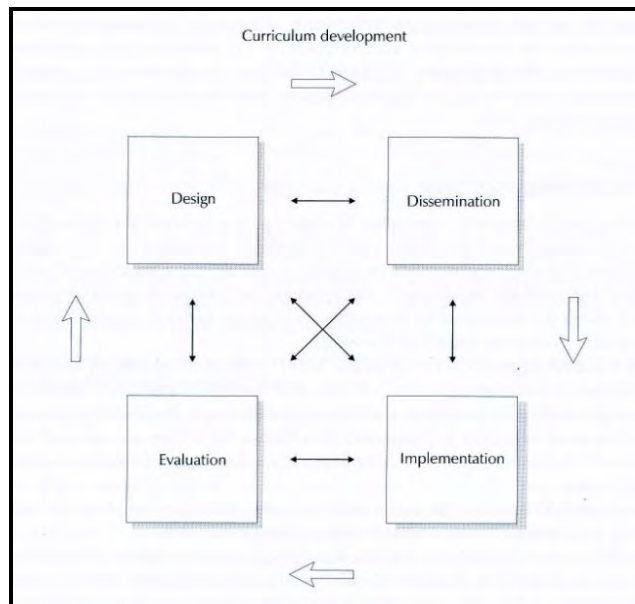
The *null curriculum* includes the subject matter that is not taught within the official curriculum (Eisner, 1994). An example of the null curriculum is the effects of cultural differences in influencing the educational process.

The *extra curriculum* is made up of all those planned experiences that are voluntary in nature, and exist outside of the official curriculum (Posner, 2004). These activities are an acknowledged dimension of the offerings of the school, but usually respond to the students interests. They include factors such as student societies and sports clubs.

The Barnett and Coate (2005, p. 7) definition of curriculum within the context of higher education will be used to guide this study. These authors define curriculum as “a set of intentions and activities intended to advance human learning to a high level such that it is adequate to the challenges facing human being and society.” However they assert that professional qualifications should not become “skills, standards and outcomes models.” They should rather be “reflexive, collective, developmental and process-oriented” (Barnett & Coate, p. 18). They argue that for the curriculum to be considered effective, it must be brought off *in situ*. It is therefore necessary to recognize differences between the concepts of *curriculum-as-designed* (intended curriculum) and *curriculum-in-action* (implemented curriculum).

### 3.3 CURRICULUM DEVELOPMENT

Curriculum development has been described as a complex but dynamic process that goes through many different phases (Carl, 2010). He conceptualized the process of curriculum development into the design, dissemination, implementation and evaluation phases, which is illustrated in Figure 2.



**Figure 2 : Carl's Conceptualization of the Process of Curriculum Development**

The research process has been considered to be cyclical in nature, where the different phases are repeated until one achieves a balance between “ideals” and “realization” (Plomp, 2010, p. 13). However to derive theories and scientific knowledge from the research, Plomp (2010) believes that throughout these phases, *reflection* and *documentation* must occur.

#### 3.3.1 Curriculum Design

Curriculum design is the planning phase of curriculum development. It occurs either when a new curriculum is planned or when an existing curriculum is re-planned after curriculum evaluation (Carl, 2010). The characteristic components of curriculum design must include purposefulness, contents, methods, learning experiences and evaluation (Carl, 2010). However this phase must also include the input of a multidisciplinary team of curriculum experts, discipline specialists, educational psychologists, and didacticians (Carl, 2010).



Carl (2010) argued that in creating a higher level of curriculum design several factors should be taken into account. These include the subject content, as well as the methods and skills needed for the learning process. Learners should also develop effective communication skills. The design should take into account the diverse backgrounds, abilities and skills of all learners. Students should also be able to learn how to use their free time appropriately, which will enhance the qualities of reflective and lifelong learning. The design should also relate closely to the needs and values of the population.

Van den Akker (2010, p. 15) described several characteristics relating to research in curriculum design. He believed that this type of research needed to be *interventionist*, where it was conducted in the real-world setting. It should also be *iterative*, where the cycle of analysis, design and development, evaluation and revision, are conducted as an ongoing exercise. He described the importance of the active participation of practitioners in the various stages of the research process. He believed that this process should be *utility-oriented*, where the merit of the design was based on the practicality within the context of the real world. The design should also be *process-oriented*, where the focus would be on understanding and improving interventions. However, the design should be *theory-oriented*, and be based upon theoretical propositions. All these characteristics provided an ideal fit to the purpose of this study.

### **3.3.2 Curriculum Dissemination**

Curriculum dissemination usually follows the design phase, and is a key activity in the process of curriculum development (Carl, 2010). McBeath (1991, p. 23) defined this term as “the process of informing teachers about new or revised curriculum ideas, documents or materials, so that they understand and accept the innovation.” She argued that this definition has changed in the past thirty years.

In the 1960s, the word *diffusion* was used to describe "the spontaneous, unplanned spread of new ideas" (McBeath, 1991, p. 25). The exchange of ideas was carried out by a two way communication of information between individuals. In the 1970s, the concept of diffusion was replaced by the term *dissemination* (McBeath, 1991). It was expanded to include the planned marketing and staff development strategies. In the 1980s, these terms were replaced by processes such as *mobilization*, *adoption*, *implementation* and

*institutionalization* (Miles, Saxl & Lieberman, 1988). However, in this study, the term dissemination as prescribed by Carl (2010) has been used.

In the dissemination phase, the consumers of the curriculum are provided with information about its implementation process. Dissemination plays a vital role in ensuring that each relevant member of the training institution is fully informed and involved in the process. If this process is not actively carried out, the revised curriculum may not be correctly implemented (Carl, 2010).

Dissemination can be achieved by published information and ideas, and in-service training (Carl, 2010). Carl states, however, that in their attitudes consumers may vary from enthusiasts to antagonists. This can be attributed to a lack of motivation, knowledge, or materials and infrastructure. It can also fail if there is insufficient clarity about how it will develop. It is therefore deemed essential that this phase is conducted in a meaningful manner to achieve the best results.

### **3.3.3 Curriculum Implementation**

The implementation phase follows curriculum dissemination, and occurs when the relevant design is applied to practice (Carl, 2010). Schubert (1986:42) described the implementation phase as “a delivery process, where the design specifications are transmitted through various channels to the academic and the teaching institution.” However it must be acknowledged that successful implementation is dependent on the dissemination process (Schubert, 1986).

There are several methodologies used in curriculum implementation, such as the development and diffusion model, the problem-solving model and the social interaction strategy (Havelock, 1969). Havelock also developed the concept of linkage, where the end user was considered to be the problem solver. McBeath (1991, p. 5) described several other models such as the *centre-periphery* and *proliferation of centres* models of Schon (1987). Details of these models will not be proffered in this section as this is not an implementation study, but an evaluation one.

Wiles and Bondi (2002) assert that 90% of new curricula fail to be implemented for one reason or another. Failure can occur because of inadequate planning about incorporating them into the educational programme (Ornstein & Hunkins, 2009, p. 249). Another reason

may be lack of management skills and knowledge among educators, as well as poor understanding of the culture of the school.

Ornstein and Hunkins (2009) describe two types of understanding essential to the implementation of curricula. The first is the understanding of organizational change, and how information and ideas fit into a real world (Ornstein & Hunkins, 2009, p. 250). The other is the understanding of the relationship between curricula and the social contexts into which they to be introduced. Therefore Ornstein & Hunkins assert that to ensure the successful implementation of a curriculum, it must appeal to participants from a logical, emotional and moral basis.

### **3.3.4 Curriculum Evaluation**

Curriculum evaluation is the fourth phase of the cycle of curriculum development (Carl, 2010), and it assesses whether the implementation of the curriculum has been effective. However Van den Akker (2010, p. 15) describes this process as *iterative*, and argues that the cycle should be conducted as an ongoing process. In this way, the mission of the university and the school will be achieved.

As this study will be evaluating the dental therapy curriculum offered at UKZN, curriculum evaluation will be discussed in detail later in this chapter.

## **3.4 CURRICULUM DESIGN MODELS IN HIGHER EDUCATION**

Jackson and Shaw (2002, p. 1) described the concept of visual imagery in curriculum design. They believed that visual images or *models* could aid in “representing, communicating and facilitating the processing of complex ideas and information such as might be contained in a concept.” Shepherd (1978) in Jackson and Shaw (2002, p. 2) deemed visual imagery to be important in creative processes because they offered rich alternatives to the constraints of language. They also demonstrated relationships and dynamics that were difficult to recognize by other means. Images were more likely to engage affective and motivational systems than language alone. Visualization of a model often facilitated structure and symmetry.

Curriculum design models, within the context of higher education, have evolved over the years, in the same way that the definition of curriculum has evolved to become “an

extraordinarily complicated conversation” (Pinar et al., 1995). The early linear models described only the micro-level or internal aspects of curriculum design. They provided basic information on curriculum and were largely inward-looking (Diamond, 2008). Examples of such models were the linear generic models of Diamond (1989) and Toohey (1999). The learning outcomes models of Jessup (1991) and Allan (1997) were also considered to be inward-looking, but also focused on assessment, competence and student achievement.

Because of the evolution of curriculum theory to include many other factors that affected curriculum, theorists considered it necessary to take account of macro-level or external influences in addition to the internal aspects (Posner, 2004). Hartman and Warren (1994) developed one of the first models to include both the internal and external influences of curriculum design. Several newer models have subsequently been developed in this field. However in the following section, only models that have impacted on the outcomes of this study will be discussed.

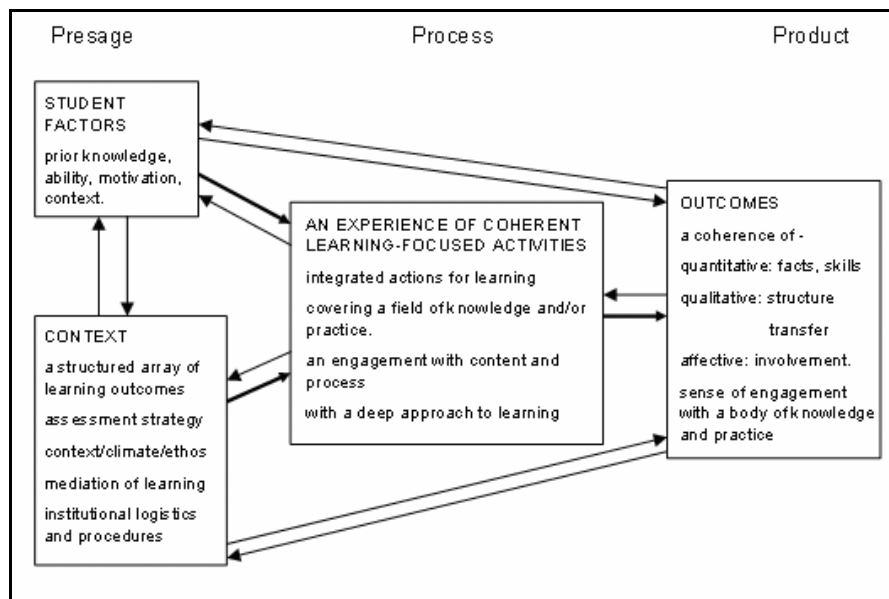
### **3.4.1 Biggs’s 3P Model of Teaching and Learning**

John Biggs’s 3P Model of Teaching and Learning (Biggs, 2003), as represented in Figure 3, is one of the most recognizable models in the higher education curriculum literature (Hicks, 2007). It is considered to be an extension of the Dunkin and Biddle (1974) model of teaching, where it integrates the concepts of teaching and learning into a single curriculum framework (Hicks, 2007).

The 3Ps in this model are *presage*, *process* and *product*. The *presage* component represents the context and student factors of the curriculum. The student factors include prior knowledge, and the ability and motivation of students. The context component encompasses the learning outcomes, assessment strategies, institutional logistics and climate within which learning occurs. The *process* aspect covers the learning-focused activities of the programme such as content and process. The *product* component takes into consideration the learning outcomes of the programme, which includes engagement between the body of knowledge and practice (Biggs, 2003).

This model is based on the Biggs theory of constructive alignment, which includes factors such as the curriculum, teaching methods, assessment procedures, student-teacher

relationships and the institutional climate. Constructive alignment will be discussed in detail later in this chapter.



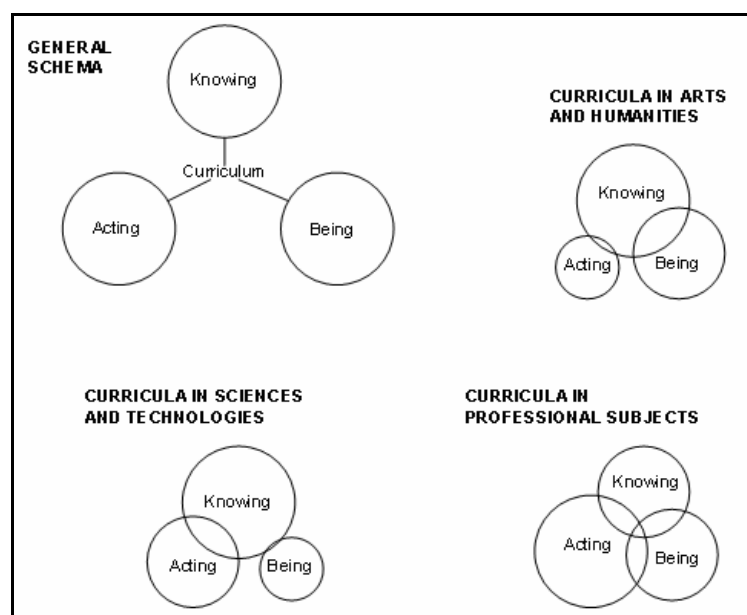
**Figure 3 : 3P Model of Teaching and Learning**

### 3.4.2 Barnett and Coate Schema for Curricula

In the Barnett and Coate (2005) schema for curricular design, the three domains of *knowing*, *acting* and *being* are represented as overlapping circles of importance. Knowing represents the foundational or proposition knowledge. This can include information from the social, human, occupational and biological sciences (Rodger, 2011). Rodger argues that it should also include the concepts of experiential knowing, which encompasses knowing in action, *in situ*, or through experiencing and problem-solving.

In the acting domain, the skills and techniques needed in practice are described. These include factors such as communication, clinical and assessment skills (Rodger, 2011). The being domain include the development of concepts such as reflection, professional identity and intrapersonal skills. This development allows students to progress from the novice stage to being deemed as clinically competent (Rodger, 2011).

However this model also recognizes the necessity for curricula to be distinctive for the different professions. In this way, it allows for different weightings within the curriculum of each of the domains of knowing, acting and being (Hicks, 2007). Thus in professional programmes such as dental therapy the acting component would be given greatest emphasis.



**Figure 4 : Knowing, Acting & Being Schema for Curricula**

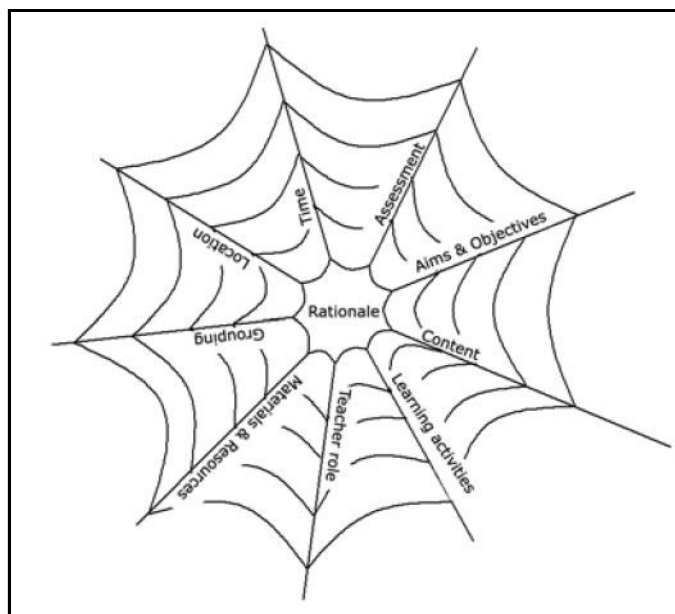
### **3.4.3 Van Den Akker Curricular Spider Web**

The Curricular Spider Web model (Van Den Akker, 2010, p. 41) attempts to demonstrate the “complexity of efforts to improve the curriculum in a balanced, consistent and sustainable manner.” It provides a visual representation of the framework of the ten components that address specific questions about the curriculum.

Rationale	Why are they learning?
Aims and Objectives	Toward what goal are they learning?
Content	What are they learning?
Learning activities	How are they learning?
Teacher role	How is the teacher facilitating learning?
Materials & resources	With what are they learning?
Grouping	With whom are they learning?
Location	Where are they learning?
Time	When are they learning?
Assessment	How far has learning progressed?

The interconnections between these components are illustrated by means of a spider web. It shows that even though the emphasis on the different components may vary over time some kind of alignment has to be present to maintain coherence. It also demonstrates the

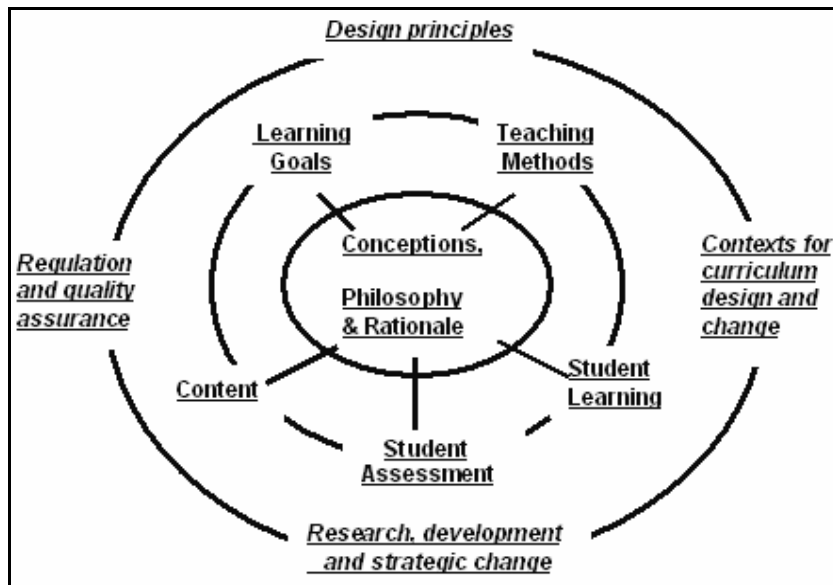
vulnerability of the interconnections within the curriculum, aptly reflected as “every chain is as strong as its weakest link” (Van den Akker, 2010, p. 41).



**Figure 5 : Curricular Spider Web**

### **3.4.4 Higher Education Academy Curriculum Model**

This model was developed by the Higher Education Academy (2007) of the United Kingdom. Hicks (2007, p. 7) argued that even though this model seems to be “somewhat static,” it is one of the most progressive developments in curriculum in higher education. It can be applied to the curriculum as a whole, or it can be used at the level of the individual modules. Information is arranged around eleven themes, which represent the principles of curriculum design. These themes are based on the conceptions, and the philosophy and rationale, of the programme. These aspects lead to the learning goals, teaching methods, student learning, student assessment, and content. These factors are underpinned by the design principles, contexts for curriculum design and change, research development and strategic change, and regulation and quality assurance. However Hicks noted that a shortcoming of this model was that it did not take into account many of the other external influences on the curriculum.



**Figure 6 : Higher Education Academy Model of a Curriculum**

### **3.4.5 Hicks Typical Influences on Curriculum**

Having reservations about the Higher Education Academy model, Hicks (2007) extended the model to include an even wider range of factors that needed to be considered when reflecting on curriculum in higher education. After careful consideration by the researcher of the various curriculum models, this model was selected to serve as the theoretical framework of the present study, and will be discussed in greater detail in the theoretical framework segment at the end of this chapter.

## **3.5 APPROACHES TO CURRICULUM DESIGN IN DENTAL EDUCATION**

The definition offered by Barnett and Coate (2005), which forms the basis of this study, asks the question: Where do issues of curriculum end, and where do issues of pedagogy begin? These authors regard pedagogy as the “handmaiden” of curriculum (pp. 5–6). While they define curriculum “as a set of educational experiences organized more or less deliberately,” they see pedagogy as being concerned with “the acts of teaching that bring off a curriculum” (p. 6). They also point out further complications to this concept, raising questions about whether problem-based learning should be seen as curriculum or pedagogy, and whether group work should be seen as a facet of curriculum or of pedagogy. In the next section, approaches to curriculum design in dental education will be



described. In view of the difficulties in distinguishing curricula from pedagogy, the researcher has chosen to use the term *approaches to curriculum design*.

Hendricson and Cohen (1999) described several approaches to curriculum design in the field of dental education. These include traditional or subject-centred approaches, competency-based approaches, problem-based approaches, case-based approaches and community-based approaches.

### **Traditional or Subject-Centred Curriculum**

In the traditional type of curriculum, students basically learn “what teachers choose to teach them” (Yip, Smales, Newsome, Chu & Chow, 2001, p. 517). Yip, et al. assert that the traditional curriculum aims to produce professionals “with prescribed packages of knowledge, some of which will be retained upon graduation.”

In this type of curriculum, students undergo intensive training in the basic and preclinical sciences in the first few years, according to the length of the programme. This is followed by a period of clinical training in the dental sciences. The focus of training is scientifically oriented, with minimal exposure to the social and behavioural disciplines (Hendricson & Cohen, 1998). Hendricson and Cohen observe that the traditional curriculum was the norm in dental schools for many years. In this type of curriculum, matriculation courses served as prerequisites for entry into the programme. Then the basic, preclinical and clinical modules were superimposed on top of these prerequisites in a “smoke-stack formation” (Hendricson & Cohen, 1998, p. 5). When all the modules were passed, the student graduated. There was little or no integration of modules within the curriculum.

### **Competency-Based Curriculum**

Competency in dental education has been defined as having the “skills, understanding and professional values of an individual ready for beginning independent dental or allied oral health care practice” (Boyd, Gerrow, Chambers & Henderson, 1996, p. 842). This type of curriculum was introduced in 1993 to overcome the shortfalls of the traditional curriculum (Haden et al., 2010). Haden et al. (2010) claimed that this type of curriculum provided a sequence of defined learning experiences to produce graduates competent to practice independently within their prescribed scopes of practice.

Licari and Chambers (2008, pp. 8–18) argued that this type of education has proven to be a valuable innovation on “guiding curricular design, clinical education and evaluation, and accreditation.” Hendricson and Cohen (1998, p. 7) indicate three questions that need to be answered when designing a competency-based curriculum.

- What knowledge, skills and professional values should the entry level practitioner possess?
- What learning experiences will enable dental students to acquire these competencies?
- How do dental school faculty know if students have attained these competencies?

Hendricson and Cohen (1998, p.7) describe the three main features of the competency-based curriculum as follows:

- Top-down planning, which is based on the competencies required by practitioners in their working environment. This planning is in contrast to the bottom-up version where focus is placed on what disciplines would like to communicate to their students.
- A readiness-based model, where students are allowed to progress at different rates compared to their peers.
- A horizontal curriculum structure where students are allowed to progress through hierarchically-organized skill layers by level of difficulty. This feature is characterized by the strong proximity of time between the preclinical and clinical components.

A shortfall of this type of curriculum is that it focuses on the mastery of skills, without considering the psychosocial and reflective aspects of learning. It is student and patient-centred, and has been regarded to be the recommended model by many dental schools, even in South Africa (Snyman & Kroon, 2005).

### **Problem-Based Curriculum (PBL)**

Problem-based learning was introduced at McMaster University in the 1960s, and is considered to be an important innovation in educational reform (Williams, 2004). Williams (2004) states that the purpose of PBL is to develop competency in clinical

decision-making, problem-solving, and self-directed learning. Students learn how to work as part of a team, and learning is centred on solving real-life problems.

Moore (2007) described the essential components of PBL as including small group collaboration, ill-structured problems, and self-directed learning. Tutors act as facilitators rather than as experts in the field. Learning usually occurs within a social context. Self-directed learning is a feature of this type of curriculum. Learning goals are developed by students to understand the causes of the condition. The necessary research is conducted to develop and analyze the solutions.

The development of critical thinking skills is considered to be one of the main advantages of this type of curriculum, where student learn how to “solve problems, ask questions, find information, communicate, work collaboratively with others, make decisions, and present and support their ideas” (Moore, 2007, p. 1058). However, in a survey of dental schools in the United States, the exclusive use of PBL was not considered to be a viable format for dental schools because of excessive financial implications (Kassebaum, Hendricson, Taft & Haden, 2004). This survey found that 5% of dental schools survey used only PBL, 36% used no PBL, and 59% used PBL in some format.

### **Case-Based Curriculum**

Case-based learning has been used for many years in health science education (Richards & Inglehart, 2006) to integrate basic knowledge learnt by the traditional lecture method in applying it to a patient. This type of learning has often been confused with PBL. However Rich, Keim and Shuler (2005) have argued that the techniques used in teaching and learning in these two methods are very different.

In PBL, the learning is driven by the problem presented, whereas case-based learning can occur in many different ways. The most common form of case-based learning occurs when the lecturer uses a clinical case to “raise awareness about a specific issue, dramatize the importance of a particular health problem or treatment strategy, or introduce a topic” (Richards & Inglehart, 2006, p. 284). It can also be used as part of comprehensive patient-based seminars, where students document their clinical care of a patient and present it to other students and clinicians. In this way, students are required to recall previously learnt material.

Case-based learning can be seen as both student- and teacher-driven. It encourages students to concentrate on the comprehensive management of the patient. This type of learning promotes self-directed learning, clinical reasoning, clinical problem solving and decision-making (Richards & Inglehart, 2006). In the survey conducted by Kassebaum et al. (2004), only 2% of dental schools surveyed used case-based learning in all courses, 5% did not use this type of teaching, and 93% used it in some aspects of their curricula.

### **Community-Based or Service-Based Curriculum**

Community-based dental education is considered to be a type of experiential learning, which affords students the opportunity to gain clinical experience in community settings (Strauss et al., 2003, p. 1234). Strauss et al. (2003) defined experiential learning as “a process by which the learner reflects on his or her experience and draws significance and meaning from such experience.”

This type of curriculum combines educational goals with service to the community, where the community and the school are regarded as equal partners (Hood, 2009). The aim of this type of curriculum is to improve learning in an appropriate setting, promote engagement with the community, and strengthen communities. In this way, students develop critical-thinking and problem-solving skills, and an ethical awareness of the community (Strauss et al., 2003).

It must be emphasised that this type of learning does not simply mean sending students to rural areas. Through this experience, students need to be conscientised about the socioeconomic, cultural and other determinants of health (Strauss, Stein, Edwards & Nies, 2010). This enables the student to contextualize their learning within the social setting. Strauss et al. (2003, p. 1234) warn, however, that community-based learning serves little purpose if it is used only in the development of clinical skills. This type of learning has to include reflection on the students’ experiences to achieve “personal growth and professional development.” This enables students to “think, interpret and construct meaning” about their experiences, thereby becoming reflective practitioners.

In the survey by Kassebaum et al. (2004), 64,3% of dental schools believed that students required community-based experiences, one dental school offered no community-based curriculum, and about 39% believed that elective community-based practice was required.

From these discussions on the approaches to curriculum design in dental education, it can be seen that several alternatives to the traditional discipline-based approach have been developed in this profession. However Kassebaum et al. (2004) has argued that dental schools do not need to follow only one type of approach. Many dental schools offer a mix of approaches to produce the most competent graduate. Based on these designs, several models have been devised for dental education, which are discussed in the following section.

### **3.5.1 Curriculum Design Models in Dental Education**

Several experts in the field of dental education (Oliver et al., 2008, p. 74-84) have described the structure of the curriculum as being “like the skeleton of a body: strong and in balance, giving direction and support to activities and determining the outline of what it represents.” It needs to consider the methods of teaching, the themes of the curriculum, and the alignment between the goals and content of the curriculum. They stress the importance of assessment being constructively aligned to teaching and learning.

Curriculum design models in dental education have also evolved over time from disease-oriented, to health-oriented, to community- or competency-based (Phantumvanit, 1996). It has been found that dental curricula in developed countries reached the status of being community-based much faster than in most developing countries. Phantumvanit (1996) argues that a community-based curriculum can also be regarded as a competence-based curriculum, although the competence statements may be different due to the different demographic characteristics between developing and developed countries.

Several models have been developed in health sciences education to demonstrate the new advances in this field. They are outlined in the following section.

#### **PRISMS Model (Bligh, 2001)**

The Prisms model as shown in Table 3, is product-focused, and students gain knowledge by solving real-life problems. It promotes the concept that curricula have to be relevant to the needs of the population. It encourages intersectoral collaboration, and promotes learning at different service sites. The pedagogy focuses on varied learning styles, including small group teaching and service-learning.

**Table 3 : PRISMS Model**

<b>Product-focused</b>	Practice-based where possible, acquiring basic science knowledge by solving real clinical problems.
<b>Relevant</b>	Linking curriculum to the needs of the learners and to the needs of the population they will serve – good in developing countries.
<b>Inter-professional</b>	Stressing collaboration and team-working for mutual respect and understanding.
<b>Shorter/ smaller</b>	Growth in graduate entry programme, with a shorter training period – pedagogy will move towards small group teaching.
<b>Multi-site</b>	Students will increasingly learn outside the hospital, where they will manage common dental problems under supervision.
<b>Symbiotic</b>	Partnership between learners, teachers, organizations and communities they serve.

### **SPICES Model of Educational Principles (Dent & Harden, 2005)**

The SPICES model, illustrated in Table 4, demonstrates the polarized anchors for consideration during dental education. The right column represents the traditional discipline-based dental curriculum described in the previous section. In this model, students passively received knowledge imparted by the teacher. Training is usually hospital-based and uniform for all students.

The left column demonstrates newer ideologies in teaching and learning. Student-centred, problem-based, and multidisciplinary learning are considered to be innovative concepts that need to be considered in dental curricula (Hendricson & Cohen, 1998). Community-based education has also been considered as progressive in these curricula. The literature demonstrates that the community-based dental curriculum creates a critical partnership between the training institution and the community (Strauss et al., 2010). In addition, student training is enhanced by developing competence in different clinical settings. Other principles aspired to in this model are electives, where students choose to work in areas of interest to them.

**Table 4 : SPICES Model**

Student-centred	Teacher-centred
Problem-based	Information-oriented
Integrated/ Inter-professional	Subject/ Discipline-based
Community-based	Hospital-based
Elective-driven	Uniform
Systematic	Opportunistic

**CELTIC Model (Oliver & Sanz, 2007)**

The CELTIC model as shown in Table 5, focuses on competency-based education which is outcomes-based. This is the model used in most dental schools, even in South Africa (Snyman & Kroon, 2005). It promotes the concepts of explicit formative and summative assessment, combined with constructive feedback to students. It encourages the development of reflective self-directed learners, and the use of student-centred teaching and learning resources. It supports the concept of internationalization, and encourages the concept of credit rating.

**Table 5 : CELTIC Model**

<b>C</b>	Competency and learning outcomes-based
<b>E</b>	Explicit formative and summative assessment with constructive feedback
<b>L</b>	Lifelong reflective self-directed learners
<b>T</b>	Tactical use of learning and teaching resources that is student-centred
<b>I</b>	International outlook, learning relevant to European and world reference
<b>C</b>	Credit-rated

All these models take into consideration the general principles of curriculum design, but also focus on the competencies that need to be achieved in the training of dental professionals. In the next section, some of the recent developments in regard to dental curricula will be discussed. They include the concepts of constructive alignment (Biggs, 2003), the continuum between learning and assessment, (Norcini, 2003) and reflective learning (Boyd, 2002).

## 3.6 NEWER CONCEPTS IN DENTAL CURRICULA

### 3.6.1 Constructive Alignment

Constructive alignment, as advocated by Biggs (2003), was based on the ideologies of Shuell (1986), who believed that the different components of the curriculum should “complement each other to become an integrated whole “to optimize learning by students (p. ix). Biggs’s ideas were based on the views of Tyler (1949), who argued that learning takes place through the active behaviour of students.

Biggs (2010, p. 1) used the term *constructive* to refer to “what the learner does to construct meaning through relevant learning activities.” Thus constructive alignment espouses the constructivist view of learning, underpinned by critical reflection. On the other hand, Biggs (2010) believed that the *alignment* component needs to be advanced by the lecturer. This can be accomplished by the establishment of a learning environment that “supports the learning activities appropriate to achieving the desired learning outcomes” (Biggs, 2010, p.1). Teaching methods, learning outcomes, assessment procedures, and a supportive institutional climate therefore need to be in alignment.

### 3.6.2 Continuum of Learning and Assessment

One of the best-known hierarchies for describing the learning and assessment continuum in health professional education is Miller’s pyramid of professional competence (Miller, 1990). Miller’s four-layer categorization of the levels of knowing and its associated assessments are *Knows*, *Knows How*, *Shows How*, and *Does*. This has been illustrated in Fig 7.

The base of the pyramid (“Knows”) assesses the factual recall or recognition of information without reference to the context of patient care. This skill is typically attained at the first level of the curriculum, where students’ exposure to the patient is minimal. It is usually measured by multiple-choice and short questions.

The second level of the pyramid (“Knows How”) is the skill developed during preclinical training. Students need to display the ability to apply biomedical knowledge to the analysis and resolution of problems presented as written cases and simulated patient scenarios. Student should “know how” the basic patho-physiological mechanisms work,

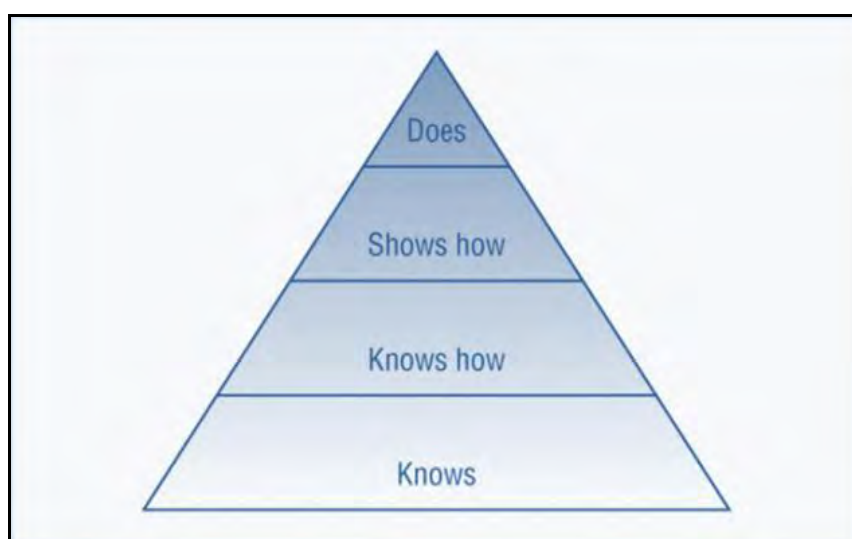


and how abnormalities occur. Questions relevant at this level include multiple-choice questions, essays in regard to a clinical scenario, as well as oral evaluations.

The third level of the pyramid (“Shows How”) is where the student needs to demonstrate the ability to apply patient care skills in simulated clinical situations. Assessment methods need to be more advanced to determine whether students can “show how” they apply knowledge and skills under controlled well-supervised conditions. Clinical competency examinations, combined with a significant theoretical component, are the main types of assessment at this level.

The tip of the pyramid (“Does”) is the level where the student is required to perform all tasks prescribed by their scope of practice in real-life working conditions, over an extended period of time, with minimal supervision. Students need to demonstrate that they have mastered the competencies needed for independent practice, and can reproduce these skills over a prolonged period of time.

In the literature, Miller’s pyramid is most often used in the evaluation of medical curricula, but it is equally applicable to dental curricula. In this study, Miller’s pyramid was used to conduct process evaluation of the form and content of the dental therapy curriculum.



**Figure 7 : Millers Pyramid for Assessing Clinical Competence**

### 3.6.3 Assessment in Dental Education

Assessment is a key element for determining success in the “achievement of skills, knowledge, affective processes and professional values that define the critical practice of dentistry” (Albino et al., 2008, pp. 1405–1435). Assessment determines whether the student is ready to graduate and where he is allowed to practice his profession on the public. With the introduction of newer pedagogical methods to dental education, it is also essential that appropriate assessment strategies are used to assess cognitive skills at the different levels.

The five main types of assessment strategies in dental education have been multiple-choice examinations, preclinical laboratory practical exercises, completing specified quotas of dental procedures, daily clinical grading, and clinical competency patients (Albino et al., 2008).

A study by Chambers (2004) showed that daily grading (where students worked under the watchful eye of the supervisor, and were rescued from difficulties) was not considered to be as effective as competency examinations (where the examiner did not get involved in the procedure, except in an emergency). Competency examinations were therefore regarded as a more reliable form of assessment in dental education.

Newer assessment strategies have been developed in the health science professions, although the traditional nature of dental education has led to some resistance to these innovations (Chambers & Glassman, 1997). Chambers and Glassman (1997) reviewed and documented techniques, strengths and weaknesses of the various assessment methods used in dental education. Albino et al. (2008) argued that Bloom’s *cognitive taxonomy* (Bloom & Krathwohl, 1984) could be used by dental academics to plan learning experiences to assist students to achieve desired outcomes. It could also help in the planning of assessments to cover a range of cognitive capacities.

These newer assessment strategies (other examples being longitudinal faculty evaluations of students’ overall performance across many domains of competence over an extended period of time, and retrospective record reviews) could assist in creating a health professional competent in providing comprehensive patient care (Albino et al., 2008).

Even though the literature has documented many innovative methods of assessment, it is equally important that there is constructive alignment between learning and assessment. In

the next section, the concept of developing a critical or reflective dental practitioner will be discussed.

### **3.6.4 Critical Thinking in Dental Education**

The concept of critical thinking has become a popular term in higher education in general, and in health science education in particular (Boyd, 2002; Teekman, 2000). Boyd (2002, p. 710) argued that critical thinking was essential for “good citizenship and scholarship in a democratic society.” This definition was based on Dewey’s (1938) concept of reflective thinking. Dewey argued that real-life problems could not be solved by formal logic alone because information may be unavailable.

In dental education, patients vary with respect to their individual needs, the many variables associated with these needs, and the various treatment options available (Boyd, 2002). Critical-thinking skills enable the clinician to make sound clinical judgments about ill-defined problems. The literature shows that several types of knowledge are needed to perform critical thinking in the clinical domain. They include conceptual knowledge, procedural knowledge, and metacognitive knowledge (Boyd, 2002; Teekman, 2000). All these types of knowledge are closely interrelated, and must be present for learning to occur.

Conceptual knowledge includes the basic facts and concepts that are needed for the development of higher-order thinking (Rittle-Johnson, 2001). In dental schools, the development of conceptual knowledge occurs in the form of foundation knowledge in the basic and preclinical sciences. It is achieved mainly by lectures and reading from textbook material. It impacts on procedural knowledge by guiding students to make better choices and accurate representations from the possible alternatives available to them. It can also offer students a basis for “evaluating the relevance of known procedures to novel problems” (Boyd, 2002, pp. 710–720).

Procedural knowledge involves the procedures or strategies for applying this knowledge (Boyd, 2002). While it is acknowledged that conceptual knowledge enhances procedural knowledge, the converse is also true: procedural knowledge may lead to an improvement of conceptual knowledge. This is particularly relevant in the clinical situation. When students learn about a pathological condition from a textbook, they obtain knowledge by rote learning and memorization. However when they come into contact with a patient in

the clinical situation, it becomes an “unforgettable experience” (Boyd, 2002, pp. 710–720).

The third type of knowledge is metacognition, defined as “the ability to think about thinking, to be consciously aware of oneself as a problem solver, and to monitor and control one’s mental processing” (Bruer, 1997, pp. 4–16). It assists with monitoring and controlling the strategies used in the application of conceptual and procedural knowledge.

Boyd (2002, pp. 710–720) also discussed another component of critical thinking with respect to dental education, namely, the ability to develop *schemas*. She argued that students must be able to develop schemas or knowledge structures, which helps to “organize experience and knowledge into memory to facilitate the use of that knowledge.” Schemas differentiate the expert clinician from a novice. Having more experience, expert clinicians are able to draw from a range of possible options for solving a problem, whereas the novice clinician has fewer schemas from which to choose. A curriculum should therefore take into consideration the time needed by students to “assimilate the information presented in the classroom or clinic” so that they are able to progress from being a novice to being competent on graduation (Boyd, 2002, p. 710–720).

Learning approaches and learning styles are important in the development of critical thinking (Oliver et al., 2008). Defined as “pattern[s] of information processing activities used in specific situations to prepare for an anticipated test of knowledge and skills” (Marton & Saljo, 1976, p. 5), learning approaches may be *deep* or *surface*. Deep learning results in information being well-understood and retained over time. Surface learning results from low levels of understanding, and therefore low retention. Therefore, a curriculum that promotes deep learning is considered to be ideal.

Honey and Mumford (2006) define *learning styles* as “attitudes and behaviours which determine an individual’s preferred way of learning”. They categorize learning styles as *activist*, *reflector*, *theorist*, or *pragmatist*. The activist is the learner who responds actively to challenges and new experiences. The reflector needs time to reflect on their learning experiences. The theorist acts when clear aims and objectives are given to them. The pragmatist reacts positively to their learning when they recognize the applicability to their practice.

All these concepts need to be considered when evaluating a curriculum. Boyd (2002) argued that in the traditional dental curriculum students learn by a dualistic way of thinking about knowledge: perceiving what is right and what is wrong. This results in a superficial level of knowledge. Students become passive learners, and focus on the memorization of conceptual knowledge. They find it difficult to apply this knowledge to the clinical situation. They become dependent on the teacher and textbooks to find answers to their problems. They find it difficult to engage in critical thinking, and therefore cannot integrate their conceptual knowledge into their clinical procedures.

### **3.7 CURRICULUM EVALUATION**

Curriculum development is a cyclical, iterative process that passes through phases of design, dissemination, implementation and evaluation (Carl, 2010). These phases are repeated until a balance between the ideals and realization has been achieved. Throughout this process, reflection and documentation will lead to the development of an appropriate design (Plomp, 2010). However in order to review the literature on curriculum evaluation, it is necessary to define the term *evaluation* within the context of this study.

#### **3.7.1 Definition of Evaluation**

The definition of evaluation depends upon how the meaning of *curriculum* has been conceptualized. If we think about curriculum in the narrow sense, where it covers content outline, scope and sequence, or syllabus, then evaluation should simply imply a judgment of merit, worth or value (Posner, 2004). In this instance, it should judge the completeness and consistency of the curriculum documents, with respect to depth, breadth and rigour. It should also determine how well-organized, well-written and up-to-date the documents are.

Conversely, if the definition of curriculum takes into consideration the views and experiences of students, graduates, academics and other stakeholders, then evaluation would imply a judgment about the value of the educational experience (Posner, 2004). In this case, questions would need to be asked about whether the curriculum was considered to be educational, challenging, appropriate and engaging. Questions also need to be asked about whether students from different socioeconomic, cultural and ethnic backgrounds were adequately catered for. In this circumstance, the curriculum should focus on how the educational experiences of the students can be improved.

In the definition of curriculum where learning objectives are the focal point, then evaluation should refer to the actual outcomes of the educational process. These include the concepts and skills that students need to learn. It can also include a comparison to similar programs. An important consideration in this definition is how well students learn, what they are expected to learn, and what are the side-effects of this learning. Cognizance needs to be taken about which students seem to benefit the most and least from the curriculum, and how maximum benefit can be accrued by all (Posner, 2004).

In all these instances, it is important to decide whether evaluation will be *formative* or *summative* (Scriven, 2003). The most important difference between these two types of evaluation is the location of the decision-maker (Posner, 2004). In formative evaluation, the decision-maker is considered to be an integral element of the evaluation, thereby making the evaluation an internal process. It usually occurs when decisions about how to improve a curriculum are needed. This type of evaluation usually occurs during the process of curriculum development.

Summative evaluation is usually conducted by an external person, and is done when a decision needs to be made about whether to continue to use the curriculum. The external evaluator then makes recommendations to the board or management who have commissioned the evaluation. In this way, the process allows the management to decide whether the curriculum deserves to be supported by the institution (Posner, 2004).

### **3.7.2 History of Curriculum Evaluation**

Madeus, Stufflebeam and Scriven (1987) argued that there had been no definitive written history of curriculum evaluation. However, Mertens (2010) claimed that evaluation in education and psychology began in the post-positivist era. Scriven (1996, p. 395) asserted that "evaluation is a very young discipline, although it is a very old practice." However it is important, when conducting an evaluation study, to trace back the roots and origins of this field. This will enable a better understanding of how and why this field has developed. It will also enable the evaluator to anticipate problems during the evaluation process, and to use the strengths and avoid the failures of other initiatives.

Six periods have been identified in the history of curriculum evaluation (Madeus, Stufflebeam & Scriven, 1987):

Age of Reform	prior to 1900
Age of Efficiency and Testing	1900 to 1930
Tylerian Age	1930 to 1945
Age of Innocence	1946 to 1957
Age of Expansion	1958 to 1972
Age of Professionalism	1973 to the present

### **The Age of Reform (1800–1900)**

The Age of Reform occurred during the period of the Industrial Revolution, where economic and technological changes transformed the structure of society (Madeus, Stufflebeam & Scriven, 1987). During this period, there were several attempts to reform education and social programmes in Great Britain and the United States. In Great Britain, there were ongoing attempts to reform education, health and other social structures. These evaluations were often informal and impressionistic in nature. Government-appointed commissions were used to investigate the areas of concern. When these reform programmes were implemented, it was often necessary to demand yearly evaluations through a system of annual reports. External inspections were also widely used in education, law and other state agencies.

Two other developments during this period contributed significantly to the history of evaluation. The first occurred during the middle of the nineteenth century, when associations dedicated to social enquiry were created to investigate and publicize findings on a number of social problems. The second occurred in response to these findings, when commissions of enquiry were set up which were official government-sponsored investigations of social programmes. They were considered to be the origins of an empirical approach to the evaluation of programmes (Madeus, Stufflebeam & Scriven, 1987).

An important event in the history of evaluation in the United States took place in Boston in 1845. Pupil test scores were used as a principle source of data to evaluate the effectiveness of a school programme. This was considered to be the traditional method of evaluation for many years. The *viva voce* (oral examination) was replaced by the essay examination because the former was considered to be unfair and lacked standardization (Madeus, Stufflebeam & Scriven, 1987).

### **The Age of Efficiency and Testing (1900–1930)**

This period was characterized by the concept of scientific management (Madeus, Stufflebeam & Scriven, 1987, p. 6), which was based on “systemization, standardization and efficiency.” Many surveys were conducted in school systems during this period to improve the efficiency of the district. These tests took on a norm-referenced character; where the percentage of students passing became the standard by which teachers judged whether their classes were above or below the general standard.

A characteristic of evaluation in this era was “muck-raking” (Madeus, Stufflebeam & Scriven, 1987, p. 7). This phenomenon was described as being initiated by a few local people who invited outside experts to expose defects and propose remedies. However the results obtained from these evaluations were often used as propaganda. Tyack and Hansrot (1982) proposed that researchers should avoid muck-racking. They recommended that evaluations should be constructive, and designed to produce “public support for unrecognized but needed change” (Madeus, Stufflebeam & Scriven, 1987, p. 8).

During this period, evaluation was closely linked with testing, where test data was often the principal data source in evaluations. This testing was usually confined to local school districts, which resulted in data that was confined to local situations, but lacked generalizability. It was only in the 1970s that this problem was addressed.

### **The Tylerian Age (1930–1945)**

Ralph W Tyler has often been referred to as the Father of Educational Evaluation (Stufflebeam, 2000). His works have had a profound influence on education in general and educational evaluation in particular (Hunkins & Hammill, 1994). He developed the term *educational evaluation* which he defined as “assessing the extent that valued objectives had been achieved as part of an instructional programme” (Hunkins & Hammill, 1994, pp. 4-18).

After the Great Depression in the United States, a movement was formed aimed at the renewal of education. This was known as the Progressive Education Movement. It reflected the philosophy of pragmatism and used tools from behaviouristic psychology. Tyler (1949), as part of this movement, developed a broader view of educational evaluation than had been seen during the age of efficiency and testing. He conceptualized evaluation as a comparison of intended outcomes with actual outcomes (Tyler, 1949).



It was significant that the Tylerian evaluation involved internal comparisons of outcomes with objectives. This eliminated the need for costly comparisons between experimental and control groups (Madeus, Stufflebeam & Scriven, 1987). A positive aspect of this evaluation method was that it focused on the measurement of behaviourally-defined objectives, concentrating on learning outcomes rather than organizational and teaching inputs. This removed the subjectivity of professional judgment or the accreditation approach. Tyler's objectives-based model for evaluation exerted a significant influence on testing and evaluation during the next few years (Stufflebeam, 2000).

### **The Age of Innocence (1946–1957)**

During this period there was expansion of educational programmes (Madeus, Stufflebeam & Scriven, 1987). A significant amount of data was collected, but there was little evidence to show that this data was used to improve the quality of programmes. However there was some development in the technical aspects of evaluation. One of the main developments of this time was standardized testing (Lindequist, 1953). The multiple requirements of experimental design in the school setting were found to be overwhelming. Bloom, Engelhart, Furst, Hill & Krathwohl (1956) developed techniques to assist programme staff to make their objectives explicit. They also proposed taxonomies of educational objectives.

### **The Age of Expansion (1958–1972)**

In this period, there were calls for widespread curriculum development projects (Madeus, Stufflebeam & Scriven, 1987). The launch by the Russians of Sputnik I in 1957 led to the enactment of the National Defence Education Act of 1958 ((Madeus, Stufflebeam & Scriven, 1987). This Act presented the opportunity to develop new programmes in the sciences, mathematics and foreign languages. It also expanded counselling and guidance services to school districts. The establishment and evaluation of several new national curriculum development projects occurred during this period.

However by the 1960s, many evaluation experts believed that their endeavours were not producing the results they had hoped to achieve. Cronbach (1982) argued that, due to the fact that evaluations lacked relevance and utility, evaluators should move away from the post-hoc evaluations which were based on comparisons of the norm-referenced test scores of experimental and control groups. He advised evaluators to reconceptualise evaluations,

thereby using this process to gather and report information that could help to guide curriculum development.

Because of discontent with evaluation efforts being used at that time, the Phi Delta Kappa Commission on Evaluations (1971) proposed that new theories and methods of evaluation should be developed. Experts such as Eisner (1963) suggested that the Tyler model should be reformed.

Many curriculum theorists, such as Glaser (1963) and Popham (2006), recommended that criterion-referenced testing should be used as an alternative to norm-referenced testing. Newer evaluation models were introduced by Scriven (1974), Stake (1967) and Stufflebeam (2000). They were considered to be different from the previously designed models. All of them recognized the need to evaluate goals, look at inputs, examine the implementation and delivery of services, as well as to measure intended and unintended outcomes of the programme (Madeus, Stufflebeam & Scriven, 1987). They also recognized the need to make judgments about the merit or worth of the object being evaluated (Posner, 2004).

Despite these developments, the history of this period ended disappointingly because several important evaluations ended in negative findings (Madeus, Stufflebeam & Scriven, 1987). This gave rise to the Age of Professionalization.

### **The Age of Professionalization (1973 to date)**

In this period, evaluators realized that evaluations must serve the needs of the clients of the evaluation (Madeus, Stufflebeam & Scriven, 1987). The technique of evaluation should achieve results that were previously deemed irrelevant to serious research. It should “deal with situational realities, meet the requirements of probity and satisfy needs for veracity” (Madeus, Stufflebeam & Scriven, 1987, p. 16). The developments in the methodology of evaluation included meta-analysis (Glass, 1976), naturalistic evaluation (Guba & Lincoln, 1981), advocate teams (Reinhard, 1972), goal-free evaluation (Scriven, 1974), and adversary-advocate teams (Stake & Gjerde, 1974).

Mertens (2010) records that the professionalization of evaluation was established in the 1960s, when it was legislated that evaluation should form a part of programme design. Mark, Green and Shaw (2005) maintained that the field of evaluation was complicated by

its pluralistic disciplinary roots. They believed that the field of psychology was associated with applied social research, while educational evaluators came from a testing, assessment and objectives-based background.

A subsequent contribution in the field of evaluation was the work of Chen and Rossi (1992), who developed the concept of theory-based evaluation. This type of evaluation occurred where the evaluator constructs a model of how the programme works using “stakeholder theories, available social science theories, or both, to guide the formation of questions and the gathering of data” (Mertens, 2010, p. 56). Mertens argued that theory-based evaluations served to avoid the “problems encountered in a more simplistic notion of quasi-experimental design when applied to evaluation” (p. 56). In this way, the evaluator is able to reflect a theoretical framework from a social science background to an evaluation setting. However, Chen and Rossi (1992) cautioned against the uncritical acceptance of the views of stakeholders as the sole basis of an evaluation.

These concepts of theory-based evaluation were expanded by Donaldson and Lipsey (2006). They suggested that the role of the evaluator was to understand the social problems related to the programme, as well as the context within which it was implemented. They argued that substantial knowledge about the evaluands needed to be determined with regard to the social, educational, health and community aspects. They recommended that the researcher must obtain in-depth knowledge about the background to the programme, which can be achieved by reviewing prior research, obtaining the views of those who have been closely associated with the programme, and by observing the programme in action. All these actions have been conducted during the evaluation of the dental therapy curriculum.

Some writers have examined the applicability of evaluation to a wide range of research techniques. These ranged from the positivistic or quantitative techniques, to the various qualitative approaches. A third viewpoint was introduced called the mixed methods approach, which combined both the quantitative and qualitative methods. Several studies have used the mixed methods approach in programme evaluation, which will be discussed later in this chapter.

### 3.7.3 Evaluation Ideologies

Scriven (1987) described four fundamental ideologies that pervade the field of curriculum evaluation: separatist ideology, positivist ideology, managerial ideology and relativist ideology. More than one ideology may support a particular model.

*Separatist ideology* involves separation of the subject and object in an appropriate way. During the evaluation the evaluator must therefore distance himself from the process. An example of this ideology is the process of peer-review by “un-calibrated, un-validated and un-followed up review panels” (Scriven, 1987, p. 230). Studies have shown that some evaluators, when posted at programme sites, often join the staff in “point of view and contention” (p. 230). In this way, objectivity may be lost by the evaluator.

In contrast, *positivist ideology* asserts that the researcher should be highly objective by analyses and documentation. This ideology rejects the evaluative nature of science, and does not even consider whether there is scientific evidence for its validity (Scriven, 1987).

*Managerial ideology* is characterized by bias and conflict of interest, where the manager and evaluator have the same interest. Precautions such as the separation of the offices of the managers and evaluators are often absent, resulting in bias in the evaluation (Scriven, 1987). In this ideology, success is achieved by identifying goals of the programme and determining whether they have been met. Other variables such as consumer inputs and side-effects are considered in the evaluation report. This ideology fits in with the positivist ideology because the achievement of goals is deemed to be equivalent to the success of the programme. In the managerial ideology, no value judgments are made.

In *relativist ideology*, there is a move away from the realistic, positivist viewpoint of evaluation (Scriven, 1987). This ideology is based on the views of multiple stakeholders, and can be recognized by the emphasis placed upon the “impossibility of establishing the truth” (Scriven, 1987, p. 239). This type of ideology is ideally suited to this study as it allows for the evaluation of multiple influences on curriculum, the use of multiple data sources, and by interviewing multiple stakeholders.

### 3.7.4 Evaluation Models

Many different evaluation models have been described in the literature (Madeus, Scriven & Stufflebeam, 1987). In this review, discussion will be confined to models that have been

particularly influential in this field. Ornstein and Hunkins (2009) classify curriculum evaluation models into three different types: *scientific* models, *humanistic* models and *action research* models. In this literature review, the researcher has also included the goals-oriented/objectives-based model of Tyler, as she believes that this model has exerted a profound influence in the field of curriculum evaluation.

### **Goals-Oriented/ Objectives-Based Model (Tyler, 1949)**

Ralph W Tyler has had a profound influence on the field of curriculum evaluation. He is known as the Father of Educational Evaluation (Madeus, Scriven & Stufflebeam, 1987). He perceived the curriculum as a set of broadly planned experiences designed and implemented to help students achieve specified behavioural outcomes (Tyler, 1949). He defined the term educational evaluation as an assessment of the extent to which valued objectives had been achieved as part of an educational programme.

Tyler (1949) conceptualized evaluation as a comparison of intended outcomes with actual outcomes. These views are in line with current curriculum theorists such as Barnett and Coate (2005) and Van den Akker (2010). This model was perceived by experts to be an improvement over other existing models at that time. A significant factor was that it did not require the costly comparisons of experimental and control groups, as prescribed by previous models. In addition, it measured behaviourally-defined objectives such as teaching outcomes. This avoided the subjectivity of professional judgment involved in evaluating organizational and teaching inputs. For many years thereafter, Tyler's work has had a profound effect in this field.

### **Scientific Evaluation Models**

#### **Context, Input, Process, Product Model (Stufflebeam, 2000)**

In the late 1960s Daniel Stufflebeam (2000) developed a comprehensive value-free evaluation model as an alternative to other models prevalent at that time. He recognized the need for a more holistic model to the ones that were currently occurring. These included the use of objectives, testing and experimental design. Stufflebeam believed that the most important purpose of programme evaluation was “not to prove but to improve” (Ornstein & Hunkins, 2010, p. 286). This model acts as a tool to ensure that programmes worked better for the people they intend to serve. It also aimed to promote growth to meet

important needs within available resources. Each part of this model could be used on its own, or it could serve as a component of the evaluation as a whole.

*Context* evaluation was conducted by studying the environment of the programme (Ornstein & Hunkins, 2009). In this type of evaluation, the evaluator would identify the desired and actual conditions of the environment, as well as the unmet needs and missed opportunities. From this information, the evaluator could diagnose the reasons for the unmet need.

*Input* evaluation acquired details about the use of resources. It evaluated the various strategies that could be used in achieving the programme goals, and identified how the strategy to be used in the evaluation would be selected (Ornstein & Hunkins, 2009).

*Process* evaluation took into account the factors that influenced the implementation of the curriculum. It also evaluated whether there was congruence between the planned and actual activities (Ornstein & Hunkins, 2009).

In *product* evaluation, evaluators gathered data to determine whether the final product (graduate) had accomplished what was required of them. This aspect enabled decisions to be made about whether to continue, modify or terminate the curriculum (Ornstein & Hunkins, 2009).

### Congruence–Contingency Model (Stake, 1967)

Robert Stake's model, proposed in 1967, was also a value-free model; he believed that educational evaluators should endeavour to establish formal evaluation procedures, rather than informal ones (Ornstein & Hunkins, 2009). Stake (1967) defined informal processes as "casual observation, implicit goals, intuitive norms and subjective judgment" (Ornstein & Hunkins, 2009, p. 285). Stake believed that formal procedures would be objective and supply data that would provide descriptions and judgments regarding the curriculum being evaluated. He emphasized that evaluators should collect and process extensive data, including the views of the various stakeholders who participated in the programme.

Stake's model defined three main data categories: antecedents, transactions and outcomes. Stake (1967) asserts that antecedents are conditions that are present prior to the commencement of teaching and learning, and cannot influence the outcomes. They could include characteristics of students and teachers, and the type of education offered

(Ornstein & Hunkins, 2009). Transactions are made up of all the factors involved in the teaching process. They include communication between students, between student and teacher, and between students and other personnel. They also include interactions with curriculum materials and the classroom environment (Ornstein & Hunkins, 2009). Outcomes involve the end-products of the curriculum. These include perceptions and clinical skills of graduates, views of school managements, and opinions of employers. Stake believed that outcomes were “immediate and long-range, cognitive and affective, personal and countrywide” (Ornstein & Hunkins, 2009, p. 286).

Stake’s model also illustrated the relationships between what was planned and what was enacted, which has been referred to as the *curriculum-as-designed* and the *curriculum-in-action* (Barnett & Coate, 2005).

## **Humanistic Models**

### **Connoisseurship and Criticism models (Eisner, 1994)**

Elliot Eisner (1994) advocated two value-bound humanistic evaluation models: connoisseurship and criticism. He believed that curriculum connoisseurs should possess expert knowledge of what to observe, value and appreciate in the field of curriculum. Eisner (1994) described connoisseurship as a private act engaged to personally appreciate the qualities that constitute some objects, situation, or event (Ornstein & Hunkins, 2009). He attributed five dimensions to this model: intentional, structural, curricular, pedagogical, and evaluative. Each of these attributes indicated different features of the curriculum and evaluation.

Intentional evaluation referred to the personal assessment of the value, merit and worth of the curriculum. Structural evaluation assessed the design of the curriculum and the organization of the school. Curricular evaluation appraised the specific contents of the curriculum, and how they were organized. Pedagogical evaluation assessed the teaching strategies and instructional design. Evaluative evaluation reviewed the evaluation itself. There are many sources of data used in connoisseurship evaluation, including interaction of students and teachers, learning materials, and student products (Ornstein & Hunkins, 2009).

The criticism evaluation model includes the dimensions of description, interpretation, evaluation and themes (Ornstein & Hunkins, 2009). The evaluators write reports where they describe the curriculum and curricular environment, interpret the findings for specified audiences, determine and communicate the educational value of the programme, and establish, by looking at the curriculum, what themes emerge (Ornstein & Hunkins, 2009). In this way, the evaluators try to “extrapolate general themes about learning and meaningful knowledge” that can guide the development and execution of the curriculum (Ornstein & Hunkins, 2009, p. 286).

### **Illuminative Evaluation Model (Parlett & Hamilton, 1976)**

The Illuminative Evaluation Model, developed by Malcolm Parlett and David Hamilton (1976), “illuminates an educational program’s specific problems and unique features” (Ornstein & Hunkins, 2009, p. 290). To establish what these problems and features are, the educational environment needs to be explored. This is because the developers of this model believed that curricula were “rarely implemented and maintained as originally conceptualized and created” (Ornstein & Hunkins, 2009, p. 290). This is a holistic and subjective approach, in which observed interactions are considered within the context of their environment, and are not separated into different categories (Ornstein & Hunkins, 2009). The value-bound evaluation takes place in three steps: observation, further enquiry, and explanation. During *observation*, the evaluators obtain an overall view of the programme by describing the context within which it was being delivered. During *further enquiry*, the evaluators split the important from the trivial components to determine why the programme worked or why not. They spend prolonged periods in the field observing the programme, which enables them to gain a sharper focus. They obtain additional information by examining school documents and portfolios of students work, and also interviewed staff and parents. The final stage in this type of evaluation is *explanation*. In this step, people do not offer judgments on the programme; they only provide answers on what is happening in the programme, and why. The findings are presented to the affected people, who then make their own decisions on how to progress.

### **Action Research Model (Palmer, 1998)**

Parker Palmer’s action research evaluation model combined scientific and humanistic approaches. It is set apart from other models by the “direct participation in the curriculum”



(Ornstein & Hunkins, 2009, p. 290). Palmer (1998) believed that the only way to evaluate teaching and learning is to be present within the learning environment. In this type of research, teachers play a key role because they are involved in the teaching and evaluation of the curriculum (Ornstein & Hunkins, 2009). This model is used to determine whether to continue or modify a particular curriculum or instructional approach. It is an ongoing process where the teacher “adjusts the content, teaching, and educational experiences” on an ongoing basis (Ornstein & Hunkins, 2009, p. 290).

The first step in this model is for the teacher to identify what s/he would like to achieve in a particular curriculum. This activity is accompanied by what students would like to accomplish. This is followed by the determination on how to monitor the curriculum. Thereafter, the data obtained during the monitoring process is interpreted. The fourth step is to continue this process of action research. Teachers may gather data by videotaping their teaching, by peer evaluation, by the use of journals, student interviews, and by the administration of tests (Ornstein & Hunkins, 2009).

In this curriculum evaluation study, the different components of the context, input, process, product model (Stufflebeam, 2000) were used as the phases of the study.

### **3.7.5 Evaluation in Health Science Education**

The Carnegie Foundation for the Advancement of Teaching funded a series of reports on professional education in the United States (Field, 1995). The fourth report of this series, by Abraham Flexner (1910), was known as the Flexner Report, and was a landmark event in medical education. It described a study of medical educational institutions, conducted early in the 19<sup>th</sup> century in the United States and Canada. It was conducted as part of the effort to reduce the number of medical schools in the United States. It also aimed to bring all medical schools in line with a predetermined set of standards (Fields, 1995).

From this study, Flexner was able to achieve a major goal of accreditation, which was the elimination of inferior medical institutions. From his report, an exemplar was derived of accreditation guidelines. In his evaluations Flexner did not, however, examine outcomes. He spent only one day visiting an institution, looking for obvious indicators for school quality using common sense. He had no medical education or background. He asserted that the appropriate person to evaluate medical education was a layman with general educational experience (Field, 1995). This view was in opposition to the argument that

proper accreditation of medical schools could only be conducted by people with inside knowledge of the profession.

Even today, the Flexner Report shapes medical and dental curricula. Some of the themes of his report were the rationalization of the relationship between universities and professional schools. He also recommended the creation of higher standards for medical school admissions, and advocated for better qualified full-time faculty.

### **3.7.6 Evaluation in Dental Education**

The Carnegie Foundation's tenth report, by William Gies (1926), gave similar attention to dental education in the United States. The Gies Report concluded, *inter alia*, that the undergraduate curriculum in dentistry should be devised for intense preparation for the duties of general practice (Gies, 1926). The curriculum should be organized so that determined and competent students complete the training. It also affirmed that dentistry was not a trade, and that students should be trained in the spirit of inquiry and scientific thinking. Gies strongly recommended that dental educators should not be allowed to subordinate their teaching duties to private practice, arguing that, with continuing advances in technique and knowledge, schools should concentrate on helping students to teach themselves and to be able to learn and grow in proficiency. Gies, like Flexner, supported a strong basic science education, and encouraged dental schools to strengthen this aspect of their curriculum. Many of Gies's recommendations are still followed in dental curricula today.

Several studies on dental education followed the Gies Report in the United States. These documents discussed the development of dental curricula, together with the many problems that emerged in dental education. These reports included a 1940 Report by the Council of Dental Education (CDE), which proposed accreditation standards for dental schools (Fields, 1995). A 1947 Report by the CDE reviewed dental schools against these standards (Fields, 1995). Several other similar surveys were conducted in the 1980s and 1990s by the Institute of Medicine (Fields, 1995).

A landmark document of the Institute of Medicine (Fields, 1995) entitled *Dental Education at the Crossroads: Challenges and Change*, recommended that training should facilitate a closer relationship between dentistry, medicine and the overall health care system. It also proposed significant curricular reform relative to content and presentation.

In 2000, the first ever Surgeon-General's *Report on Oral Health in America* (Satcher, 2000) acknowledged the effect of oral health on the health of the American nation. A significant recommendation of this report was the need to increase access to oral health care for underserved communities.

One aspect that emerged from this report was the concept of standard setting in the dental profession. Professional standards should reflect the community and self-interest; and the professions interest in the education of their prospective members. Stringent admission and graduation requirements, as well as the setting of other standards for dental schools, were necessary to protect the public from ill-trained practitioners, and to improve the status of the profession (Satcher, 2000).

Tedesco (1995) conducted an evaluation on whether dental schools in America had actually responded to these calls to reform dental education. She reviewed curriculum reform reports over the past 75 years, since the Gies Report in 1926. Tedesco (1995, p. 97) found that the dental education community had responded to curricular change with "some growth and little change."

The Macy Study (Formicola, Bailit, Beazoglou & Tedesco, 2005) was conducted over three years to explore new educational models and strategies to strengthen their educational, research and service programmes. This study recognized that teaching, research and service at all dental schools must contribute to reducing oral health disparities in the population. It also recommended that dental education must re-align itself to health science education, so that dental personnel can function as part of a team. A third recommendation was that clinical training should include community-based patient-centred care. Service-learning was found to be one of the most successful strategies to improve the educational and financial sustainability of dental schools. The report suggested that dental education had to keep up with scientific and technical advances to be considered as a learned profession rather than a technical occupation.

The literature indicates clearly that educational evaluation should be grounded in scientific research and thinking (Flexner, 1910). This view was supported by Cronbach (1975), who argued that common sense pervaded all knowledge, and should form an integral part of evaluation. He criticized the mass-produced quantitative evaluations conducted in the social sciences. He also believed that the finding of generalisable evaluative results by

qualitative methods alone was not feasible. He asserted that to capture the complexities of programme evaluations both qualitative and quantitative methods should be used.

This review encompassed the literature that occurred mainly in the United States and the United Kingdom. However, to contextualize this study appropriately, the schooling and higher education systems within the context of South Africa will be discussed.

### **3.8 EDUCATION IN SOUTH AFRICA**

The South African Qualifications Authority (2000, p. 14) argues that:

In the South African context, the democratic government faced substantial problems in education and training at the systemic level. These problems were so deep rooted and widespread in the system from schooling through to higher education and training that they impacted negatively on actual teaching practice and student learning. Hence in the South African scenario, the most pressing need for reform was at the systemic level.

#### **3.8.1 The Schooling System**

The schooling system of South Africa replicates the inequities of the health care system. The report by the Council on Higher Education (CHE) stated that the performance on the Senior Certificate examinations was very poor, and highly skewed in terms of race (Scott, Yeld & Henry, 2007). It showed that less than 50% of eligible learners were in school. Of this number, just over 15% obtained a matriculation endorsement, and were therefore eligible for entry into university. Just over 5% of black candidates gained endorsements.

This report also asserted that there has been a decline in the quality in the Senior Certificate examination, which has resulted in an increase in the number of students attaining the matriculation endorsement. The low number of students writing and succeeding in mathematics and science was also of great concern, since success in these subjects was considered to be an indicator of the quality of the education system. These problems cascade into the higher education system of South Africa.

### 3.8.2 The Higher Education System

The standard curriculum structures of all degrees offered at South African universities are codified in the Higher Education Qualification Framework (Department of Education, 2004) and the funding policies of the CHE (Scott et al., 2007). The CHE has emphasised that in the context of globalization and the knowledge economy, higher education is fundamental for national development. Training in higher education needs to produce an appropriate number and mix of quality graduates based on the policies and needs of the country. The CHE indicated that, in South Africa, there is a discrepancy between university outputs and the needs of the economy.

Scott et al. (2007) identified several problems encountered within the higher education landscape. Damning statistics regarding first-year university students showed that only one in five first time entering students graduate in regulation time. The overall rate of attrition of this cohort of students was 29%. Key factors responsible for this unsatisfactory situation are mostly attributable to the legacy of apartheid in the education system of the country, and include the unsatisfactory schooling system, increased student diversity, ineffective articulation structures between consecutive educational levels, and inappropriate curriculum structures (Scott et al., 2007).

These authors recognize the effects of affective factors and institutional cultures on the academic performance of students. Factors that divert students away from their studies at university include anxiety about personal and financial problems, lack of motivation, or alienation from the institution.

Student diversity, in terms of race, language, and educational background, has also increased significantly in universities since the 1980s (Scott et al., 2007). This has resulted in the perpetuation of the socioeconomic differences seen in South Africa today. It has been recognized that there has been inadequate provision in the educational processes to address these diversities.

Another problem identified in the higher education system is the *articulation gap* (Department of Education, 1997), which has been described as inadequate articulation between the secondary and higher education sectors. Students lack sound foundations for tertiary studies and are not able to respond appropriately to tertiary educational programmes.

Scott et al. also identified student selection and admission policies for higher education as a matter of concern. Harman (1994) recognized similar problems in the Asian region, where the rapid growth in enrolments was not matched by an increase in funding to implement these demands. He argued that, in order to train appropriate personnel, the issues of access, selection and the admission process should be linked to the labour market. He added that institutions should only accept students who have the knowledge and ability to fully benefit from the programme. He went on to state that students perform best when they follow courses that match their abilities and interests.

To address these issues, the CHE argued that it was imperative that the educational processes in higher education should be aligned with the diverse realities and needs of the population (Scott et al., 2007). Strategies to promote greater success across the student spectrum, without sacrificing the quality and standards of qualifications, also needed to be addressed. One of the successes in dental education in many countries has been the inclusion of community-based engagement as part the education policies of the country.

### **3.8.3 Policy Documents and Community Engagement**

In the post-apartheid era, the concepts of community engagement and service-learning have frequently been highlighted in policy documents of the South African Department of Education (DOE), among them being the Green Paper on Higher Education Transformation (DOE, 1996), the White Paper on Higher Education (DOE, 1997), and the Higher Education Quality Committee (HEQC) Criteria for Institutional Audits (DOE, 2004).

The Green Paper on Higher Education Transformation (DOE, 1996, p. 6) noted that higher education

has not succeeded in laying the foundations of a critical civil society . . . and there is inadequate consideration of and response to the needs of our society, and insufficient attention to the problems and challenges of the broader African context . . . programmes should be responsive to the social, political, economic and cultural needs of the country and all its people.

This would require different patterns of teaching and learning, new innovative curricula and more varied modes of delivery. The White Paper on Higher Education (DOE, 1997)

endorsed the views that higher education institutions should promote and develop social responsibility and awareness among students. Community-based education could serve as a vehicle to achieve this goal.

The HEQC Criteria for Institutional Audits (DOE, 2004) explicitly defined criteria required for the higher education institutions to fulfil their community engagement functions. The mission of the university should be translated into a strategic plan for the achievement of its goals, targets and quality-related priorities should be aligned with the mission and strategic goals of the university, service-learning programmes should have adequate facilities and infrastructure to support service-learning, and support should be extended to include the development of human resources. The document stressed the need to monitor and evaluate these initiatives to assess whether they had made an impact on the population.

Department of Education (1996, 1997, 2004) policy documents identified community engagement, in the form of service-learning, as an integral component of the learning process. This type of learning has its roots in the pedagogical foundation of experiential learning. Duley (1981) argued that service-learning connects the experience of students to reflection and analysis in the curriculum. It enables students to achieve a complete education through their interaction with complex social problems.

John Dewey is considered to be one of the founding proponents of experiential learning. He believed that this type of learning resulted in the “reconstruction of experience, and an ongoing questioning of old ideas” (Bender, Daniels, Lazarus, Naude & Sattar, 2006, p. 14). This resulted in the transformation of learners, by enlarging their knowledge, and by altering their perceptions and ethical commitments as individuals. Community engagement and experiential learning will be discussed further in the section on philosophical foundations later in this chapter.

From the previous discussions, it is clear that the concept of curriculum has indeed become “an extraordinarily complicated conversation” (Pinar et al., 1995, p. 848), and has been influenced by several factors. As a result, the Hicks model was selected to serve as the theoretical framework of this study, as it takes into consideration the multiple influences on curriculum

### **3.9 THEORETICAL FRAMEWORK**

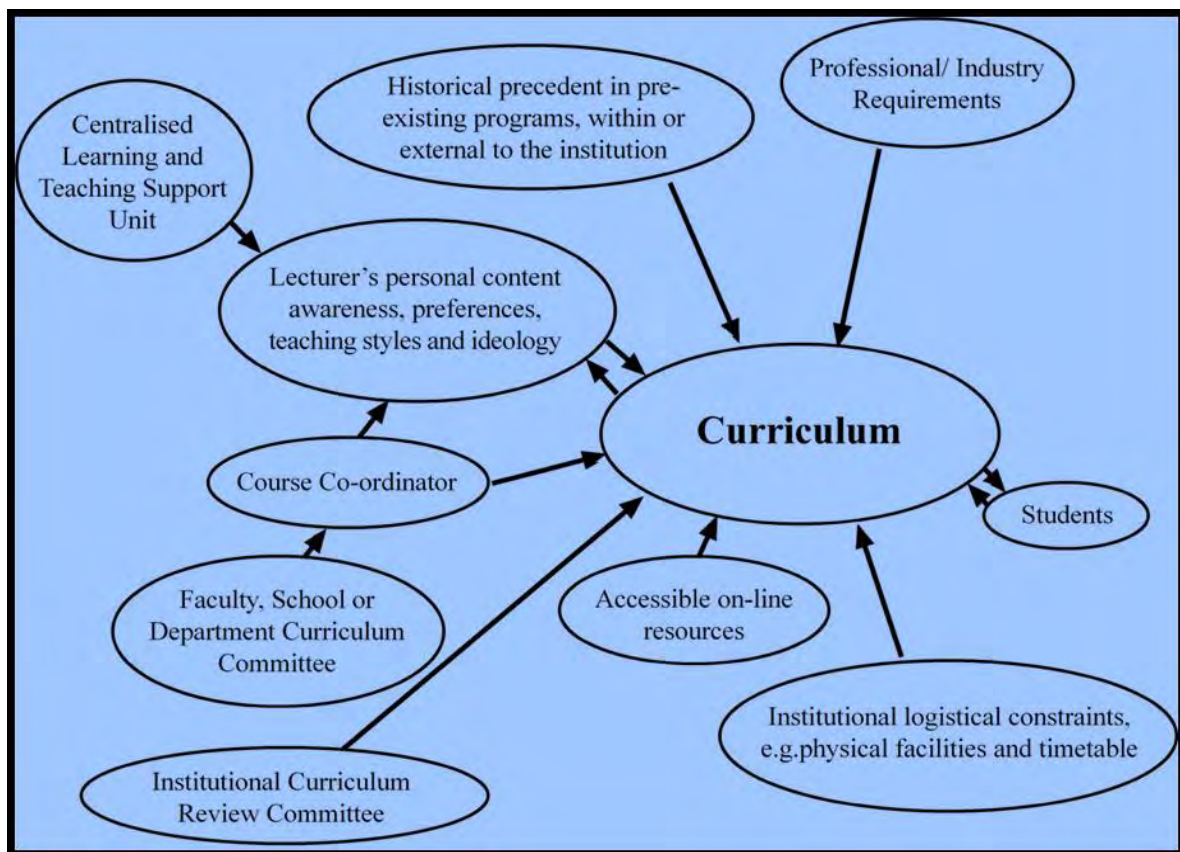
After the critical appraisal of the literature on curriculum in Higher Education, the model devised by Owen Hicks (2007) called Typical Influences on Curriculum was selected to serve as the theoretical framework of this study. This model was chosen because it encompassed all the factors that affected the dental therapy curriculum within the context of the health care system of South Africa. On making this decision, the researcher communicated with Professor Hicks to obtain further information on this model.

Professor Owen Hicks is a Senior Consultant at the Carrick Institute for Teaching and Learning in Higher Education in Australia. Hicks (2010) informed the researcher that he devised this model as a result of his “consideration of what I had observed incidentally across a number of universities across Australia during my time working with them on curriculum development projects.” He elaborated that this model highlighted a range of elements that needed consideration when reflecting on curriculum, but the elements were “certainly not exhaustive.”

When he was asked whether he considered it to be a figure or a model, he replied that this was “something of a semantic distinction.” However he explained that a shortcoming of this model was that it was largely descriptive rather than explanatory. He alluded to the fact that there were few models available for the critical analysis of curriculum in Higher Education. He suggested that the researcher could test the appropriateness of this model within the South African context, and extend or refine the model if necessary.

In an article by Hicks (2007, p. 7), he asserted that this model could “incorporate a juxtapositioning of curriculum as institutional offerings, as learning opportunities provided by academics, and as the learning undertaken by the students.” He believed that curriculum could be elaborated by “intention, delivery and outcome” (p. 7). He also recommended exploring the contextual dimensions of curriculum. These included the social, community and political influences, the perspectives of academics delivering the programme, and the perceptions of the different types of learners within the school.





**Figure 8 : Typical Influences on Curriculum**

This model was selected to serve as the theoretical framework of this study for several reasons. After a preliminary appraisal of the literature in regard to the South African health care system in general, and the oral health care system in particular, it was clear that the oral health was considered to be a low priority area by the Department of Health. The inequities in the distribution of human and financial resources between the private and public sectors, and even within the public sector, coupled with increasing oral health needs, had to be considered during the production of oral health personnel by universities to meet the industry needs.

The *industry*, designated by the Department of Health (2006, p. 85), has clearly articulated that dental therapists are “critical to the provision of oral health care” especially in rural and other underserved areas. However the literature (Hugo, 2005; Prinsloo, 1993) has shown that most dental therapists worked within the private sector, thereby exacerbating these inequities. The National Health Insurance System (Department of Health, 2011b) has made recommendations for the provision for oral health care. Dental therapists appear to be the ideal cadre of oral health personnel to fulfil this role, as has been demonstrated by the experience of other countries (Nash et al., 2008). Therefore the dental therapy

curriculum needs to be evaluated to determine whether dental therapists are trained appropriately to meet these needs.

The *professional requirements* or competencies of the dental therapist are clearly prescribed in policy documents of the HPCSA (1993). Although the School has been fully accredited by the HPCSA, the curriculum needs to be evaluated to determine whether the graduates are competent to practice within the health care system.

The *historical precedent in pre-existing programmes within or external to the university* is of particular importance in this study. The apartheid context, within which the dental therapy profession was introduced to South Africa, has cast a shadow on the credibility and role of this profession for many years (Campbell, 2006). However the international literature has argued that this profession has played a significant role in improving access to oral health care in many developing and developed countries (Baltutis & Morgan, 1998; Nash & Nagel, 2005). The responses of key stakeholders to the critical question on the role of the dental therapist may redefine the role that this health professional can play within the health care system of South Africa.

The views of *students* were considered to be of vital importance in this study. The early literature showed that a high attrition rate existed in this profession (Prinsloo, 1993). This was attributed to a “lack of posts in the public sector, poor career pathing, and inadequate salaries” (p. 617). However this study hopes to determine whether this position still persists. Students’ views can also play a critical role in evaluating the form and content of the curriculum, and their perceived competency to practice independently on graduation. In this study, *graduates* were added as an extension to the Hicks model in order to obtain a more comprehensive viewpoint.

The opinions of *academics* in regard to their teaching styles and ideologies will provide information on the type of curriculum offered at this university. The literature on dental education (Hendricson & Cohen, 2001) has made several recommendations to improve curricula from the traditional discipline-based type to the newer formats. This study needs to determine whether the curriculum offered at this university has in fact evolved from the traditional model to include any of the newer pedagogies (Posner, 2004).

The documents of the *School, Faculty* and *University* need to be critically analyzed for several reasons. The recruitment and selection strategies need to be examined to determine

whether the correct and appropriate information is presented to prospective students, to attract them to work in the public sector. The form and content needs to be scrutinized to establish whether there is constructive alignment between the competencies prescribed by the HPCSA (1993), and the teaching, learning and assessment methods. It also needs to determine whether there is congruence between the previously discussed concepts of *curriculum-as-designed* and the *curriculum-in-action* (Barnett & Coate, 2005).

The *available online resources* need to be examined to determine whether the curriculum has adopted newer trends in dental education in regard to e-learning. The *institutional logistical constraints* such as inadequate teaching facilities and overcrowded timetables also need to be taken into consideration. These factors may play a significant role in shaping the type of graduate that is produced by this university.

It is clear that the Hicks model provides the ideal framework to evaluate the dental therapy curriculum from multiple perspectives. Hicks (2007, p. 9) emphasized the fact that “conceptual and substantive differences are likely to be evident in these potentially different perspectives.” As a result, pragmatism has been chosen to form the philosophical foundation in this study because it takes into account *multiple perspectives*, and allows for the inclusion of qualitative and quantitative research methods in a single study (Burke Johnson & Onwuegbuzie, 2004). In the next section, pragmatism as the philosophical foundation for this study will be discussed.

### **3.10 PRAGMATISM AS THE PHILOSOPHICAL FOUNDATION**

Pragmatism can be defined as:

a deconstructive paradigm that debunks concepts such as truth and reality and focuses instead on „what works’ as the truth regarding the research questions under investigation. Pragmatism rejects the either/ or choices associated with the paradigm wars, advocates for the use of mixed methods in research, and acknowledges the values that the researcher can play in the interpretation of results (Tashakkori & Teddlie, 2003, p. 713).

Burke Johnson, Onwuegbuzie and Turner (2007, p. 113) have argued that this viewpoint can be traced back to the philosophical debates about “singular or universal truths to viewing the world (Socrates, Plato); versus multiple or relative truths of the Sophists

(Protagoras, Gorgias); versus balances or mixtures of the extremes (Aristotle, Cicero).” Mixed Methods research is positioned between the extremes of Plato (quantitative research) and the Sophists (qualitative research).

### 3.10.1 History of Pragmatism

Mertens (2010) describes the history of pragmatism as being separated into an early period (1860–1930) and a neo-pragmatic period (1960 to the present). The founding fathers of this paradigm were the natural scientist and philosopher Charles Sanders Pierce, the psychologist and philosopher William James, and the psychologist, philosopher and educationalist John Dewey (Biesta & Burbules, 2003). Other contributors to this school of thought were George Herbert Mead and Clarence Irving Lewis. All of these individuals are regarded as the original pragmatists (Biesta & Burbules, 2003).

Pragmatism was believed to be the first truly American philosophical movement (Biesta & Burbules, 2003), although all the founding fathers had been influenced to some extent by European philosophers. Pierce and Dewey were closely associated with the work of Immanuel Kant. James, Dewey and Mead all studied at some stage at European universities. Their viewpoint was that social inquiry could not access the truth solely by means of a scientific method (Mertens, 2010).

During most of the twentieth century, pragmatism did not feature prominently in the Western philosophical position. Pragmatists in this era were known as *analytic* pragmatists, and included Willard van Orman Quine, Donald Davidson, and Hilary Putnam (Mertens, 2010).

However, the philosophy of pragmatism was resurrected in the early twenty-first century, when *neo-pragmatists* like Bernstein, Kaplan and Rorty extended the work of the original pragmatists (Biesta & Burbules, 2003). They developed the concepts of common sense and practical thinking into educational research.

The current thinking about this paradigm focuses on the work of earlier pragmatists. Morgan (2007, p. 48) argued that pragmatists believed that:

The lines of action are methods of research that are seen to be most appropriate for studying the phenomenon at hand... the essential emphasis is on actual behaviour (lines of action), the beliefs that stand

behind those behaviours (warranted assertions), and the consequences that are likely to follow from different behaviours (workability).

The views of Dewey (1916) have influenced this study to a certain extent, and will be discussed in the following section.

### **3.10.2 Influence of John Dewey**

Dewey (1938) believed that philosophy is a way of thinking that gives meaning to our lives. He argued that democracy and education should go hand-in-hand. School should be viewed as a “miniature democratic society in which students learnt the skills necessary for democratic living” (Dewey, 1916, p.186). He believed that this could be achieved by problem-solving and scientific methods. He argued that, due to the fact that reality was constantly changing, it was not necessary to focus on a fixed body of knowledge. The focus of education should be on *how* to think rather than on *what* to think.

Pragmatism is based on the fundamental concepts of “change, process and relativity” (Ornstein & Hunkins, 2009, pp. 130 - 131). It interprets knowledge as a process in which reality is constantly changing. It does not accept concepts such as unchanging universal truths and believes that the learner and the environment are constantly changing (Ornstein & Hunkins, 2009).

In this philosophy, teaching focuses on concepts such as critical thinking and problem solving. The teaching method is believed to be more important than the subject matter, and should be exploratory rather than explanatory. Questions such as *Why*, *How Come* and *What If* are considered to be more relevant than *Who*, *What* and *When* (Ornstein & Hunkins, 2009, p. 36).

Traditional curricula, which are commonly used in dental education, focused on what to think, where knowledge was transferred, often passively, from the teacher to the student. Dewey (1938) described this act as “inscribing records upon a passive phonographic disc to result in giving back what has been inscribed when the proper button is pressed in recitation or examination” (Ornstein & Hunkins, 2009, p. 36).

Dewey (1938) also believed that the teacher should act as a guide, who helps students to “locate, analyze, interpret, and evaluate data, in order to draw their own conclusions” (Ornstein & Hunkins, 2009, 36). This can be achieved when curricula are focused toward

multidisciplinary, problem-solving and scientific projects. He rejected educational concepts such as rote memorization and learning, authoritarian teaching, and the use of static learning materials.

However Dewey's pragmatism also advocated a greater focus on the needs of society. He believed that to educate for change and social reform curricula should be transformed to reflect social, economic and political realities (Ornstein & Hunkins, 2009).

Dewey also emphasized the importance of interaction, reflection and experience, as suggested in his formula, "experience plus reflection equals learning" (Biesta & Burbules, 2003). These concepts served as the basis for the development of experiential learning (Dewey, 1963), which lead to the concept of service-learning. While it is believed that Dewey himself, never actually used the term *service-learning* (Bender et al., 2006), his philosophies of education played a significant role in the development of this concept, which will be discussed later in this thesis.

### **3.10.3 Belief Systems of This Study**

Guba and Lincoln (2005) stated that a paradigm can be defined by four basic belief systems: axiology, ontology, epistemology and methodology. In this section, each of these terms will be discussed with reference to this study.

Axiology asks the question: *What is the nature of ethics in this study?* In the pragmatic paradigm, ethics of care was considered to be very important to the early pragmatists (Mottier, 2004). They believed that the ethical goal of research was to gain knowledge in the pursuit of desired ends (Morgan, 2007). This has been explained by the utilitarian theory of ethics (Christians, 2005, p. 139) where he stated that "all that is worth valuing is a function of its consequences."

The ontological aspect of this study inquires about: *What is the nature of reality?* Pragmatists are known to avoid the metaphysical concepts of truth and reality (Tashakkori & Teddlie, 2003). Their views accept that there is one world, but they also believe that all individuals have their own interpretations of that world. Morgan (2007) argued that the pragmatist stresses the significance on creating knowledge through joint actions or projects that different groups of people can accomplish together. In this study, the combination of multiple research methods, taking into account the views of different



groups of stakeholders, can provide a better understanding of the research problem, than would a single method alone. Effectiveness is used as the criterion by which the study is judged. Maxcy (2003, p. 51) defined effectiveness as “establishing that the results work with respect to the specific problem.” Maxcy believes that this paradigm does not place emphasis on validity, but rather on results. This is in contrast to other paradigms, where the emphasis is on reality and truth. Morgan (2007) believes that one of the defining questions that this paradigm hopes to address is *what difference does this study make?*

The epistemological perspective asks the question: *What is the nature of knowledge and the relationship between the knower and the would-be-known?* Tashakkori and Teddlie (2003) assert that the pragmatic paradigm allows the researcher freedom to study whatever s/he deems to be of interest and value. S/he can study it in different ways that may be appropriate, and can utilize the results in ways that can bring about positive consequences within the value system. Therefore in this study, the use of multiple quantitative data sources and techniques, coupled with the qualitative narratives obtained from semi-structured interviews and focus group discussions, enabled the researcher to achieve a comprehensive evaluation of the curriculum.

The final component of the belief systems that govern a paradigm is methodology, which asks the question: *How can the knower go about obtaining the desired knowledge and understandings?* The methodology used in this study is discussed in Chapter 4.

### **3.11 CONCLUSION**

In this chapter, the evolution of the concept of curriculum was reviewed. Curriculum development and design models within the context of higher and health science education were critically evaluated. This resulted in the selection of the Hicks model to serve as the theoretical framework of this study. The various approaches to curriculum design with respect to health science education were examined. Recent trends specific to dental curricula were appraised.

In the next section, curriculum evaluation was discussed. This included the history of evaluation from the Age of Reform to the present time. The ideologies behind curriculum evaluation, and an overview of curriculum evaluation models, were examined to select an appropriate one for this study.

This was followed by a critical appraisal of the schooling and higher education systems of South Africa. The policy documents of the Department of Education with respect to community engagement were examined.

The analysis of the concept of *curriculum* revealed that there were multiple influences on the curriculum. To achieve a comprehensive evaluation of the dental therapy curriculum, the Hicks model (2007) was selected to serve as the theoretical framework of this study. This resulted in the selection of pragmatism as the philosophical foundation for this study, and for the mixed methods approach to serve as its research partner. In the following chapter, the mixed methods research methodology, within the context of this study, will be discussed.



## CHAPTER 4

### THE MIXED METHODS APPROACH

#### 4.1 INTRODUCTION

Mixed Methods research is an intellectual and practical synthesis based on qualitative and quantitative research; it is the third methodological or research paradigm. It recognizes the importance of traditional quantitative and qualitative research, but also offers a powerful third paradigm choice that often will provide the most informative, complete, balanced, and useful research results. This paradigm partners with the philosophy of pragmatism, follows the logic of mixed method research, relies on qualitative and quantitative viewpoints, data collection, analysis and inference techniques, and is cognizant of broader sociopolitical realities, resources, and needs” (Burke Johnson et al., 2007, p. 129).

In this evaluation study of the dental therapy curriculum, it was deemed necessary to consider the multiple influences on the curriculum. Consequently, the Hicks model was selected to serve as the theoretical framework of the study. The researcher believed that a comprehensive evaluation can be accomplished by using the mixed methods approach. Therefore, this research approach, with its underlying assumptions, will be discussed.

The methodology of this study will be based on the definition of the mixed methods approach as described by Burke Johnson et al. (2007) in the opening paragraph of this chapter. In the following section, the history will be traced of the paradigm wars that led to the development of the mixed methods approach.

#### 4.2 PARADIGM WARS

Mertens (2010, p. 7) defined *paradigm* as a way of looking at the world, made up of philosophical assumptions that guide and direct thinking and action. She labelled the four main paradigms in the field of educational research as post-positivist, constructivist, pragmatic and transformative.

The early paradigms to emerge in the field of educational research were positivism and constructivism. The positivist paradigm argued that all research should be based on scientific methods (Mertens, 2010). It consisted of “testing of hypotheses by means of data that take the form of quantitative measurements” (Atkinson & Hammersley, 1994, p. 251). Post-positivism was developed as a sequel to positivism in an attempt to address some of the criticisms made against it. The first criticism was that the positivists maintained that their research was conducted in an objective, value-free environment. However, post-positivists believed that “value-systems play an important role in how they conduct their research and interpret their data” (Reichardt & Rallis, 1994, p. 85).

In post-positivism, the research question is usually presented as a *research hypothesis*. This has been defined by Teddlie and Tashakkori (2009, p.5) as a “specialized quantitative research question in which investigators make predictions, based on theory, previous research, or some other rationale, about the relationships among social phenomena before conducting a research study.” These questions are used to guide the investigations, and relate to unknown aspects of a phenomenon. Data analysis is conducted by the analysis of numerical data. The researchers commonly associated with this research approach include Campbell and Stanley (1963), Maxwell and Loomis (2003), Popper (1959), and Shadish, Cook and Campbell (2002).

However, the constructivist researchers were highly critical of the quantitative approach, which resulted in the introduction of qualitative methods. The qualitative approach was defined by Teddlie and Tashakkori (2009, p.6), as “the techniques associated with the gathering, analysis, interpretation, and presentation of narrative information” Eichelberger (1989) asserted that, in this approach, researchers construct reality on the interpretations of data with the assistance of the participants who supplied the data. The concept of multiple realities in this research method implies that the research questions cannot be established before the study begins (Mertens, 2010). Mertens stated that the questions will evolve and change as the study progresses, adding that perceptions of a wide variety of persons must be determined, and must include the backgrounds and contexts within which they are studied. In this approach, multiple data collection strategies can be used, which includes interviews, observations and document reviews. Because the data obtained from qualitative research is narrative in form, analysis is accomplished by thematic data analysis. This can be achieved by inductive and iterative techniques. Experts in the field of

constructivist research include, among others, Denzin and Lincoln (2005), Glaser and Strauss (1967), Lincoln and Guba (2000) and Patton (1990).

Qualitative and quantitative purists have argued that mixing methods is “neither meaningful nor valuable” (Teddlie & Tashakkori, 2009, p.7). Until the 1980s, most health science research, including dental research, was conducted according to the quantitative paradigm. This type of research was framed in hypothesis-driven experimental designs (Maxwell & Loomis, 2003). Quantitative purists criticized qualitative researchers for being too context-specific, for unrepresentative sampling, and for making unwarranted claims about their work (Brannen, 2005).

Conversely, qualitative researchers (Cronbach, 1975; Lincoln & Guba, 2000) criticized the quantitative paradigm for its inability to fully understand complex human behaviour and motivations within social environments. They viewed quantitative research as “oversimplistic, decontextualized, and failing to capture the meaning of participants” (Brannen, 2005, p. 173).

Burke Johnson et al. (2007, p. 116) argued, however that some qualitative purists such as Lincoln and Guba (2000, p. 198-199) have recognized that “indeed, there are many opportunities for the naturalistic investigator to utilize quantitative data – probably more than appreciated.” Recently, Guba and Lincoln (2005, p. 200) reaffirmed that “mixed methodologies may make perfectly good sense.”

Following the development of post-positivism and constructivism, a third paradigm was introduced, which included critical theory, feminist theory, cultural competency and other such theories (Lincoln & Guba, 2000). However, Mertens (2010) revised the labels commonly associated with these different paradigms. Mertens (2010, p. 21) believed that critical theory, and other such theories, should be considered under the transformative paradigm because theories “provide frameworks for thinking about the inter-relationships of constructs and are more limited in scope than paradigms.” She also asserted that earlier literature (Lather, 1992) labelled the transformative paradigm as *emancipatory*. However, Mertens (2010) changed this label to the transformative paradigm because she believed that the agency for change lay with the community working closely with the researcher towards achieving social transformation.

The transformative paradigm attempts to deal with the politics in research by “confronting social oppression at whatever level it occurs” (Oliver, 1992, p. 101). Researchers working in this paradigm accomplish this by purposely situating themselves alongside the less powerful communities in an attempt to bring about social transformation (Mertens, 2010). There are several characteristics that distinguish this paradigm from the two that were previously described. The first one places importance on the lives and experiences of marginalized groups (Mertens, 2010), such as women and people with disabilities. The second differentiating characteristic is that it analyzes how and why inequities occur in power relationships, with respect to race, gender and ethnicity. It also studies the association between the effects of poverty, and political and social action. It uses transformative theory to build on the programme theory and research approach (Mertens, 2010). It therefore enables educational researchers to develop agendas that are seen to be responsive to transformative issues.

Mertens (2010) described the fourth paradigm as being *pragmatism*, because she believed that many researchers (Cresswell, 2003; Tashakkori & Teddlie, 2003), especially in the field of mixed methods research, use it as the philosophical basis for their work. Mertens (2010, p. 36) believed that this paradigm advocates the use of “whatever methodological tools are required to answer the research questions.” Therefore it was seen as an alternative to qualitative and quantitative research. Tashakkori and Teddlie (2003) have identified pragmatism as the underlying philosophical framework for mixed methods research.

### **4.3 THE MIXED METHODS APPROACH**

The first evidence of mixing qualitative and quantitative research methods was seen in the work of anthropologists and sociologists in the first half of the twentieth century (Gans, 1963; Hollingshead, 1949; Lynd & Lynd, 1929). However the recognition of mixed methods research as a research paradigm occurred several years later.

In a study to define the field of mixed methods research, Burke Johnson et al. (2007) found that many different names have been attributed to this concept. Among these are *integrative research* (Burke Johnson & Onwuegbuzie, 2004), *mixed research* (Johnson & Christensen, 2004), *multimethod research* (Morse, 2003), *triangulated studies* (Sandelowski, 2003), and *blended research* (Thomas, 2003).

This study also provided definitions by several leaders in the field of mixed methods research. Greene (2006, p. 93) stated that

mixed methods inquiry is an approach to investigating the social world that ideally involves more than one methodological tradition and thus more than one way of knowing, along with more than one kind of technique for gathering, analyzing, and representing human phenomena, all for the purpose of better understanding.

Hunter and Brewer (2003, p. 577) preferred the term multimethod research because it indicates that

different styles of research may be combined in the same project. These need not be restricted to quantitative and qualitative; but may include, for example, qualitative participant observation with qualitative in-depth interviewing. Alternately it could include quantitative survey research with quantitative experimental research. And of course it would include quantitative with qualitative styles.

Cresswell (2003) described this type of research as “a research design (or methodology) in which the researcher collects, analyzes, and mixes (integrates or connects) both quantitative and qualitative data in a single study or a multi-phase programme of inquiry.”

An examination of these definitions shows that each displayed varying levels of specificity. Some definitions are confined to where in the design mixing occurred (Yin 2006). The definition by Cresswell (2003) extends to include mixing at all stages of the study. However, Burke Johnson et al. (2007) expanded the definition to include mixing of methodological worldviews and language.

Another approach to defining this research method is to consider the purpose for conducting this type of research. Most definitions used the *bottom-up* approach where the research questions drive the research method. However Mertens (2007) applied the *top-down* approach in her definition, because it was driven by the need to conduct transformative research.

In the literature, *mixed methods research* is the term most commonly used to describe this type of research; and is used as the research method in this study. However, it must be

recognized that *method* is a broad term that encompass strategies surrounding methods of data collection (e.g. questionnaires, interviews), methods of research (e.g. experiments), and related philosophical issues (e.g. ontology, epistemology and axiology).

### 4.3.1 The Case for Mixed Methods Research

Debates on the use of mixed methods research in the social and behavioural sciences have been described extensively in the literature (Alise, & Teddlie, 2010; Brannen, 2005; Burke Johnson & Onwuegbuzie, 2004; Cresswell, 2003; Greene, 2006; Maxcy, 2003; and Morgan, 2007). A key feature of these debates is the *incompatibility thesis*, which asserts that it is not appropriate to mix qualitative and quantitative methods in a single study owing to fundamental differences in the paradigms underlying those methods (Smith, 2008). The basis of this assumption was due to the inferred link between paradigms and research methods. Smith (2008) believed that there was a one-on-one relationship between the research paradigm and the research method. He therefore inferred that a combination of methods was not a possibility.

In reaction to the incompatibility thesis, proponents of the mixed methods approach put forward the *compatibility thesis*. Howe (1988, p. 10) argued that

the pragmatism of employing multiple research methods to study the same general problem by posing different specific questions has some pragmatic implications for social theory. Rather than being wedded to a particular theoretical style, and its most compatible method, one might instead combine methods that would encourage or even require integration of different theoretical perspectives to interpret the data.

These proponents responded to the incompatibility thesis by proposing an alternate philosophical paradigm called pragmatism (Howe, 1988; Maxcy, 2003; Tashakkori & Teddlie, 2003). Howe (1988) argued that pragmatism presented a third alternative to the either/or choices of qualitative or quantitative methods of the incompatibility thesis. Howe asserted that the compatibility thesis maintained that the combination of qualitative and quantitative methods was valuable, and refuted the fact that it was epistemologically incoherent. However, by the 1990s there was a decreasing interest in these paradigm debates (Patton, 2002). Researchers wanted to get back to the task of doing their research.

As a result, mixed methods research has moved from the conventional domains of anthropologists and sociologists, to other fields such as health sciences. A study of the reasons for using mixed methods in health sciences research showed that the main driver for using this method was *comprehensiveness* (O’Cathain, Murphy & Nicholi, 2007). Other reasons cited by O’Cathain et al. (2007) include increased confidence in findings, and ensuring that disempowered groups in society are heard. They concluded that the use of mixed methods in health sciences research was driven by pragmatism rather than principle. Many perceived the inability of a single research method to address the complexity of research in health care to be a significant motivating factor.

Mixed methods studies have also been used in programme evaluation in the field of health sciences (Ellis & Hogard, 2006). These authors described a trident approach to programme evaluation. The methodological implications of the three prongs of this study represent objective specification and outcome measurement, approaches to process description and analysis, and the techniques available to sample the perspectives of multiple stakeholders. However Ellis and Hogard (2006) argued that each of the evaluative prongs posed distinctive problems in regard to validity, reliability and feasibility of data gathering, which lead to the use of a multimethod approach.

In this study, the researcher has chosen to use the mixed methods approach because this type of research can add value to the study, for the following reasons: it can produce greater convergence of evidence and corroboration of findings than can be achieved by a single method (Cresswell, 2003), and it can also minimize or eliminate multiple explanations for conclusions drawn from the data (Burke Johnson & Onwuegbuzie, 2004). This approach can draw from the strengths, and minimize the weaknesses associated with the use of either the qualitative or quantitative method. It can also help to explain or enrich, or it may even contradict information, thereby telling different stories on the same subject (Thomas, 2003).

#### **4.4 RESEARCH DESIGN**

Cohen, Manion and Morrison (2007) stated that the research design of a study should be established by *fitness for purpose*, and should be shaped according to the purpose and research questions. Teddlie and Tashakkori (2009) reiterated this view, where they argued that researchers should create a design that will answer the research questions effectively.

To create a cohesive and integrated research design, the different phases of this study have been correlated with the theoretical framework, critical questions, research design, stakeholders, qualitative, quantitative and mixed methods data generation, data analysis, data integration, and development of mixed methods meta-inference. This is illustrated in Tables 6, 7, 8, and 9.



PHASES	CONTEXT	INPUT	PROCESS	PRODUCT
<b>Theoretical Framework</b> Hicks model	(i) Historical Precedent (ii) Industry Requirements	(iii) University Curriculum Documents (prospectus) (iv) Students	(v) Students (vi) Academics (vii) Curriculum Committees (viii) Institutional Logistical Constraints (ix) Online Resources	(x) Graduates (model extension)
<b>Critical Question</b>	1. What is the role of the dental therapist in the health care system of South Africa?	2. How does the dental therapy curriculum offered at the university of KwaZulu-Natal prepare its graduates to fulfil this role?		3. What are the perceptions of internal & external stakeholders regarding the professional competence of graduates to practice within the health care system of South Africa?
<b>Research Design</b>	QUAL only	QUAL + quan	QUAL + quan	QUAL + quan
<b>Mixing Purpose</b>	No mixing	<ul style="list-style-type: none"> <li>• Complementarity of data –two methods are juxtaposed to generate complementary insights on the phenomenon being studied</li> <li>• Data &amp; method triangulation – multiple data sources &amp; methods led to convergence &amp; corroboration of results</li> <li>• Initiation – where contradictions were discovered, which led to re-framing of research question</li> <li>• Expansion – where breadth &amp; range of research was expanded by using multiple methods</li> </ul>		
<b>Stakeholders</b>	Students, graduates, academics,  Key external stakeholders:  Employers, Regulatory Body, Professional Association, Dental Deans	Students	Students, graduates, academics	Key external stakeholders, students, graduates, academics

**Table 6 : Conceptualization Stage**

PHASES	CONTEXT	INPUT	PROCESS	PRODUCT
<b>Quantitative Data Generation</b>	No data generation	<b>UNOBTRUSIVE MEASURES</b>  <b>Applicant &amp; Enrolment Profile</b> <ul style="list-style-type: none"> <li>• Age, Race, Gender</li> </ul> <b>INTERVIEWS (Students)</b> <b>Biographical Interview</b> <ul style="list-style-type: none"> <li>• Age &amp; Gender</li> <li>• Number of years in school</li> <li>• First language</li> <li>• Choice of Dental Therapy</li> <li>• Would they like to study further?</li> <li>• Satisfaction with educational experience</li> </ul>	<b>UNOBTRUSIVE MEASURES</b> <b>Hospital Records</b> <ul style="list-style-type: none"> <li>• Patient Statistics</li> </ul> <b>University Records</b> <ul style="list-style-type: none"> <li>• Student Pass Rates</li> </ul> <b>INTERVIEWS (Students)</b> <ul style="list-style-type: none"> <li>• Competency Evaluation</li> <li>• Module Evaluation</li> </ul>	<b>UNOBTRUSIVE MEASURES</b>  <b>Graduate Profile</b> <ul style="list-style-type: none"> <li>• Age, Race, Gender</li> <li>• Practice Patterns</li> </ul>
<b>Quantitative Data Analysis</b>		Descriptive Analysis  SPSS to determine frequency & percentages	Frequency distribution	Descriptive analysis  Excel Software to create tables and graphs

**Table 7 : Experiential Stage -Quantitative Data Generation**

PHASES	CONTEXT	INPUT	PROCESS EVALUATION	PRODUCT
<b>Qualitative Data Generation</b>	<b>INTERVIEWS</b> (External Stakeholders) <ul style="list-style-type: none"> <li>History of the dental therapy profession</li> </ul> <b>INTERVIEWS</b> (All Stakeholders) <ul style="list-style-type: none"> <li>Role of the dental therapist</li> </ul>	<b>UNOBTRUSIVE MEASURES</b> <ul style="list-style-type: none"> <li>Analysis of university prospectus to determine strategies used by the university to recruit students</li> </ul>	<b>INTERVIEWS</b> (Academics) <ul style="list-style-type: none"> <li>Personal content awareness, preferences, teaching styles, ideologies</li> </ul> <b>FOCUS GROUP DISCUSSIONS</b> (Students) <ul style="list-style-type: none"> <li>Perceptions of curriculum</li> </ul> <b>UNOBTRUSIVE MEASURES</b> <b>Faculty Handbooks</b> <ul style="list-style-type: none"> <li>Management &amp; organizational structure</li> <li>Academics – number, type &amp; qualifications</li> </ul> <b>School Module Portfolios</b> <ul style="list-style-type: none"> <li>Form &amp; Content of curriculum</li> </ul> <b>OBSERVATIONS</b> <ul style="list-style-type: none"> <li>Institutional Logistical Constraints</li> <li>Online Resources</li> </ul>	<b>INTERVIEWS</b> (Graduates, Students, Academics & Key External Stakeholders) <ul style="list-style-type: none"> <li>Job Satisfaction</li> </ul>
<b>Qualitative Data Analysis</b>	Contextualizing Strategy – thematic analysis	Contextualizing Strategy – thematic analysis	Contextualizing Strategy – thematic analysis	Contextualizing Strategy – thematic analysis

**Table 8 : Experiential Stage - Qualitative Data Generation**

PHASES	CONTEXT	INPUT	PROCESS EVALUATION	PRODUCT
<b>Mixed Methods Data Generation</b>	<p>The phase served to contextualize the role of the dental therapist within the health care system of South Africa, thereby answering the first critical question of this study.</p> <p>The first part of this phase served to provide a historical background to this profession.</p> <p>The perspectives of multiple external and internal stakeholders were used to provide complementary insights on the role of the dental therapist.</p>	<p>The analysis of the recruitment strategies of the university showed that dental therapy was marketed as a high-technology, first world profession.</p> <p>The high number of applicants, and the large number wanting to study further, complemented these findings.</p> <p>However, problems of English not being first language in a significant number of students, and the poor secondary schooling system confounded these findings.</p>	<p>The high student pass rates, high patient statistics, and student interviews all showed that students were deemed to be competent on graduation.</p> <p>Most academics believed that students were adequately trained, but identified some shortcomings in teaching. These shortcomings were complemented by the student focus group discussions.</p> <p>The examination of the Handbooks and module portfolios provided data for a comprehensive evaluation of the curriculum, which also identified shortcomings in the curriculum with regard to the health care system of South Africa.</p>	<p>The results of the process evaluation showed that students were deemed to be competent to work independently.</p> <p>However patterns of graduates showed that most worked in the private sector, exacerbating the inequities in access to oral health care.</p> <p>The graduate interviews also showed high levels of dissatisfaction among this profession.</p> <p>These discrepancies and shortcomings leads to the development of the final critical question:</p> <p>Why do these stakeholders have these perceptions?</p>
<b>Mixed Methods Meta-Inferences</b>	<p>The integration of all components of this study led to the creation of a meta-inference. The quality of this meta-inference was evaluated by the concepts of design quality and interpretive rigour.</p>			

**Table 9 : Inferential Stage - Mixed Methods Data Integration**

#### **4.4.1 Typologies of Research Design**

In mixed methods research, the typologies of research design are important for several reasons:

- They assist the researcher to decide how to proceed when designing their studies, and provide a number of paths that the researcher can follow to achieve the goals of the study (Teddlie & Tashakkori, 2006).
- They present a common language in this field, which includes notations and abbreviations (Morse, 2003).
- The typologies help in “legitimizing” this field of study, because they provide examples of research designs that are distinct from the qualitative or quantitative designs (Teddlie & Tashakkori, 2006).
- They assist in providing the field with multiple alternative organizational structures.
- They can serve as a pedagogical tool, where students can learn about and compare the different designs in this field.

Therefore, when designing a mixed methods study, it is necessary to recognize that the design may evolve and change during the course of the study.

#### **4.4.2 Criteria Used in the Typology of Mixed Methods Research**

Many authors have used the seven criteria to create typologies in the field of mixed method research (Burke Johnson & Onwuegbuzie, 2004; Cresswell, Plano Clark, Gutmann & Hanson, 2003; Morgan, 2007; Morse, 2003). These criteria include number of methodological approaches used, number of strands or phases, type of implementation process, stage of integration of approaches, priority of methodological approach, function of study, and theoretical perspective.

However Teddlie and Tashakkori (2009) argued that only the first four criteria can be characterized as criteria, and have been used in the development of their methods-strands-matrix. They believe that the last three criteria are methodological components. However, in this study the seven criteria listed above will be used.

### 4.4.3 Research Design of This Study

The typology of research design in this study will be discussed using the seven criteria described in the previous section.

#### i. Number of Methodological Approaches Used

This criterion describes how many methods (quantitative or qualitative) will be used in a study. A mono-method study uses either the qualitative or the quantitative methods. A mixed method study uses both the qualitative and quantitative methods. In this study, a combination of qualitative and quantitative methods has been used to answer the research questions. Therefore it is considered to be a mixed methods study.

#### ii. Number of Strands or Phases

This criterion seeks to determine whether the study will be conducted within a single phase (*monostrand*) or in multiple phases (*multistrand*) as described by Teddlie and Tashakkorie (2009). Monostrand designs occur where only the quantitative or qualitative approaches are used across all stages of the study. Multistrand designs are seen where qualitative and quantitative approaches are mixed across all stages of a study. Therefore, this study can be described as multistrand, because it has been conducted in four phases.

A *Phase* in a research design is made up of three stages (Teddlie & Tashakkori, 2009). These stages include the conceptualization stage (formulation of research purpose and critical questions), the experiential stage (methodological and analytical) and the inferential stage (emerging theories, explanations, inferences). These phases are summarized in Tables 6 to 9.

#### iii. Type of Implementation Process

The type of implementation process provides direction about how the research process is implemented (Teddlie & Tashakkori, 2009). The first type takes into consideration whether the different phases of the study are conducted at the same time (concurrent or parallel), or if they occur sequentially. The type of implementation process also includes the use of conversion designs, where collected data is converted into another data type. A more complicated implementation method is known as *multi-level* mixing, and includes the collection of qualitative and quantitative data from multiple levels within an organization or institution.

*Parallel* or *concurrent* mixed designs occur where the different phases (qualitative and quantitative) occur in a parallel manner, either simultaneously or with some time lapse (Teddlie & Tashakkori, 2009). It can be represented by a plus sign [+]. Cresswell (2003) used the term *concurrent*, to mean that both phases occur at exactly the same time. Consequently Teddlie & Tashakkori (2009) proposed the alternate term *parallel*, to make allowance for brief time gaps that may occur due to practical considerations.

*Sequential* mixed designs refer to a study in which the phases of a study occur in chronological order, with one strand following the other (Teddlie & Tashakkori, 2009). In this case, the research questions from one strand are dependent on the results obtained in a previous strand, and can be depicted by the arrow [→].

*Conversion* designs occur where collected data is converted into another data type. An example of data conversion occurs when collected quantitative data is converted into narratives, and is analyzed qualitatively (Tashakkori & Teddlie, 2003). This type of conversion is known as *qualitizing* data. The converse occurs when collected qualitative data is converted to numerical codes that can be statistically analyzed (Miles & Huberman, 1994). This is known as *quantitizing* data.

*Multi-level* mixing entails the collection of qualitative and quantitative data from multiple levels within an organization/ institution. However this type of design is only possible in hierarchically-organized social institutions, such as schools, universities and hospitals. An example in a university, where one level of analysis is nested in another, can be demonstrated by the student within a classroom within a grade within a school (Teddlie & Tashakkori, 2009). From the critical evaluation of the implementation methods used in mixed methods research, the design of this study can be labelled as a *parallel mixed design*.

#### **iv. Stage of Integration of Approaches**

The design question seeks to determine at what stage in the research process mixing occurs (Tashakkori & Teddlie, 2003). Does mixing occur only at the *experiential stage* (methodological and analytical), or does it occur across all three stages of the study?

In this study, mixing occurs at the experiential and inferential stages.

#### **v. Priority of Methodological Approach**

This criterion takes into account whether the research is oriented towards the qualitative or quantitative perspective. The approach that takes priority is considered to be the *dominant* approach, and is depicted as uppercase letters such as *QUAN*. The *less-dominant* approach is represented by lowercase letters such as *qual*. However Teddlie and Tashakkori (2009) believe that priority of approach cannot be determined before starting the study because either one could become dominant as the study progresses.

In this study, the dominant approach was deemed to be the Qualitative component. Therefore this design can be graphically represented as QUAL=quan, where the QUALITATIVE component is *dominant*, the quantitative is *less-dominant*, and the (=) indicates that both approaches occur within the same time period.

#### **vi. Functions of the Research Study**

The functions of a study refer to the role that the results may play in formulating recommendations and conclusions (Teddlie & Tashakkori, 2009). These functions have been described by Burke Johnson et al. (2007) as:

- complementarity – where the data analyzed from the two methods are juxtaposed and generate complementary insights that together create a bigger picture
- triangulation – where the researcher tries to find convergence and corroboration of results from different methods and designs studying the same phenomenon
- development – where findings of one method helps to inform the other method
- initiation – where contradictions are discovered which may lead to re-framing of the research question
- expansion – where the breadth and range of the research is expanded by using different methods for different components

In this study, the functions of *complementarity*, *triangulation* and *expansion* have been used to add value to this study.



## **vii. Theoretical or Ideological Perspective**

The theoretical or ideological perspective needs to be identified in the research design in cases where there is a transformative agenda. However Teddlie and Tashakkori (2009) believe that this is not a design issue, but rather an axiological consideration.

In this study, the ideological perspective with regard to the evaluation of the dental therapy curriculum is framed by the relativist ideology. This ideology is based on the views of multiple stakeholders, and can be recognized by the emphasis placed upon the impossibility of establishing the truth (Scriven, 1987). There is a move away from the realistic positivistic view (Scriven, 1987), and is driven by common sense. Therefore this ideology is well suited to this study as it allows for the evaluation of the multiple influences on curriculum, the use of multiple data sources, and by interviewing multiple stakeholders.

On evaluation of all this information, the research design of this study can be described as a multistrand parallel mixed methods study. Integration occurred in the experiential and inferential stages of the study, and the dominant method is the qualitative component. The purpose for mixing methods in this study was to achieve the functions of complementarity, triangulation and expansion. Since the philosophical foundation of this study is based on pragmatism, which focuses on *what works*, the use of multiple research methods will enhance the outcomes of this study. In the following section, the phases used in this study will be described.

## **4.5 PHASES OF THIS STUDY**

The four phases used in this study have been adapted from the context, input, process and product model of curriculum evaluation (Stufflebeam, 2000). Therefore the phases in this study have been designated as the context, input, process and product phases. They include all the influences described in the Hicks (2007) model, which serves as the theoretical framework of this study, and is summarized in Tables 6 to 9.

### **4.5.1 Context Phase**

The context phase of this study attempts to contextualize the dental therapy profession within the health care system of South Africa. This phase uses only the qualitative

research method, in the form of semi-structured interviews. It is made up of two parts, which are based on the first two elements of the Hicks model: *historical precedent* and *industry requirements*.

- *Historical precedent* of the dental therapy profession was determined by means of qualitative interviews with key external stakeholders (Annexure 4). They were asked the question: “*Historically, can you please tell me your views of why dental therapy was introduced in South Africa?*” These stakeholders were considered to have an in-depth knowledge of this profession, and the criteria used to select them will be discussed in the section on sampling strategies.
- *Industry/Professional Requirements* were determined by conducting qualitative interviews with all stakeholders: key external stakeholders (Annexure 4), academics (Annexure 6) and students and graduates (Annexure 8), to determine their views on the role of the dental therapist. They were asked the question: “*Do you believe that dental therapists can play an important role in the oral health team of South Africa? What would you say is that role?*”

The viewpoints obtained in the qualitative interviews, combined with the literature reviewed on the dental therapy profession within the context of the South African health care system, provided theories about the first critical question of this study which is:

*What is the role of the dental therapist in the health care system of South Africa today?*  
These results will be presented in Chapter 5.

#### **4.5.2 Input Phase**

The input phase of this study described two elements of the Hicks model, namely, the *University curriculum documents* (prospectus) and the *students*. This phase uses a combination of both qualitative and quantitative methods.

The qualitative evaluation of the university prospectus and faculty handbooks was conducted to determine how the dental therapy profession was marketed to prospective students. It also aimed to establish whether these documents accurately reflected the role of the dental therapist within the health care system of South Africa.

The quantitative component described the student application for the period 2001–2010, stratified by number, race and gender. These statistics were confined to the period 2001–2010 because the statistics were available only for this period. The enrolment profile was recorded for the period 1980-2010. This data was also stratified by number, race and gender. These records were obtained from the Data Management Information (DMI) system of the University of KwaZulu-Natal (2010).

Demographic data of the Classes of 2009 and 2010 was obtained by means of a quantitative Student Biographical Interview (Annexure 10). Data collected in this instrument included information on:

- Age, gender, number of years in the school, and first language
- Choice of Dental Therapy
  - Was Dental Therapy their first choice?
  - Would they practice this profession on graduation?
  - Would they like to study further on graduation?
  - If so, what would they like to study?
- Student satisfaction with their educational experience
  - What could be done to improve this experience?

These statistics were considered to be important in this study because they provided information about whether students had entered this programme directly from school (age), the number of years in the School (pass rates), and language skills (English as first language). All these factors need to be considered in light of the poor quality of the schooling system of South Africa. Gender statistics would be used to either corroborate or contradict similar information obtained in the application, enrolment and graduate profiles of this study.

The questions on their choice of dental therapy and whether they would like to study further would be used to corroborate or contradict the findings regarding the practice patterns and job satisfaction among graduates. This will be described in the following section. Satisfaction with their educational experiences would also be used to corroborate information obtained during the process phase.

### 4.5.3 Product Phase

The product phase of this study described the *graduate* element of the Hicks model. Even though this element does not form a part of the Hicks model, the researcher decided to extend the Hicks model in this study, by combining the element *graduates* with the *student* element. This is because the graduate provides a very different viewpoint of the curriculum. They have already started independent practice, and are therefore aware of the strengths and weaknesses of the curriculum. They are also able to provide an informed viewpoint in regard to gaps in their knowledge, especially with respect to independent practice. Graduates would also assist in determining the level of job satisfaction among these professionals.

In the product phase, a combination of both the qualitative and quantitative methods was used. The quantitative component described the graduate profile from the inception of the programme at this university (1982–2010). This information was also stratified by number, race and gender. These records were obtained from the DMI system of the University of KwaZulu-Natal (2010).

The graduate profile also included quantitative information on the practice patterns of graduates. This information was obtained by telephonically contacting all graduates from this university. The list of graduates with their contact details were obtained from the DMI system (University of KwaZulu-Natal, 2010). During the telephonic conversations, graduates were asked where they were currently working. This information was categorized into: private practice (PP), public sector (PS), dentistry (D), other (O) and unknown (U). The first two categories are self-explanatory. The category “dentistry” included graduates who had gone on to study dentistry. The category “other” consisted of graduates who were not longer working in the field of dental science. The “unknown” embraced all graduates who could not be traced.

The qualitative component provided information about the level of job satisfaction among dental therapy graduates. All stakeholders including the key external stakeholders, students, graduates and academics, were asked the question: *Do you think that dental therapists are satisfied within their present careers?* This information was deemed to be important as the perceptions on job satisfaction obtained in these interviews were compared to the recruitment and selection strategies of the university. This comparison

provided insight into whether the School was training the appropriate type of student to function as a health care worker in South Africa.

#### **4.5.4 Process Phase**

In the process phase, all remaining elements of the Hicks model were evaluated. They included the form and content of the curriculum, the profile of academics, institutional constraints and accessible online resources.

##### **Form and Content of the Curriculum**

The form and content of the dental therapy curriculum were evaluated with respect to the minimum competencies required for the graduating dental therapist, as prescribed by the Health Professions Council of South Africa (HPCSA, 1993). These competencies were divided into general and clinical competencies.

The general competencies encompass academic skills, communication, business and office management, and professional issues, equipment maintenance and repair, infection control, health as a human right and community health (HPCSA, 2008).

Content analysis of the general competencies was conducted by examining the School Module Portfolios. Information was obtained to determine where in the curriculum these competencies were offered, how they were presented, and how they were assessed. This information was presented in Chapter 6 of this study.

The clinical competencies include diagnosis & treatment planning, primary preventive measures, scaling & polishing, restorative dentistry, minor oral surgery, dental therapeutics, dental radiography, children's dentistry, and emergency care in the dental practice (HPCSA, 2008).

Content analysis of the clinical competencies required for a beginning dental therapist was also conducted using the School Module Portfolios. This analysis examined where in the curriculum these functions were presented, how they were presented, how they were assessed and recorded, and how competence was assured. The information was also presented in Chapter 6. However due to the large size of these documents, these competencies were tabulated in Tables 20 to 42, and located in the Annexure section of this thesis (Annexure 21 to 29).

The information obtained from the content analysis was combined with data derived from the qualitative interviews with academics (Annexure 6), the focus group discussions with students from the Class of 2010 (Annexure 8), and the quantitative interviews conducted with all students of the Classes of 2009 and 2010 (Annexure 11 and 12).

In addition to the above information, quantitative information on the student pass rates in the various modules was obtained from the DMI system (University of KwaZulu-Natal, 2010). However the pass rates were restricted to modules conducted by the School of Dentistry. It did not include pass rates on modules provided by service departments such as Anatomy and Physiology. Quantitative patient statistics for the year 2010 (Annexure 30) were obtained from the Oral and Dental Training Hospital (School of Dentistry, 2011).

These multiple data sources have enhanced this study as it helped to explain certain phenomena identified in the curriculum. It also produced contradictory information, which warranted further investigation in some instances. Convergence of evidence added strength to the evaluation of the form and content of the curriculum.

In the next section, the methodology used in the evaluation of other elements of the Hicks model will be discussed.

### **Profile of Academics in the School**

Qualitative information was obtained on the management and organizational structure of the School, using the Faculty Handbooks. The number, type and qualifications of academics were also determined from the Faculty Handbooks.

This information was supplemented conducting qualitative interviews with academics (Annexure 6) on the various factors included under the heading “Academics”, in the Hicks model. These include the lecturers’ personal content awareness, preferences, teaching styles, and ideologies. Academics were asked: *“Does the programme follow basic educational principles and practices? Do you have any training in education?”*

These questions were followed by in-depth interviews on whether students were adequately trained in their respective disciplines (Annexure 6). These questions covered several important aspects of the curriculum. The encompassing question asked was:

*“Do you feel that our students are adequately trained at the university in order to go out and practice their profession competently with regard to community engagement, clinical*

*skills, private practice, appropriate referral, ethical considerations, articulation between preclinical and clinical training, and the integration of theoretical knowledge and clinical practice?”* The responses obtained from these questions were used to triangulate the findings of the process evaluation of the form and content of the curriculum.

### **Institutional Constraints**

A critical appraisal of the institutional facilities was conducted at the university campus as well as at the training hospital. It included the evaluation of the library, the preclinical facilities at the university, clinical facilities at the training hospital, the lecture rooms, areas for self-study and the student common rooms. Timetables were also scrutinized to determine the amount of time allocated to lectures, clinical training, self-study, and to other pedagogies.

### **Accessible Online Resources**

Access to computers with internet and e-mail facilities at the training hospital and the university were evaluated. The availability of telemedicine facilities to facilitate community-based distance learning was also examined.

The use of these multiple data sources in the Input, Product and Process phases of this study, combined with the review on curriculum evaluation, provided a comprehensive answer to the second critical question of this study:

*How does the dental therapy curriculum offered at the UKZN prepare its graduates to fulfil this role?* The results obtained in response to this question will be presented in Chapter 6.

The third critical question of this study asked:

*What are the perceptions of internal and external stakeholders regarding the professional competence of these graduates to practice within the health care system of South Africa?* The perceptions of all stakeholders were obtained by means of qualitative interviews, and were asked two questions:

(i) *Do you think that the training of dental therapists is appropriate to meet the oral and dental health care needs and challenges experienced in South Africa presently?*

(ii) *Do you believe that the curriculum offered at the dental school enable its graduates to practice competently within the scope of practice prescribed by the Health Professions Council of South Africa?*

The perceptions of all stakeholders in response to these questions were combined with information obtained in the other interviews. This provided a comprehensive response to the third critical question, which will also be presented in Chapter 6.

The fourth critical question is: *Why do these stakeholders have these perceptions?* It will be answered in the final chapter of this thesis, by theorizing about all the results obtained in the context, input, process and product phases of this study.

## **4.6 SAMPLING**

Mertens (2010, p. 309) defined sampling as the “method used to select a given number or people (or things) from a population.” She explained that it encompassed various aspects ranging from whom data will be collected, which participants are included, how participants are selected, and what needs to be done to conceal or reveal their identities.

These participants are usually persons or groups of people who have a stake in the evaluation, and are known as *stakeholders* (Guba & Lincoln, 1981). These authors have identified three groups of stakeholders: agents, beneficiaries and victims. The *agents* are those persons who are involved in producing, using or implementing the evaluand. The *beneficiaries* are those individuals or groups who benefit from the evaluation. The *victims* are those persons who are negatively affected by the evaluand. The stakeholders will be discussed in greater detail in forthcoming sections of this chapter.

### **4.6.1 Typology of Sampling Techniques**

Teddlie and Tashakkori (2009) provide a typology of sampling techniques that are commonly used in the social and behavioural sciences. They are *probability sampling*, *purposive sampling*, *mixed methods sampling* and *convenience sampling*. The first three types represent the three major research approaches: quantitative, qualitative and mixed methods respectively. Convenience sampling can occur in any of the methods (Teddlie & Tashakkori, 2009).



## Probability Sampling Techniques

Probability sampling techniques are used mainly in quantitative research. Henry (1990, p. 17) defined probability samples as “selected in such a way that every member of the population actually has a possibility of being included in the sample. . . . They can be rigorously analyzed to determine possible bias and likely error.”

Wiersma and Jurs (2005, p. 490) stated that probability samples aspire to *representativeness*, which can be defined as the degree to which the sample accurately represents the entire population. Wiersma and Jurs (2005, p. 490) defined the term *population* as “the totality of all elements, subjects, or members that possess a specified set of characteristics that define it.” They also defined the concept of an *accessible population* as the “total number of elements, subjects or members for which it is possible to collect data” (p. 490). Probability samples are usually significantly larger than purposive samples, and are believed to have less risk of bias (Cohen, Manion & Morrison, 2007).

Teddlie and Tashakkori (2009) have described the different techniques used in probability sampling: random sampling, stratified sampling, cluster sampling and multiple probability techniques. In random sampling, each sampling unit in a defined population has an equal chance of being included in the sample. In stratified sampling, the population is divided into subgroups or strata. Each unit is allocated to a single stratum, and then selects units from those known strata. In cluster sampling, the sampling unit is not an individual, but a group that occur naturally in populations. Multiple probability techniques include a combination of at least two probability techniques.

## Purposive Sampling Techniques

On the other hand, the purposive sampling techniques are mainly used in qualitative research. Maxwell (1994, p. 3) defined this technique as “a type of sampling in which particular settings, persons or events are deliberately selected for the important information they can provide that cannot be gotten as well from other choices.”

Teddlie and Tashakkori (2009) have described the defining characteristics of this type of sampling. They assert that purposive sampling focuses on specific purposes associated with research questions. As a result, the researcher selects cases that can provide rich information with regard to those questions. Samples are usually selected based on *expert*

*judgment* of researchers and informants. The sampling procedure focuses on the *depth* of information that can be produced. Sample sizes are usually small (30 cases or fewer), and usually depends on the type of data being collected. This may be deemed to be unrepresentative of the whole population, and demonstrate skewness or bias (Cohen, Manion & Morrison, 2007).

### **Convenience Sampling Techniques**

Cohen, Manion and Morrison (2007, p.114) have defined convenience sampling techniques as “choosing the nearest individuals to serve as respondents and continuing the process until the required sample size has been obtained.” In this type of sampling, researchers usually choose their sample from those to which they have easy access. However, as it does not represent any group apart from itself, it does not attempt to generalize about the wider population.

Convenience sampling is divided into *captive* and *volunteer* sampling. In captive sampling, the sample may be taken from a grouping who may find it difficult not to participate. In this study, this type of sampling occurred during the administration of the quantitative interviews to all final year students in the lecture room.

Volunteer sampling occurs where individuals willingly agree to take part in a study, as was seen in the focus group discussions in this study. However it must be acknowledged that convenience sampling can often result in biased data (Tashakkori & Teddlie, 2003). In addition, the captive sample may convert to a volunteer sample, if some members from the captive group opt out of the study.

### **4.6.2 Mixed Methods Sampling**

Sampling in mixed methods research entails selecting cases for a study that uses the probability, purposive and convenience techniques (Teddlie & Yu, 2006). However the ability of the researcher to combine these techniques creatively in order to answer the research questions is considered to be one of the defining characteristics of mixed methods sampling.

This type of sampling must be able to choose procedures that will generate representative samples in the quantitative strand and rich thick data in the qualitative strand. Therefore

when the researcher combines both orientations, complementary data that has depth and breadth will be produced (Teddlie & Tashakkori, 2009).

Most mixed methods studies comprise multiple samples, which vary in size from a large number of units of analysis (quantitative), to a small number of cases (qualitative). It is common to have a large variance in sample size between the different phases of a study. Sample size is believed to be dependent on the research questions (Johnson & Turner, 2003).

Johnson and Turner (2003) believe that in most mixed methods studies, the sample strategy is usually determined before the study starts. However, the qualitative questions may generate new sampling issues during the course of the study. In such cases, expert judgment must be used in terms of the overall study sample (Johnson & Turner, 2003).

Since most mixed methods studies generate both narrative and numeric data, it is important to provide an overview of the relationship between the sampling techniques and the generation of different types of data.

#### **4.6.3 Sample Size in Mixed Methods Research**

Mixed methods research usually combines a large quantitative sample based on formal sampling frames, with a specially-selected smaller qualitative sample, based on informal sampling frames (Cresswell, 2003). Quantitative sample sizes are determined by the “mathematically-defined estimates of the number of cases required to estimate the characteristics of the population within a prescribed margin of error” (Bartlett, Kortlik & Higgins, 2001, p. 43). This quality has been described as *representativeness*.

Patton (2002) stated that there were no rules for sample size in qualitative inquiry. He argued that the sample size was dependent on factors such as *what you want to know?* and *what will have credibility?* However, methodologists in the field of qualitative research (Cresswell, 2003; Mertens, 2003; Morse, 2003) believe that one of the most important factors used to determine sample size in qualitative research was saturation. Glaser and Strauss (1967) described *saturation* as the point at which all the ideas have been heard, and you are not getting any new information.

Representativeness and saturation are regarded as the rule for probability and purposive sampling respectively. However, in mixed methods sampling, there needs to be balance

and trade-offs between probability and purposive sampling to achieve the best result for the research study as a whole.

The sample size used in this mixed methods research study was dependent on several factors (Teddlie & Tashakkori, 2009):

- what sample size was considered to be practical in the study
- what component was deemed to be dominant
- what the trade-off was between the depth and breadth of information
- what the trade-off was between the requirements of external validity and transferability

A rule common in mixed methods sampling, called the *representativeness / saturation rule* has been described by Teddlie and Tashakkori (2009, p. 184) as follows: “as more emphasis is placed on the representativeness of the quantitative sample, the less is placed on saturation in the qualitative sample; and vice versa.”

#### **4.6.4 Types of Mixed Methods Sampling Strategies**

Teddlie and Tashakkori (2009, p. 185) have argued that even though there was no accepted typology of mixed methods sampling, they believed that mixed methodologists “combined probability and purposive sampling techniques in unique prescribed manners to meet the specifications of mixed methods designs.” They also provided a typology of mixed methods sampling strategies:

- basic mixed methods sampling strategies
- sequential mixed methods sampling
- parallel mixed methods sampling
- multi-level mixed methods sampling
- sampling using multiple mixed methods sampling strategies

In this study, parallel mixed methods sampling was conducted.

## **4.6.5 Mixed Methods Sampling Used in This Study**

### **Sampling Units**

Teddlie and Tashakkori (2009, p. 181) described the three types of units that can be sampled in mixed methods studies: case sampling, material sampling and sampling other elements in the social situation.

Case sampling can be defined as “the selection of individual participants or groups of participants under study” (p. 181). In this study, case sampling included students, graduates, academics, employers, university deans, representatives of regulatory bodies and professional associations.

Material sampling may be defined as “the selection of units of written information, artefacts, and other written materials” (p. 181). In this study, material samples included the university prospectus, faculty handbooks, school module portfolios, university records, and hospital statistics.

Sampling other elements in the social situation has been defined as “the selection of other components relevant to the unit of analysis” (p. 181). In this study, the setting of the training hospital, the dental library, the preclinical laboratory, and the lecture rooms form part of this unit of analysis.

### **Mixed Method Sampling Strategy**

In this parallel mixed methods sampling technique, the researcher selected units of analysis through the use of purposive and probability strategies in a parallel manner i.e. at the same time, or with some time lapse (Teddlie & Tashakkori, 2009). This resulted in the triangulation of results from the separate quantitative and qualitative components of the study. Cresswell, Plano Clark, Gutman and Hanson (2003) argued that this process allowed the researcher to confirm, cross-validate, or corroborate findings within a single study.

### **Quantitative Sampling Strategy**

The research instruments used in the quantitative component of this study were the Student Biographical Interview (Annexure 10), Student Competency Evaluation

(Annexure 11) and the Student Module Evaluation (Annexure 12). They will be described in greater detail in the section on data generation.

Because of the low number of students at each level, these instruments were administered to the entire final year class of 2009 (15 students). However when the statistical analysis of this data was completed, the statistician informed the researcher that the results were not conclusive from a quantitative perspective due to the low number. These interviews were subsequently administered to the final year Class of 2010 (15 students) in the following year. As the results for both these classes were similar, they were combined and analyzed as a single unit of 30 students.

In this study, data was collected during the period 2009 to 2010. The quantitative data was collected from all available sources during that time. Therefore, in this study, the number of students that formed the sample in the quantitative component was deemed to be adequate for the following reasons. This sample size seemed to be practical in terms of the low number of students in the School. The quantitative component was deemed to be non-dominant in this study. The trade-off between external validity and transferability resulted in the low sample size to be regarded as acceptable in this study. The inclusion of the class of 2010 added value by providing a broader population base with which to compare data obtained in the qualitative section of the study.

## **Qualitative Sampling Strategy**

### **Key External Stakeholder Interviews**

Purposive sampling was used to identify the key external stakeholders who were perceived to play a key role in this profession (Annexure 14). They were defined by their first-hand in-depth knowledge of the dental therapy profession in South Africa. All these stakeholders held comparable roles within their domains.

The following stakeholders were included:

- Human Resource Directorate: Department of Health, which was responsible for formulating the Human Resources for Health Plan for South Africa (Department of Health, 2006). However, the director could not meet with the researcher. Instead, he referred her to the minutes of a meeting that he held with the Committee of

Dental Deans on the training of dental therapists. However, nothing valuable was obtained from these minutes.

- Employer: National Department of Health, which is responsible for formulating oral health policy nationally, and who is also responsible for the planning, production and management of oral health personnel in South Africa.
- Employer: Provincial Department of Health, which is responsible for the employment of dental therapists in the public sector.
- Regulatory Body: Professional Board for Dental Therapy, Oral Hygiene and Dental Assisting, which is the regulatory body for the dental therapy profession. This Board falls directly under the control of the HPCSA.
- Other training institutions: current dean of a dental school, who has been involved in the education and training of all cadres of oral health personnel for many years.
- This Training Institution: past Dean of UDW, who has also been involved in the education and training of oral health personnel for many years.
- Professional Association: Dental Therapy Association of South Africa, an independent professional association representing the views and opinions of dental therapists in South Africa.
- Professional Association: South African Dental Association, an independent professional association representing the views of dentists in South Africa. The KwaZulu-Natal branch of this association was invited to be interviewed in this study because their members employed the greatest number of graduates from this university. However they refused to participate and referred the researcher to an editorial in the *South African Dental Journal* which had responded to the new initiatives with regard to the training of dental therapists (Campbell, 2006).

The details with regard to the external stakeholders have been summarised in annexure 14. It provides details about the date and duration of the interview. It also provides the designation, race and gender of the stakeholder, with his/ her allocated pseudonym in order to maintain anonymity.

Semi-structured interviews were conducted with these stakeholders to develop background knowledge on the history and role of the dental therapist within the health care system. They also presented their views on the future expectations for the scope of practice, and their perceptions of the competence and training of the dental therapist.

## **Academic Interviews**

Purposive sampling was also used for the selection of academics to be interviewed (Annexure 18 and 19). The study population comprised dentists, dental therapists, oral hygienists, and an attorney with a medico-legal background, who have taught in the academic programme for at least two years. They were purposively sampled so that at least two academics were chosen from each of the four clinical disciplines, as well as a non-clinical discipline.

The clinical disciplines were Minor Oral Surgery (dentist and dental therapist), Restorative Dentistry (dentist and dental therapist), Diagnostics and Radiology (dental therapist and oral hygienist), and Oral Health (two oral hygienists). An attorney was interviewed for the non-clinical discipline Ethics, Law, and Practice Management.

Details of academics who were dental therapists, were summarised in Annexure 18. Information was provided about the date and duration of the interview, the role of the academic (coordinator or lecturer), and the pseudonym. The academics who were not dental therapists were summarised in Annexure 19, which included the same information.

## **Graduate Interviews**

Convenience sampling was used to select this study population, depending on how easily accessible they were to the interviewer. Five graduates were selected in this cohort (Annexure 17). Two of them worked in the private and public sectors in rural areas. Two graduates worked in the public and private sectors in urban areas. One worked only in private practice in an urban area, but was also involved in clinical training. The graduate details were provided in Annexure 17.

## **Student Interviews**

Students were also selected by convenience sampling, depending on how accessible they were to the interviewer. Initially five students were selected from the final year Class of 2009 for individual interviews (Annexure 15). However, due to a lack of rich thick descriptions, a focus group discussion was subsequently conducted with six final year students from the Class of 2010 (Annexure 16). Details of the participants have been provided in Annexure 15 and 16.



In this study, the sampling strategy emerged from the purpose and research questions. Even though purposive and probability samples were selected in this study, there appeared to be a saturation/representativeness trade-off, due to the low number of students in the School. However saturation was reached and thick data was generated in the qualitative component. The sampling strategy used in this study was therefore deemed to be feasible and efficient because the researcher had access to most of the data sources. However, the two sources that were not available (South African Dental Association and the Human Resource Directorate of the Department of Health) provided the researcher with alternative options (position papers and minutes of meeting) to gain this information.

## **4.7 DATA GENERATION**

Data collection in mixed methods research can be defined as the “gathering of both quantitative and qualitative data in a single study” (Teddlie & Tashakkori, 2009, p. 246). These authors have described six data collection techniques: interviews (qualitative and quantitative), unobtrusive measures, observations, focus group discussions, questionnaires and tests. A brief overview of these techniques, within the context of this study, will be discussed in the following section.

### **4.7.1 Qualitative Interviews**

Teddlie and Tashakkori (2009, p. 229) defined interviews as a “research strategy that involves one person (interviewer) asking questions of another person/s (interviewee/s).” They believed that the interview questions may be open-ended, closed-ended, or both. The one-on-one interaction allows the researcher to ask in-depth questions to answer the research problem, and also to explain questions if the interviewee requires further information.

Patton (2002) categorized qualitative interviews into four types: informal conversational interview, general interview guide, and standardized open-ended interviews:

- informal conversational interview – there is no fixed format to the questioning, and questions emerge as the interview progresses.

- general interview guide – the issues to be discussed, and the questions and sequence of the interview, are determined by the interviewer during the course of the interview.
- standardized open-ended interview – the exact questions and sequence are resolved by the interviewer before the interview is conducted.

In this study, general interview guides were used to conduct the interviews. The interview process occurred as follows:

**Consent** – Letters were sent to the various interviewees, which introduced the interviewer and defined the purpose of the interview (Annexure 3, 5, 7, 9). A consent form accompanied these letters (Annexure 13). A copy of the interview schedule (Annexure 4, 6, 8) was sent to the different interviewees prior to the interview. The interviews were scheduled at a time convenient to the interviewee.

**Interview Guides** (Annexure 4, 6, 8) – the interview schedules served to guide the interview. In this way, the interviewee was given freedom to answer in any way s/he deemed fit. The interviewer followed the script of the interview guide to a certain extent in order to obtain answers to specific questions.

**Data Collection** - data was collected by handwritten notes taken during the interview, as well as by recording with a tape-recorder to ensure that answers were captured accurately. This information was transcribed soon after the interview was completed by an independent transcriber. An allowance was made for five hours for transcription for every hour of speech. The interview date, recording method, length of interview, and role of the interviewee was documented.

**Initial Interviews** - an initial round of two interviews were conducted, chosen on the immediate availability of the interviewee. The data was immediately analyzed to identify gaps in the data, and issues that required further information were reviewed. Further interviews were then conducted, and common themes were identified. Data was transcribed, and analyzed as described in the section on Data Analysis.

**Setting** - the interviews took place in a quiet setting so that information was accurately recorded. After the interview, notes were made about the interview. The interviews were conducted face-to-face, and lasted between 20 and 30 minutes.

In the following section, the quantitative interviews will be discussed.

#### **4.7.2 Quantitative Interviews**

In mixed methods research, quantitative interviews, determined by means of self-reports, describe the feelings, beliefs and attitudes of participants. They can be used to generate quantitative, mixed methods and qualitative data. They may be used in a variety of formats, which often complement each other (Teddlie & Tashakkori, 2009).

Teddlie and Tashakkori (2009) note that quantitative questionnaires may have similar features to quantitative interviews, but can be differentiated from each other in that the interviews involve face-to-face interactions with the researcher, while questionnaires do not require interaction with the researcher. In this study, all interviewees were debriefed about the research process by the researcher, who also personally implemented the interview. Consequently the quantitative data was generated by quantitative interviews.

Another difference, between quantitative interviews and quantitative questionnaires, is that the former involves fewer participants while the latter involves large numbers. A disadvantage of this technique is that these interviews may be deemed to be close-ended and structured. This may result in participants having to fit their responses into predetermined categories (*strongly agree, agree, uncertain, disagree, strongly disagree*).

In this study, three types of quantitative data were collected by interviews: biographical data, competency evaluation, and module evaluation.

#### **Student Biographical Data (Annexure 10)**

The information obtained in this quantitative interview included demographic data (age and gender), number of years in the School, first language, and was dental therapy their first choice at university. These were all closed-ended questions. They were then questioned about what was their first choice during the application process at the university.

In the next section of this interview, students were asked the closed-ended question about whether they were going to practice as a dental therapist on graduation. This was followed by a question on whether they were going to study further. An open-ended question concluded this section, where students were asked what they would study, if they wanted

to study further. In the final section, students were asked if they were satisfied in their educational experience, and what could be done to improve this experience.

### **Student Competency Evaluation (Annexure 11)**

This instrument listed the exit-level outcomes of the dental therapy programme as recommended by the HPCSA, with its associated assessment criteria. Students were asked to mark their answers on a statistical sheet, which was attached to the questionnaire. Students were requested to select their perceived level of competence in each of the exit-level outcomes. They were asked to rate themselves on a Likert Scale of 1–5: where (1=*excellent*), (2=*very good*), (3=*average*), (4=*below average*), (5=*poor*). This data was analyzed by a statistician, which will be described in the section on Data Analysis. This instrument was reproduced by the kind permission of Professor W D Snyman (2009) of the School of Dentistry at the University of Pretoria.

### **Student Module Evaluation (Annexure 12)**

In these self-reports, students were asked to provide information on their attitudes, beliefs and feelings about the various clinical modules and one non-clinical module, as described in a previous section. It included questions about value, workload, level of difficulty and course materials in the various modules. It also elicited information about whether teaching was hospital or community-based. It determined whether students felt competent to identify and treat common pathologies, and to refer patients where necessary.

Questions were asked on student knowledge of their scope of practice, and whether a strong ethical ethos prevailed in their training. This was followed by questions on whether they believed that the preclinical and clinical components of the curriculum articulated appropriately, and whether they were able to integrate information between the basic and clinical disciplines. The final part of this interview questioned whether students believed that their clinical skills were adequately developed during their degree, and if they felt competent to practice independently on graduation.

Students answered directly on the interview sheet. They rated each module on a Likert Scale of 1–5; where 1 was *strongly disagree* and 5 was *strongly agree*. This information was analyzed by a statistician, and will be discussed in the section on Data Analysis.

In this study, the data was collected during the last week of the academic year, which is the period between the last examination paper and the oath-taking ceremony. This ensured that students did not feel intimidated by the process as they would have completed their examinations by this time. The quantitative self-reports provided information about the attitudes of students with regard to the dental therapy curriculum. This statistical data was combined with the qualitative descriptions of the academics to generate complementary information on the curriculum.

### **4.7.3 Focus Group Discussions**

Several authors have made the point that focus group discussions are a distinctive data collection strategy (Johnson & Turner, 2003; Teddlie & Tashakkori, 2009) because they involve both the interview and observation techniques. Krueger and Casey (2000) define this technique as being made up of a carefully-planned series of discussions aimed at determining the perceptions of interviewees, in a defined area of interest, in a non-threatening environment. They advise that the focus groups should comprise between five and ten participants and should be homogenous, and that the discussions should not last longer than two hours.

In this study, focus group discussions were carried out on a group of six students from the final year class of 2010. This was done to complement the data obtained in the student interviews conducted with selected students of the class of 2009, because the researcher believed that the qualitative data obtained from the early interviews did not produce rich thick data and did not achieve saturation.

The interview guides used in the qualitative interviews were also used in the focus group discussions. The focus group was generated by volunteer sampling, where students willingly agreed to take part in the study. It was noted that the discussions in the focus group were more animated and free than was obtained in the individual interviews. This could be attributed to the fact that students felt confident to assert themselves with their colleagues present. Their perceptions tended to develop and intensify as the discussions progressed. In the next section, observation, as a data-generating technique used in this study, will be described.

#### **4.7.4 Observations**

Flick (1998) defined observations as the recording of units of interaction which occurs in a defined social situation and is based on visual inspection of that situation. Observations can be structured (close-ended) and unstructured (open-ended).

The instrument used in structured observation utilizes numeric or quantitative data. Selected items, with their accompanying pre-coded responses, enables the researcher to select the most appropriate ones for the study (Teddlie & Tashakkori, 2009).

Unstructured observations are a qualitative method of data collection. The instruments usually involve the use of blank sheets of paper (scripting form) or a series of prompts to guide the observer about what to record (Teddlie & Tashakkori, 2009).

In this study, unstructured observations were conducted in the process phase, where the preclinical and clinical facilities, the library (books, journals, computers), student common rooms (recreational facilities), and lecture rooms (audiovisual facilities, seating arrangements) were observed. It was conducted during peak university time (August to September 2010) so that accurate observations were achieved.

#### **4.7.5 Unobtrusive Measures (Secondary Data)**

Johnson and Turner (2003) converted the term “secondary data” to “unobtrusive measures” to give it a more inclusive meaning. These authors described unobtrusive measures as being carried out in cases where researchers examine social phenomena without identifying with, or changing the phenomena. This type of data collection includes archival records and physical trace evidence. Archival records have been categorized into private written records, public written records, archived databases, and information stored in non-written formats (photographs, videotapes).

In this study, archived databases on the application, enrolment and graduate profiles, together with student pass rates, were accessed from the Data Management Information system of the University (UKZN, 2010). The patient statistics were obtained from the School of Dentistry (2010). This information complemented the data obtained from the other collection techniques.

The remaining two data collection techniques (questionnaires and tests) were not used in this study, and have therefore not been described.

## 4.8 DATA ANALYSIS

### 4.8.1 Qualitative Data Analysis

Teddlie and Tashakkori (2009, p. 6) have defined qualitative data analysis as the “analysis of various forms of narrative data . . . by converting raw data into partially processed data.” The main feature of this type of analysis is the search for themes known as thematic analysis. Themes have been described by Eisner (1998, p. 104) as “a pervasive quality that tends to permeate and unify situations and objects.” They move the researcher through the process of *observation* (seeing), *coding* (seeing something in it), and *interpretation*.

Qualitative data analysis has been described by Teddlie and Tashakkori (2009) as *inductive*, *iterative* and *eclectic*. Lincoln and Guba (1985) described Inductive Data Analysis as projecting specific data to a general theme. In this way, themes are generated which are grounded in the data. This type of analysis also emphasizes the search for *negative cases*, which describes the cases that do not fit the expected pattern. This type of analysis therefore enables the researcher to theorize about the problem.

Iterative data analysis refers to the back and forth process between data collection and analysis (Patton, 2002). The data sources are collected and analyzed on an ongoing basis in a cyclical manner, thereby enabling the researcher to identify themes. Eclectic data analysis refers to the difficulty in prescribing a singular theme in this type of analysis (Teddlie & Tashakkori, 2009). Therefore the researcher uses a mix of analytic tools that are deemed to be suitable for the data set. This is particularly relevant in this study due to the wide range of data collection techniques, which warrant the use of similarly variable data analysis strategies.

Several types of data analysis have been proposed by researchers in this field (Flick, 1998; Maxwell, 2004). However, Teddlie and Tashakkori (2009) defined the taxonomy of qualitative data analysis as the categorical strategy, the contextualizing strategy, and qualitative data displays:

- Categorical strategies entail the separation of narrative data into categories, which are then compared. This comparison facilitates a better understanding of the research question.
- Contextualizing strategy involves the interpretation of narrative data in the context of the whole experience.

- Qualitative data displays are comprised of visual representations of themes that emerge from the qualitative data. They may be used to summarize information obtained in the previous two strategies, or they may occur as a separate strategy of data analysis.

In the qualitative component of this study, the contextualizing strategy will be used, with phenomenology serving as the research orientation.

#### **4.8.2 Phenomenology as the Qualitative Research Orientation**

Cresswell (1998, p. 51) described phenomenology as the “meaning of lived experiences for several individuals about a concept or phenomenon ... which involves the exploration of the structures of consciousness in human experience.”

Moustakes (1994), in Teddlie and Tashakkori (2009, p. 255) described the principles of phenomenology as wholeness where entities are examined from multiple perspectives. It focuses primarily on descriptions of experience, and less on analyses and interpretations. It derived meaning from appearances, and arrived at essences through reflection on conscious acts. Moustakes believed that evidence of scientific investigation involved the “thinking, intuiting, reflecting and judging” by the researcher.

Dahlgren (1991) described the steps to be followed in phenomenological data analysis.

- familiarization with the data, where the researcher is introduced to the material by reading through the transcripts
- compilation of answers of all respondents to a certain question in order to identify the most significant elements
- condensation or reduction of individual answers to find the central parts of the dialogues
- preliminary grouping or classification of similar answers
- preliminary comparison of categories where borders between categories are established
- naming the categories to emphasize their essence
- contrastive comparison of categories which contains a description of the unique character of every category as well as a description of resemblances between categories



Frequency, position and pregnancy serve as indicators for assessing the significance of elements in the answers. Frequency denotes how often an answer is given, position shows at what point in the statement the most important answers are found, and pregnancy indicates where certain areas of concern are emphasized more than others (Dahlgren, 1991). In this study, the qualitative analysis started immediately after data was collected.

### **4.8.3 Quantitative Data Analysis**

Quantitative data analysis has been defined as the “analysis of numeric data using a variety of statistical techniques” (Teddlie & Tashakkori, 2009, p. 256). Several types of data analysis techniques have been used in qualitative research. They include descriptive and inferential statistical methods, univariate and multivariate methods, and parametric and nonparametric statistical methods. However, due to constraints of length of the thesis, only the statistical method used in this study will be discussed.

#### **Descriptive Analysis**

This type of analysis is conducted where data is summarized to discover trends and patterns, in order to facilitate comprehension of the data (Wiersma & Jurs, 2005). The outcomes of descriptive analysis result in descriptive statistics, which include frequency tables, graphs, means and correlations.

In this study, the quantitative data was analyzed by a statistician. The information obtained from the Data Management Information system on application, enrolment and graduate profiles were analyzed using Excel software. Basic measures of description such as tables, graphs and percentages were displayed in this regard.

#### **Statistical Methodology**

The data obtained from the Competency and Module Evaluations were analyzed using the SPSS version 15.0 (SPSS Inc., Chicago, Illinois, USA). A p-value of  $<0.05$  was considered to be statistically significant. SPSS rounds off accurately to 15 decimal places. However, only up to four decimals places have been displayed in the tables. This data generated descriptive statistics in the form of frequency and percentage. Cross-tabulations were computed to compare responses between the different modules.

## Reliability

Cronbach's alpha was computed to determine reliability of the data.

### 4.8.5 Mixed Methods Data Analysis

Mixed methods data analysis has been defined as “the integration of statistical and thematic data analytic techniques, plus other strategies unique to mixed methods” (Onwuegbuzie & Teddlie, 2003, p. 351). They elaborate on this definition by stating that researchers go “back and forth seamlessly between statistical and thematic analysis.”

These authors provided a typology of mixed methods data analysis, which was based on the typology of mixed methods designs, described in the previous section. The mixed methods typology used in this study can thus be described as a parallel mixed data analysis. It is a widely used data analysis strategy in the human sciences (Teddlie & Tashakkori, 2009).

In this type of analysis, there are two separate processes of data analysis. The quantitative data analysis uses descriptive statistics for the appropriate variables. The qualitative data analysis uses thematic analysis relevant to the narrative data. These two data sets are considered to be independent, but each provides insight to the phenomenon under investigation. These insights are combined, linked or integrated into meta-inferences, which may be convergent or divergent (Teddlie & Tashakkori, 2009).

Teddlie and Tashakkori (2009, p. 266) described the steps involved in parallel mixed data analysis as follows:

- the qualitative and quantitative research phases are planned and implemented to answer related aspects of the research questions,
- the qualitative and quantitative data collection procedures occur in a parallel and separate manner,
- the qualitative and quantitative data analysis procedures follow in a parallel and separate manner,
- inferences are made on the results of each strand, and then integrated to form meta-inferences at the completion of the study.

Two types of parallel mixed data analysis are described by Greene (2007). The first is *parallel tracks analysis*, where the analysis occurs independently and is brought together after analysis of each component. The other is *cross-over tracks mixed data analysis*, where researchers allow the two data sets to talk to each other during the analysis process (Greene, 2007). In this way, the findings of one method, informs the other throughout the course of the study. In this study, the cross-over tracks method of data analysis was used in most phases.

Onwuegbuzie and Teddlie (2003) recognized seven stages when analyzing qualitative and quantitative data within the mixed methods research framework. They recommended that during analysis, researchers should go through at least some of these stages. In this study, some of the stages recommended by Onwuegbuzie and Teddlie (2003) were followed during the process of mixed methods data analysis:

- data reduction – the dimensionality of the qualitative data was reduced by thematic analysis
- data display – the qualitative data was represented by tables, graphs and lists, while the quantitative data was illustrated as tables and graphs
- data correlation – the qualitative data was correlated with the quantitative data
- data consolidation – the qualitative and quantitative data were combined to create new data sets
- data comparison – data sources from both the qualitative and quantitative sources were compared
- data integration – the qualitative and quantitative data were integrated into a coherent whole to create inferences and recommendations for this study

## **4.9 RESEARCH INFERENCES AND DATA VALIDATION**

### **4.9.1 Research Inference**

The term *inference* is a relatively new addition to the mixed methods nomenclature, and represents the final stage of the research process (Teddlie & Tashakkori, 2009). It is regarded as the most important stage of a study because it involves the interpretation of the findings of the qualitative and quantitative data to find answers to the research questions of the phenomenon under investigation (Greene, 2007).

The inference process is defined as “the process of making sense out of the results of data analysis” (Teddlie & Tashakkori, 2009, p. 287). It is considered to be an iterative process, which encompasses data collection, analysis and the development of conclusions. The inferences of a study can be measured by *inference quality* and *inference transferability*.

Teddlie and Tashakkori (2009, p.287) defined inference quality as the “standards for evaluating the quality of conclusions” that have been based on the research findings. Qualitative markers are *credibility* and *trustworthiness*. Quantitative indicators are *internal validity* and *statistical conclusion validity* (Teddlie & Tashakkori, 2009, p.287).

Inference transferability has been described as “the degree to which these conclusions may be applied to other similar people, settings or contents” (Teddlie & Tashakkori, 2009, p. 288). In the qualitative components of the study, it can be evaluated by *transferability*. In the quantitative element, it can be evaluated by *generalisability* and *external validity*.

Teddlie and Tashakkori (2009) advise that inferences should encompass both the process and outcomes of a study. They should not be confined to answering the research questions, but should also “develop new understandings and explanations for events, phenomena and relations” (Teddlie & Tashakkori, 2009, p. 288). This can be achieved by the inference encompassing the study as a whole, rather than focusing on single findings to individual questions.

Inferences, as research outcomes, can be divided into descriptive and explanatory inferences (Teddlie & Tashakkori, 2009). The descriptive inference involves the understanding of a phenomenon, and is based on a set of observations. The explanatory inference expands on the descriptive inference by connecting cause and effect. The descriptive inferences can be validated (confirmed or disconfirmed) on the basis of the explanatory inferences.

## **4.9.2 Validation of the Data**

### **Quantitative Validation Procedure**

Quantitative data can be validated by the measurement of validity and reliability (Shadish et al., 2002). Validity has been defined as “whether the data represents the constructs they were assumed to capture, and rules out alternative plausible explanations of the obtained

results” (Krathwohl, 2004, p. 148). Krathwohl also defined reliability as “whether the data consistently and accurately represents the constructs under examination” (p. 148).

There are four main types of validity: statistical conclusion validity, internal validity, construct validity, and external validity (Shadish et al., 2002).

Statistical conclusion validity is the degree to which the statistical procedures are deemed to be appropriate and adequate to detect relationships or differences. Internal validity is the extent to which alternative explanations for the explained results can be ruled out. Construct validity is the degree to which the constructs under investigation are captured or measured. External validity is the degree to which the inferences made on the basis of the results are consistent across variation in persons, settings, and other variables (Shadish et al., 2002).

In this study, validity was confirmed by quantitative data analysis of the different components of this study. Descriptive statistics in the form of frequency and percentage were computed for all questions. The biographical variables were analyzed by the use of frequency tables.

Analysis of the module evaluations was conducted by means of cross-tabulations, to compare the responses between the different modules. The frequency distribution for each module showed that most students answered positively, (Agree or Strongly Agree) to most of the questions.

An overall mean was also calculated for questions relating to each module. The responses to the 15 questions were averaged for each module to obtain an overall average within the scale of 1 to 5. The mean values reflect that respondents are very positive towards module Minor Oral Surgery (score of 4 on a scale of 1 to 5) and least positive towards the module Ethics, Law and Practice Management.

Evidence of reliability, as determined by Cronbach’s Alpha, on the evaluation of modules, was also proven, as seen in Table 10. A high degree of internal consistency and stability amongst items has also been demonstrated.

**Table 10 : Reliability Statistics**

Cronbach’s Alpha	No of Items
907	75

## Qualitative Validation Procedure

Validation or *trustworthiness* of the qualitative data can be determined according to *credibility* and *dependability*. Credibility, construed as the analogue of validity, has been defined as whether or not the findings of the study are credible to the constructors of the multiple realities (Lincoln & Guba, 1985). In this study, the concepts of credibility determined whether the data was actually evaluating what was intended in the study, and to what extent the findings were considered to be believable. Credibility was ensured by prolonged engagement in the field, making sure that a sufficient amount of data was collected, and also by triangulation of different methods in this study.

Similarly, dependability, linked to the quantitative concept of reliability, has been defined as the extent to which variation in a phenomenon can be tracked or explained consistently using the human instrument across different contexts (Lincoln & Guba, 1985). Dependability refers to the extent to which a set of findings are likely to be relevant to a different time than the one in which it was conducted. In this study, this was accomplished by keeping an audit trail of all data collected throughout the duration of the study. This data will be stored in the Faculty of Education for a period of five years. It will be disposed of by incineration and shredding.

Dependability was also ensured by the publication of an article on “The Profile of the Dental Therapy Graduate” [from the University of KwaZulu-Natal], in the *South African Dental Journal* in November 2011. Three other articles, on “Job Satisfaction among Dental Therapists in South Africa”; the “New Dental Therapy Curriculum for South Africa,” and on the Methodology used in this study are currently being prepared for publication; and should be published by the end of 2012. These articles will facilitate a comparison with other institutions, and also provide a template for similar studies to be conducted in the future.

Another factor that affects qualitative validity is the concept of *transferability*, which can be defined as the extent to which a set of findings are relevant to settings other than the ones from which they are derived (Lincoln & Guba, 1985). This can be achieved by the collection of detailed rich thick descriptions, which must be accompanied by convincing analysis and interpretation (Hull, 1997). The findings obtained in this study were obtained from a wide array of stakeholders externally (employers, dental deans, professional

associations, and the regulatory body) as well as from internal stakeholders (students, graduates and academics).

In addition, when the student interviews were conducted with the class of 2009, the qualitative and quantitative data was considered to be inconclusive. Therefore the focus group discussions were conducted with the Class of 2010 to achieve *saturation*. The quantitative statistics were also improved by increasing the number of interviewees by interviewing the Class of 2010.

The confirmability of the data can be measured by the extent to which the researcher has not allowed personal values to intrude to an excessive degree (Lincoln & Guba, 1985). The researcher has acknowledged her close association to the School, curriculum and the profession. On critical self-reflection, she was determined not to become personally involved in the responses of interviewees, and has tried to remain as impartial as possible throughout the study.

*Member-checking* is considered to be a powerful technique for establishing the trustworthiness of data (Teddlie & Tashakkori, 2009). It involves asking the interviewees to verify the themes generated, as well as the accuracy of the interpretations and conclusions. This procedure was conducted in the present study, through informal discussions with two academics, two graduates and two external stakeholders. They confirmed the trustworthiness of the data.

*Referential adequacy*, described by Teddlie and Tashakkori (2009), has also been described to establish the validity of data. In this concept, the researcher split the qualitative data into two halves. She compared the themes that were generated from the first half (exploratory) with that obtained in the second half (confirmatory). This was performed in the context phase of this study.

These discussions confirm that the qualitative data was considered to be trustworthy because they represented all the constructs that they were assumed to capture (Teddlie & Tashakkori, 2009). In the following section, the validation procedure used in this mixed methods study will be discussed.

## **Mixed Method Validation Procedure**

A problem with the validation of mixed methods research is the large schism between the procedures involved in the validation of the quantitative and qualitative data. Maxwell (2004, p. 3) argued that one strategy for reducing this gap was to “create an integrative framework” that incorporates both methods. This integration should attempt to integrate the two sets of inferences in order to create a meta-inference. Features such as “compare and contrast, infuse, link, modify one of the basis of the other” need to form a part of the integration process (Tashakkori & Teddlie, 2003).

Teddlie and Tashakkori (2009) assert that, in order to achieve a strong integrative framework, emphasis needs to be placed on the formulation of the research questions, the research design and the methodology stages. This integrative framework has been constructed in Tables 6 to 9. In this way, the criteria for evaluating the quality of inferences may be generated as *design quality* and *interpretive rigour*.

### **4.9.3 Design Quality**

Design quality encompasses the research criteria of *design suitability*, *design fidelity*, *within-design consistency*, and *analytic adequacy* (Teddlie & Tashakkori, 2009, p. 302).

#### **Design suitability**

The parallel mixed methods approach was deemed appropriate for this study in order to answer the research questions. The combination of the two approaches served to provide data and methodological triangulation in this study. The design enabled the results obtained in one method to complement data obtained in the other method in each phase of the study. The use of multiple methods also expanded the breadth and range of the research of the study.

#### **Design fidelity**

The adequacy of the design was determined by the rigour and quality used in the sampling, data collection and data analysis, in order to capture the meanings, effects and relationships that were deemed to be important in this study.



### **Within-design consistency**

The various components of this study appeared to fit together effortlessly. The different phases followed each other in answering the research questions in a logical manner.

### **Analytic adequacy**

The data analysis procedures were considered to be adequate for this study. Because the qualitative component was deemed to be dominant, the data analysis was much more rigorous in this component. The quantitative data was analyzed using descriptive methods, and was used to confirm the results obtained in qualitative component in most instances. However there was some degree of trade-off between the qualitative and quantitative methods in order to achieve the best result for the study as a whole.

## **4.9.4 Interpretive Rigour**

Interpretive rigour can be defined by the criteria of *interpretive consistency*, *theoretical consistency*, *interpretive agreement*, *interpretive distinctiveness*, *integrative efficiency*, and *interpretive correspondence* (Teddle & Tashakkori, 2009, p. 303).

### **Interpretive consistency**

The inferences made in this study closely follow the relevant findings in terms of type, scope and intensity. In some cases, multiple inferences made on the same findings have been deemed to be consistent with each other.

### **Theoretical consistency**

The inferences obtained in this study appear to be consistent with the literature in the various fields. This will be discussed in greater detail in the final chapter.

### **Interpretive agreement**

The researcher believes that, if this study is repeated in a similar setting, it is likely that the results will match this study. She also believes that the inferences obtained in this study correspond closely with the views of the participants.

### **Interpretive distinctiveness**

The inferences in this study have been developed in the context of the study as a whole. These inferences may therefore be deemed to be distinct for this study.

### **Integrative efficiency**

The meta-inferences have adequately integrated the inferences that have been made in each phase of this study.

### **Interpretive correspondence**

The inferences derived from study correlate with the purpose and critical questions.

From these discussions, it can be seen that the meta-inferences developed in this study have been accomplished through the use of the mixed methods research approach combined with the pragmatic orientation of multiple perspectives of the Hicks model that was used as the theoretical framework of this study.

## **4.10 ETHICAL ISSUES**

### **4.10.1 Ethical Approval**

Ethical approval (Number HSS/0867/2009: Faculty of Education) was obtained from the Humanities and Social Sciences Ethics Committee of the University of KwaZulu-Natal on the 5<sup>th</sup> December 2009 (Annexure 1).

### **4.10.2 Gatekeeper Permission**

Gatekeeper permission was obtained from the Dean of the Faculty of Health Sciences (Annexure 2).

### **4.10.3 Informed Consent**

Informed consent is the agreement by the participant to take part in a research study, with a well-defined understanding of all risks and processes involved (Teddlie & Tashakkori, 2009). A letter introducing the interviewer to the interviewees (Annexure 3, 5, 7, 9), included information on the reasons for conducting this study, background of the researcher, the type of data being collected, and the reason for the selection of the

interviewee. Information was detailed on the type of interview to be conducted. Emphasis was placed on the voluntary nature of participation, the significance of anonymity and confidentiality, and the ability of the interviewee to withdraw from the study at any stage. Information was provided on how the information would be disseminated and stored on completion of the study. The contact details of the supervisor of this student were included in the letter. Pseudonyms were used for all interviewees in this study.

To ensure that all participants had a full understanding of the purpose and possible outcomes of the study, it was necessary to develop different letters for each category as follows: Annexure 3 – External Stakeholders; Annexure 5 – Academics; Annexure 7 – Graduates; Annexure 9 – Students.

#### **4.10.4 Ethical Considerations in Mixed Methods Research**

Ethical considerations for mixed method research are similar to those required for other research methods. However in mixed methods, the emergence of new information during the qualitative phase may necessitate the examination of additional sources. In this study, the necessity to examine additional non-obtrusive measures emerged during the course of the study.

#### **4.10.5 Pilot Studies**

A pilot study occurs when a small amount of data is collected to test the instruments, and to identify problems in data collection (Teddlie & Tashakkori, 2009). In this study, the qualitative interview was piloted on one academic and one external stakeholder. No problems were identified by the researcher or the interviewees with regard to the process or the instruments.

The quantitative interviews were tested on two students. Minor revisions were made to the language used in the interview guides on the recommendations of these students. However the viewpoints of these students were used in the final data collection procedure.

The pilot study thus indicated that the research instruments were adequate and feasible for this study. It also provided guidelines for the researcher to allocate realistic time-frames for the different aspects of data collection.

#### **4.11 CONCLUSION**

On completion of this chapter, Tables 6 to 9 were created summarizing the conceptualization, experiential and inferential stages of this study. They illustrated the relationship between the theoretical framework, critical questions, research design, data generation, and data integration techniques. This integration enabled the development of mixed methods meta-inferences which provided the basis of the inferences and recommendations of this study.

## CHAPTER 5

### CONTEXTUALIZING THE DENTAL THERAPY PROFESSION IN SOUTH AFRICA

#### 5.1 INTRODUCTION

Issues of curriculum are intertwined with the social and historical context of universities and the wider world in which they are situated (Barnett & Coate, 2005, p. 28).

The opening statement shows that, in order to accomplish a comprehensive curriculum evaluation, it is necessary to contextualize the study within the environment in which it is situated. The literature shows that the dental therapy profession has played an important role in reducing disparities in the provision of oral health care to children and underserved communities (Nash et al., 2008). But this has not occurred in South Africa, as is evident from the two National Oral Health Surveys (Department of Health, 1994; van Wyk & van Wyk, 2004).

The Department of Health's (2011b) recently introduced National Health Insurance is intended to improve universal health coverage to the disadvantaged communities of this country. One of the proposals in the NHI document is to review the roles and scope of practice of all health professionals. From this information, new training and career paths can be developed. However, all these considerations have to be framed within the context of the primary health care approach.

The results in this chapter are accordingly presented in three phases: *context*, *input* and *product*. In the context phase, the views of the internal and external stakeholders contextualize the role of the dental therapist within the health care system of South Africa.

In the input phase, the student profile of the School is presented. This includes recruitment and selection strategies, application and enrolment profile, and biographical details of the final-year classes of 2009 and 2010. This information was deemed to be necessary as these students formed the sample for the qualitative and quantitative interviews.

The third part of this chapter discusses the profile of the dental therapy graduate of this university, together with practice patterns and career satisfaction.

## **5.2 HISTORY OF THE PROFESSION: STAKEHOLDER PERCEPTIONS**

To locate this study appropriately, it was important to interview key external stakeholders who had in-depth knowledge of the history of this profession in South Africa. They were asked the question: *Historically, can you please tell me your views about why dental therapy was introduced in South Africa?*

The responses to this question yielded two main themes: *legacy of apartheid* and *improving access to disadvantaged communities*.

### **Theme A1: Legacy of apartheid**

Most stakeholders believed that the dental therapy profession was the brainchild of an apartheid government, and it therefore lacked credibility amongst the dental fraternity. Both deans interviewed have been involved in dentistry education for over thirty years. Professor Tom, a current dean of a dental school, stated that he wanted to believe that dental therapy was introduced to achieve access for African people. However he argued that the context within which it was introduced was wrong, resulting in a profession that lacked credibility.

*It was introduced within the context of apartheid. It had a racial overtone, it was in the Bantustans. In order to improve access, you had to compromise to train dental therapists and, if indeed it was done on a universal basis, irrespective of race, it would have had a lot more credibility to me because in those days, some of us were vehemently fighting the morality of this. And this, to some of us, who are progressive, it was the last vestige of the apartheid policy. For me it was introduced wrongly, and that is why, in my eyes, it has lack of credibility. In terms of access, I still am not sure whether it has improved access to Black people.*

Professor Philips, a previous dean of the dental school at UDW, corroborated these views.

*I believe that was, perhaps not to put in a racist notion, but it was also in keeping with apartheid philosophy at that time. Medunsa was just about to be opened as a university. The Western Cape provided training for Coloured and Indian people. But there was virtually no training for Blacks. And it was in keeping with that philosophy. . . . We don't need to worry too much in providing dentist and specialist training for the Africans in particular . . . this will do for the time being, . . . and it fitted in very much with their apartheid philosophy.*

These reflect the views of people who have first-hand information about this profession from the time of its inception in South Africa. It is clear that, if dental therapists are to be accepted by all stakeholders, the role of this profession needs to be revisited by all stakeholders. This will enable buy-in and acceptance among the dental fraternity.

## **Theme A2: Lack of access for black people**

Most stakeholders believed that the main reason for the introduction of dental therapists was to provide dental services to the disadvantaged people of South Africa. However all of them unequivocally stated that this cadre of personnel should work in public sector clinics in underserved areas. This has been demonstrated in the following Section 5.3 on the role of the dental therapist. In this section, most stakeholders were against dental therapists working in the private sector.

Professor Tom, the dental dean from another university, explained the reasons for the introduction of dental therapists.

*Historically, black people in South Africa didn't have access to dental care in South Africa. And there was the major need for oral health care and these people demanded such service.*

Dr Jones, an employer in the public sector, elaborated on this statement:

*He (Taljaard) introduced this course to specifically work in the public sector . . . originally, they were only allowed to work in the public sector and to treat these patients at primary health care facilities at clinics and community health centres; to do simple fillings as well as extractions and*

*do emergency services as well as primary preventive oral health care. And to refer those patients who are in need of more advanced dental treatment.*

From these responses, it is clear that the negative connotations associated with the apartheid past, still clouds this profession today. In the next section, the results of the interviews in respect to the role of the dental therapist will be discussed.

### **5.3 ROLE OF THE DENTAL THERAPIST**

The external stakeholders and academics were asked their opinion on what the role of the dental therapist should be within the health care system of South Africa. The question put to these stakeholders was: *Do you believe that dental therapists can play an important part in the oral health team of South Africa? What would you say is that role?*

Most stakeholders believed that dental therapists were essential to the provision of basic oral health care to disadvantaged communities in the public sector. Four themes emerged from these interviews. All the themes were encompassed by the overarching principles of the Primary Health Care approach.

#### **Theme B1: Dental therapists as providers of basic oral health services**

The external stakeholders as well as the academics believed that the role of the dental therapist was to provide basic oral health services to the underserved communities, especially in rural areas. They believed that the dental therapist should not only focus on the relief of pain and sepsis as was currently the status. They should also play an active role in health education, promotion and preventive care.

#### **Academic Staff**

The views of Dr Crystal, an academic and oral hygienist, embodied the sentiments of all academic staff, when she said that the dental therapist should:

*be a part of basic oral health service delivery, in response to meeting the historical inequalities in health service delivery and also in providing optimal health care within a framework of evidence-based dental practice. Therefore the dental therapist would be meeting basic oral health needs,*



*and also quality evidence-based health provision within the scope of dental therapy.*

Ms Chetty, an academic and dental therapist, believed that dental therapists should also be working closely with other health workers, such as doctors, nurses, and other health auxiliaries, in order to provide holistic health care to patients. This was in line with the concept of intersectoral collaboration within the primary health care approach.

### **External Stakeholders**

The external stakeholders had similar views. Dr Jones, the public sector employer, supported the role of the dental therapist working in the public sector.

*Yes I'm a strong believer; I've always defended the profession of dental therapy even within SADA, whereby they took a stance that the studies of dental therapists should be stopped in South Africa . . . In the public sector, we simply need them. They certainly can play a very very important role . . . at primary health care level at a lower cost than to employ a dentist.*

These sentiments were reiterated by Mr John, a dental therapist representing the views of the professional association of dental therapists.

*If you look at our country, dental therapists are fully equipped to do primary oral health care, oral health promotion and prevention programs, and to intervene in pain and emergency services, provide extractions, restorations and to prevent periodontal disease and manage the patient quite adequately. So from that angle, it is what I would call a strategic fit for the needs of the country. If I could refer to the sentiments of the National Human Resource Plan for Health, the sentiments in that document showed that the needs of the country fits with what the dental therapists can do. We can see that they can identify that the role of the dental therapist is very crucial to providing South African citizens with proper and appropriate care.*

However Dr Patel, another public sector employer, vehemently disagreed. He believed that dental therapy training should be stopped, the register with the HPCSA should be closed, and that dental therapists were not cost-effective to the country.

*The most radical thing that I will like to say is that in my honest opinion, it should not exist as a profession. The cost that the country is training them is horrendous and we as a state are not getting value for money . . . And I'm not only talking from the Department of Health's expenditure, the universities' expenditure, the Department of Education's expenditures, and then they don't practise the profession or emigrate. They are taking it as a back door into dentistry, . . . so you are on the losing streak from the day you admit that student. By continuing to train, you are continuing to add to the problem and I have said this in other forums and I will say it again, the register must be closed by the Council. The training must be stopped; all those in the profession must be given one year to fast track them to dentistry. You will not train the mid-level worker because the mid-level worker in this category is only increasing disparities in the private sector and has got a very limited, unfulfilling role in the public sector.*

Professor Tom had different views on the role of this profession in South Africa.

*I think that they certainly can play an important role within the context of the Primary Health Care approach - that is the Alma-Ata Declaration. If we have a cadre of dental therapists who are set within a primary health care approach, who will be able to impact on district oral health services – there will be a change – I would like to believe. They must work directly or indirectly under the supervision of a dentist.*

He went on to say that to attain this role, the modern curriculum for a South African dental therapist must be strong in dental public health. The curriculum should be focused on the primary health care approach, located within the District Health System. This would include health education and promotion, basic epidemiology, and policy and planning. However he emphasized that:

*you don't train them in large numbers. If you train them in huge numbers, you are going to see them moving out. Train them with a specific emphasis.*

*Train them to go the Master of Public Health route. Strengthen them within the context of public health.*

From these discussions it was evident that most stakeholders believed that dental therapists had a role to play in the public sector of the health care system.

## **Theme B2: Dental therapists as part of the oral health team**

The second theme to emerge from responses on the role of the dental therapist was that they had an important role to play as part of the oral health team of South Africa. The representative of the regulatory body, Mr Mkhize, stated:

*Yes dental therapists will play a major role in the oral health team. If one dentist has got a team of three to five dental therapists within the catchment area of a service, the benefit of that dentist is that he becomes a referral pathway for those therapists. Then the dentist with high-tech skills becomes appropriately utilized in the public sector - unlike using qualified dentists currently in the public sector to mop the floor.*

Similar views were echoed by Professor Philips, a past dental dean from this university.

*We don't need dentists to work at primary health care level. The dentists should work as a referral in a hospital setting to treat more advanced cases, and cases referred by dental therapists to them.*

Professor Philips was asked to suggest a model that would work in the public sector. He corroborated the views of Mr Mkhize, when he stated:

*The model should be four or five therapists, two or three hygienists and one dentist. If you have that model, you can deliver in the public service cost-effective treatment to a large number of people. Especially if the hygienists are focusing on prevention and they (therapists) do things like extractions or fillings.*

Dr Patel argued that, even though he believed that therapists had a role to play in the oral health team, he was concerned about their ability to work unsupervised in rural areas.

*Yes - they have a role to play in providing primary health care and leaving the more secondary and tertiary care to the dentist as part of the team. However, if the dental therapist is the only oral health person in the deep rural area, then I think it places the patient at a disadvantage. It also places the practitioner at a disadvantage. Unless he is very experienced person, he will not be able to cope with some of the issues that arise in the deep rural areas.*

These viewpoints corroborate the original reasons for introducing dental therapists to the oral health team of South Africa. However consideration must be given to the newer concepts that have been introduced in other countries in regard to the oral health team. The question of the oral health therapist was posed to stakeholders.

### **Theme B3: The oral health therapist**

Interviewees were asked about their views regarding the formation of a new cadre of oral health professional within the oral health team called the *oral health therapist*. This oral health worker was created by combining the dental therapist and oral hygienist (Nash et al., 2008). This cadre of personnel has been successfully introduced in countries such as Australia, New Zealand and the Netherlands (Satur et al., 2009).

Both public sector employees, Dr Jones and Dr Patel, displayed an unwillingness to consider this concept, as they believed that each category had a specific role to play in the oral health team. They believed that the oral hygienist should concentrate on preventive care, while the therapist should provide curative treatment. Dr Jones argued that

*the problem that I have with this is that we might neglect the preventive part. Because once they are qualified to do extractions and fillings, they tend to concentrate on that because they feel they are now on a higher level and they neglect the very important primary preventive part of it.*

Dr Patel argued that dental therapists were not interested in the preventive aspects, and wanted to work only in the clinics. He also felt that the therapist identified more closely with dentists than with oral hygienists, because they do most of the things that the dentists are doing and do not wish to perform any of the duties associated with the oral hygienist.

*I think it's a mind set in South Africa - a hierarchical sort of society. There is no multi-tasking. The therapist is not willing to go out into the community to do any work. He is totally unwilling to get involved in the duties that the oral hygienist performs. He considers himself a little bit above the hygienist and will not involve himself in going to schools, working in the community or doing oral health promotion outside the clinical setting.*

These views were contrary to successful international initiatives, and would need further investigation. The next theme identified was the lack of posts in the public sector.

#### **Theme 4: Lack of posts in the public sector**

The fourth theme that emerged was the lack of posts in the public sector. When dental therapists were originally created, they could only work in the public sector. However due to a shortage of posts in this sector at that time, they were allowed to work in independent private practice (Prinsloo, 1993). Dr Jones, an employer in the public sector, stated that the shortage of post still prevails. Even compulsory community service for dental therapists was not being considered by the Department of Health due to the lack of financial resources.

*I don't think there will be any posts. I think that more posts should be created, but in the current financial situation, I believe the Treasury will not make the necessary funds available because oral health services are not that high priority because patients rarely die of dental diseases. So it's not that high as a priority as compared to other health needs in the country.*

Dr Jones said that he had tried to institute compulsory community service for dental therapists and oral hygienists for many years, but did not succeed. He was informed by the Department of Health that there were no funds available to create such posts.

The public sector employers were then asked, if there were no posts in the public sector, what plans do the Department of Health have to improve access to underserved communities. Dr Jones replied that school dental services have been identified as a priority area.

*Our programme is to move out into schools into those areas such as primary schools. Introduce primary oral health care services that will be oral health education, fluoridated tooth paste, tooth brushing sessions as well as the application of fissure sealants . . . So these are priority services for us. We have to find alternative methods to work on the younger generation, to try and ensure that they have their teeth their whole life.*

The results obtained thus far provided insight into the first critical question of this study. Most stakeholders believed that the role of the dental therapist is to be a part of the oral health team as described by the primary health care approach. They should provide basic dental services, as well as health education, promotion and preventive care. They should work in the public sector, providing care to children and disadvantaged communities.

#### **5.4 THE RECRUITMENT PROCESS**

The recruitment activities and documents of the University were examined to determine the target audience for the Dental Therapy programme. The activities included “open-days” where schools from the province of KwaZulu-Natal were targeted. Recruitment videos and pamphlets were sent to schools in both urban and rural areas. Experienced faculty members gave talks to Grade 12 learners on the professions in health sciences in general. However there was very little discussion on the specific disciplines.

On examination of the recruitment material, it was noted that the school was inaccurately called the “School of Dentistry.” This flaw was identified by both staff and students during the interviews. Dr Crystal, an academic in the School, argued that

*the fact that we are training therapists and hygienists, and we call ourselves School of Dentistry, in itself it becomes a very vague area and a very grey area. So maybe we as a school need to redefine our own name . . . . maybe refer to ourselves as School of Dental Therapy and Oral Hygiene . . . in that way now we are defining who we are training and we are also defining right at the very beginning that we are not training dentists.*

The student Colin was adamant that he believed that he was studying Dentistry, and said: “even when it is advertised, it is written in the handbook as the School of Dentistry.” This may be one cause for the dissatisfaction expressed by so many students.

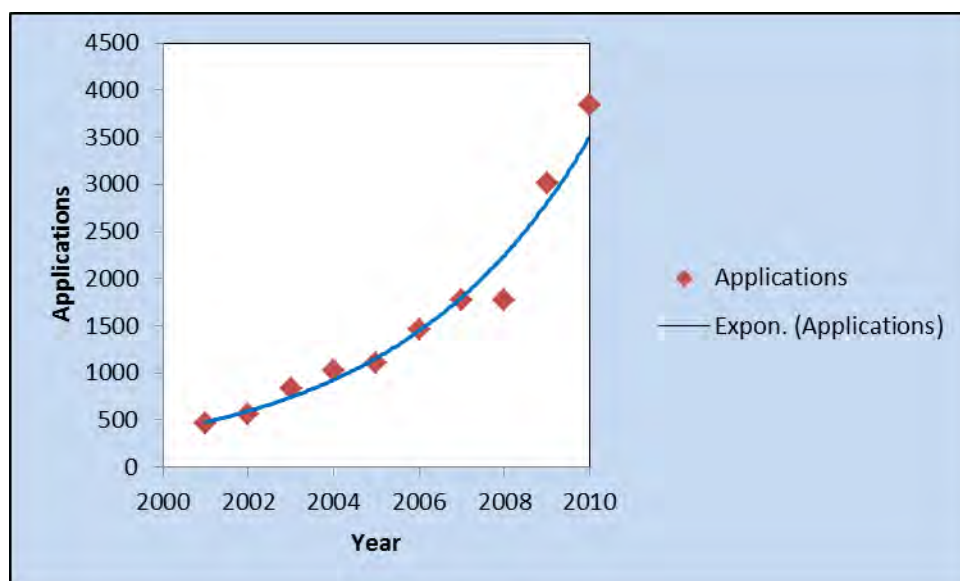
Another problem identified with the recruitment material is that, even though the scope of practice was clearly defined, to the inexperienced young student, there was no clear demarcation between dental therapy and dentistry. It may be perceived to be dentistry due to the use of scientific terminology such as radiography, anaesthesia, cariology, periodontology and oral medicine. In addition, photographs in the brochures show dental therapists working in ideal first world conditions, with no mention of community or rural exposure. It was evident that the recruitment process did not target the student from a rural or disadvantaged background. In the next section, the application profile of the School will be discussed.

## 5.5 THE APPLICATION PROFILE

### 5.5.1 Application by Number

The quantitative data obtained from the Data Management Information system of the university (UKZN, 2010) showed an exponential increase in the number of applications to the School of Dentistry (Figure 9). This number increased from 460 in 2001, to 3 845 in 2010. This information is contrary to the declining number of applications for dental therapy and oral hygiene described by Lalloo (2007) at other dental schools.

**Figure 9 : Number of Applications for the period 2001–2010**



The reasons for this increase are unknown, but several factors may contribute to this phenomenon. Active marketing by the university could be an important factor. It could also be due to the prosperity that dental therapists are perceived to display in the private sector. It is a commonly bandied-around joke in the dental fraternity that in many dental therapy practices the dental therapist is often referred to as “doctor”.

### 5.5.2 Application by Racial Group

The racial breakdown of the number of applications for the period 2001 to 2010 (Table 11) also demonstrates an exponential increase in the number of African applicants, from 246 in 2001, to 3 352 in 2010. This number is significant because it could reflect a greater awareness of the dental therapy profession among the African population. The number of Indian applicants has always been high, but the low number of Coloured and White applicants is a cause for concern. This trend can be traced back to the historical training of dental therapists at the Indian and African ethnic universities (Reddy, 1985).

**Table 11 : Number of Applications by Race for the Period 2001–2010**

<b>Race</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
<b>African</b>	246	339	529	653	742	1106	1482	1446	2586	3352
<b>Indian</b>	203	215	281	350	339	310	264	296	372	426
<b>Coloured</b>	10	4	16	18	15	20	19	18	30	55
<b>White</b>	1	5	4	7	14	16	13	12	17	12
<b>Total</b>	<b>460</b>	<b>563</b>	<b>830</b>	<b>1028</b>	<b>1110</b>	<b>1452</b>	<b>1778</b>	<b>1772</b>	<b>3005</b>	<b>3845</b>

### 5.5.3 Application by Gender

The number of applicants by gender for the period 2001 – 2010 demonstrated a male: female ratio of 45:65 which has been illustrated in Table 12. These numbers showed similarities to the application profiles of dental schools internationally, where an increasing number of female applications have been the trend over the past ten years



(Murray, 2002; Sinkford, Valachovic & Harrison, 2003). In countries like Malaysia, the dental therapy profession is exclusively female (Nash et al., 2008).

**Table 12 : Number of Applications by Gender for the period 2001–2010**

<b>Gender</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
<b>Female</b>	306	384	540	662	715	922	1103	1107	2002	2575
<b>Male</b>	154	179	290	366	395	530	675	665	1003	1270
<b>Total</b>	460	563	830	1028	1110	1452	1778	1772	3005	3845

The application profile demonstrates that the dental therapy programme at this university is over-subscribed. The number that can be enrolled is limited by the number of dental chairs and equipment at the training hospital. Currently this number is 30. As a result, the School conducts a protracted selection process in order to select the most appropriate 30 students from the huge pool of applicants.

## **5.6 THE SELECTION PROCESS**

### **5.6.1 Entrance Requirements**

The minimum entrance requirements to be considered for selection are provided in the university prospectus (UKZN, 2011a). The Bachelor of Dental Therapy is described as a three-year formative degree (HPCSA, 2008). The minimum requirements are an APS score of 30, with NSC subjects English 4 (HL/FAL), Life Orientation 4, Life Sciences and Mathematics Literacy or Mathematics at level 3. Dr Barry informed the researcher that in 2009 and 2010, the entry scores ranged from 33 to 43, which are significantly higher than the prescribed minimum.

In the next section, an overview of the selection process will be described. This information was obtained from the Student Selection Report of the School for 2007 (School of Dentistry, 2008).

## **5.6.2 Eligibility for the Programme**

The selection process began with grouping all eligible applicants into various categories, which included:

- matriculants only
- post-matriculants with additional qualifications/ further studies
- oral hygienists, dental assistants, or other dental experience
- university foundation courses
- certificate / diploma / degree programmes
- oral hygienists who wish to convert their diploma into a degree
- international students

## **5.6.3 The Interview Process**

All candidates who meet the minimum requirements are invited for an interview. Post-matriculation candidates who are engaged in tertiary education are also invited.

### **The Interview Panel**

The panel consisted of the academic coordinator, an oral hygienist, a dental therapist, and a final year student dental therapist. All administration was conducted by the school administrator. Race and gender were considered in the selection of the panel.

### **Biographical Questionnaire**

On arrival, interviewees were asked to complete a biographical questionnaire before attending the interview.

### **Scoring of Matriculation Points**

Scoring was done by adding the points obtained for the six best subjects as listed in Table 13, but the points for Biology were doubled.

**Table 13 : Grading Points for Selection**

<b>Grade</b>	<b>Higher Grade</b>	<b>Standard Grade</b>
A	8	6
B	7	5
C	6	4
D	5	3
E	4	2
F	3	1

### **Interview Score**

After the interview is completed, each applicant is rated by the panel and assigned a score from 1 to 5. (Rating Scores: Excellent 5; Very Good 4; Average 3; Poor 2; Very poor 1).

### **Factors Considered during the Interview**

Before the interview, students were requested to write a short essay on their motivation for studying dental therapy. The factors that were considered during the interview process were the academic, social and cultural background, personal details (age, marital status), attitude and motivation for application, employment history, community experience, knowledge of the profession, writing and computer skills, interpersonal and listening skills, and communication skills.

### **Interview Questions**

The following standardized questions were asked by the interview panel:

- i. Why did you choose to study this course?
- ii. What do you know about the dental profession?
- iii. What specific knowledge do you have about Dental Therapy?
- iv. What are your feelings about working with infectious patients?

### **Final score**

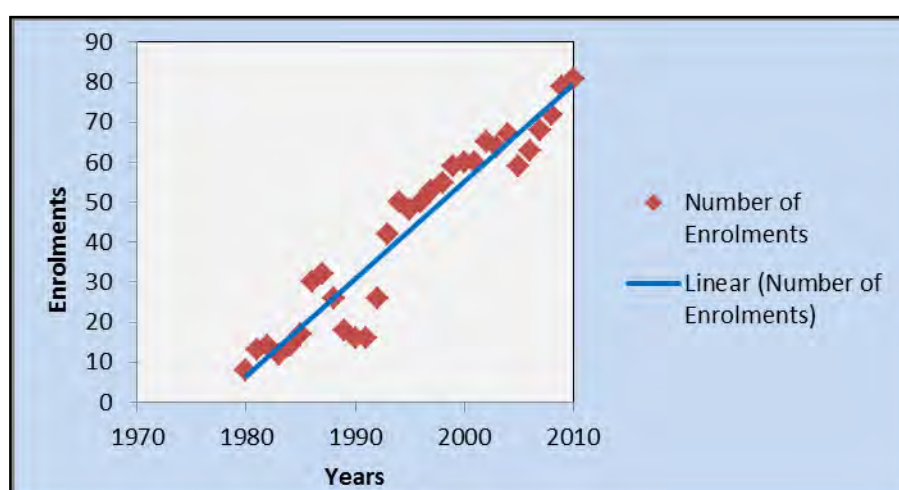
The final score was calculated by adding the scores obtained from the matriculation points and the interview. The applicants were ranked according to their scores and their

population groups; and allocated to the various categories. The successful candidates were contacted telephonically. Quotas were allocated to the various racial groups as follows: 60% African, 30% Indian, Coloured and White, 5% International students, and 5% Other Categories. Once the selection process was completed, students were enrolled into the Dental Therapy programme.

## 5.7 The Enrolment Profile

### 5.7.1 Enrolment by Number

The quantitative data on student enrolments, stratified by number, race and gender, were obtained from the Data Management Information system of the university (UKZN, 2010). The total number of students enrolled in the first, second and third years, from 1982 (inception) to 2010 has been demonstrated in Figure 10. This figure shows a linear



increase from 8 in 1980, to 81 in 2010. However, in the years 1989, 1990 and 1991, a deviation was noted from this linear trend.

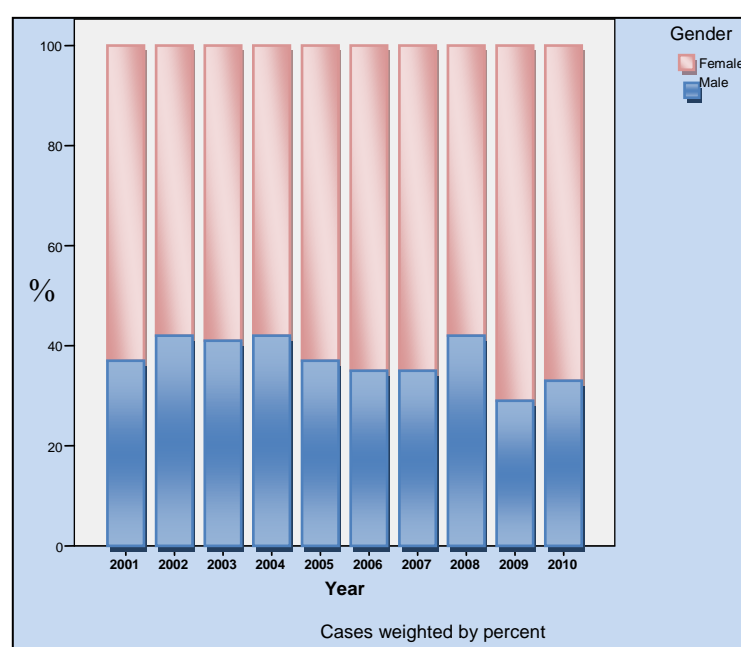
**Figure 10 : Total Number of Enrolments for 1982–2010**

The number of students enrolled was limited by the availability of preclinical and clinical training facilities, infrastructure and human resources at the training hospital. Up to 2007, the maximum number of students enrolled in the first year was 25. This number has been increased to 30 on the recommendation of the University.

The enrolments for 1989, 1990 and 1991 were much lower than would have been expected if the general pattern of enrolments had continued. A conclusive explanation could not be reached, and interviews with senior staff working during this period, did not provide satisfactory answers.

### 5.7.2 Enrolment by Gender

The enrolment profile for the period 2001-2010 showed that the percentage of female students enrolled at the School fluctuated around a mean number of 62,7%. The percentage of male students enrolled were around a mean of 37,3%. These figures have been represented in Figure 11.



**Figure 11 : Enrolments for the period 2001–2010, by Gender**

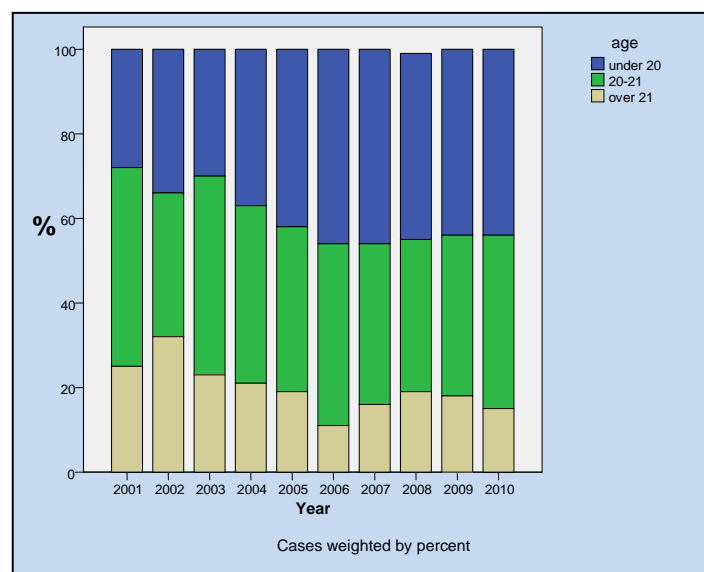
The 60:40 female: male ratio at UKZN followed the trends of feminization in the dental therapy profession (Baltutis & Morgan 1998; Nash et al., 2008) as well as in the dentistry profession internationally (Murray, 2002; Sinkford, Valachovic & Harrison, 2003). Dental therapists in most countries are predominantly female, and in Malaysia, they are exclusively female (Nash et al., 2008). It is also important to take into consideration that practice patterns of women differed from their male colleagues (Katrova, 2004). These

authors assert that many female dental professionals preferred to work flexible hours, in group practices or in the public sector.

### 5.7.3 Enrolment by Age

The trends in enrolment by age for the period 2001-2010 were divided into three groups. These groups comprised of the under 20-year, the 20 to 21-year, and the over 21 year age groups. The enrolment figures for these groups have been demonstrated in Figure 12.

The enrolments in the under-20 year age group showed a steady increase from 2001 to 2006. However, from 2006 onwards, it fluctuated around a mean percentage of 44.8%. The enrolments in the 20 to 21 year age group fluctuated around a mean percentage of 40.5%. The percentage enrolments in the over-21 year age group showed a steady decrease from 2001 to 2006. From 2007 onwards it fluctuated around a mean percentage of 17%.



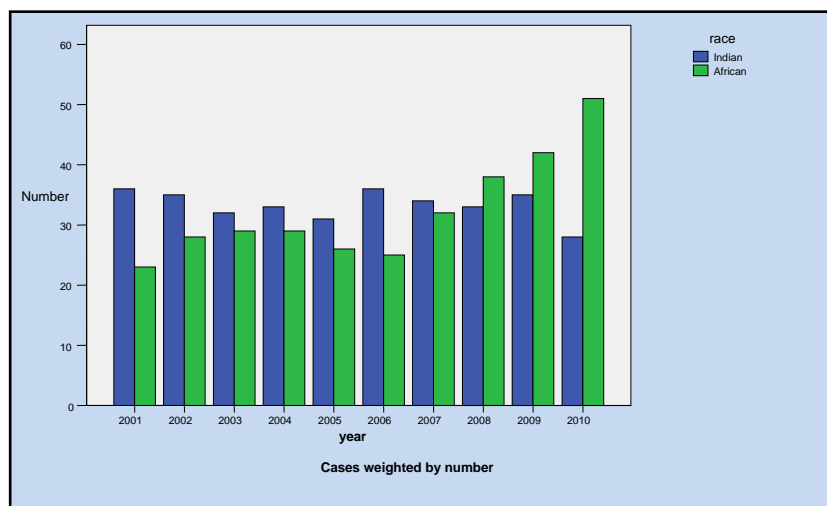
**Figure 12 : Percentage Enrolments for the period 2001–2010, by Age**

The steady increase in enrolments in the under-20 age group was significant, as this group includes students who entered university straight from school. In order to take cognizance of the implied problems with regard to student intake of school leavers, the problems identified by the CHE (Scott et al., 2007) with regard to students entering university directly from school need to be considered. This includes the unsatisfactory schooling system, increased student diversity, ineffective articulation structures between consecutive educational levels, and inappropriate curriculum structures (Scott et al., 2007).

### 5.7.4 Enrolments by Race

The enrolment by racial group for the period 2001-2010 revealed that the Coloured and White population groups comprised only 3,2% of the total number of enrolments. As a result, Figure 13 only reflects the number of enrolments of the Indian and African students. These figures show that from 2001 to 2007, there were more Indian than African students enrolled at this School. However, this trend was reversed after this period.

The racial predominance of Indian and African students reflects the historical circumstances under which the dental therapy profession was introduced (Reddy, 1985). However, it needs to be noted that from 2007 the racial profile of the students enrolled has been gradually changing to become demographically representative of the South African population. The low number of White and Coloured students enrolled is a cause for concern, and warrants further investigation.



**Figure 13 : Enrolments of Indian and African Students for the Period 2001–2010**

## 5.8 DEMOGRAPHIC PROFILE OF THE FINAL YEAR CLASSES OF 2009 AND 2010

In this section, the demographic profile of the final year class of 2009 and 2010 has been presented. This profile was considered to be necessary as all questions with regard to career choice, scope of practice, job satisfaction and the dental therapy curriculum were directed to this sample of students.

### 5.8.1 Age Profile

The age profile represented in Table 14 showed that, between 75% and 85% of final year students, are 21 years or over.

**Table 14 : Age Profile of the Final Year Classes of 2009 and 2010**

Age	Frequency 2009	Frequency 2010	Percentage 2009	Percentage 2010
17–20	4	3	26,7	20,0
21–25	11	12	73,3	80,0
TOTAL	15	15	100,0	100,0

### 5.8.2 Gender Profile

The gender profile showed a similar number of males and females in both years, as has been represented in Table 15.

**Table 15 : Gender Profile of the Final Year Classes of 2009 and 2010**

Gender	Frequency 2009	Frequency 2010	Percentage 2009	Percentage 2010
Female	8	8	53,3	53,3
Male	7	7	46,7	46,7
TOTAL	15	15	100,0	100,0

### 5.8.3 First Language

The three main languages spoken by students were English, Zulu and Xhosa. Table 16 shows that just over 50% of all students used English as their first language.



**Table 16 : First Language Speakers in the Final Year Classes of 2009 and 2010**

Language	Frequency 2009	Frequency 2010	Percentage 2009	Percentage 2010
English	8	7	53,3	46,6
Zulu	5	6	33,3	40,0
Xhosa	1	1	6,7	6,7
Other	1	1	6,7	6,7
TOTAL	15	15	100,00	100,00

## **5.9 DENTAL THERAPY AS FIRST CHOICE?**

In this section, the students of the final year class of 2009 and 2010 were asked “*Was dental therapy your first choice when you applied to the university?*” Their responses to this question generated three themes: *not first choice*, *dissatisfaction with the profession*, and *affinity for dentistry*.

### **Theme C1: Not first choice**

#### **Students**

All five students in the individual qualitative interviews, as well as the six students in the focus group discussions, stated that dental therapy was not their first choice. The reasons that these students gave for choosing dental therapy varied. Most of them wanted to do “*something in the health sciences*.” Colin stated that dental therapy was his fourth choice, and he accepted this course because it was the only one that accepted him.

#### **Graduates**

When the graduates were asked the same question, only Vuyo, who came from a deep rural area, acknowledged that dental therapy was his first choice. He said he had always wanted to work as a dental therapist because he hoped to contribute to the community by taking care of all their dental needs. He said that it had always been his “*passion from the days when I was young*.”

Sibusiso, also from a rural area, stated that he had started doing medicine at another university, and was financed by the homeland government. Due to the political transition, the homeland governments could not afford to finance him. Therefore due to financial constraints, he had to change from medicine (6 years) to dental therapy (3 years).

### **Theme C2: Disillusioned with the profession**

The second theme that emerged in response to this question was that many students and graduates expressed regret at their choice of study. The student Colin, from an urban area, recommended that only students with dental therapy as first choice should be selected as they “*probably had a passion for it.*” He was particularly fervent about his regrets

*I wanted to leave every single day. I used to tell my father that you know what, we are second class. We are always made to see that dental therapists are right down the pay line. There is always someone better than a therapist that can perform the job. Our pay is not that good. Students are always told that and then while studying that it gets to their minds - that why am I in this field? Why am I spending so much money, so much time and yet I'm only getting nowhere? The main reason why they come to study is a good future and money. They want to be well off and then they are being told you know what, therapists are just second class to dentists, they can't do this, they can't do that, they can't do a lot of things.*

The student Mala, who also came from an urban area, said that she was initially happy to do this course. But after she reached the final year, and realized what her job entailed, her views of the profession changed significantly.

Following on the qualitative question regarding Dental Therapy as First Choice, the quantitative interview asked three additional probing questions

The first question the students were asked was “*On graduation, would you practice as a dental therapist?*”

Only 65% of students in the classes of 2009 and 2010 indicated that they would practice their profession.

The second question the students were asked was *“Do you have any plans to study further on completion of your degree?”*

The responses obtained were that 43% of the students said that they would study further. Of those that wanted to study further, 5 chose Dentistry, 3 Public Health, and 1 each Law, Business Administration, Medicine and Dental Technology.

The third question in this section asked about the students' satisfaction with their educational experience. Just over 60% of the students indicated that they were satisfied with their experience. Their suggestions for improving their educational experience included: more clinical work (4 students), make learning a more positive experience (3 students), highlight strengths of our profession during training (1 student), increase practice management (1 student), expand scope of practice (1 student), more post-graduate training (1 student), and credit for modules to study dentistry (1 student).

From the discussions of these two themes, it is evident that many students had a negative attitude to this profession. The third theme could provide the reason for this attitude.

### **Theme C3: Dental therapy as stepping stone to dentistry**

#### **Students**

During the focus group discussions, many of the students said that they believed that dental therapy was the same as dentistry when they started the programme. Most of them said that, at that time, they did not know the difference between the two professions. This corroborates the findings obtained during the qualitative interviews with the academic Dr Crystal, as well as with the student Colin.

#### **Graduates**

More than half of the graduates responded that they did not want to study dental therapy. They wanted to become dentists. However, because there was no dental school training dentists in KwaZulu-Natal, they opted to study dental therapy. The main reason cited was the financial implications of living away from Durban, as all other dental schools were in Cape Town or Gauteng. Due to the conservative nature of the Indian community, many of them felt that they did not want to leave home.

Anita, an urban-based graduate working in the private sector stated that

*I would have loved to study dentistry, but because it was out of Durban and for me as a young Indian girl, it was way out. And also the financial aspect. And so because UDW offered dental therapy, so I did take dental therapy.*

It was clear that most students and graduates were dissatisfied with this profession. Many of them said that they wanted to study dentistry. The question that needed to be addressed in the next section was whether they were aware of the limited scope of practice of dental therapy, when they started this programme.

## **5.10 SCOPE OF PRACTICE**

Students, graduates and academics (therapists and non-therapists) were asked whether students were aware of their scope of practice at the time of enrolment to the university. The themes identified from these interviews were very similar to the previous section, and included *knowledge of scope of practice, disillusionment with the profession and affinity for dentistry.*

### **Theme D1: Knowledge of Scope of Practice**

#### **Students**

In the qualitative interviews, four of the five student interviewees were adamant that they did not know about the scope of practice, and expressed their views very emotionally. They said that if they had known about the limitations, they would not have studied dental therapy. They reiterated the fact that they wanted to study dentistry. Joseph said

*No initially before I had been accepted for it, I didn't realize that there were limitations towards scope. I just assumed that it was dentistry.*

Colin was even more emphatic in his response

*No, not at all, not at all. I honestly thought it was dentistry. Even when it's advertised, it is written in the handbook of the School of Dentistry. I honestly thought it was Dentistry – as in a dentist - that's your practice. I didn't even know that such a thing as a therapist existed until I came and studied here.*

Mala's perceptions of the scope of practice of dental therapists were that they

*will be like a normal dentist, the ones that we normally see for our root canals and stuff like that, but I didn't know that it was such a limited profession.*

They were asked whether they would have accepted the place in the School if they had known about the scope of practice before starting their studies. All of them replied that they would not have accepted it, and would have preferred to do dentistry. However all of them stated that they would practise as dental therapists when they qualified.

A focus group discussion was conducted with a group of students from the final year class of 2010. All these students also replied that they were not aware of their scope of practice. Pretty, who comes from an urban area stated

*I knew it was something to do with extractions, fillings, and such things. Ja, I think I would have chosen something else if I had known from the beginning. Ja there's so much conflict and commotion in this profession. And it gets us worried about what's going to happen to us when we get out there. So I would have chosen something else.*

However, Robin, who comes from a deep rural area, responded that, even though he did not know what the scope entailed, it did not really matter to him. He said

*When I did find out, it really didn't matter to me. I'm quite happy with what's in front of me. I think that it's a very good profession and I'm proud of it.*

Tandi, also from an urban area replied that she

*only got to know about it in second year. In first year, it was one road just going somewhere, but I didn't know where. . . . But honestly I don't have a negative view about it. I was fine, and I'm happy now.*

Nelson, from a rural area said that he was

*disappointed with the scope. Because when you are in matric, you are not given any details about the profession. I didn't know what the difference*

*between dentistry and dental therapy. So ja. If I had known, I would have chosen something else.*

This student raised concerns with the recruitment process. He said that the people who were providing information about the profession, such as career counsellors at school, often did not provide prospective students with accurate details.

John, from a rural area, stated that he knew about the scope of practice when he started. However he believed that five years down the line, he may be bored with the profession

*extractions, fillings, again and again and again – eish!*

## **Graduates**

The graduate responses were in direct contrast to those of the students. All of them stated that they were aware of their scope of practice when they applied for this degree. Vuyo is a successful practitioner who works in a deep rural area in both the public and private sectors. He believed that as a dental therapist you can

*contribute positively in oral primary health care . . . So focusing on primary health care had also been my passion.*

## **Academics**

The response of all academic staff to this question was they believed that students were aware of their scope of practice. This was because the questions asked during the interview process included reasons for applying for this programme and the scope of practice of dental therapy. Dr Barry, who has sat on the selection committee for many years, stated that in the interviews, most students expressed great commitment to “*helping the community*” and “*practising the dental therapy profession.*” He also emphasized the fact that, contrary to student responses to their knowledge of the scope, he said that students were informed during the interview process. He clearly articulated his viewpoint

*I know previously it used to be a problem where students used to think that they were studying dentistry and a lot of them became despondent especially after the first couple of weeks when they found out that it was actually dental therapy. I sit on the selection committee, and I make sure*

*that every single applicant that comes to an interview, the scope of practice is explained to them very clearly. It is very clearly marketed to them – what the scope of practice is for dental therapy, what the difference is between dental therapy and dentistry. And we make sure that when they get into the programme and when they get selected, they actually know from the beginning that is what the scope of practice is. . . . there are some of them are still using it as a stepping stone to do something else.*

However another academic, Mr Findley, was not convinced that students really were aware of the scope, even though they were informed about it during the interview.

*I think that when students are going through selection, my assumption is that the student will say anything to be registered for the course. In an interview, one looks at the situation of desperateness, one looks at the issue of confusion, one looks at the issue of pressure, peer pressure, and one also has to understand that a freshman coming into university is eager to get going in a career. Because there are people around him - family, friends, relatives – who are all wanting this person to get on with things. And that person is making a choice now – saying yes to things they really don't understand. We are not in a position in an interview to test the understanding of that. I really have problems when you ask a student in the interview, you understood? We are talking about students here. We are talking about their tender age at eighteen years old. We are talking about their excitement to want to enter another level of education. All those things tied up don't weigh up with what you tell them this is the scope of your profession. It must be anchored in some course early in their study.*

Another academic, Dr Crystal, responded by stating that, in addition to informing students about their scope during the interview, it is taught to them in detail during the first and second years

*What we normally do is that we introduce the scope of practice in the first year as a formal lecture prior to the student being introduced to the clinical environment. I take each function that is outlined in the scope of practice and I teach it to a level where the students recognize the*

*parameters within which the dental therapists should function. I then follow that scope through into the second year, into the Ethics, Law and Practice Management module where we revisit the functions of the dental therapist.*

All academics were convinced that the new students were fully informed about the scope of practice, but they accepted the place to study dental therapy because many of them had no other alternative, or they were using it as a stepping stone to dentistry. In the next section, the theme about the disillusion with the profession will be discussed.

## **Theme D2: Disillusionment with the profession**

### **Graduates**

Most of the graduates interviewed have worked as dental therapists in the public and private sectors for many years. They expressed varying degrees of frustration within their profession. Anita, who works in the private sector, as well as at the training institution believed that

*for that time, for what I was looking for, I think at that stage I was happy with what I got. You know further down the line, you know being in the profession for so many years, I feel differently. I think you know now that dentistry would have been a better option. Basically we are limited to what we have and I can understand why sometimes therapists do get a bit frustrated doing the basic dentistry.*

Prem, a graduate who works in a group practice in an urban area, said that she was initially happy. But over the years, she felt that she should have studied dentistry because of the limitations of dental therapy

*If a patient comes to your practice and the patient refuses to pull out the tooth, the only other option is to do root canal. And I feel so helpless because I can't do root canal, or dentures. You see so many patients that need dentures and I have to send them away, so I have limitations.*

Susan, an experienced dental therapist who works in the private and public sectors, wanted to do dentistry at the outset. Her only problem was there was no dental school in



KwaZulu-Natal, and she did not want to leave home to study dentistry. She had employed several graduates from the School in her practice. She expressed satisfaction with their level of competence and that she had not received complaints from her patients regarding their work.

Sibusiso, who works in a private practice in a rural area, had another viewpoint. When he was a first-year student, he asked a friend what was the difference between dentistry and dental therapy. He was informed that

*with dental therapy, it's just an introductory course. Here you get the idea of what you gonna do with dentistry. But the main guy here is the dentist, you know.*

He had worked in a practice with a dentist, and he stated that they had a healthy symbiotic relationship

*There was a dental therapist on one side and dentist on one side, there used to be continuity. For me I saw no problem about it, because you will find that the dental therapist does just the basic work to treat the patient. On the other side the dentist does the specialized jobs. For me I would say there was absolutely no problem with it.*

Reggie worked in the private and public sectors, in a deep rural area. He also showed concern that the limited scope of the dental therapy profession had affected his practice

*Yea I would say to a certain extent it affected, but I was actually in a deep rural where people had to be educated about certain things. They knew mainly about extractions. They only knew that if you had toothache, you have to take it out, and if you can afford maybe to do a filling, then they can allow you to do that. But with root canal and dentures, it affected us because there were those who knew. But now we have to refer and it affected the income, the cash flow, the revenue in that way. But that is where the problem was.*

Most of the graduates believed that because of their limited scope they had to refer to the dentist for more complicated procedures. Consequently patients felt that the dental therapist was inferior, and did not go back to them.

## Academics

Ms Dhlomo, an academic and oral hygienist, stated that many dental therapists were frustrated within their profession due to the lack of career pathing. They therefore recognized dentistry to be a more lucrative career

*One thing that is a problem is in terms of upgrading yourself – they feel that they cannot really expand and go further. A lot of people you find that, after dental therapy, they go and do dentistry, which they feel is much better than the qualification they already have. Most of them would go for professions such as dentistry.*

All academics, who are dental therapists, believed that students were aware of their scope of practice at the outset. However, they said that when students started the clinical subjects, and realized their limitations, they became frustrated. One of these academics stated that many students used this degree as a stepping stone to dentistry. All academic dental therapists have worked within the public service at some stage in their careers. They were very frustrated during this time due to the monotonous nature of their work. Now that they were employed as academics by the university, they were very happy in their careers.

## Theme D3: Dental therapy as stepping stone to dentistry

### Academics

An academic, Mr Findley, expressed the view that dental therapists showed a greater affinity to dentists rather than to other auxiliaries of the oral health team.

*They do believe that they are in a similar position as that of dentists, as opposed to being therapists. I think that this is something that must be clarified from an educational point of view. Their roles, versus the role of the dentist. Their capabilities versus the capabilities of a dentist . . . I think their protection level is the reason why students need to know the scope of their profession. Because when they do that, it acts as a protector more than a competitor for their existence.*

When the topic of new graduates being asked by dentists to perform tasks which are outside their scope of practice, Mr Findley elaborated by referring to

*the need to talk about the aspiring professional who is then lured into practice believing he can do x, y and z. Having being trained, and then maybe not being clarified as to what he can do. And then doing that which he was not supposed to do, and then getting into trouble for it. Crossing lines with the HPCSA, crossing lines with various organizations, and then crossing lines illegally. It ends up being their demise. And whether that is done deliberately or not, it brings disrepute to that particular sector of the profession.*

He went on to say that at least 70% of the students that he speaks to are oblivious about the true nature of their vocation. They are not aware of who are their contemporaries. He said that they do not speak about oral hygienists as their allies. They speak about dentists, maxillo-facial surgeons, and other specialists as people to whom they can relate about professional matters. He spoke of the problem of students not knowing about their professional boundaries. They do not know about the professional jealousy that exists between dentists and therapists. He spoke passionately about these issues.

*There is severe competition about tariff charges, we hear about why it is in fact important for those who are SADA-affiliated to be competing with guys who are DENTHASA-affiliated because of the issue of tariff. . . . And then they must be aware of their profession, their professional boundaries - I think is something that should be taught them early rather than later.*

The responses generated from these qualitative interviews with students and graduates revealed that many of them were unaware of their limited scope of practice, and were disillusioned with their profession. This information was vehemently disputed by the academics.

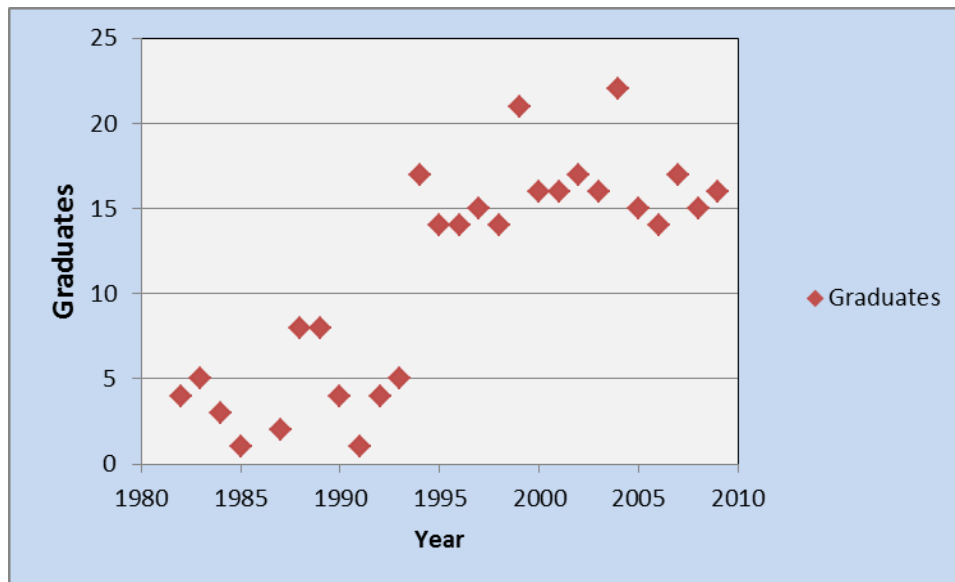
Most of the interviews with students, graduates and academics showed that dental therapists trained at this University, were dissatisfied with their profession. Many of them had used this programme as a stepping stone to dentistry. The lack of a fully-fledged School of Dentistry in this province could have contributed to this situation.

## 5.11 The Graduate Profile

### 5.11.1 Total Number

The total number of graduates trained from the inception of this programme in 1980 to 2010 was 324 (UKZN, 2010). The data shows that initially the number of graduates trained was very low, and fluctuated around a mean figure of 4 (Figure 14). However, after 1993, the mean number of graduates showed an upward shift and fluctuated around a mean number of 16.

These numbers display a disparity between the number of academics employed and the number of students enrolled. In the first ten years (1980 to 1990), the School had the largest number of academics (senior and junior). Every post in the human resource organogram of the School was filled. From 1992, when dental therapists were allowed to work in independent practice, the number of applicants increased. This led to an increased student enrolment. However, due to the uncertain future of the fully-fledged dental faculty, several senior academics resigned. These posts were immediately frozen, and have not been filled to date.

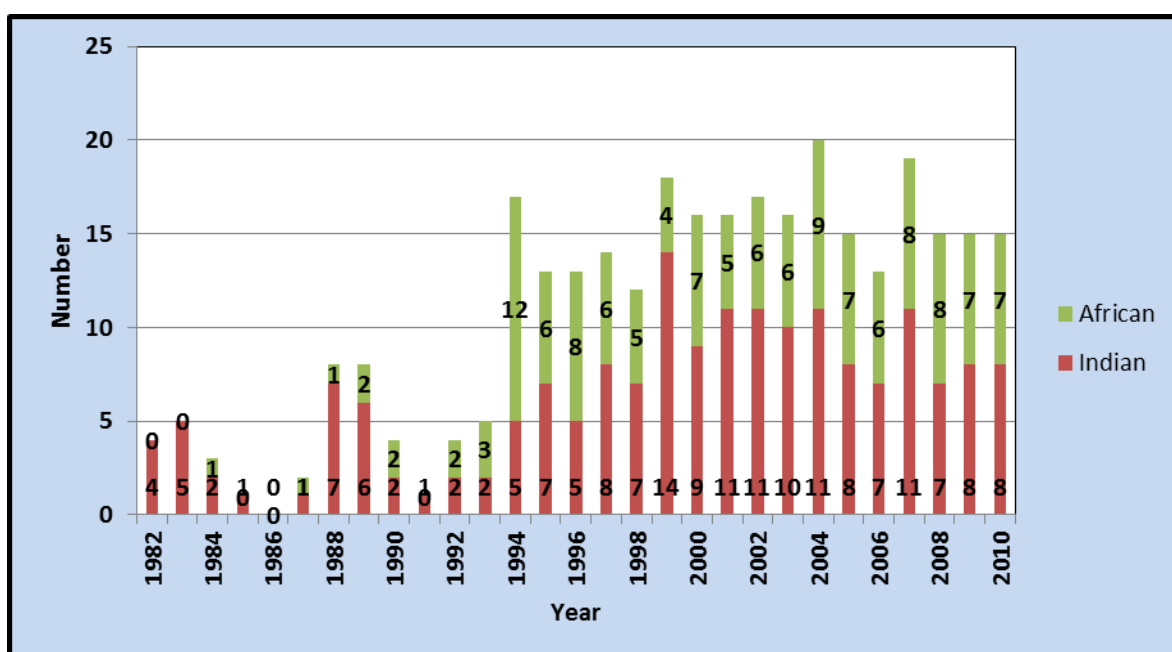


**Figure 14 : Total Number of Graduates 1982–2010**

### 5.11.2 Racial Composition

The data showed that up to 1991, over 80% (29 out of 36) of graduates were from the Indian group. After 1991, Indians still made up the majority of the graduates (53%), but

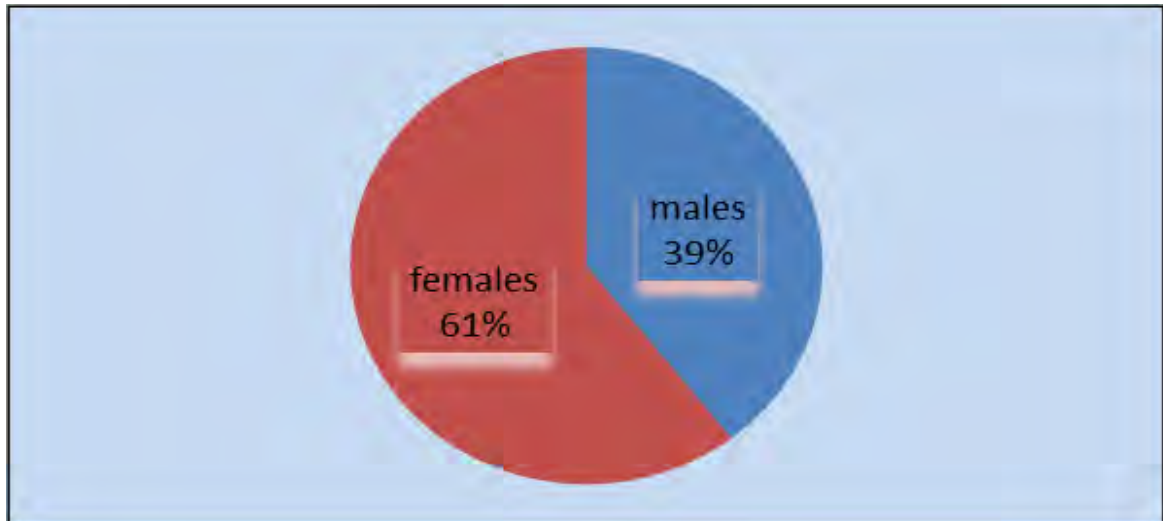
the percentage of African graduates had increased significantly to 42%. This racial pattern reflects the historical circumstances under which this profession was introduced (Reddy, 1985). The Coloured and White racial groups remained just under 4% of the total number of graduates, which was consistent with the enrolment figures. Consequently, Figure 15 shows only graduate figures for the Indian and African racial groups. Consultations with the previous dean and academics did not provide satisfactory answers for this phenomenon. However this low number remains a cause for concern, and necessitates further investigation.



**Figure 15 : Number of Indian and African Graduates per Year 1982–2010**

### 5.11.3 Gender Composition

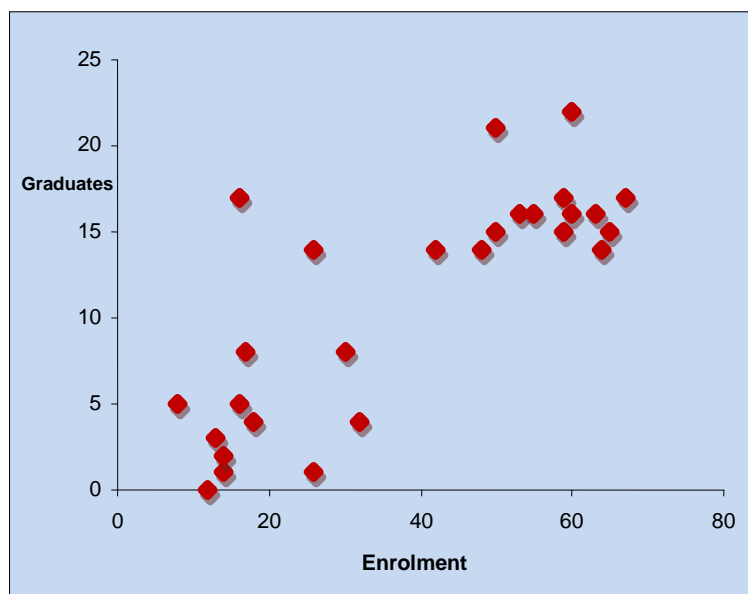
The gender composition of the dental therapy graduates from this university shows that 60,5% were female; while 39,5% were male. This has been demonstrated in Figure 16. These figures are in line with the international trends described in the previous sections.



**Figure 16 : Gender Composition of Graduates 1982–2010**

#### **5.11.4 Enrolment vs Graduates Three Years Later**

When the enrolment figures for a particular year was used statistically to predict the number of graduates three years later, the actual number of graduates produced was significantly lower than the predicted value (Figure 17). However, as a general trend, the number of graduates increased with enrolment.



**Figure 17 : Predictability Chart of Enrolment versus Graduates Three Years Later**

### **5.11.5 Practice Patterns**

The practice patterns of the graduates have been described under the headings Private Sector, Public Service, Dentistry, Other and Unknown, and have been illustrated in Figure 18.

#### **Private Sector**

This study showed that the highest number (47%) of graduates worked in the private sector. The reasons for high number have been eloquently explained by all stakeholders in the section on job satisfaction. However this high number has resulted in the exacerbation of inequities in the provision of oral health care.

#### **Public Sector**

Of even greater concern is the decrease in the percentage of graduates working in the public sector. This number varied from a maximum value of 35% in 1985 to 9,5% currently. Similar statistics were described by Hugo (2005) who showed that there were many vacant posts in the public sector. The reasons for these figures need further investigation because these low numbers are exacerbating the inequities in oral health service provision. This is because the literature has demonstrated that over 80% of health professionals work in the private sector, resulting in an inequitable distribution of skilled health professionals between the private and public sectors (Chopra et al., 2009).

#### **Dentistry**

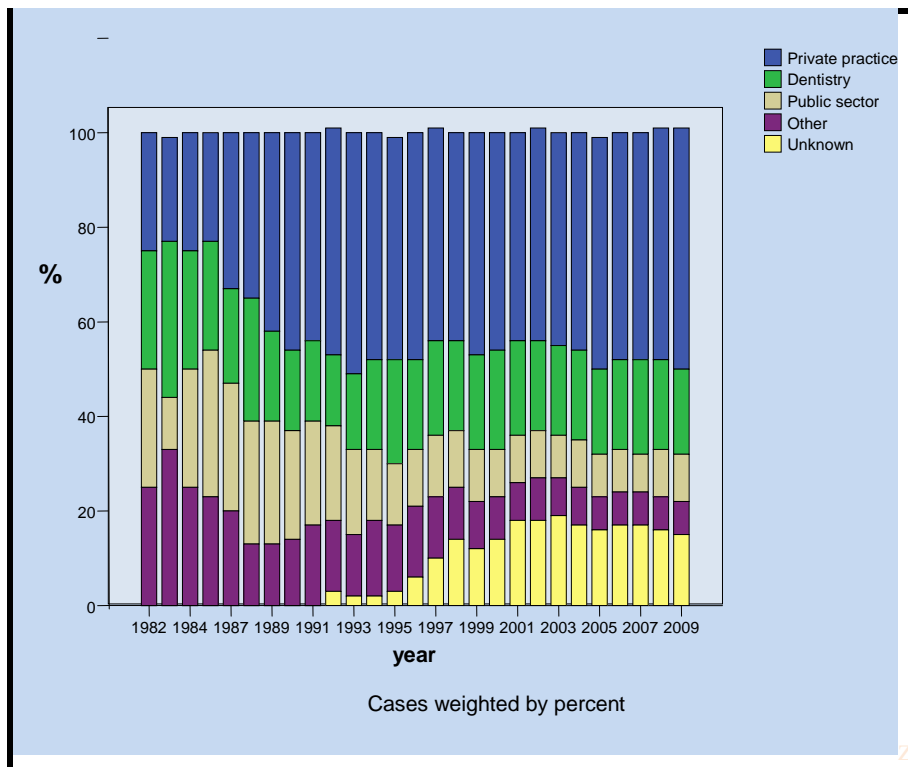
Initially, the number of dental therapist who went on to study dentistry was high. However this number has decreased significantly since 1993, where this figure seemed to have stabilized at a mean of 19%. This date coincides with the introduction of private practice for dental therapists in 1992, which could mean that therapists were satisfied with practising their profession within the private sector.

#### **Other Professions**

The percentage of dental therapists going on to practise professions other than dentistry was also low at 7%, and it could include people who studied medicine, who have retired, or who have left the profession due to personal reasons.

## Unknown

This category was approximately 16%, but this accounted for all graduates who could not be traced. Reasons for this may be due to several factors, among which could be death or emigration. All these figures are graphically represented by percentage composition in Figure 18.



**Figure 18 : Practice Patterns of Graduates from 1982–2010 by Percentage Composition**

## 5.12 JOB SATISFACTION AMONG DENTAL THERAPISTS

The previous discussions have demonstrated that many dental therapists were dissatisfied in their careers. The responses received to the questions on job satisfaction among all stakeholders echoed the themes identified in the previous questions. They were: *The Ideal Situation*, *Dissatisfaction in the Public Service*, *Frustrations in the Private Sector*, and *As a Stepping Stone to Dentistry*.



## Theme E1: The ideal situation

All key external stakeholders, such as the employers, the regulatory body and both deans, as well as senior academics, unanimously agreed that the role of the dental therapist was to work under supervision of a dentist within the public health system.

### External Stakeholders

Professor Tom, a dental dean at another university, stated convincingly

*ideally in my opinion, in the primary health care context, it would be better if we are serious about quality of care in this country. The dental therapist should work under the supervision of a dentist, within a public health system.*

However he was adamant that the training of this cadre of health worker should continue only if sufficient posts were available in the public sector. He believed that when posts were not available, then therapists go directly into the private sector. This exacerbated the existing problems in the health care system, thereby “*disadvantaging the patients, reducing the quality of care, and not improving access to dental care for the majority of people in this country.*”

### Academics

Dr Crystal, a senior academic, echoed the views of the dean

*The dental therapy profession in South Africa has a very, very important role to play given the huge unmet oral health need, given the historical inequities in health care, given the current inequities in health care because remember we do have urbanization. We have massive movement of people from historically disadvantaged communities. We have informal settlements that have developed and we have now a huge oral health need that has developed as result of that. Coupled with which we do have also HIV involvement in which the oral health worker has a very big role to play. So in that sense the dental therapist has a very very integral and very vital role to play in primary oral health care.*

Dr Barry, another senior academic, corroborated these views.

*it was also regarded as significant that therapists should function as a mid-level worker . . . to provide relief of pain and sepsis and to refer those cases appropriately where they can't manage it.*

Most stakeholders recognized that the problems identified in this profession stemmed from the expansion of their scope of practice to include independent private practice. Dr Alan, an academic, believed that

*we were very short sighted in granting limited private practice, if we kept the concept of saying that we are training dental therapists like every other therapist practice in other disciplines, they are still controlled practices. Unfortunately in dental therapy, we were a little bit short sighted in allowing private practice that leads to the complications that we now experience.*

The main reason for allowing dental therapists to work in the private sector was the lack of posts in the public service (Prinsloo, 2003). However the next section will show that this situation has not improved since that time.

## **Theme E2: Dissatisfaction in the public sector**

From previous discussions, and from the literature reviewed, it was clear that the public sector was the ideal place for dental therapists to work. However problems were identified in the public sector by all stakeholders.

### **External Stakeholder**

Strong sentiments were expressed by Dr Patel, an employer in the public sector:

*Those in the public service are a very unhappy lot. The working conditions are atrocious. The remuneration is not what they think it should be. They do not have the support of the institutions in which they work. It is no longer a vertical program, and they suffer from constant shortages, lack of supplies and even supervision and referrals. They do not have a forum, they do not have any representation at any level, no institutions provide them with any budget, they don't repair their equipment. And generally it is characterized by extraction, extraction, extraction. They do no other*

*restorative care or anything that they've been trained. They do extractions all the time. So I don't think they are a happy lot in the public service for all these things that I have mentioned.*

Many of the stakeholders agreed that the lack of facilities and infrastructure was greatest in rural areas. Dr Patel stated that

*most dental therapists try to move from rural areas into the more urban areas. They are constantly looking for transfers away from rural areas where things like accommodation is a problem especially on their low salaries. Generally they are an unhappy lot.*

The representative from the regulatory body, Mr Mkhize, was more emphatic in his response:

*Rural areas historically haven't treated therapists with the dignity they deserve. They compete with other health professionals, and they are then lost in the list. Some of our rural based hospitals don't even see a therapist post to be critical, they rather appoint a medic or a nurse or a radiographer as opposed to a dental therapist. If a therapist happens to be in that particular rural hospital, if a doctor comes and joins the services, then that therapist is likely to forfeit that official accommodation. This is the type of raw deal that the dental therapist had in the public sector, therefore we ended up losing them.*

Dr Jones, a senior employer from the Department of Health, provided several reasons for the dissatisfaction among dental therapists in the public sector. He stated that dental therapists and dentists worked together in the same facility, doing the same treatment, but were paid “*half the remuneration.*” He believed that dentists should only be employed at the referral level, and should treat more advanced cases that cannot be treated by a therapist at the primary level.

Another factor causing frustration was the “*scarce skills allowance*” which was introduced in 2003 to attract essential health workers into the health care system. Most of the health workers, including dentists, received this allowance. However the dental therapist was

excluded from this allowance even though they played a significant role at the primary health care level.

A third reason for the discontent cited by Dr Jones was that dental therapists received the same salary as the oral hygienists, even though they have a wider scope of practice. The oral hygienist studies for a two-year diploma, while the dental therapist completes a three-year degree.

He reiterated the problems of “*lack of posts in the public sector,*” as well as “*inadequate facilities, infrastructure and equipment.*” He believed that these frustrations resulted in the large number of dental therapists working in the private sector or going on to study dentistry.

When Dr Jones was asked why there were no posts in the public sector, and whether it was due to financial constraints, he responded

*It's not financial. It just happens . . . dentistry or dental services have not been a priority in many of our hospitals . . . especially where the hospitals historically have been led and managed by executives who are medics or from a nursing background. So because of those challenges, you would never have a dental service to be given a priority by most of our leadership in those hospitals. Yes we can train them, the question comes back, are the provinces aligned to raise the posts for these cadres that we are producing? Now that we need to carefully make sure that there is the equilibrium between these two.*

Mr John, a representative of the Dental Therapy Association of South Africa added that one of the greatest frustrations of a therapist in the public sector was the fact that “*they were limited just to being clinicians in the clinics and they are not given opportunities to become managers of dental facilities.*”

## **Students**

Students also had strong views on this issue. Colin said,

*I've never seen a dental therapy post being advertised by government yet. There are so many therapists out there. If the government had to set up a*

*clinic somewhere, a dental clinic and put a therapist there, we can effectively treat that area and improve the oral health of the country. But yet there is no post. The only post available is working for the dentist.*

These responses have shown that several problems have been identified in the public sector. This situation has led to many dental therapists working the private sector, thereby exacerbating the inequities in the health care system.

Even though all stakeholders believed that the role of the dental therapist should be within the public sector, all of them were of the opinion that this sector was not conducive to their employment.

### **Theme E3: Frustrations in the private sector**

#### **External Stakeholders**

Several stakeholders voiced their discontent at this situation. Professor Philips was against dental therapists practising in the private sector. However, he believed that dental therapists should have attained some degree of job satisfaction in their current situation:

*I believe since they were allowed to go into private practice about fifteen twenty years ago, I believe by a very narrow vote in the Medical and Dental Council. And I think that has brought some amount of satisfaction to them. They are now independent and you know, they could run their own practices and they could probably earn a decent income and I think all of that has brought a degree of satisfaction. I think from that point of view it has helped them.*

He said that that many therapists believed that they should be allowed to study dentistry:

*But there is the down side of it, many of them feel that they have gone so far, they have done virtually all the things that dentists in practice do, they should really be allowed to become dentists and I think that most of them will say look, give us three years of exemption. We will do two years and become dentists. I think that is the frustration for them, because they are not dentists.*

Dr Jones, an employer from the public sector stated that this situation has created problems among dentists because they believe that dental therapists tended to work outside of their scope of practice:

*Once the then Medical and Dental Council decided they would also work in the private sector, it created some problems whereby they move beyond the scope of practice. And that is creating a problem for dentists because now they compete with dentists. And they are in fact not allowed to do more advanced work. . . . it might also be that dentists will teach them how to fulfil these functions, so creating such a problem. We experienced similar problems in the production of dental technicians or technologists, whereby they teach dental laboratory assistants to do more advanced work than the dental technician can do. So I think that the profession itself is also causing the problem.*

He said that he had received complaints regarding dental therapists who caused problems when they worked outside their scope of practice. This was due to the fact that they were not trained in these expanded functions. But he added,

*I know also that there are dental therapists who treat some cases beyond their scope and then they create problems whereby the dentists will then have to assist and try and rectify the problems created by the dental therapist in treating patients.*

## **Academics**

Ms Ally, an academic who is also a dental therapist, felt that they were not satisfied with their present careers because of all the limitations. Mrs Chetty, who is also an academic dental therapist, added that even in private practice, therapists are not satisfied:

*They feel that they can do so much more for the patients, but they cannot do it because they have very limited scope of practice. They make much more money in private practice.*

Ms Ally said that said she “*always had a passion for dentistry*” even when she was in school. But because dentistry was not offered in KwaZulu-Natal, she chose to study dental therapy. She said that the reason that she did not go into private practice was

*because of all the limitations . . . I know I have worked sometimes in private practice and I realize that being in the private practice work can be a little bit frustrating. . . . especially when it comes to root canal treatment or fitting in a crown or bridge if a patient wants that and even like fitting in a denture . . . and you feel so frustrated that you cannot provide these services for the patient. And you actually lose your patient. Once you refer, then they don't come back to the therapist.*

Ms Chetty corroborated this point, stating that

*when you talk to therapists out there that are working in private practice and in hospitals, they feel stifled, a lot of therapists are pro expanded functions . . . they wanna do more.*

## **Students**

Students had similar views on this issue, and felt that dental therapists were not satisfied in the private sector. Joseph stated

*I've seen that most of the time they end up doing something else after this degree like they go for medicine and anything else rather than being dental therapists. So I don't think they are satisfied.*

Mala agreed with Joseph on this issue.

*Speaking to my friends and colleagues that are currently studying dental therapy, most of them are not very happy with the profession in that it is very limited and they feel that, even with me, I also feel that there should be something further that we can do as a dental therapist after this.*

Colin's explanation to this problem was very different to his peers.

*People want to get rich no matter you are a dentist, you are a therapist - you want to get rich no matter."*

He voiced his concern that even if therapists are not taught to do more advanced treatment, they did it anyway.

*if you go do things you are not taught to do, then you gonna get complications, you gonna reduce the health of the patient, you gonna compromise the health of the patient and that, it might even be that was your family member or something.*

## **Graduates**

Common problems identified by graduates with regard to private practice are the inequities that exist between dentists and therapists. All graduates complained about the difference in fees that could be charged between dentists and therapists. Susan explained:

*As a private practitioner, I think everybody is going to complain about tariff charge . . . because I mean you are doing the same radiograph as a dentist but then you are getting paid less. Or you are using the same infection control measures, using gloves and the mask and you are still getting paid less. So I think those would be the only issues that will make therapists not satisfied. You are buying it from the same company, you are paying exactly the same for a box of gloves but when you try the 8109 code, you are getting paid less because you are a therapist.*

So even though dental therapists are allowed to work in private practice, all the stakeholders believed that they are not satisfied in their careers. Many believed that they wanted to be dentists.

## **Theme E4: Dental Therapy as stepping stone to dentistry**

Two opposing views emerged from these interviews. All dental therapists, whether they were students, graduates or academics, believed that therapists should be allowed to expand their scope of practice by attending short courses over a period of time. Conversely, all employers, deans, and academics who were not therapists, believed that this should not occur.

## **External Stakeholders**

Most external stakeholders expressed the concern that students who could not gain entry to study dentistry often did dental therapy as a “stepping stone to dentistry.” The dean, Professor Tom stated:



*I've observed a trend that dental therapists, with low matric ratings, come in to do dental therapy. And those that perform well want to do either medicine or dentistry. And for those who eventually do dentistry, they tend to do well. And when I interact with them informally, and ask them why do you do it? In effect with the old Dentistry curriculum, it is almost nine years – three years dental therapy and five years dentistry and one year community service. The answer I always get is they want to be able to practise the full range of dentistry. They want to get a sense of fulfilment in who they are, what they are able to do within the context of competency as a dentist.*

He went on to say that approximately one third of the first-year class of dental therapy students of 2009 at his university, were qualified dental therapists from this university

*Definitely with good grades, we take them in, we want to fill the classes and obviously take students who meet our entry requirements, and students who are capable of completing the programme without repeating a year.*

He described the concept of the “revolving-door syndrome,” where dental therapists complete their degree, exits, and then comes back again to finish a degree usually in medicine or dentistry. He believed that this commonly occurred in well-motivated students.

A point of contention among the academics was the request by dental therapists to provide additional courses in the dental specialties. Professor Tom expressed his opposition to this.

*Some of them had the audacity to ask us to run courses in orthodontics. Something like cut and paste to become a dentist because they are presented with patients with a wider spectrum of problems which they cannot manage and there is a reluctance to refer to the next level.*

## **Academics**

All dental therapists, (students, graduates and academics) were unwavering in their views that additional courses were required to expand their scope of practice. Ms Chetty, an academic dental therapist, stated articulately that

*therapists out there wanna do more, like dentures, sometimes root canal treatment and they request modules in training- a sort of ladder approach in training where therapists can now come into university and do a module . . . if their practice requires them to do dentures they will do a module in prosthetics or a module in root canal treatment and thereafter practise in their surgery. They believe that once a tooth is exposed and more needs to be done and they refer, people lose respect for them. That shouldn't be the case but that's how they feel. So I wouldn't oppose expanded function. I think there is a need for it and I think we would have more happy people out there working together with dentists. It shouldn't just stop at just being a dental therapist.*

## **Students**

Brandon expressed his views assertively when he said

*some people may be satisfied. But anyone with aspirations, they will not be satisfied. They do not want to settle for second best. That's the constant feeling that you have – that you are settling for second best. So ultimately, nobody is really happy – some people want to go and study further. For myself, I know that I really want to do dentistry at a later stage. If I love my profession so much, and I love what I do, why should I have so many limitations?*

When he was asked what could be done to fulfil this need, he replied:

*Do some filler courses to bring us up to speed. Bottom line – when you are exposed to something, you want to do more. They should be brought in slowly, one thing at a time. No matter how long it takes to do it, they should bring in these extra courses one at a time.*

He went on to say that he was even prepared to

*sacrifice time to learn it, then whatever time they think it is necessary – even if it takes six months at a time as a block to study dentistry. It can be provided as post-grad modules. Why not?*

## Graduates

Graduates too were steadfast in their beliefs. Prem believed that the only acceptable end-point for her was to be a dentist:

*Okay, I always used to think, I mean I know eventually after so many years, like if we are having dentures as a one year course. I'll say a therapist who has like ten years' experience. They should only be allowed to study. Like first-year we are taking fifteen students who've already had ten years' experience as a therapist. So we start you in an endodontics clinic which you'd like to study. We do it, and after about so many years, we'll obviously then have a dentistry degree. But I think it's like slowly, but it will be like, therapists will have like ten years or so experience because we still need therapists from that first year to ten years, at least we won't run short of our therapists. But it should only be given as an option for our therapists that have ten years' experience.*

The lack of the fully-fledged dental school in KwaZulu-Natal also surfaced as a problem for many graduates. Anita stated emotionally that

*we would love to do dentistry if it was offered close by. Obviously I'm female and we don't want to leave our families. And if dentistry were offered, we would like to take that opportunity to study further in the profession and then take that one step further. I think that will be nice.*

In response, Susan who is an experienced dental therapist in the private sector stated that

*they are doing it anyway. You know the job description should be extended in the sense that even if they had to take an impression, when they work for dentists, they are given the opportunity to do an impression. Just take a look, and you would find that lots of dental therapists in private practice do all kinds of things. Most of the patients don't know that these are dental therapists because you are referred to as a doctor and they assume that you are qualified to do that so. I suppose because they do it so well that the patients accept it.*

The final question posed to all therapists was whether they were happy in their profession. A significant majority stated that there were “*lots and lots of unhappy dental therapists.*” However, when they were asked whether the dental therapy profession should be abolished, most of them said that there was “*definitely a place for dental therapy.*” They added that

*for those people that want to take the profession further, I think there should be a bridging course like if they want to make dentures for example, let them do dentures. Let there be a diploma in Prosthodontics,. . .*

The bottom line was that most dental therapists wanted to do expand their scope of practice, in order to become a dentist. But they felt that the profession of dental therapy still had a role to play in the oral health care system of South Africa. This was aptly summarized by the graduate Prem, who said,

*I know a lot of therapists that are willing and are very eager to study further and you know, to be able for their scope to improve. I think that will be very very nice. And there are some therapists as well, we kind of spend some time with fellow therapists and we would love to do dentistry if it was offered close by. If dentistry were offered, we would like to take that opportunity to study further in the profession and then take that one step further. think that will be nice. But definitely dental therapy should not be scrapped.*

### **5.13 CONCLUSION**

In this chapter, the key external stakeholders agreed that the dental therapy profession lacked credibility due to its apartheid origins. The role of the dental therapist was contextualized within the health care system of South Africa. This formed the context phase of this study.

This was followed by the input phase, which evaluated the recruitment and selection processes of the University, Faculty and School. Trends in the application and enrolment profiles of the School were discussed in relation to the South African situation. The demographic profile of the classes of 2009 and 2010 was created, as this group formed part of the sample for the qualitative and quantitative components of this study. The

viewpoints of the students and graduates were obtained regarding dental therapy as their first choice in university. This data was coupled with their views on their scope of practice.

However, the graduate profile showed that most dental therapists worked in the private sector, thereby exacerbating the inequities in access to basic oral health care. Most dental therapists felt frustrated in their careers due to poor working conditions in the public sector and the limited scope of practice in private practice.

From these results, it is evident that the role of the dental therapist needs to be re-evaluated in order to meet the needs and challenges of the South African population.

## CHAPTER 6

### PROCESS EVALUATION OF THE CURRICULUM

#### 6.1 INTRODUCTION

A curriculum is like an animate conversation on a topic that can never be fully defined (Bruner, 1996, p. 116).

The previous chapter evaluated two important influences of the Hicks model: *student perceptions* and *professional/industry requirements*. The researcher extended this model to include the perceptions of graduates from this institution. The results revealed that students and graduates were disillusioned with their profession. This resulted in a high attrition rate among graduates from the inception of this profession. Consequently, the graduates from this institution were not fulfilling the role for which they were created.

Bruner (1996), in the opening statement of this chapter, articulates that due to the multiple influences on curriculum, this topic cannot be fully defined. Therefore in this chapter, several other influences of the Hicks model have been examined. The form and content of the curriculum, the accessible online resources and the institutional constraints are evaluated by different methods. This information is combined with the perceptions of students and academics to achieve a comprehensive evaluation.

#### 6.2 FORM AND CONTENT OF THE CURRICULUM

Chambers (1994, p. 342) defined *competencies* as the “skills essential to beginning the practice of dentistry and allied dental practice. Competencies combine appropriate supporting knowledge and professional attitudes, and they are performed reliably in natural settings without assistance.” In South Africa, the minimum competencies for the graduating dental therapist have been prescribed by the regulatory body (HPCSA, 2008). They have been listed in Table 17, and have been divided into General and Clinical Competencies.

**Table 17 : General and Clinical Competencies**

GENERAL COMPETENCIES	CLINICAL COMPETENCIES
Academic Skills Communication Business & Office Management and Professional Issues Equipment Maintenance & Repair Infection Control Health as a Human Right Community Health	Diagnosis & Treatment Planning Primary Preventive Measures Scaling & Polishing Restorative Dentistry (Direct Procedures) Minor Oral Surgery Dental Therapeutics Dental Radiography Children's Dentistry Emergency Care in the Dental Practice

### **6.2.1 General Competencies**

The form and content of the general competencies were evaluated by examining the School Module Portfolios. The content analysis determined where these competencies were offered, how they were presented, and how they were assessed.

Where applicable, the quantitative data obtained from the student interviews (competency and module evaluations) were added to the content analysis. This data was corroborated and extended by the qualitative interviews with students and academics. The juxtapositioning of the different methods of data collection provided a comprehensive evaluation of the general competencies.

In the next section, the development of Competency 1: Academic Skills will be presented.

### **Competency 1 – Academic Skills**

#### ***Content Analysis***

Two modules, Academic Skills and English as Second Language, contributed to the development of the competency Academic Skills. The Academic Skills module was directed towards students from disadvantaged backgrounds. It was a short six-week module, conducted by the University Student Counselling Services, in the first semester of the first year. It covered topics such as time management and goal setting, effective communication, skills in note-taking, reading, effective study methods and oral

presentations. Stress management, assessment of self-esteem, assertiveness and conflict management were also included.

The module English as a Second Language was guided by the needs of students who did not use English as their first language. Due to the inequalities in language competencies among students of different cultural backgrounds, all students were required to write an English Placement Test before registering for their studies. If they passed this test, they could continue with their studies. If they did not pass, they were required to register for the additional module English Language Development, which was aimed at improving the students English language skills.

### ***Student Biographical Interviews***

The quantitative data obtained from the Student Biographical Interviews, with respect to the first language of students, showed that just over 50% used English as their first language. It was clear that many students benefited from the English Language Development and Academic Skills modules. A repetition of certain aspects of this module may be deemed necessary if students were found to be struggling in the second and third years. However consultation with Student Counselling Services revealed that these skills were offered throughout the year, at the request of students. However due to the overcrowded second and third year timetables, students often found it difficult to attend.

### ***Inference***

There is evidence to show that the curriculum does address the problem of students with English as their second language. However, on examination of the teaching material, notes and text books, everything appears to be in English only.

## **Competency 2 - Business & Office Management and Professional Ethics**

### ***Content Analysis***

This competency is developed in a single module: Community Oral Health (Ethics, Law & Practice Management). This module is made up of three main components:

- Practice Management, which deals with regulations of practice, principles of defence, office management, practice location and conditions of employment.



- Ethical Practice and Professionalism, which covers topics such as morality, ethical dilemmas, professionalism, consent, HIV/AIDS, contracts, professional boards and scope of practice.
- Health Services in the Public Sector, which describes the governance, policies and procedures of the public health sector.

This module is taught by lectures only, and is assessed at the end of the second year by a two-hour theory paper. In discussing the quantitative data and qualitative interviews, this section was divided into two components: Practice Management, and Ethical Practice and Professionalism.

## **Practice Management**

### ***Student Competency Evaluation (Annexure 11, p.376, no.2)***

When students were asked whether they were able to “manage a practice or clinic effectively,” 80% answered *very good or excellent*. This response was in direct contrast to the response of graduates in the qualitative interviews.

### ***Qualitative Interviews***

Most graduates believed that this competency was not adequately developed for independent private practice. Two graduates running successful private practices in rural areas were emphatic that the one missing element in their training was Practice Management. Sibusiso stated:

*The only aspect that I will say is not emphasized in dental therapy is the practice management. . . . when you go out there, it's a completely new world to you. . . . You don't know how to run the practice as such. It takes you about a year or two to sort of find your footing . . . not only practice management, but also Business Management . . . make no mistake, whatever financial decision or practice blunder you make is gonna impact negatively on the practice.*

Vuyo stated that only after he had graduated, did he realize this deficiency in his training. He therefore went on to study Financial Management:

*We were only trained to be clinicians but not to run the business. . . . I was only taught how to extract and do fillings. But to manage the business in the private sector, I would say the university never gave us an opportunity. . . . When I graduated, I studied Financial Management and Business Management. Even legislation was lacking. And also computer studies. We are living in financial times now. If you don't have any knowledge about computers, it becomes difficult because you send your claims to medical aid on the computer, . . . If you don't know how to use the computer then you are out. You will have to outsource that and outsourcing means paying someone to do the claims for you. You see. Everything is electronic now.*

The reason for this difference of opinion between students and graduates was probably due to the fact that the graduates had several years of experience in private practice, while the students' only experience was at the training hospital.

### ***Inference***

The study of Practice Management in the field of dentistry has become significant due to the complex nature of dental practice in the private and public sectors. The concepts of patient rights, communication and ethical patient care have become priorities in the health sector. The keeping of accurate patient records and the ordering of materials and equipment have also become important factors in the management of a successful practice. The private sector has the additional burden of medical aid payments.

### **Ethical Practice and Professionalism**

#### ***Student Module Evaluation (Annexure 12, p.381, no.11)***

The students' response to the statement "a strong ethical ethos was maintained through all stages of study" was rated very highly at 4.5. This competency was taught through a series of lectures over one semester in the second year, and assessed by a two-hour theory paper. There was little evidence in the clinical modules to demonstrate that competency in ethical practice and professionalism was being developed or assessed. No direct reference to this competency was mentioned in any of the final year clinical modules.

### ***Qualitative Interviews***

Interviews with Academics, Dr Barry, Mr Findley and Ms Dhlomo, as well as the employers, Dr Jones and Dr Patel, showed that dentists often complained about dental therapists working beyond their scope of practice. However, it was emphasized that it was often the dentist who encouraged the dental therapist to do the additional tasks when he was busy.

### ***Inferences***

Non-ethical practice among dental therapists has been a cause of concern among the dental fraternity in South Africa. The South African Dental Association (SADA) has repeatedly called for the removal of this cadre of personnel from the oral health team as they perceived them to be encroaching on their turf. This was probably the reason for the refusal by this association to be interviewed in this study. It is for this reason that the form and content of this competency needs to be re-evaluated.

## **Competency 3 – Communication**

### ***Content Analysis***

The various aspects of communication skills have been developed in the different modules. Basic interpersonal communication skills are developed in the module Academic Skills. The module Psychosocial Development for Health Care reinforces these concepts, especially with reference to the clinical situation. It covers topics such as people management, anti-oppressive practice, sexuality, the management of the HIV/ AIDS patient, poverty and related topics.

The module Basic isiZulu Communication Skills is offered to students who use English as a first language. It provides the student with basic knowledge on how to communicate with patients in Zulu, which is the language indigenous to the province of KwaZulu-Natal. Similarly, the English Language Development module is aimed at students who use English as their second language, and has been discussed in the previous section.

The Community Oral Health module contains a very small component on how to achieve effective communication with patients in the clinical situation. In the module Diagnostics, Infection Control & Dental Specialties, students are taught how to communicate with a

patient with regard to examination, treatment planning and consent. All communication skills in this module are taught by means of lectures only, and assessed in English.

### ***Inference***

It is clear that there is an attempt to develop basic communication skills with respect to language and patient communication in the clinical setting. However, the skill in the indigenous language (IsiZulu) is taught by lectures and assessed by a two-hour theory examination. There is no relevance in regard to the clinical situation. Therefore when English language students start working on patients, their application of the indigenous language in the clinical setting remains untested.

## **Competency 4 – Equipment Maintenance and Repair**

### ***Content Analysis***

In the first-year attendance module Clinical Practice, the procedures that need to be used in the handling and maintenance of equipment and materials are demonstrated. However there is little evidence in the curriculum of the development of this competence, and there was no assessment of this activity.

### ***Inference***

A basic knowledge on how to maintain dental equipment was essential especially if the graduate was going to be treating patients in a rural area, where qualified technicians may be unavailable.

## **Competency 5 - Infection Control and Care of Instruments**

### ***Content Analysis***

In the first-year Clinical Practice module, students become acquainted with the handling of equipment, materials and waste disposal, before they start working on patients. The student also spends time in the sterilization area of the clinic to learn how to wash, pack and sterilize instruments. There is no assessment of this activity.

In the second year module Diagnostics, Infection Control & Dental Specialties, formal lectures, clinical demonstrations and practical sessions are conducted on the principles and

practice of infection control within a dental clinic. This module is delivered by a professional nurse.

In the second and third year clinical modules, Oral Health, Minor Oral Surgery, Restorative Dentistry, and Diagnostics & Radiology, infection control is emphasized and assessed on an ongoing basis during the clinical sessions.

### ***Inference***

Infection control appeared to be adequately covered in depth and breadth at each level. Students appear to be acutely aware of infection control due to the high prevalence of HIV/ AIDS and tuberculosis in the province (Coovadia et al., 2009). However there seems to be little evidence of testing this competence.

## **Competency 6 – Health as a Human Right**

### ***Content Analysis***

This competency is developed from the first year in the Community Studies module. In this multidisciplinary module, students learn about health, primary health care, community-based health care, health promotion, and social development. They learn about the basic concepts of poverty, inequality and health as a human right.

In the second year, these concepts are developed in the Community Oral Health (Ethics, Law and Practice Management) module. The student gains an understanding of the basic concepts in health as a basic human right and the public health system.

At the third level, the module Diagnostics and Radiology encourages students to research the latest developments in regard to health as a human right. They present their finding as group seminars.

### ***Inference***

Students' theory knowledge with regard health as a human right is developed through all three years of study. They learn the theory on concepts like poverty, health and disease, and social and economic development. However there is little evidence to show that students have had any experiential training in these situations.

## Competency 7 – Community Health

### *Content Analysis*

This competency is developed in all three years of the curriculum. In the first year, the students experience multidisciplinary teaching in the Community Studies module. In this module, the dental therapy students work closely with other health science students, such as occupational and speech therapists. They learn about basic concepts such as health and disease, poverty, primary health care, health promotion, and social development. This module is the first exposure of students to disadvantaged communities.

In the second year module, Community Oral Health (Prevention, Health Promotion and Epidemiology), students learn about the basic concepts in community health, which include a basic knowledge of general and dental epidemiology, principles and methods of oral health prevention, promotion and education, and a basic understanding in research methodology and biostatistics. Clinical exposure includes basic epidemiological studies conducted among schools in urban areas.

In the second year clinical module, Cariology, Periodontology and Prevention, students conduct health education and promotion initiatives in schools, orphanages, geriatric institutions, and institutions for those with disabilities, in the urban setting. In the third year module, Minor Oral Surgery, students conduct a weekly outreach clinic in a disadvantaged urban area, where they only do extractions. During the July vacation, students work for two weeks on the Phelophepa Health Train<sup>3</sup>, which provides basic dental care in underserved rural areas.

### *Student Module Evaluations (Annexure 12, p.379, no. 6-7)*

All clinical modules were evaluated for their level of community exposure, which revealed that most teaching was done at the training hospital (Tables 41). The community outreach component was negligible in most modules (Table 42). The only modules that offered any

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<sup>3</sup> Phelophepa Health Train: This custom built train was developed in 1994 to supply quality healthcare to communities where health services and infrastructure were not fully in place. This initiative offers a wide range of health services, by a team of resident staff who live on the train for its 9 month operational period. These health professionals manage and supervise approximately 1 200 final year students from academic institutions all over South Africa (Transnet Foundation, 2011).

type of outreach were Cariology, Periodontology and Prevention, where second year students visited schools and other institutions to provide health education and promotion in urban areas. In the third year, the only module that offered some degree of community exposure was Minor Oral Surgery, where students attended a weekly clinic in a disadvantaged urban area. Students also worked on the Phelophepa Health Train in deep rural areas for two weeks during the mid-year vacation.

### ***Qualitative Interviews***

The qualitative interviews with academics regarding community outreach corroborated the quantitative data of the students. Ms Ally, a lecturer in Minor Oral Surgery, was the only one who could state unequivocally that her students were competent to work in a clinic in a disadvantaged area. All other staff stated that training occurred only at the training hospital.

### ***Inference***

The qualitative and quantitative data complemented each other, thereby corroborating the research findings that community-based training was rudimentary within the curriculum.

In this section, the development of the General Competencies as prescribed by the HPCSA (2008) was discussed. Several strengths and weaknesses were identified, which will be discussed in Chapter 7.

## **6.2.2 Clinical Competencies**

Clinical competencies can be defined as “the demonstrated ability to perform a clinical task or to explain and discuss a clinical concept. These skills are usually acquired in a clinical setting or in the context of patient care” (Chambers 2004, p. 342). Chambers asserts that competence develops through four stages, which are beginner (unconsciously incompetent), novice (consciously incompetent), competent (consciously competent) and expert (unconsciously competent). This progression usually takes up to ten years to develop after graduation. In light of the above, the most feasible end-point for a newly-qualified graduate would be consciously competent.

In the next section, the clinical competencies required for a beginning independent dental therapist was evaluated. The School Module Portfolios were examined to locate where in

the curriculum these functions were presented, how they were presented, how they were assessed and recorded, and how competence was assured. The clinical competencies 1 – 9 have been tabulated in Annexures 21 – 29.

This information was combined with the quantitative data obtained from the Competency and Module Evaluations. Statistics showing the number of patients treated by students at the training hospital was added to the data (Annexure 30: Patient Statistics). Pass rates for the years 2007 – 2010 were obtained from the Data Management Information system (UKZN, 2010). However pass rates were only obtained in the modules run by the School.

The qualitative interviews obtained from the students and academics complemented these statistics. The combination of the multiple methods of data collection provided a more comprehensive overview of the effectiveness of the dental therapy curriculum. This picture provided the researcher with greater confidence to generate the inferences of this study

## **Clinical Competency 1: Diagnosis and Treatment Planning**

### ***Content Analysis (Annexure 21; Table 20)***

Foundational knowledge was developed in the basic and preclinical sciences, and clinical competency was developed by exposure through all the clinical modules. Integration of this competency occurred in the final year module Diagnostics and Radiology, where pass rates were usually over 80%.

On appraisal of the content of the basic, preclinical and clinical modules, it was found that many of them were overloaded with irrelevant material. In the basic sciences, the Anatomy module provided students with detailed knowledge of the subject. This was because many different disciplines in the Faculty of Health Sciences were taught by common lectures.

In the second year module Oral Medicine, Oral Pathology and Clinical Pharmacology, students were expected to know a wide range of dental conditions. There was little emphasis on the most common oral conditions such as the oral manifestations of HIV/AIDS, oral cancers and NOMA. There was no clinical component to this module, and students learnt this module by lectures only, with little access to patients.



The aim of the module General Medicine and Special Patients was the management of medically-compromised patients in the dental setting. Even this module was primarily didactic in nature, with little exposure to patients. The didactic nature of these modules resulted in an overcrowded timetable, especially in the first and second years.

In the development of this competency, students should be able to show competence in decision-making, clinical reasoning, and the ability to provide a provisional or definitive diagnosis of the condition. They must be able to correlate all the findings (medical, dental social, cultural) in order to compile an appropriate treatment plan. They should also be able to recognize their limitations, and to refer patients appropriately to other health professionals where necessary. However due to the overcrowded timetables, students did not have time to develop these competencies.

### ***Student Competency Evaluation (Annexure 21, Table 21)***

Student responses to the question “*Are you competent to diagnose and refer patients correctly*” showed that 80% rated themselves “very good or above.” None of the respondents rated themselves below average.

When they were asked “*whether they were able to develop an appropriate treatment plan,*” over 90% rated themselves as “very good” and above. This competence was rated highest by students amongst all the variable of the competency evaluation.

### ***Student Module Evaluations (Annexure 21, Table 22)***

The module Diagnostics and Radiology was assessed by students on a rating scale of 1–5, where 1 indicated *Strongly Disagree* and 5 *Strongly Agree*. This data showed that students believed that they had learned something valuable in the module, and the workload was not too much. They did not find the module very difficult, and clearly understood the objectives. They believed that the course materials were well prepared, and felt competent to treat patients holistically and appropriately in independent practice. Students generally believed that the preclinical and clinical components articulated appropriately and that their clinical skills and competence in this function were appropriately developed.

### ***Patient Statistics (Annexure 30)***

The statistics obtained from the training hospital revealed that 4 908 patients had undergone examination and charting by students in 2010. This figure is considered to be high in light of the fact that only students from the second and third years provide this service.

All three sets of quantitative data complemented each other in regard to the fact that students felt competent in Diagnosis and Treatment Planning.

### ***Qualitative Interviews***

However, the focus group discussion contradicted some aspects of the quantitative data. Many students expressed the view that in the first year, they did not understand the relevance of their modules in the basic and preclinical sciences. One student, Pretty said

*At first you study all those subjects, but you wonder where is it going. Only in third year, at the end of the year, where we have covered everything - you know when we were doing physio, only now you realize why we did it.*

In the focus group discussions, students raised the problem of learning oral pathology by lectures only, without seeing clinical cases. Student John argued

*if we come across pathology cases, we would be confused. If we see lesions, I think it will make more sense. The problem is we don't see lesions.*

A concern raised by an academic who taught in the Diagnostics and Radiology module was that teaching still occurred in compartments. Mrs Lawrence said that because of the way the curriculum was arranged

*Students still tend to think in compartments. Even when we try to get them to look at it holistically some of them still think in compartments.*

When she was asked about whether they trained the students by discipline, she answered affirmatively. However she said: “*when we do the lecturing we try to incorporate the other subjects as well.*”

A graduate, Vuyo, argued that the holistic management of the patient needed improvement.

*You will get an apprehensive patient, but for you to carry on, you will need to cool the patient down and assure him that you are not going to hurt him in any way. You just want to treat him. So I will also suggest that there should be a little bit of counselling or communication. . . . because you will deal with the patient holistically rather than just focusing on the tooth.*

### ***Inference***

The School Module Portfolios showed that this competency was developed from the first to the third levels with increasing levels of difficulty. In the first year, students gained foundation knowledge in the basic sciences. Similarly students were introduced to the preclinical sciences in the Oral Biology module; where they were informed about the morphology, spatial and functional relationships of the human dentition to its surrounding structures.

On appraisal of the form and content of the first-year modules in the basic and preclinical sciences, it was found that the content was delivered as lectures and practical demonstrations. The content was available in textbooks and course packs. The psychomotor skills required in the recognition and reproduction of tooth morphology was obtained by carving teeth from wax blocks and plasticine. Most learning at this level appears to be decontextualized with little direct clinical application. This finding was corroborated by the concerns expressed by the students in the qualitative interviews.

## **Clinical Competency 2: Primary Preventive Measures**

### ***Content Analysis (Annexure 22, Table 23)***

Primary preventive measures were introduced to students in the first year in the form of lectures, practicals and preclinical training, in the module Cariology, Periodontology and Prevention. Pass rates in this module varied from 69% and above. In the second year, students worked on adults, children and disabled patients in a continuation of this module. Pass rates for this module was generally higher than in the first year. The preventive skills were enhanced in the final year, where students incorporated them into their clinical

sessions in Restorative Dentistry and Minor Oral Surgery, as well as in the outreach programmes.

### ***Student Competency Evaluation (Annexure 22, Table 24)***

The student responses to the question about whether they were competent to “provide health promotion and oral disease prevention” revealed that just over two thirds of the students believed that they were competent to provide these functions. Similar results were obtained for the function “able to implement preventive care.” However over 70% believed that they were “competent to provide maintenance service.”

### ***Student Module Evaluation (Annexure 22, Table 25)***

The student’s perceptions of the Cariology, Periodontology and Prevention module showed that most students believed that they learnt something valuable in the module, and that it was not difficult. The workload was not too much, and they clearly understood the objectives of this module. An average number believed that the course materials were well prepared. High scores were obtained when students were asked about their competence to treat patients holistically and appropriately in independent practice. They felt that preclinical and clinical training articulated appropriately, and that their clinical skills were adequately developed.

### ***Patient Statistics (Annexure 30)***

Patient statistics revealed that the students had treated a significant number of patients in this competency. Over 2 500 patients were treated for oral hygiene instructions, fissure sealants were applied to 549 teeth, and 221 patients were provided with fluoride treatment.

### ***Qualitative Interviews***

An academic, Dr Crystal, believed that students were adequately exposed to health education and promotion, and prevention programmes. She argued that

*students run community projects on specific sites that have been identified; this will be your institutionalized patients, crèches, primary schools, hospitals, old age homes, special need schools, primary health care centres. Students spend four sessions per two hours per week for*

*approximately twenty-five weeks. Apart from that we also have other forms of community engagement where students are involved in oral health programmes in partnerships with dental companies such as Colgate.*

However Professor Philips, a previous dean at this School, believed that the curriculum deflected away from preventive care

*I don't think that we probably give them enough community experience during their training. I don't think that those principles we inculcate in them, you know once they finish . . .*

He elaborated that dental therapy graduates believed that their two main functions were fillings and extractions. Other issues such as health promotion and prevention were the responsibility of the oral hygienist. He believed that the emphasis was placed on attaining competence in technical procedures

*They will fill and they will extract and I think they go away with that philosophy. And they say oh, the other things are for the hygienists. So I think there is a lot wrong with our training in this regard.*

## ***Inference***

The content analysis provides evidence of the development of competence in regard to preventive care. The qualitative interviews with academics corroborate this evidence. However the quantitative data obtained from student surveys contradicts this evidence as students did not display overwhelming confidence in this competency. This may be explained by the views expressed by the dean (Professor Philips) and the employer (Dr Jones). Both of them believed that dental therapists do not consider health promotion and prevention to be their core functions. They believed that dental therapists regarded these functions to be the responsibility of the oral hygienist.

## **Clinical Competency 3: Scaling and Polishing**

### ***Content Analysis (Annexure 23, Table 26)***

This competency is developed in the Cariology, Periodontology and Prevention module in the first year in the form of lectures and preclinical training. These skills are developed

further when students start working on patients in this module at the second level in the clinical setting. Pass rates in the first year is moderately lower than in the second year, which can be attributed to the articulation gap between school and university.

### ***Student Competency Evaluation (Annexure 23, Table 27)***

Student responses to the question about whether they were competent to “provide health promotion and oral disease prevention, able to implement preventive care” and “competent to provide maintenance service” have been discussed in the previous competence.

### ***Student Module Evaluation (Annexure 23, Table 28)***

Students perceptions of the Cariology, Periodontology and Prevention module have also been described in the previous competency.

### ***Patient Statistics (Annexure 30)***

The statistics showed that students treated 963 patients for scaling and polishing. This figure is considered to be high as clinical exposure in this competence is only performed in the second and third years.

### ***Qualitative Interviews***

The qualitative interviews echoed the sentiments obtained in the previous competency Primary Preventive Measures, where academics believed that students had adequate exposure to this competence. However students complained bitterly in the focus group discussions about “*doing too much scaling the whole of the second year.*”

### ***Inference***

The content analysis provides evidence of the development of competence with regard to scaling and polishing. This skill is especially important due to the high levels of periodontal (gum) disease in South Africa, which will be attributable to poverty (Gugushe, 1998), as well as to the oral manifestations of HIV/ AIDS.

## **Clinical Competency 4: Restorative Dentistry (Direct Procedures)**

### ***Content Analysis (Annexure 24, Table 29)***

The direct restorative procedures or fillings are one of the main methods used to treat dental caries. The development of this competency begins in the first year, where students become acquainted with the normal anatomy of the teeth and surrounding structures in the module Oral Biology. Students then learn about the aetiology, pathology, clinical features, management and prevention of dental caries in the module Cariology, Periodontology and Prevention, which runs over the first and second years. In Clinical Practice, students assist and observe senior students and clinicians performing restorative dentistry. In the second semester of the second year, students do a lecture-based theory module covering mainly dental materials. Students do not perform any preclinical and clinical work in the first two years of their studies.

In the third year, students train for six weeks in the preclinical component on mannequins in the preclinical laboratory. They have to successfully complete a theory and practical examination, after which they are allowed to work on patients. For the next six weeks, students treat patients in the clinic on a daily basis. During the six-week mid-year vacation, students spend two weeks working on the Phelophepa Health Train in rural areas, and two weeks working in the training hospital.

The development of this competence is attained by daily clinical assessments by the supervisor and student. Four clinical examinations are conducted, at the end of each term. The final examination comprises of a two-hour theory paper, an objective structured clinical examination (OSCE), a patient-based clinical examination and an oral. The examination is conducted by two internal and one external examiner. The pass rates in this module is considerably lower than in most other modules, which can be attributed to the technical skills necessary as well as the short time span in which this competence is developed.

### ***Student Competency Evaluation (Annexure 24, Table 30)***

Student responses to the question “Provides curative and surgical treatment” showed that just over 70% rated themselves as “very good” or higher.

### ***Student Module Evaluation (Annexure 24, Table 31)***

Most students believed that they learned something valuable in the module, but many believed that the workload was too much. It was the only module that students found to be difficult. Most students clearly understood the module objectives, and found that the course materials were well prepared. However, most students felt competent to treat patients holistically and independently. They believed that the preclinical and clinical training articulated appropriately, and that their clinical skills with respect to this competence were well developed.

### ***Patient Statistics (Annexure 30)***

The hospital statistics show that for the first six months, students do very few or no fillings as they are involved in preclinical training. Even when they start working on patients, the patient numbers are very low in the first few months. It is only after July that patient statistics increase as students become more competent. This information is a cause for concern because it takes longer than six months to develop competency in restorative procedures (Chambers & Glassman, 1997).

### ***Qualitative Interviews***

The academic, Ms Chetty, was confident that students were competent in this module:

*In Restorative we have a six to seven week preclinical training session where the student cuts cavities on plastic teeth. The last two weeks of the preclinical, the student works on mounted natural teeth so that they get used to the enamel and the normal anatomy of the tooth. Thereafter the students work on patients. I think there is articulation in the preclinical and clinical training because by the time the student reaches July, they are competent enough to go and work on the Phelophepa train and we get feedback that is very positive from them.*

However Dr Barry, also from this discipline, expressed the concern that the clinical training time was too short

*We have to actually think about it roughly in terms of basically one year of experience that they have . . . in that time, they get the basic training and*



*when they leave our facility, they have a basic training. Basic, in the sense that they are able to diagnose and manage conditions that they can in Restorative Dentistry. They know when they are not supposed to do things. . . . And they can manage adequately with that . . . clinical skill is something that develops over a period of time and the more we do, the better it will become. . . . But I think one year is a bit of short time if you think about it. But what we do is, we provide them with basic skills so that they are not a danger to themselves and the community out there.*

However, Ms Chetty reaffirmed that three years training was sufficient to develop competence for dental therapists

*Therapists only fill teeth. They do not do crown and bridge work and the complicated stuff. So basically three years is sufficient for what they are trained in.*

When Dr Barry was asked about the articulation between the preclinical and clinical components, he replied:

*Pre-clinical and clinical are totally different things in restorative. . . . well not total different. . . . it does simulate clinical conditions to an extent. But there is the whole added dimension when you actually start working on a patient about the tongue and saliva and the muscle movements and all that sort of things.*

However he believed that the preclinical component was very important, because “it doesn’t make sense to go immediately and start working on patients.” He added that this component “gives a student a chance to get to know how to work, how to hold the hand piece . . . how to work without injuring the tissues.”

Students in the focus group discussion complemented these sentiments:

*the preclinical and clinical are completely different. In the phantom head room, you learn how to cut a cavity, but when you work on the patient, it’s completely different. There’s tongue and saliva, and exposure.*

A graduate Sibusiso corroborated these statements, when he said:

*when you start, you have to go through certain stages. So phantom head played a major role because that is where you get your practice - like you become hands-on, it played a crucial role in ensuring that we become better therapists before even treating the patients.*

However Dr Barry felt that training in this module was made easier because students in the third year already had experience working on patients, in the second year Cariology, Periodontology and Prevention Module:

*Fortunately, in the second year, they already had a year of working on patients. But basically that's with the scaler and things like that. It's just that the high speed handpiece can be a little bit more dangerous - if I can use that word. But I think it does come together. It takes a little bit of time to make that adjustment from preclinical to clinical.*

These sentiments corroborate and thereby triangulate the results obtained from the quantitative data with regard to the high workload and level of difficulty expressed by the students.

### ***Inference***

On appraisal of the School Module Portfolios, the Restorative Dentistry theory component only started in the second semester of Level Two. Preclinical training only began in the third year, and lasted for the entire first term. Students had to develop competence in this area before being allowed to work on patients. Therefore, clinical competency was developed over a period of six to eight months.

### **Clinical Competency 5: Minor Oral Surgery**

#### ***Content Analysis (Annexure 25, Table 32)***

The basic science modules such as Anatomy and Physiology provided the foundational knowledge for the development of this competence. They cover the normal structure and functions of the human body. The development of clinical competence starts in the first year, where students observe and assist their seniors and clinicians in the clinic. In the

second year, students are introduced to abnormal conditions in subjects like Pathology, General Medicine, Oral Medicine and Oral Pathology. Basic techniques in local anaesthesia and extractions are also demonstrated at this level.

In the third year, students have a three week preclinical training period, after which they start working on patients in the clinic. Students undergo daily clinical assessments, and the final examination comprises a theory paper, an OSCE, a patient clinical examination and an oral. The pass rates range between 90 to 100%.

### ***Student Competency Evaluation (Annexure 25, Table 33)***

Student responses to the question “Provides curative and surgical treatment” showed that just over two-thirds rated themselves as “very good or above.” However this competency included both Minor Oral Surgery and Restorative Dentistry. The latter has been identified as a difficult subject with a very high workload.

### ***Student Module Evaluation (Annexure 25, Table 34)***

Most students believed that they learned something valuable in the module, the workload was not too much, and it was not considered to be difficult. Most students clearly understood the module objectives, and found that the course materials were well prepared. The responses proved that students felt competent to treat patients holistically and independently. They believed that the preclinical and clinical training articulated appropriately, and that their clinical skills with respect to this competence were well developed.

### ***Patient Statistics (Annexure 30)***

The hospital statistics showed that students conducted over 7 000 extractions during their third year of training in 2010. This figure is considered to be high, and can be attributed to the large patient numbers that attend the training hospital. All three sources of quantitative data complement each other in confirming that students are considered to be competent in this function.

### ***Qualitative Interviews***

The qualitative responses of Mrs Ally, the module coordinator, corroborated the views of the quantitative data. She believed that students were competent because they treated

patients at the hospital as well as at community level because they “go once a week, on a Friday to the St Wendolins Clinic.” She added that they also

*go on the Phelophepa Train for two weeks at a time, each student goes for two weeks and they are exposed to dental education, to extraction, scaling and polishing etc. they do that at the community level.*

She added that their level of competence really improved when they returned from the Phelophepa experience. Another academic from this discipline, Dr Alan, believed that due to the high number of patients treated at the training hospital, students were exposed to a wide variety of patients. Dr Alan believed that students were clinically competent because

*they are exposed to rigorous clinical training in the sense that they are exposed to about four times a week, four two-hour sessions per week, and they develop the skills quite nicely by the end of the year.*

Both academics from this department concurred that the preclinical and clinical components articulated appropriately. Before students are allowed to work on patients in this discipline, they have to undergo a preclinical test. Mrs Ally stated that students need to have a 70% pass in order for them to start working on patients:

*All the theory based on minor oral surgery, oral surgical principles, mechanical principles involved in exodontia, etc., and immediately they pass that, they can start working on patients. And they start right at the beginning of the year in the third year and they get enough exposure to patients. So the preclinical and clinical training articulate very well. What they learn in their preclinical sessions, they practise that in their clinical sessions.*

Dr Alan argued that students were competent because

*great emphasis was placed on normal structures in oral biology and anatomy and physiology in the first year. When they come to the second year, they learn to bridge the normality to understanding of abnormality . . . preclinical period brings a little bit more clarity of making pretty clear distinctions of normal structures to abnormal structures.*

However both academics from this discipline believed that students “*struggle with integrating the basic with the clinical sciences.*” However they asserted that students were well supervised in the clinic, where the staff: student ratio was 1:4. Students were therefore able to receive “*individual attention, and if they find that they do have a problem, the supervisor is there to actually help with this integration of knowledge.*”

### ***Inference***

From the content analysis, quantitative data and qualitative interviews, it is evident that students and academics believe that students are competent to perform this function.

## **Clinical Competency 6: Dental Therapeutics**

### ***Content Analysis (Annexure 26, Table 35)***

Dental therapeutics encompassed the common medications used in dental treatment. The General Pharmacology component is taught by the Pharmacology Department of the University, as part of the second year module Oral Medicine, Oral Pathology and Clinical Pharmacology. Students learn about the pharmacology of the medications which are within the scope of practice of dental therapists. At the third level, the clinical application and prescription of these medications are taught in the single semester module called Medical Emergencies and Clinical Pharmacology. Pass rates in this module are also very high. Competence in the clinical application of medications is extended in the Minor Oral Surgery module.

### ***Student Competency Evaluation (Annexure 11, page 376, no.8)***

Data obtained in response to the functions “provide pain control and medical emergency care” revealed that over 80% of the Class of 2009 and 2010 rated themselves as “very good” and above. Students therefore believed themselves to be competent in this function.

### ***Student Module Evaluation***

This module was not included in this assessment due to the fact that it was not considered to be an exit-level clinical module.

## ***Patient Statistics***

The data management system of the training hospital does not capture these statistics.

## ***Qualitative Interviews***

The qualitative interviews with students and graduates showed significant levels of frustration with regard to this function. They believed that they had studied for a comprehensive module in General Pharmacology in the second year, and the application thereof in Clinical Pharmacology in the third year. However they were not allowed to prescribe any medications. Personal communication with academics teaching this module indicated that this problem was a “political” one. The Dental Therapy Professional Board of the HPCSA had approved prescription of common medications used in dentistry. However the Pharmacy Regulatory Board did not accept this function as they believed that dental therapists only had “a three-year degree,” and therefore were not allowed to prescribe.

A student Brandon stated emphatically:

*The most frustrating thing - it is antibiotic coverage. How are we supposed to provide holistic treatment to patients if we are unable to give them the basic antibiotics? If we are not allowed to prescribe on our own, the patient comes to us with a periapical abscess for extraction, what are you gonna do? They are in severe pain, what are you supposed to do? Say no and he will go down the road to see the next guy for the same thing. You know the dosages and you know what to prescribe. You ask them to go to the dentist for medication, you think they gonna come back to us for the extraction? I don't think so; they will go to the person who relieved his pain.*

## ***Inference***

The School Module Portfolios and clinical training showed that students have had adequate exposure to develop competence in dental therapeutics. The ongoing frustrations among graduates regarding the prohibition on prescribing by the Pharmacy Council has resulted in dental therapists doing so anyway, thereby working outside their scope of practice. If dental therapists are to work in underserved and rural areas, they will be

unsupervised. Therefore it is imperative for them to be able prescribe at least basic medication for the relief of pain and sepsis.

## **Clinical Competency 7: Dental Radiography**

### ***Content Analysis (Annexure 27, Table 37)***

Competency in this module was developed from the first to the third years, and involves the techniques used in the taking of radiographs. In the first year, students learn the various techniques by lectures, practical demonstrations, and preclinical experience on mannequins. In the second year, students gain clinical experience by working on patients. Clinical exposure is continued into the clinical modules in the third year. Pass rates of between 95–100% are considered to be very high.

### ***Student Competency Evaluation***

No questions were asked in the curriculum map specifically on this competency because it was considered to form a part of the Diagnosis and Treatment Planning module

### ***Student Module Evaluation***

This module was not included in this quantitative assessment due to the fact that it was not considered to be an exit-level clinical module as it was completed in the second year.

### **Patient Statistics (Annexure 30)**

Student statistics in this function was very high. In 2010, second and third year students recorded taking 6 564 intra- and extra-oral radiographs during the clinical sessions.

### ***Qualitative Interviews***

The interviews revealed that students and academics were satisfied with this module. However no other significant information emerged from the interviews.

### ***Inference***

Pass rates of between 95 to 100% in the clinical component of the Radiography module combined with the high patient statistics demonstrated that students should be competent in the taking of radiographs. No additional quantitative and qualitative data was obtained

due to the fact that this module was completed in the second year, and the quantitative interviews only covered modules that students completed in their third year of study.

## **Clinical Competency 8: Children's Dentistry**

### ***Content Analysis (Annexure 28, Table 38)***

The content analysis of the module portfolios revealed that the management of children was covered as minor components of the various modules. An example is Pedodontics (Children's Dentistry), which was taught in just six lectures as one of the specialties of the module Diagnostics, Infection Control and Dental Specialties. The management of the disabled child was covered in the module General Medicine and Special Patients. As a result, there was no significant evidence of teaching, learning and assessment in the management of child patients.

### ***Student Competency Evaluation***

No questions were asked in the competency evaluation specifically on the management of child patients.

### ***Student Module Evaluation***

This module was not included in this quantitative assessment due to the fact that it was not considered to be an exit-level clinical module.

### ***Patient Statistics (Annexure 30)***

The hospital data system only records 'Headcount under 5 years' and 'Headcount 5 years and over.' The Headcount under 5 years was very low at 129. It can be assumed that the application of fluorides and fissure sealants would have been done on child patients, but there is no evidence to support this evidence.

### ***Qualitative Interviews***

These low statistics were a matter of concern, especially in light of the fact that the treatment of children was considered to be one of the focus areas in the NHI; and dental therapists were responsible for the management of children in many countries (Nash et al., 2008; Satur et al., 2009).



A public sector employer Dr Patel argued that dental therapists should work in schools as in New Zealand and Australia (Nash et al., 2008):

*I think the training should be geared so that they treat children only at schools. It's a radical thing, but it will work.*

He went on to say that children did not present to the dental clinics unless in an emergency. Some of the barriers to children attending public sector clinics were the high fees charged by some hospitals, travelling costs to and from clinics, parents do not know the value of preventive care, and that toothpaste and brushes are expensive:

*No amount of training of hygienist, therapists, dentists is going to make an impact on the oral health of the people . . . no amount of training of therapists is going to make an impact until maybe they are limited to the treatment of children in the public sector. When they are trained, they should train on children and then they leave, they should treat children only.*

### ***Inference***

It is clear that there is a lack of focus on the management of the child patient in the curriculum. This is considered to be a serious deficit in light of the national oral health surveys (van Wyk & van Wyk, 2004) and the international literature (Nash et al., 2008).

## **Clinical Competency 9: Emergencies in the Dental Practice**

### ***Content Analysis (Annexure 29, Table 39)***

The modules in the basic sciences (Anatomy and Physiology) form the foundation modules for the development of this competence. In the second year, the students do a short First Aid course for non-examination purposes. In the third year, the Medical Emergencies module was introduced at the request of the HPCSA when they allowed dental therapists to work independently in private practice in 1992. This module is taught by Emergency Medical Practitioners from the School of Medicine. The pass rates in this module are deemed to be high.

### ***Student Competency Evaluation (Annexure 29, Table 40)***

This module was assessed as part of the function “*Provide pain control and medical emergency care.*” Most students felt competent to provide such care.

### ***Student Module Evaluation***

This module was not included in this assessment due to the fact that it was not considered to be an exit-level clinical module.

### ***Patient Statistics***

No data was recorded in this regard in the hospital data system.

### ***Qualitative Interviews***

Since this module is considered to be of a short duration, no student or academic views were obtained.

### ***Inferences***

The content analysis and the excellent pass rates indicate that the competence of students in regard to the emergency care of patients is well developed from the first to third level.

The process evaluation of the School Module Portfolios, with respect to the prescribed general and clinical competencies, has brought to the fore several strengths and weaknesses. These will be discussed in the final chapter.

The Hicks model suggests that the profile of academics have a significant influence on the curriculum. Therefore in the following section, the profile of the governance and functions of academics in the school will be discussed.

## **6.3 PROFILE OF ACADEMICS IN THE SCHOOL**

### **6.3.1 Management and Organizational Structure**

The School of Dentistry and the Oral and Dental Training Hospital are managed by a joint Head of School/ Head of Hospital. This is the policy of all dental schools in the country. The Head of School reports to the Dean of the Faculty of Health Sciences. The Head of

Hospital reports to the Department of Health. This person is responsible for both the academic and service functions.

The Academic Coordinator manages the teaching and learning components, and reports to the Head of School. Three level coordinators are responsible for the day to day running of the School, and reports to the Academic Coordinator.

### **6.3.2 Number of Academics**

On comparison of the original human resource organogram of the Oral and Dental Training Hospital, and the current university handbooks, it appears that the number of academics has undergone a significant level of attrition over the past 30 years. All senior posts have been “frozen” for almost 15 years. All academics up to 2009 have been employed by the Department of Health. This pattern of employment has been due to a Joint Health Agreement (University of Durban-Westville & Natal Department of Health, 1979). This Agreement states that all personnel, facilities, infrastructure and consumables should be provided by the Department of Health. In return, all staff was expected to treat patients at the hospital and provide outreach programmes to the community. Personal communication with Dr Alan, who has also been a previous hospital manager, has shown that the training hospital is one of the busiest in the country, and treats approximately 35 000 patients annually.

### **6.3.3 Type of Academics**

The academic complement comprised of six dentists, six dental therapists, five oral hygienists, one radiographer and an academic development officer (ADO). The role of the ADO is to provide support to students in regard to personal, academic and social problems. In addition, the university employed 15 part-time clinicians (dentists, therapists, hygienists) to do clinical supervision. A dietician and an attorney conduct lectures in their respective fields.

The basic sciences (Anatomy, Physiology, Microbiology, Pharmacology) are conducted by service departments of the University. Dr Barry stated that due to the fact that they have to use staff from the Department of Health, it was *“not always possible for us to pick and choose who we want, so we manage with the resources that we have at our disposal.”*

The academics are supported by dental assistants, professional nurses, financial and human resource practitioners, three technicians and two administrative officers.

#### **6.3.4 Qualifications of Academics**

Because of the high staff turnover, only one academic had a PhD, and three were currently reading for a PhD. Three of the academics had a Master's degree, and two were currently studying for it. Most of the other staff was involved in some academic activity such as post-graduate diplomas. All staff have been encouraged by the university to credential themselves up to PhD level. This requirement has been difficult to implement due to staff being employed by the Department of Health. This constraint has resulted in a low level of research productivity in the School.

In view of the problems just mentioned, the university has employed four full-time academics. The School chose to employ three dental therapists and one oral hygienist. Their role was to coordinate the academic activities of the School, as well as to produce research and to credential themselves up to PhD level. When the academic dental therapists were asked about their job satisfaction, Ms Chetty responded “*now that I'm involved with training students, this is my new career and I love it.*” This contentment may be due to the fact that they are not being exposed to the constant tug of war between the Department of Health and the University. Another significant factor was that they could serve as role models for the students that they train. Previously all training was performed by dentists with the assistance of oral hygienists.

Mr Mkhize, from the Regulatory Body, who is also a dental therapist, stated:

*My biggest concern is who is the trainer of the dental therapist in this country? Obviously is the dentist. It's the dentist who is training our therapists in the country, who lose the dignity of dental therapy in them. So for our professionals to be proud and have the dignity of the profession, the like must produce the like. It's instrumental.*

When he was informed that this university had employed dental therapists as academics, he was delighted.

### 6.3.5 Experience and Teaching Styles

When academics (dental therapists and non-dental therapists) were asked in the qualitative interviews about their experience and background in the field of education, all of them replied that they did not have any formal training in education. Ms Lawrence stated:

*I started off as a clinical supervisor in teaching the students on a one-to-one basis, and then from there I progressed to doing group work with them, and then now I lecture as well to the students.*

However Ms Ally emphasized that her discipline was very specific:

*We do lectures in the form of PowerPoint presentations and we do a lot of tutorials and small group work studies and research projects as well . . . we do mainly clinical training where students are taught a certain procedure under supervision by an experienced supervisor, a dentist or a therapist. And they also do self-study where they get seminars to work on, and they are allowed to present their seminars in front of trained supervisors and lecturers and they also do group work – small group work, and they also do outreach programmes as well as part of their training.*

When she was asked which aspect the students enjoyed most, she responded:

*They like the clinical aspect of it because it is relating all the theory that they have learned and they are using that knowledge that they have learned in their theory. They enjoy the clinical aspect of their training very much.*

With regard to assessment, she maintained that she followed proper educational principles:

*We have proper lecture schedules, module guidelines . . . so we do follow basic education principles . . . we have no training in education, but we have adequate courses that we attend where we learn about these new assessment criteria, new teaching and learning criteria and we follow these.*

Dr Crystal corroborated these findings:

*There is a strong theoretical component with measurable outcomes that evaluate both students and fellow staff members . . . the module guidelines are reviewed on an annual basis and we also look at the assessment criteria, the notes, the lecture schedules etc.*

However Mr Findley strongly believed that “*education in academia and education formally are two separate worlds.*” He believed that educators at the tertiary level must be someone who “*can inspire and be well-versed in their area. They are looking for someone with a deep understanding of practice as opposed to textbook knowledge.*” He went on to say that it was important to be educated by university academics as well as by practising professionals. He said that “*it’s the marrying of the two parts that allows for balance. If one has the balance, then one can also practise ethically.*”

It is evident that, even though all academics are dental professionals, they lacked formal training in education. However they have upgraded their skills by attending short courses on assessment, teaching and learning, e-learning, which are conducted by the university.

## **6.4 INSTITUTIONAL CONSTRAINTS**

An evaluation of the training hospital showed that most of the equipment, facilities, and learning materials supported student learning.

### **6.4.1 The Library**

An appraisal of the library revealed that it contained a wide spectrum of textbooks and journals. There was a reading area for student self-study. This area contained a photocopier as well as computers which had access to internet and e-mail.

### **6.4.2 Lecture Rooms**

The two lecture rooms adequately supported the teaching and learning methodologies used in the School.

### **6.4.3 Student Common Rooms**

At the hospital, students have an adequate common room. However, in light of the fact that students are located at the training hospital for the second and third years of study, they have very little interaction with “campus life.”

### **6.4.4 The Clinical Area**

The clinical area used for student training has 17 dental chairs which can accommodate both left and right handed clinicians. There are approximately 25 students in the second year and 15-20 in the third year. As a result, only a limited number of students can be trained per clinical session. The low number of dental chairs has resulted in a greater number of clinical sessions per day, resulting in a larger number of clinical supervisors required.

On examination of the clinical area, satisfactory infection control procedures were evident. Equipment and infrastructure appeared to be adequately maintained by an on-site technician. The radiography area appeared to be well equipped with high-technology conventional and digital intra- and extra-oral X-ray machines.

### **6.4.5 Preclinical Laboratory**

This laboratory is situated on the Westville campus, which is approximately ten kilometres away from the training hospital. Students are transported to and from the hospital by university buses. The laboratory comprises 24 individual stations with mannequins for clinical procedures. Three radiography mannequins provide for preclinical training in this discipline. A fully equipped surgery supports training in patient positioning and comprehensive patient care. The laboratory also has a mini-library to complement the preclinical training.

### **6.4.6 Timetables**

On appraisal of the timetables in the first, second and third levels of study, it was found that they were overloaded, leaving little free time for students. This can be attributed to the fact that modules in the basic sciences (anatomy and physiology), as well as in the clinical sciences, were overloaded with redundant information. This “bloated” curriculum was typical of dental schools internationally (Kalkwarf, Haden & Valachovic, 2005, p. 1086).

The reasons cited for this bloating was the “conflicting demands by the various disciplines, pet interests of teaching staff, and rapidly changing technological advances” (p. 1086).

The appraisal of the timetables, especially in the second year, showed that students often did not have a designated tea or lunch break. On some days, they attended lectures continuously for three to four hours. Many of them used their clinical sessions as a time to take a break. It is acknowledged by students and academics that the curriculum was too full. This often led to academics “teaching to the test,” resulting in students learning what was required for that assessment (Kalkwarf et al., 2005, p. 1086).

#### **6.4.7 Telemedicine Facilities**

The training hospital is located within the King George V Hospital Complex. On examination of the available resources within this complex, a fully-functional telemedicine facility was located adjacent to the training hospital. It was linked to most rural hospitals in this province.

### **6.5 ACCESSIBLE ONLINE RESOURCES**

Students have access to only five computers with internet and e-mail facilities at the training hospital. However on the main campus, there are an adequate number of computer LANS with internet and e-mail facilities. Some modules utilize the moodle online learning programme for student communication. Personal communication with academics show that some staff are undergoing training in online learning, and it is hoped that all communication with students will be accessible online by the end of 2012.

Up to this point, all the influences on the curriculum proposed by Hicks (2007) have been evaluated with respect to the dental therapy curriculum. This has provided results to the second critical question:

*How does the curriculum at this university prepare its graduates to fulfil its role in the South African health care system?*

In the next section, the perceptions of all stakeholders will determine whether the training of dental therapists is appropriate to meet the needs and challenges of the health care system of South Africa.



## 6.6 APPROPRIATENESS OF TRAINING TO MEET THE NEEDS AND CHALLENGES OF THE HEALTH CARE SYSTEM OF SOUTH AFRICA

The final part of this chapter provided the results which could be used to answer the third critical question of this study, which was:

*What are the perceptions of internal and external stakeholders regarding the professional competence of graduates to practise within the health care system of South Africa?*

Four main themes emerged from these interviews.

### Theme 1: Training meets basic oral and dental needs

All stakeholders initially agreed that the training of dental therapists met the basic oral and dental needs of the country. An academic Ms Ally elaborated:

*Yes they do meet it because I do believe that in South Africa today most patients require basic dental treatment and the dental therapist is trained for basic dental treatment, basic dental care.*

When she was asked to define “basic dental care” she replied: “*I think it’s procedures such as extractions, scaling and polishing, restorations.*”

Mr Mkhize, from the regulatory body, also believed that students were appropriately trained:

*Training for dental therapists is fine as it is. We, as the Board of Dental Therapy and Oral Hygiene, have revised quite a number of things in the scope of practice. We have revised areas that need to be improved, and make it appropriate and relevant. The fact of the matter is, if you bring those requirements that will protect the public out there, we as a Board will be very happy with that.*

Sibusiso, a graduate from a deep rural area believed that the training he received at this university was very good. “*I am very very proud to be part of UDW. . . . and the training that I got was excellent.*”

The student Colin reiterated the view of the graduate. He added that because therapists were not happy with their limited scope, many of them practised outside their scope of practice even though they were not trained to perform advanced dental procedures.

*We are trained to provide basic health care and we are trained effectively. But then you see therapists go and do things they are not supposed to. That's because of greed. They want to be something they are not. They want to get rich and they want to do the expensive specialized work. And they are not trained for it. That's the truth - they are not trained for it.*

When the employer Dr Patel was asked this question, he referred me to the two national oral health surveys:

*The treatment needs of the population were identified at that time . . . but the public sector is swamped by adults due to the backlog of treatment . . . this is being done at the expense of children who need that treatment . . . treatment need is not being met at the moment in the public sector . . . the only service we provide in the public sector is extraction extraction extraction.*

## **Theme 2: Gear training towards children**

Dr Patel went on to explain that “if training was geared more towards children and then they were sent out as teams into schools, it would work.” He believed that the public sector was swamped by adults. He argued that treating children in public sector clinics was not feasible as there were many barriers to the attendance of children. He listed some of these barriers:

*some hospitals charge a fee, there are huge travelling costs to and from clinics, follow-ups are never adhered to, parents do not know the value of preventive care, and tooth paste and brushes are expensive . . . no amount of training of hygienists, therapists or dentists is going to make an impact on the oral health of the people . . . and no amount of training of therapists is going to make an impact until they are limited to the treatment of children in the public sector. They should be trained on children and when they leave, they must only treat children.”*

These views were of concern to the researcher in light of the fact that there was so little evidence of the development of this competency in the content analysis of the curriculum.

### **Theme 3: Refocus training toward primary health care**

Professor Philips believed that there was not enough emphasis on primary health care. He said that stress was placed on curative dental care, where there was “*too much of drill and fill, and not enough taught on prevention and education.*” He believed that this led to the perception among dental therapists that health promotion and preventive care were the responsibility of the oral hygienist, and were not part of their work. A similar view was obtained in the student interviews in the content analysis of the curriculum.

Professor Philips also believed that the curriculum did not focus on being a part of a multidisciplinary team. He expressed concern about whether graduates would be able to manage patients holistically, and whether they could diagnose common oral diseases.

### **Theme 4: Increase community-based experience**

Students and graduates agreed that there was a lack of community-based dental experience in the training program. A student Fatima believed that

*We need to go there (to the community) more often because the health care needs in the rural areas are not met . . . A lot of dental therapists work in private sector and there aren't a lot of people who are willing to go to the public sector, and that is where the problem is.*

Another student Pretty reiterated these views in the focus group discussion:

*because of private practice, therapists are no longer going to rural areas. All of them are going to private practice. This profession was not made for private practice, but there are no posts in the public sector. So we have to go to private practice. We would work in public if the posts are there.*

She added that the experience of working on the Phelophepa Health Train opened her eyes to the lack of services in rural areas.

A graduate Sibusiso believed that community-based dental education was needed to improve the oral health awareness of the community:

*Community training is definitely lacking. Because the only thing they know, more especially with the African community, is when the tooth is painful, irrespective of how deep the cavity is, take it out. Even in private practice, I'm always trying to convince to fill teeth. But they say why? Why do I have to fill it? Just take it out.*

He elaborated on the need for community-based education:

*If a curriculum were to include compulsory community work, you will make these people aware. For example, you will find that where I am at Umlazi, it's an African Township. Now you know you talk to people about basic things like brushing, some of them will ask you that hey, but I brushed in the morning, why should I brush at night? You know all those things because there is no proper teaching . . . and the worst part of it is when it comes to private practice, there is no time to sit down with the community. You can only see one patient, deal with them at that point in time and thirty minutes later, they are gone.*

He believed that if there was community-based training, patients would become aware “of what dentistry is all about. We need to make them aware about what's the best thing they can do for their mouth.”

These views were echoed by both dental deans. Professor Philips said:

*I don't think that we probably give them enough community experience during their training and I don't think that we inculcate those principles in them, once they finish.*

Professor Tom provided his views on how this could be achieved:

*If we can anchor the curriculum within dental public health, there should be a lot of experiential learning. Things like service-learning – where they should go and be part of the health service during training – like the Botswana model. So when they go into the workplace (like in training nurses), they fit in almost immediately.*

However the literature on the Botswana model (Croucher et al., 1990) showed that even though training was based on the primary health care approach, students and graduates were less inclined toward the prevention of diseases. They showed a greater interest in curative care and the development of advanced restorative dentistry skills. These views were similar to the South African situation where students and graduates have expressed the need for expanded functions: to make dentures, to do root canal treatment, to provide specialized dental care; which are the functions of the dentist. It must be noted that it is not only dental therapists from this university that have these views. At a conference of the South African Dental Association held in September 2011, in a panel discussion on the dental therapy profession in South Africa, graduates from all dental schools in South Africa expressed the view that they were frustrated by their limited scope of practice. In addition, the graduates from other African countries such as Zimbabwe, Botswana, Swaziland and Zambia, reiterated these sentiments.

The stakeholder perceptions corroborated the conclusions of the content analysis which showed that the curriculum produced graduates competent to perform the technical skills within their scope of practice. However many stakeholders believed that the curriculum did not produce the appropriately-trained graduates to meet many of the oral health needs of the country. These needs included children's dentistry, improving access to disadvantaged communities, and primary health care.

## 6.7 CONCLUSION

In the previous chapter, the first two elements of the Hicks model were evaluated. These were the *historical precedent* and *professional requirements* of the profession. This enabled the researcher to contextualize the profession in response to the first critical question:

*What is the role of the dental therapist in the health care system of South Africa today?*

In this chapter, the remaining components of the Hicks model were evaluated. They included the evaluation of the University and School documents to determine the form and content of the curriculum. The teaching, learning and assessment strategies were examined to see if they were constructively aligned to the prescribed competencies. A profile of the academic staff was created, including details about their number, type, qualifications and

experience. An overview of the institutional constraints and accessible online resources were explored to determine if they had any effects on the curriculum. This information provided an answer to the second critical question which asked:

*How does the dental therapy curriculum offered at UKZN prepare its graduates to fulfil this role?*

In the final part of this chapter, the results required to provide answers to the third critical question were obtained:

*What are the perceptions of internal and external stakeholders regarding the professional competence of these graduates to practise within the health care system of South Africa?*

The answer to this question was that many stakeholders believed that the curriculum did not adequately prepare its graduates to meet many of the oral health needs of the country.

The fourth critical question is: *Why do the stakeholders have these perceptions?* The researcher will provide this answer in the next chapter by theorizing about all the results obtained in this study.

## CHAPTER 7

### DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

#### 7.1 INTRODUCTION

Curriculum is an important topic for public debate. It shapes the society we are and hope to be (Frank T. Rhodes, 2001, p. B10).

The *Two Nations* address of past-President Thabo Mbeki (1998) aptly described the effects of racial segregation and apartheid on the population of South Africa. Poverty and inequality still exist even after the country attained democracy in 1994. The legacy of apartheid has resulted in inequities between provinces, population groups, and socioeconomic status (Coovadia et al., 2009). Even though South Africa has been classified as a middle-income country, it is considered to be a most unequal society (Pressly, 2009).

The Constitution of the Republic of South Africa (1996) has been described as one of the most progressive in the world (Coovadia et al., 2009). The Department of Health has based its policies on the democratic values of human dignity, equality and freedom. The right of access to basic health care is one of the cornerstones of these documents. A recent policy development of the Department of Health (2011b) has been the proposed implementation of the National Health Insurance (NHI). The aim of this policy is to improve universal coverage to health care for the population of South Africa, by improving access to appropriate, efficient and quality health services. It recommends that primary health care should serve as the main mode of health care delivery, and focus on the prevention of disease and the promotion of health.

The implementation of the NHI (Department of Health, 2011b), is based on three main arms: a district-based service delivery model which will provide basic health services at the district level; a school-based primary health care programme which will address basic health issues in schools; and a municipal-based ward-based model which will focus on the provision on health education and promotion within the context of local communities. However details have not been provided about how oral health care will fit into this

scheme. This policy document also recommends that the role and scope of practice of all health professionals should be reviewed, and new training and career paths should be developed. This recommendation has been used to guide this curriculum evaluation study.

The impact of the apartheid legacy on the health care system in general (Coovadia et al., 2009), and on oral health care in particular (van Wyk & van Wyk, 2004), has resulted in inequities in the provision of oral health care to disadvantaged communities. The training of oral health personnel in South Africa has produced inequities between provinces, dental schools, races and by cadre trained (Lalloo, 2007; van Wyk et al., 1994). These authors demonstrate that gross inequities also exist between the private and public sectors, and between urban and rural areas. This situation has resulted in severe challenges in the oral health care system. The Department of Health (2011b) believes that the implementation of the NHI will alleviate these problems to some extent.

The introduction of dental therapists into the health care system of South Africa in 1977 was intended to improve access to underserved communities (Prinsloo, 1993). In many other countries, dental therapists have played an important role in improving access to basic oral health services, especially among children and underserved communities (Nash et al., 2008; Satur et al., 2009). However in South Africa, this has not occurred.

As the researcher has worked within the academic and clinical sectors for over twenty years, she has in-depth knowledge of both scenarios. However she has been aware of the need to maintain an impartial view throughout the duration of the study.

The study revealed that dental therapy graduates from this institution are generally frustrated by their limited scope of practice. This has resulted in their performing specialized dental procedures for which they have no training.

Students often complained about the number of lectures that they sat through each day, and the lack of clinical exposure to the various dental diseases. They believed that their training was focused on the treatment of the two most common oral conditions, which are dental caries and periodontal (gum) disease. They have little clinical exposure to other common oral conditions. The Hicks model suggests that the profile of academics have a significant influence on the curriculum. Therefore in the following section, the profile of the governance and functions of academics in the school will be discussed.



Most of their clinical experience occurs in the training hospital, with little exposure to other work environments. The daily monotony of doing fillings and extractions in order to fill their required quotas was also identified as a problem. Graduates believed that they were competent in the clinical skills. However, many of them said that when they went out into the real world they did not feel competent in the general competencies such as practice management and interpersonal communication.

Most external stakeholders believed that dental therapists have not fulfilled the role for which they were intended. They have not improved access to basic oral health services for disadvantaged communities and children. These stakeholders also believe that dental therapists are generally dissatisfied with their profession, and have entered this career as a stepping stone to dentistry.

*So why do these stakeholders have these perceptions?* This is the fourth critical question of this study. This question will be answered by critically evaluating all the results obtained in this study, and will take into consideration the views of all stakeholders.

The purpose of this study was to explore the dental therapy curriculum offered at the University of KwaZulu-Natal, in order to evaluate whether it was able to produce graduates who were adequately prepared to practise competently, according to the scope of practice prescribed by the HPCSA, and to meet the oral and dental needs of the population of South Africa today.

Before the theoretical framework of this study was selected, the various definitions of *curriculum* were critically examined. This term was no longer considered to be just content, standards and objectives (Posner, 2004). Many curriculum theorists believe that the curriculum is shaped by multiple influences (Barnett & Coate, 2005; Higher Education Academy, 2007; Hicks, 2007). Consequently the curriculum model proposed by Hicks (2007), called “Typical Influences on the Curriculum”, was selected to serve as the theoretical framework of this study. This model included factors such as university, faculty and school documents, the perceptions of students, graduates and academics, the profession and industry requirements, institutional logistical constraints, accessible online resources and the historical precedent in pre-existing programmes.

Taking account of these multiple influences to evaluate the dental therapy curriculum was not possible using either the qualitative or quantitative research method alone. Therefore

the mixed methods research approach was used in this study. This approach was based on the pragmatic paradigm, which allowed for the inclusion of both qualitative and quantitative research methods in a single study. It took into account multiple perspectives, which corresponded with the viewpoints of the Hicks model

The mixed methods approach was used in this study to provide the most “informative, complete, balanced and useful research results” (Burke Johnson et al., 2007, p. 14). Mixing occurred at the levels of data collection, analysis, and in the development of inferences. The typology of research design in this study can be described as a multistrand parallel mixed methods study; where the dominant method was the qualitative (QUAL) component, and the non-dominant was the quantitative (quan) component. Integration occurred in the experiential and inferential stages.

The objective in mixing methods in this study was to achieve three functions commonly associated with this type of research: complementarity, triangulation and expansion. These functions have been discussed in detail in the chapter on methodology. In the next section, the research questions will be discussed.

This study was conducted in four phases: context, input, product and process, which are analogous with the CIPP evaluation model of Stufflebeam (2000). This author believed that curriculum evaluations should not prove, but improve. Evaluations should be conducted for the purpose of improving the curriculum. The results of the evaluation should work for the people they were intended to serve, within the constraints of limited resources.

Cresswell (2003, p. 116) notes one way of presenting the research questions in a mixed methods study is for each question to be “written as an introduction to each phase of the study.” Accordingly, the discussions in this chapter will be provided in relation to each critical question of this study.

## **7.6 DISCUSSION: CONTEXT PHASE**

The context phase provides the answer to the first critical question: *What is the role of the dental therapist in the health care system of South Africa today?*

The first question was answered by examining two elements of the Hicks model: the historical precedent from within and external to the university, and the profession and industry requirements. Qualitative interviews conducted on all stakeholders provided the answer to this question.

### **7.6.1 History of the Profession**

Historical perceptions from within and external to the university clearly demonstrated that from the time of its inception the dental therapy profession has been negatively perceived by the dental fraternity. Key external stakeholders such as the university deans, employers and the regulatory body expressed the view that this profession lacked credibility because it was perceived to be the brainchild of the apartheid government. This perception is inaccurate because dental therapists have been introduced to many countries that did not have an apartheid history. Their function was to improve access to oral health care to disadvantaged communities and children (Satur et al., 2009).

The negative perceptions with regard to the apartheid origins of the profession can be attributed to the choice and location of the ethnic training institutions (Reddy, 1985). This situation has resulted in most graduates being from the Indian or African racial groups. At first most graduates at this institution were of Indian origin, but this situation appears to be changing, and the number of African applicants has increased exponentially over the past ten years. However, the low number of Coloured and White students is a cause for concern, and should be investigated further in a separate study.

Another source for these negative perceptions about this profession is from the dentists. In this study the researcher requested an interview with the South African Dental Association (KwaZulu-Natal branch) and was refused. This perceived hostility towards the dental therapy profession has occurred from its inception. Many dentists perceived dental therapists to be a threat to their practices. This viewpoint is in direct contrast with that expressed by dentists in other countries (Pack et al., 1991). This can be attributed to the fact that in most countries the roles, scope of practice and referral patterns of each member of the oral health team is clearly delineated and members did not impinge on each other's turf (Barmes, 1983).

Presently in South Africa, dentists and dental therapists work in the public and private sectors, performing the same basic dental procedures such as extractions, fillings and

cleaning of teeth (HPCSA, 1993). In addition, dentists perform specialized procedures such as dentures, root canal treatment and crown and bridge. However the public sector employers and the dental deans argued that many dental therapists also attempted to perform these specialized procedures. The academics in the School were adamant that that they do not train dental therapists to perform these functions. The students, graduates and employers assert that dental therapists are trained to work out of their scope of practice by the dentists who employ them.

It is clear that the historical precedence from within and external to the university has tainted this profession to a certain extent. The literature demonstrates that this profession *can* play a valuable role in reducing disparities in oral health care for the population.

## **7.6.2 Role of the Dental Therapist**

In this section, the profession and industry requirements of the dental therapist in the health care system will be discussed. These discussions provide an answer to the first critical question of the study.

The literature demonstrates that the dental therapist has played a significant role in the provision of basic dental services to children and underserved communities in many countries around the world (Nash et al., 2008; Satur et al., 2009). The key external stakeholders held similar views. Their performance of this role would improve access to underserved communities and children. All external stakeholders believed that the introduction of private practice for dental therapists was inappropriate for the South African health care system. It has increased disparities in the provision of oral health care.

The interviewees were asked about the feasibility of combining the dental therapist and oral hygienist, thereby creating the oral health therapist. This suggestion was in line with successful developments in other countries such as New Zealand, Australia and the United Kingdom (Nash et al., 2008). However all interviewees strongly believed that dental therapists and oral hygienists had clearly defined and separate roles in the oral health team of South Africa.

An important factor raised by employees, students and academics was the lack of posts in the public sector. The employer Dr Jones attributed this situation to the fact that oral

health care is regarded by the Department of Health as a low priority area. Lack of financial resources was also cited as a reason.

The new NHI documents make it clear, however, that the appropriate implementation of the NHI could assist in alleviating these problems. Dental therapists can play a significant role in all three streams of the NHI.

### **District-Based Service Delivery Model**

As part of the primary health care team, dental therapists can provide the basic oral health package within the district-based service delivery model. In this study, several interviewees (regulatory body, dental deans and an employer) suggested that each district should have an oral health team which is made up of four to five dental therapists providing basic oral health care at primary level. Oral hygienists should concentrate on health promotion and preventive care at this level. For complicated cases, these personnel would refer patients to a dentist at the secondary level. The dentist, in turn, would refer more complicated cases to the specialist.

Such a proposal is in line with the primary health care approach (World Health Organization, 1996), but it is completely contradicted by pattern of training of oral health personnel in South Africa, where the number of dentists trained is highest and the number of dental therapists is lowest (Lalloo, 2007).

### **School-Based Primary Health Care Programme**

The dental therapist can also play a significant role in the school-based primary health care programme which will address the basic health needs of children, focussing on health promotion and prevention and basic curative care, with oral health demarcated as one of the programme components. This role has been extensively described by the key stakeholders in this study. Nash et al. (2008) noted that this type of initiative has been successful in many countries, and that in New Zealand the school dental service employed 1 300 dental therapists, with a 95% utilization rate. In South Africa, this type of initiative can alleviate the high levels of untreated dental caries among children, thereby improving oral health and quality of life. It can also help to increase the number of children who are caries free.

The national oral health surveys showed that the greatest need for dental care among children was for basic dental services such as extractions, fillings and prevention (Department of Health, 1994; van Wyk & van Wyk, 2004), which are within the scope of practice of dental therapists (HPCSA, 1993). The literature makes it clear that dental therapists are able to provide high-quality care in low-technology dental services such as extractions, fillings and cleaning of teeth (Douglass & Cole, 1979; Roder, 1974). Dental therapists can thus play a significant role in the provision of basic oral health care to children.

### **Municipal Ward-Based Model**

The municipal ward-based model is based on the identification by the community health workers of problems within the local context. Dental therapists and oral hygienists can play many roles within this model. They can train community health workers in oral health care, and they can devise and implement appropriate preventive programmes to address local problems. In this way, dental therapists can facilitate the integration of oral health into the general health programmes of the country.

From these discussions, it is clear that dental therapists can play a significant role in providing basic oral health services, within the public sector and the NHI, to improve access to children and disadvantaged communities. With the high burden of disease in this country, cognizance must be also taken of the significantly greater opportunity cost associated with the training of dental therapists (three years) in comparison to dentists (five years) (Addo et al., 2006) in view of the high disease burden of the country (Motsoaledi, 2010). Dental therapists can be trained to provide appropriate high-quality, low-technology dental services in a shorter time period and at a lower cost.

## **7.7 DISCUSSION: INPUT PHASE**

In the next two sections, answers will be provided to the second critical question: *How does the dental therapy curriculum offered at the University of KwaZulu-Natal prepare its graduates to fulfil this role?*

In the input phase, discussion will focus on the recruitment and selection strategies of the School and the University, and on the perceptions of students with regard to their profession.

Data was obtained by both qualitative and quantitative methods. Quantitative interviews were conducted with students relating to their biographical information (age, gender, first language). They were also asked about their choice of dental therapy as a profession, their plans to study further, and their satisfaction with their educational experience.

Qualitative data was also collected by means of unobtrusive measures from two sources: application and enrolment profiles, stratified by number, race and gender, were obtained from the Data Management Information system of the University, and recruitment and selection strategies were retrieved from the University Prospectus and Faculty Handbooks.

### **7.7.1 Student Recruitment and Selection**

#### **Inaccurate Recruitment Strategy**

Barnett and Coate (2005, p. 37) point out that marketing programmes are now an important recruitment strategy for higher education institutions, with a significant shift of focus towards the economic market where students are seen as the “consumers of education.” Programmes are packaged attractively to offer a “lifestyle choice to their customers.”

This type of marketing is also evident in the documents of this institution. The university prospectus describes dental therapists as being trained in high-technology, curative, urban-based settings. There is little evidence of training in community-based health care. Even the narrative in the prospectus describes training in the dental training hospital, with little emphasis on community involvement. The prospectus cites subjects such as local anaesthesia, oral surgery, restorative dentistry, and oral medicine. This terminology could incorrectly convey the message that students were studying dentistry, rather than dental therapy.

#### **Inappropriate Selection Criteria**

Another problem with student enrolment at this School is that selection is based (a) on merit and (b) on the ability to present oneself at an interview. Mr Findley, an academic,

articulated this problem, commenting that “*students will say anything to gain entry to the programme*”.

The merit entry points are also considered to be high, thus attracting relatively high-achieving students. It is possible that this type of student will not be interested in working as a mid-level worker in a rural area, and therefore may not be satisfied with this profession. One student, Brandon, expressed his disappointment in this profession by stating eloquently: “*I want more!*”

It must be emphasized that almost 46% of the South African population lives in the rural areas (WHO, 2011). To achieve extensive health coverage, there has to be active recruitment and selection of from these areas. International studies (Fritzen, 2007; Pascal et al., 2004) have shown that one way to retain health workers in rural areas is to recruit them from these communities. The WHO (2011) document on the recruitment and retention of human resources in the South African context states that community engagement is crucial in the recruitment of students from the rural sector.

One method of increasing the pool of students from rural areas is to implement an affirmative action policy. This may not be considered ethical or fair to other applicants but it will ensure that the appropriate students are enrolled into this programme. Currently the application profile of the School has demonstrated an exponential increase in the number of applications, especially among the African group. As a result, all students are selected on merit. The selection criteria show no evidence of emphasis on rural students. The WHO (2011) has shown that students from rural areas are two to five times more likely to work in these areas, but also that less than 30% of all health science students at South African universities are from rural areas.

## **7.8 DISCUSSION: PROCESS PHASE**

In the process phase, the critical question was answered by taking into account the other influences of the curriculum as proposed by Hicks (2007). These influences included the faculty and school documents, institutional logistical constraints, accessible online resources, combined with the perceptions of students, graduates, and academics on these aspects.



In this phase, the qualitative method was the dominant approach. Qualitative information was obtained by several methods of data collection. Interviews with academics provided information on their personal content awareness, preferences, and teaching styles. The focus group discussions with students corroborated the information obtained in the other interviews. Unobtrusive measures, in the form of the Faculty Handbooks and School Module Portfolios, afforded information on the management and organizational structure of the School, the profile of the academics, and the form and content of the curriculum. Observations were conducted on the institutional facilities and online resources.

In the less-dominant quantitative approach, data was generated by the use of unobtrusive measures and quantitative interviews. Unobtrusive measures included patient statistics, and student pass rates. Quantitative interviews were conducted with all final-year students in 2009 and 2010 to obtain information on their perceptions of the various modules and on their level of competency.

### **7.8.1 The Discipline-Based Curriculum**

Barnett and Coate (2005, p. 33) describe curricula as knowledge fields which have been compartmentalised into disciplines, with the disciplines as “territories” and the academics who teach in them as “academic tribes.” Comparing the results of this study with the literature, it is evident that the dental therapy curriculum is essentially a traditional discipline-based one.

Matriculation subjects such as Biology, Mathematics and English were identified as prerequisites for entry into the programme. The basic, behavioural and preclinical sciences were presented to students with little focus on clinical relevance. Training in each clinical discipline occurred independently of the others. The general competencies such as ethics, communication and practice management were taught in a series of lectures, with no integration into the clinical domain. This resulted in a “smoke-stack curriculum”, which is characteristic of discipline-based curricula (Hendricson & Cohen, 1998, p. 9).

To compound this situation, the qualitative interviews with academics revealed that they did not have any formal training in education. The School followed the standard operational model of dental schools for the twentieth century which asked the question: “What do we want to teach our students about our various areas of specialization?” (Hendricson & Cohen, 1998, p.5). Strongly-framed classroom interactions (Bernstein,

1990) were the main form of teaching. It involved the traditional lecture method, where students listened and took down notes. There was little interaction between teacher and student, or even between student and student.

A point of concern identified by the researcher was that when students passed all disciplines they graduated as dental therapists. This meant that to become competent clinicians students had to rely on their own devices to “assimilate, retain and integrate” information obtained in the various modules (Hendricson & Cohen, 1998, p. 10).

Another problem identified with this type of curriculum was the lack of focus on comprehensive patient care. Each discipline concentrated their efforts on the mastery of individual procedures such as extractions and fillings. The “quota-based” system in dental education, where students are required to complete a required number of dental procedures as evidence of having achieved competence, was still used in this curriculum (Bertolami, 2001, p.726). This system created a conflict where the students’ need to complete the stipulated number of dental procedures competed with what was in the best interests of the patient. The literature shows that this often results in unethical practice, where patients are used “primarily as vehicles for meeting practitioner’s needs” (Bertolami, 2001, p. 726).

Barnett and Coate (2005, p. 33) note that many experts no longer used the term *discipline* when discussing curriculum because they believe it involves “immersion in the field and mastery of knowledge.” These experts prefer to use the term *subject* because they perceive it to be “more inclusive to those who study it.” It can also be easily structured into taught units and assessed outcomes, and is seen as “interactional” and shaped by human values (Barnett & Coate, 2005, p. 33).

To overcome the discipline-based nature of dental curricula, many dental schools use a combination of curriculum designs to produce the most appropriately-trained graduates (Hendricson & Cohen, 1999). In the dental field these designs include competency-based, case-based, problem-based, and community-based curricula.

The competency-based curriculum is one of the most commonly used in South African dental schools (Snyman & Kroon, 2005). However the literature shows that relying on this type of curriculum alone put the focus on mastery of skills and fails to promote the psychosocial and reflective aspects of learning (Boyd, 2002).

## **7.8.2 Form and Content of the Dental Therapy Curriculum**

Bernstein's theory on the analysis of pedagogical transactions argued that all educational interactions are bounded by rules (Bernstein, 1990). The rules determine "what is taught, how it is taught, and how it is assessed" (Barnett & Coate, 2005, p. 33). Bertolami (2001) concurred that most dental curricula demonstrate a great divide between their content (what we teach) and their form (what students learn), with considerable disjuncture between what we think we are teaching and what we are actually teaching. He maintained that when the form and content are in conflict it often results in a diminished quality of learning, dissatisfied students, and difficulty in generating enthusiasm for the profession.

The form and content of the dental therapy curriculum was evaluated by reviewing the general and clinical competencies prescribed by the HPCSA (2008). The South African Qualifications Authority (2000, p. 18) refers to the importance of applied competence, which they define as "the ability to put into practice in the relevant context the learning outcomes acquired in obtaining a qualification." They refer to the concepts of foundational competence, practical competence and reflexive competence as necessary for successful learning in the context of the real world. They define foundational competence as "an understanding of what is being done and why." Practical competence is described as "a demonstrated ability to do a particular thing." Reflexive competence was described as "a demonstrated ability to integrate or connect performance with the understanding of that performance so as to learn from the actions and adapt to change and unforeseen circumstances" (SAQA, 2000, p. 18). The following section critically evaluates the foundational, practical and reflective competencies within the context of the general and clinical competencies prescribed by the regulatory body.

### **GENERAL COMPETENCIES**

The evaluation of the general competencies revealed several shortcomings, which will be discussed in the following section.

#### **Cultural Awareness**

One of the shortfalls identified in the curriculum was a deficiency in bridging the gap between the school and university situation, and the development of cultural awareness among students. The Academic Skills module addressed the improvement of the day to

day skills necessary for a student entering university for the first time. However it did not take into consideration the affective factors and institutional cultures that the students from rural and other disadvantaged areas experienced (Scott et al., 2007). There was no mechanism in place to make students from these areas feel more comfortable in their surroundings. Cultural awareness could be achieved by introducing the concept of community-based learning into the curriculum (Strauss et al., 2010).

### **Communication Skills**

Inadequate development of basic communication skills in the clinical situation was another area of concern. The evaluation showed that English and Zulu skills are developed and assessed in the first year by means of a theory examination. There was no assessment of communication skills in the clinical domain. Thus, when English language students started working on patients, their application of the indigenous language in the clinical setting remained untested.

The solution to this problem could also lie in community-based clinical training, where students practise as clinicians among non-English speaking populations. The literature shows that if students are trained within a community-based setting, they will become more fluent in the indigenous language of that area (Strauss et al., 2010; Yoder, 2006).

### **Health as a Basic Human Right**

The third general competency that needed improvement was *Health as a Basic Human Right*. The literature argues that community-based dental education has been successful in introducing students to diverse patient populations, health care delivery systems and health care models (Evans, Bolden, Hryhorczuk & Noorulla, 2010). Evans et al., (2010) suggested that community-based exposure may remove the fear of the unknown in the rural areas and may even encourage students to choose to work in these areas on graduation.

The literature thus clearly demonstrates that training in the general competencies can be developed appropriately by community-based dental education. The evaluation of how students attained these competencies showed, however, that training is primarily conducted in the hospital setting.

This tendency for hospital-based dental education is not exclusive to South Africa and has been identified as a problem in many African countries (Thorpe, 2006). Community-based dental education occurs when a significant proportion of clinical education is shifted from training hospitals to community clinics (Strauss et al., 2010). These authors argued that for community-based dental education (CBDE) to be effective the curriculum must include cultural awareness, the social and behavioural sciences and communication. They also believed that training students in underserved communities could result in the added benefit of children from these areas being attracted to study for this profession.

CBDE programmes have been introduced in many countries to meet the needs of disadvantaged communities (Piskorowski, Fitzgerald, Mastey & Krell, 2011). Successful initiatives have been recorded in countries such as Peru and Vietnam (Karim, Karina, Mascarenhas & Dharamsi, 2008). These authors described how Vietnam modified its dentistry curriculum by integrating the basic oral health package into the curriculum. In this initiative, it was also considered to be mandatory for all graduates to work in the public sector for up to three years. Bernabe, Bernal and Beltran-Neira (2006) described how a dental public health curriculum was implemented in a dental school in Peru in an attempt to improve access for disadvantaged communities. All these initiatives will be taken into consideration when making recommendations for this study. However, all these initiatives were implemented as part of a five-year dentistry programme. It therefore needs to be established whether CBDE can form a part of a dental therapy curriculum in light of the fact that this programme is of three years duration, compared to the five years in dentistry.

The answer to the first critical question of this study on the role of the dental therapist in the health care system of South Africa clearly demonstrates that this cadre of oral health professional is needed to provide basic oral health services to disadvantaged and rural populations in the public sector. Based on the success of CBDE for dentists in other parts of the world, it is obvious that dental therapists should be trained in a similar manner. However there appears to be a scarcity of literature on community-based training programmes for dental therapists.

## **Practice Management**

Management skills are considered necessary for practice in the public and private sectors. Most graduates identified that training in the development of this competency was lacking at this university. Graduates believed that because students were taught by lectures only, they had no practical experience in this field. These views were echoed by dental graduates in other countries (Chmar, Harlow, Weaver & Valachovic, 2007). Glassman and Chambers (1998) stated that in most dental curricula, competencies in practice management were written as behavioural objects rather than as true competencies. They suggested that this field of study should be defined as a competency to adequately prepare graduates to practise independently in the dental environment.

Willis, Smith and Golden (2009) reasoned that teaching practice management by the lecture method alone satisfies only the lower level learning skills and does not provide the skills necessary to become a competent clinician. They argued that the same methods used to develop clinical competencies should be used in the development of this competency. It should include the utilization of teaching methods, materials, and assessment strategies which are appropriate to the level of learning (Bloom & Krathwohl, 1984).

Willis et al. (2009) stressed the importance of teaching practice management at a level higher than simple knowledge, and should include the teaching of higher level skills, abilities and values. They affirmed that critical thinking should form an integral component of this module. Boyd (2002, pp. 710–720) expressed similar sentiments when she argued that critical thinking was “essential for good citizenship and scholarship in a democratic society.” She believed that reflecting on experience was the manner in which learners made meaning out of the information they acquired, and was a key feature of critical thinking. The findings of her study conducted on first and second year dental students showed that critical-thinking skills could be achieved by asking students to write reflection papers on their work, and by keeping clinic journals.

## **Ethical Practice and Professionalism**

There has been an ongoing debate in the dental fraternity about ethical practice among dental therapists. Most students believed that they had developed strong ethical values during their training. However some of the external stakeholders believed that dental therapists often practised out of their scope of practice.

The evaluation of the training in this competence revealed that it was also conducted through a series of lectures, with no follow-through to the clinical domain. For better training in ethical practice and professionalism, Christie, Bowen and Paarmann (2007) argued that these competencies are best measured in contexts comparable to clinical practice. They documented the effectiveness of several modalities for teaching and evaluation of ethical decision-making. These included patient-based vignettes, simulated cases, online interactive studies, portfolio assessment, service-learning and the rating of professional judgment during patient care. They argued that authentic evaluation was the best method for assessing this competence.

### **Infection Control**

Although the curriculum showed evidence of training in infection control, most of the training occurred by means of lectures and clinical demonstrations. There was little evidence of assessment of this competency in the clinical domain.

Kanjirath, Coplen, Chapman, Peters and Inglehart (2009) argued that oral health personnel are at greater risk of contracting infections such as HIV/ AIDS and tuberculosis. This is because they work with sharp instruments at very high speeds in an environment containing saliva and blood. A study on competency assessment for infection control in the undergraduate dental curriculum (Milward & Cooper, 2007) revealed, however, that the incorporation of formal preclinical teaching and the introduction of an infection control competency provided long-lasting knowledge and clinical application benefits.

From these discussions it is clear that several shortcomings have been identified in the development of general competencies in the dental therapy curriculum. Inferences and recommendations on how to redress these deficiencies will be described later in this chapter.

## **CLINICAL COMPETENCIES**

### **Clinical Skills**

Restorative Dentistry, Minor Oral Surgery, Radiography, and Cariology, Periodontology and Prevention were regarded as the clinical modules in the curriculum. Before students were allowed to work on patients, preclinical training was done in six-week blocks in the preclinical laboratory. In the latter three modules, preclinical training occurred over a six-

to eight-week period in the previous year. However in the Restorative Dentistry module, it was found that preclinical training occurred in a six-week block at the beginning of the third year. In this time, students worked between six and eight hours per day to perfect their motor skills. In all clinical modules, students had to achieve a minimum pass mark in the preclinical component to be allowed to work on patients.

Chambers (1987) described the learning stages in the development of clinical competencies in dental education as a continuum with five stages: novice, beginner, competent, proficient and expert. He based these assertions on the motor skills theory of Hauser and Bowen (2009, p. 390) who define *motor skills* as a “skill primarily determined by the quality of movement produced by the performer.” These skills can be improved by practice and repetition. Hauser and Bowen also distinguished between *motor performance* and *motor learning*. Motor performance was described as an observable attempt to perform a motor task, and is influenced by issues such as motivation, fatigue and stress (Hauser & Bowen, 2009, p. 390). Motor learning, on the other hand, includes changes in the student’s internal processes that determine the person’s capability to perform a motor task.

Another feature in the development of clinical competences is the concept of *implicit learning*. A definition of implicit learning is “the process by which a learner improves performance through practice until the correct performance of the motor skill becomes automatic” (Hauser & Bowen, 2009, p. 392). They described the early learning stages as cognitive (trial and error) and associative (targeted). The associative stage of learning was described as autonomous (free and easy). In this context, preclinical performance is deemed to be cognitive in nature.

Early learning may be characterized by “inaccuracy, inconsistency, hesitation, indecision, and a lack of confidence” (Hauser & Bowen, 2009, p. 390–398), and even when novice learners perform a skill correctly they are often unaware how they have achieved it. Depending on the level of difficulty of the skill and the student’s motivation and capabilities, practice and repetition often results in the performance becoming more accurate and consistent. This achievement is described as the *associative stage*. Only after significant and repeated exposure to this skill, does learning become automatic. This level is described as the *autonomous stage*. These stages describe the continuum of learning in competency-based education (Chambers, 1997).



The literature shows that the development of motor performance is influenced by factors such as fatigue and stress (Hauser & Bowen, 2009). Therefore the intense nature of the preclinical component in Restorative Dentistry in the third year was not deemed to be appropriate. This aspect of training should be moved to an earlier period in the programme to eliminate the intense and rigorous nature of this training.

Chambers (1997, p.795) has argued, however, that there is a poor correlation between preclinical laboratory performance and good clinical competence. The differences in the preclinical and clinical situation may result in the failure to teach for the transfer of skills to the new setting, and the laboratory-based practices can create “clinically-dysfunctional habits” (Chambers, 1997, p. 795). This has been corroborated by the academic, Dr Barry, in the qualitative interviews.

### **Diagnostic Skills**

The Diagnostics and Radiology module serves as a capstone module in this curriculum. It was devised to facilitate the integration of the basic and preclinical sciences, into the clinical domain. This module would also enable the student to become competent in comprehensive patient care.

However, one of the problems identified during evaluation of this module was that students felt that they were not aware of the relevance of studying the various modules until they had reached the final year. These modules appeared to be decontextualised and showed little relevance to the clinical setting. Moore (2007) showed that similar concerns were expressed by students at other dental schools internationally.

To address these concerns, some schools introduced the concept of problem-based learning (PBL) into the preclinical years to contextualise the basic and preclinical sciences within the clinical domain. In this way, students moved away from rote learning and memorization, and developed skills such as critical thinking, communication, clinical decision-making, and lifelong learning (Moore, 2007).

Another problem identified in this module was the lack of focus on the changing epidemiological priorities identified in the policy documents (Department of Health, 2005). The Oral Pathology and Oral Medicine modules encompassed a wide spectrum of disease conditions, many of which were not relevant to South Africa. The literature

showed that curriculum content has to be constantly reformed according to changes in the current and projected demographics of disease (Bertolami, 2001). Therefore the curriculum should demonstrate the general principles of diagnosis and treatment planning, and focus on those conditions that have been identified as epidemiological priorities (Department of Health, 2005).

On appraisal of the curriculum with respect to the form and content of the changing oral health priorities such as HIV/AIDS, oro-dental trauma, oral cancer and diseases of poverty, it was found that basic theoretical knowledge was provided in the second year, but there was limited clinical exposure to these conditions. Even when these patients did present for treatment, they were immediately referred to the tertiary hospital. If the role of the dental therapist is to be located at the primary level of the health care system, they need to be able to diagnose, provide emergency medical care, and refer patients appropriately within the district health system. Therefore greater emphasis on these priorities needs to be included at the different levels of the curriculum.

**HIV/AIDS:** The evaluation of how the form and content of HIV/ AIDS was presented to students showed that it was taught in a lecture format as part of the Oral Medicine module in the second year. In the qualitative interviews, students expressed dissatisfaction about the considerable theoretical content, with minimal clinical exposure to these patients. It must be remembered that dental personnel often observe the first clinical signs of the disease (Darling et al., 1992). Therefore topics on HIV/ AIDS have to be covered in greater depth and breadth at all levels of training, so that students become competent to diagnose, manage and refer patients appropriately. In addition, students need to become aware of the disease process, in order to ensure self-protection for their own safety. They will also be less afraid to treat such patients (Matheney & Kilpatrick, 1988).

**Diseases of Poverty:** Due to the high levels of poverty in South Africa, students need to be aware of the diseases of poverty such as NOMA, which affects children from disadvantaged communities (Petersen, 2004). On appraisal of the curriculum, this condition is just mentioned in the Oral Medicine module, but students are not exposed to these patients in their clinical training.

**Oro-Dental Trauma:** Oro-dental trauma often presents at the primary health care level due to the high levels of crime and interpersonal violence, domestic abuse and motor vehicle accidents (Petersen, 2004). Therefore personnel employed at the primary level,

should be able to diagnose, manage emergencies and refer patients appropriately within the primary health care team (Petersen, 2008). The curriculum evaluation showed that students received theoretical knowledge on these topics, only in the form of lectures. No clinical exposure to these patients occurred in the clinical situation. In view of the fact that there may not be any other personnel available in rural and disadvantaged clinics, dental therapists need to be confident in the appropriate diagnosis, management and referral of these patients. They can also form a part of a multidisciplinary team in the management of these patients.

**Oral Cancer:** In view of the increasing prevalence of oral cancer around the world, lifestyle factors needs to be emphasized especially within the school health service, in the prevention of this life-threatening disease (Petersen, 2003). In addition, the literature showed that, before patients undergo any radiation to the head and neck region, their oral health status needs to be optimal (Patton, 2003). This can be achieved by scaling and polishing, fillings, extractions, and health education and preventive care. These functions are within the scope of the dental therapist, who therefore needs to form a part of the multidisciplinary team in the management of cancer patients (Petersen, 2008).

From these discussions, it is clear that the form and content of this aspect of the curriculum needs urgent revision to make students aware of the evolving epidemiological priorities of the country. Consequently, when patients present to the dental clinics, therapists will be able to diagnose common conditions, and to refer them appropriately where necessary.

### **Health Education, Promotion and Preventive Care**

The curriculum evaluation revealed that there appeared to be a lack of emphasis on the development of this skill. The quantitative interviews showed that students did not provide evidence of confidence in this competency, and several external stakeholders believed that dental therapists did not believe that this was their role.

The literature has demonstrated that health education and promotion is considered to be the cornerstone of the primary health care approach, and should therefore be at the forefront of the training agenda (WHO, 1996). However, Brown (2007) argued that there appeared to be several barriers to the teaching of this competence, the most significant being the manner in which dental schools were organized. Too much time was spent on

the development of clinical competences at the expense of health promotion and prevention. This problem was also identified as a problem at this dental school by the deans and the employers in the interviews.

The evaluation of the form and content of this competence was also identified as a matter of concern. Dental health education programmes tended to deal with only “dental” conditions, such as dental caries and periodontal disease. However in light of the newer epidemiological priorities in the country (Department of Health, 2005), it was necessary to include the other risk factors identified by the WHO (Petersen, 2003). Common risk factors for the development of periodontal disease and oral cancer are cigarette smoking and the abuse of alcohol (Department of Health, 2005). Other initiatives such as smoking cessation should also become an important part of preventive programmes (Lamster & Eaves, 2011). Other health promotion programmes could also include dietary advice for healthy lifestyles, and the prevention of HIV/ AIDS.

### **Dental Therapeutics**

The dental therapeutics competency appears to be well developed within the curriculum. However the Pharmacy Council prohibition on prescribing has led to frustrations among this profession. It must be emphasized that if dental therapists work in outlying areas they would be working on their own. The prescription of basic medication to alleviate pain and sepsis is essential for comprehensive patient care.

### **Children’s Dentistry**

The evaluation of this component of the curriculum produced the most startling results. There was very little evidence of students being exposed to the treatment of children. This was because children usually presented to the training hospital for the relief of pain and sepsis. During the qualitative interviews, an employer in the public sector commented that children seldom presented for routine dental check-ups due to the high cost of care and the lack of access.

However, the low number of children treated during dental training was not limited to the School in this study. In a study of 55 dental schools in the United States, Seale and Casamassimo (2003) found that the pool of child patients was inadequate to meet competency requirements, and that paediatric dentistry was mentioned in less than 50% of

all competency documents. To address this problem, Thikkurissy, Rowland, Bean, Kumar, Levings and Casamassimo (2008) recommended that it was possible to increase paediatric patient exposure by community-based dental education.

The development of this competence is of even greater importance with the introduction of the NHI, because dental therapists can play an integral role in the School Health Programme (Department of Health, 2011b). From these discussions on the clinical competencies required by the dental therapy graduate, several deficiencies have been identified.

### **Assessment Strategies**

The principles of constructive alignment indicate that the curriculum, teaching methods, and assessment tasks should be aligned to each other (Biggs, 2003). On evaluation of the assessment strategies in this study, it was found that assessment mainly consisted of recall and recognition of facts, and the demonstration of specific technical skills. The theory component was usually a two-hour paper, made up of multiple-choice questions, essays and short questions. Questions were usually restricted to categories of knowledge, comprehension and application of Bloom's Taxonomy (Bloom & Krathworl, 1984). There was little evidence of testing the analytical, synthesis or evaluative cognitive domains.

In the preclinical and clinical domains it was found that rating scales were used as assessment strategies in all modules. During the clinical sessions, daily clinical assessments were carried out. To prepare full-time and part-time clinical supervisors to conduct these assessments accurately and uniformly, a workshop was held at the beginning of each year to inform them of criteria and procedures to be used. Students were required to complete a specified "quota" for each procedure in order to be deemed clinically competent to sit for the final theory and clinical examinations.

In the clinical examinations, personal communication with the module coordinators revealed that calibration among assessors was achieved by using the same two academics performing the assessment for that year. Standardized criteria were developed for each module, which were explained in detail in the module portfolios. Students were thus aware of these criteria before assessments were carried out.

In the final examinations, the theory paper would be followed by a clinical competency examination or the objective structured clinical examinations (OSCE). In the OSCE examination students rotate through a series of stations where they are required to perform a variety of clinical tasks (Zartman et al., 2002). This type of examination has been used in medical education from the early 1970s, but was only introduced to dental education in the 1990s. The literature showed that the OSCE was consistent with the principles of competency-based education, and was a valuable indicator of clinical competency. The final examinations in this school also included the option of an oral examination, especially in cases of borderline students. All final-year examinations were conducted by two internal examiners (from within the School) together with an external examiner (usually a specialist in the field from outside the University).

The evaluation of this aspect of the curriculum revealed that students were unable to integrate information holistically within a given context and apply it to specific situations. The literature showed that this function can be developed by nurturing students' critical-thinking and problem-solving skills (Albino et al., 2008)

### **Critical Thinking Skills**

Development of critical-thinking skills is considered to be essential in the dental field (Boyd, 2002). This is because each patient is different, and a clinician must be able to assess the patient's needs in relation to the treatment options in order to develop an appropriate treatment plan. This skill can be developed by incorporating the concept of critical thinking in the curriculum, where conceptual, procedural and metacognitive knowledge can be developed so that they complement each other (Boyd, 2002).

This can be achieved by the use of problem-based learning in certain aspects of the curriculum. The literature has demonstrated that the problem-based approach should not determine the entire dental curriculum (Kassebaum et al., 2004). Problem-based learning can form a *part* of the curriculum format. In this way, it will to some extent redress the problem of rote learning and the memorization of facts.

The students in the focus group discussions commented on the large amount of theory that they had to learn in some modules, and the lack of cohesion between theory and practice. Students believed that it made no sense to them when they learnt by lectures and textbooks only. This is because when they learnt in this manner, they gained knowledge by rote

learning and memorization, but when they came into direct contact with the patients in the clinical setting it became an “unforgettable experience” (Boyd, 2002, p. 710–720).

The Institute of Medicine (Field, 1995) also recommended that the development of critical-thinking skills could be achieved by exposing students to more active learning strategies such as problem-based learning. In this type of activity, even though the problems are deemed to be complex, a correct answer usually exists. This type of problem is considered to be well structured. However with the numerous complexities involved in patient management in the dental setting, the well-structured problem-based approach may be insufficient (Boyd, 2002).

The literature refers to the concept of reflective thinking as a way to address this problem. Reflective thinking has been defined as the “integration of all learning in practice . . . which allows one to make judgments in complex and ambiguous situations” (Teekman, 2000, p. 1125). Thus “meaning making” occurs by reflection on an experience. These views were based on the thinking of Dewey (1963), where he emphasized the importance of interaction, reflection and experience. His formula *Experience plus Reflection equals Learning* (Biesta & Burbules, 2003) has also served as the basis for the development of the recommendations for this study

### **7.8.3 Profile of Academics in the School**

Benjamin Franklin stated that “a gifted teacher is as rare as a gifted doctor, and makes far less money” (Hendricson et al., 2007, p. 1513). This is equally true in dental education, because academics have the option to practice their profession and earn a better salary but each has consciously chosen to work in academia. It is also widely acknowledged that there is a shortage of experienced academics in the dental fraternity (Hendricson et al., 2007, p. 1513–1533).

The organizational structure of the School is in line with other dental schools in the country. However this school has the unenviable history of not being considered as a “fully-fledged” dental school. The constant vacillation of the major stakeholders in the province (University and the Department of Health) about the creation of the full dental school has resulted in uncertainty and lack of commitment by some academics. However, in the academic interviews, many staff were confident that a fully-fledged school of dentistry would be a reality within the next five years.

The joint nature of academic appointments creates a tug of war between the time that academics spend on clinical service on the one hand, and teaching and research on the other. The dental therapists who are employed as full-time academics have served as role models for dental therapists in general. Many of them want to study further and have enrolled to study for master's and doctoral programmes at the university.

On appraisal of the academics in this School, it was found that many have not been adequately credentialed to the PhD level. This can be attributed to the “joint” nature of their appointments between the University and the Department of Health. It can also be attributed to the uncertain future of the School. However their experience and enthusiasm in their role as academics, as evidenced in the student and academic interviews, should be valued. This concept has been referred to as *faculty vitality*.

In an article by Hendricson et al. (2007, p. 1513–1533), Wilkerson and Irby described academic vitality as “dependent upon faculty members’ interest and expertise.” They argued that faculty development can play a vital role in “promoting academic excellence and innovation.” They believed that it was a “tool for improving the educational vitality of our institutions through attention to the competencies needed by individual teachers and to the institutional policies required to promote academic excellence.”

#### **7.8.4 Institutional Facilities and Constraints**

An evaluation of the training hospital showed that most of the equipment and facilities supported teaching and learning. However the learning materials were in English only, which may be a hindrance for the large number of students who used English as their second language. The discovery of the telemedicine facilities at the King George V Hospital Complex, within which the training hospital is located, provided the opportunity for further exploration within the context of community-based training.

#### **Overloaded Timetables**

Overloaded timetables were identified as a problem affecting the clinical proficiency of the student. The literature has demonstrated that students should be given sufficient free time in their timetables to develop schemas of knowledge (Boyd, 2002). Therefore an appropriate amount of time should be allocated to each student to enable them to develop these knowledge structures, thereby organizing their experiences and knowledge into



memory. The overloaded timetables identified in the dental therapy curriculum afforded little time for reflection on learning (Boyd, 2002). There was also little opportunity for students to develop from novice to competent clinicians (Chambers, 2004).

### **Teledentistry Facility**

An exciting discovery within the institution was the telemedicine/teledentistry facility at the training hospital. This facility could serve as a valuable resource for community-based training. Teledentistry has been defined as a “new area of dentistry that fuses electronic health records, telecommunications technology, digital imaging, and the Internet to link health providers in rural or remote communities” (Friction & Chen, 2009, p. 537). In dental education, teledentistry can be divided into two categories: self-instruction and interactive videoconferencing (Chen, Hobdell, Dunn, Johnson & Zhang, 2003).

Teledentistry can also play a vital role in the extension of care to underserved communities, especially in deep rural areas. In this way, the “digitally-linked” oral health team can diagnose and treat patients in rural areas, provided that the hospital is linked to the training hospital (Chen et al., 2003). It also allows the specialist, who may be located in a city, to make a diagnosis for a patients located in outlying areas. Patients can then be appropriately referred to the necessary hospital.

Teledentistry has also been used to supplement traditional teaching methods (Chen et al., 2003). In the United States, teledentistry has been successfully used to develop mid-level health care workers in underserved communities (Summerfelt, 2011). In this way, healthcare workers can practise unsupervised, and use the teledentistry facility to get advice when needed. Most of the hospitals in KwaZulu-Natal have been linked to the unit at the training hospital.

### **7.8.5 Accessible Online Resources**

Online resources have changed the way in which learning occurs at higher education institutions (Barnett & Coate, 2005). These authors assert that academic knowledge is no longer confined to libraries and lecture rooms. Students can access written materials such as assignments and lectures on the web. They can even communicate with their lecturers by e-mail. This results in students not needing to be present on campus at all times.

Evaluation of the online resources at the training hospital reveals a shortage of computers, e-mail and internet facilities, although there are adequate numbers of computers with all the additional facilities at the university campus. Students are transported each day to the main campus, which will enable them to utilize these resources.

The introduction of online learning in some modules has resulted in better communication between students and academics. It also allows the students to learn at different rates. A problem identified with online learning is that students have different capabilities with the computer. Students from the urban areas usually have excellent computer skills, while those from rural areas may struggle to use the computer. On appraisal of the curriculum, there is no evidence of computer training. This fact was also identified as a problem by a graduate from a rural area.

However Barnett and Coate (2005, p. 91) have argued that an advantage of online learning is that it encourages “surfing, chatting and messaging” among students. Even though this type of activity produces a more “superficial type of knowledge,” it can encourage students to engage with the curriculum (p. 91).

From these discussions, it can be seen that the process phase took into account several influences of the Hicks model. They included university, faculty and school documents, institutional logistical constraints, accessible online resources. These factors were combined with the perceptions of students, graduates, and academics on these aspects in order to answer the second research question: *How does the dental therapy curriculum offered at the University of KwaZulu-Natal prepare its graduates to fulfil this role?*

## **7.9 DISCUSSION: PRODUCT PHASE**

The discussions presented in this phase provide the answer to the third critical question: *What are the perceptions of internal and external stakeholders regarding the professional competence of graduates to practise within the health care system of South Africa?*

To answer this question, a profile was created of the dental therapy graduate. This was followed by discussions on the job satisfaction of these graduates in the public and private sectors.

### 7.9.1 Graduate Profile

The graduate profile was drawn up from data obtained by both the quantitative and qualitative methods. The quantitative data was extracted from the Data Management Information system of the university (UKZN 2010). Unobtrusive measures included the total number of graduates, stratified by age, race and gender. The practice patterns of graduates were also obtained from these measures. Qualitative data was generated by means of interviews, with graduates, students, academics and key external stakeholders, on the levels of job satisfaction among the graduates.

The number and racial profile of graduates shows the evolution of this profession from being predominantly Indian to being mainly African. This is because the university has transformed from being an ethnic university in the apartheid era to the multi-racial institution it is today. The graduate profile also shows that the dental therapy profession is transforming to become demographically representative of this country.

Even though the number of enrolments has increased over the years, the number of graduates produced was significantly lower than the statistically predicted value (Figure 18). This could be attributed to the numerous factors affecting higher education in South Africa. The poor schooling system, combined with the decline in the quality of the Senior Certificate examination, has resulted in an increased number of under-prepared students gaining admission into university. This situation has created several problems within the higher education system. In drawing up recommendations from this study, all these factors had to be taken into account, including student diversity in terms of race, language, and educational background, and the inequities in socioeconomic status discussed in the literature review (Scott et al., 2007).

The practice patterns of graduates tell the tale of the dental therapy profession in South Africa. The high number of graduates working in the private sector, and the low number in the public sector, has exacerbated the inequities in oral health service provision. The fact that over 25% of graduates do not practise dental therapy is also a cause for concern.

To conclude these discussions, there are several concerns with regard to the dental therapy graduate from UKZN. High scoring students selected from a large pool of applicants have resulted in graduates who are dissatisfied and frustrated in their careers. This frustration builds up within the short time period that students are enrolled at the university

### **7.9.2 Graduate Perceptions**

A comparison of the scope of practice of dental therapists in South Africa with the international experience showed that the scope of practice in this country is wider than in most other countries (Nash et al., 2008). Although the scope of practice in South Africa does not include procedures such as orthodontic and pulpal treatment (as in New Zealand, Australia and the United Kingdom), it is wider because dental therapists can work independently in private practice without supervision (Prinsloo, 1993). In most countries, dental therapists are supervised to varying extents (Nash et al., 2008).

During the qualitative interviews, many stakeholders commented that graduates were dissatisfied with their profession. However the reasons for this dissatisfaction differed for the public and private sectors.

#### **Public Sector**

The early studies on job satisfaction in the dental therapy profession (Prinsloo, 1993, p. 617) revealed that the low levels of satisfaction can be attributed to a “lack of career pathing, low salaries, and lack of posts in the public sector”. The qualitative interviews with all stakeholders showed that these high levels of dissatisfaction still existed in this sector. They were attributed to low salaries, poor working conditions, lack of materials, poor facilities and infrastructure, and the low priority that hospital managers assigned to oral health. Most oral health personnel only performed extractions. There was no time, facilities or infrastructure to do any other type of dental treatment. A public sector employer emphasized the fact that the rural areas were worst affected by these conditions.

#### **Private Sector**

In the private sector, all stakeholders believed that dental therapists were frustrated with their limited scope of practice. This often resulted in therapists working outside their scope. However, one employer clearly indicated that it was often the dentists who employed the therapists and taught them to perform these procedures.

Students and graduates expressed high levels of frustration with their scope of practice. Many graduates said that dentistry was their first choice, but they chose to study dental therapy because it was the only course of study in this field that was offered in this province. Many students argued that they were not aware of the limited scope of practice

at the time of starting their studies. However, this fact was vehemently opposed by academics. However these frustrations were not restricted to graduates from UKZN. A seminar on the dental therapy profession was held in Gauteng in 2011. During the discussions, dental therapists from all universities in South Africa, as well as from other parts of Africa, expressed similar views.

A dental dean argued that students who did not achieve adequate grades to gain entry into dentistry often studied dental therapy “as a stepping stone to dentistry.” He described this phenomenon as the “revolving-door syndrome.” However students from the dental school at UKZN did not have low grades, as suggested by the dean. The selection scores for 2011 ranged from 34 to 44, and were comparable to scores at other health science faculties. The question that needed to be answered was why these students enrolled for the dental therapy programme.

### **7.9.3 Student Perceptions**

Bertolami (2001, p. 726) argued that “one of the biggest tip-offs that the form of dental education needs revision is the simple observation that dental students do not, in general, like dental school.” The results of the qualitative and quantitative interviews demonstrated that students were disillusioned with the dental therapy profession and expressed regret at their choice of study. In the classes of 2009 and 2010, just over 60% of the students said that they would practise their profession. When asked whether they wanted to study further, just over 40% responded positively. In response to satisfaction with their educational experience, just over 60% of the students, responded affirmatively. However Bertolami (2001) argued that this response was common in dental education.

Bertolami (2001, p.730) stated that university education should be “enriching, mind broadening and even life-altering.” However, he argued that most dental school experiences do not fulfil these requirements. He believed that students perceive dental education as “narrow, stressful and debilitating,” and does not promote an ideal learning environment (p. 730). The traditional form of dental education promotes rote memorization and learning, and shows a lack of coherence between the basic and preclinical sciences, and the clinical disciplines. This type of education may result in a lack of intellectual challenge to the students.

The one factor about a dental school in comparison to other faculties in a university is the fact that the dental school is considered to be “personal”. Classes are small, and students usually attend the same modules throughout the year. This results in the development of close relationships among students, and also with academics. On graduation, students are usually assured of a suitably paying job which can lead to affluence and prestige.

Bertolami (2001, p. 730) also argued that, in general, students preferred mainstream university courses to dental programmes because of the “asynchronous” nature of mainstream curricula. Dental curricula are rigid and fixed, and students have to enter and leave their selected programme at fixed times during the year. Students do not have the option to change the sequence of their studies. Dental schools follow this synchronous model to contain the high costs involved in running the programme (De Paola, 2004).

The nature of dental schools also promotes a spirit of competition among students. Due to the low student numbers, and the “strict lockstep synchronous design” (Bertolami 2001, p. 731), student progress is easily compared, and thereby promotes competition. This may result in demoralization especially among disadvantaged students. Bertolami (2001) believed that the humiliation of dental school often stays with graduates long after graduation.

#### **7.9.4 Other Stakeholder Perceptions**

At the beginning of the interviews, all stakeholders expressed the view that the dental therapy graduates were competent to practise in the health care system of South Africa. All of them emphasized the role of the dental therapist was to provide basic dental care to underserved communities within the public sector. A graduate from a deep rural area believed that his training was “excellent” and that he was “very proud to be a part of UDW.” Most students corroborated this view.

However when the stakeholders were probed in regard to the professional competence of graduates, their perceptions changed. They identified several shortcomings in the training of dental therapists at this institution, which corroborated the findings of the process phase of this study. Factors that they identified were the lack of focus on primary health care, the need to concentrate on the treatment of children, and the need for community-based training.

### **Lack of Focus on Primary Health Care**

The lack of emphasis on health promotion and preventive care was identified as a significant gap in training by the deans and the employers. Professor Philips believed that too much emphasis was placed on the development of motor skills in curative care. He maintained that this type of training led dental therapists to believe that health promotion and preventive care were the responsibility of the oral hygienist. These views were corroborated by the quantitative interviews on the development of this competency. The lack of training as part of a multidisciplinary team was also identified as a problem.

### **Inadequate Exposure to Children's Dentistry**

The employers commented that clinical training was focused on the treatment of adults at the expense of children. They argued that training should be focused on the promotion of health, preventive care, and the provision of basic oral health services to children. They stated that the reason that children usually attended dental clinics was for the relief of pain. As a result, children had little exposure to health promotion and preventive care. Both employers recommended that dental therapists should work in the school health services as part of an interdisciplinary team.

### **Need for Community-Based Training**

Most stakeholders believed that the lack of community-based training was a major deficiency of this curriculum. These findings corroborated with the evaluation of the form and content of the curriculum. The students unanimously asserted that their clinical experience on the Phelophepa Health Train provided them with the confidence to work independently and also provided insight about working in rural communities. A graduate believed that if students were trained in disadvantaged communities it would improve awareness of oral health care among these communities. He stated that most oral health professionals in the private sector did not provide health education and promotion.

The dental deans argued that, if students were subjected to community-based training, their thinking would be focused towards the public sector. This would encourage them to work within the disadvantaged communities in this sector.

The results obtained on the perceptions of stakeholders in regard to the professional competence of graduates to practise within the oral health system provided answers to the

third research question of this study: *What are the perceptions of internal and external stakeholders regarding the professional competence of graduates to practise within the health care system of South Africa?* It also corroborated and triangulated the finding of the input and process phases.

From the discussions on the context, input, process and product phases of this study, several inferences were formulated. These will be discussed in the following section.

## **7.10 INFERENCES OBTAINED FROM THIS STUDY**

The inferences derived from this study led to the answer of the fourth critical question: *Why do these stakeholders have these perceptions?*

The mission of the University of KwaZulu-Natal (2011a) is:

To be a truly South African University that is academically excellent, innovative in research, critically engaged with society and demographically representative, redressing the disadvantages, inequities and imbalances of the past.

From evaluation of the dental therapy curriculum it was clear that it did not fulfil the expectations of the mission of the university. Academically, it has not evolved to take into consideration newer innovations in teaching and learning, and the research effort in this school was lacking. It did not engage with society in any significant manner, and therefore did not redress the disadvantages, inequities and imbalances of the past.

This curriculum also did not meet the aspirations of the mission of the School of Dentistry (2011), which was:

To achieve excellence in the provision of education and training programmes aimed at recruiting and developing oral health personnel who are competent to respond appropriately to the oral health needs of the people they serve, with emphasis on the primary health care approach.

The recruitment and selection process was not appropriate as it did not focus on attracting students who would respond appropriately to the needs of the South African society.



Training was not focused on the needs of the population, especially in regard to primary health care.

Therefore the inferences derived from this study were related, directly or indirectly, to the curriculum. Accordingly, the inferences will be discussed under two main headings: General Inferences and Curriculum Inferences.

### **7.10.1 General Inferences**

#### **Role of the Dental Therapist**

All external stakeholders strongly believed that the role of dental therapist in South Africa was to provide basic oral health services as part of the oral health team to children and disadvantaged populations in the public sector. This cadre of oral health worker could play a significant role in all three streams of the NHI.

#### **Student Recruitment**

The high levels of disillusionment among students and the lack of job satisfaction among graduates can be attributed partly to the recruitment of the “inappropriate” type student. If the role of this profession is to provide basic dental services to rural and underserved communities in the public sector, then the university recruitment and selection strategies must focus on attracting this type of student.

#### **Student Selection**

Selection was also identified as a problem because it was based on academic merit and interview skills. There was no evidence of a determined effort to select students from rural areas. This is in spite of the fact that the literature has demonstrated that students who are recruited from rural areas are more likely to return to work in these areas (WHO, 2011).

#### **Student Perceptions**

Only 60% of students at this school were satisfied with their educational experience. These results are similar to the experience of dental schools internationally (Bertolami, 2001). These results can be attributed to common problems in dental curricula in general. The overcrowded timetables and the rigid lockstep formation of the curriculum often resulted in students having no time to participate in “normal” student activities. Students

were confined for most of their studies, to the training hospital, which left little interaction with campus life. The stresses of working on fearful dental patients, combined with the high prevalence of patients with communicable diseases such as HIV/AIDS and tuberculosis, may have added to this dissatisfaction.

Students and graduates also expressed high levels of dissatisfaction with the dental therapy profession. Many of them stated that “thought they were studying dentistry.” They also attributed this to the fact that their scope of practice is limited compared to that of the dentist. This dissatisfaction could have been augmented by the fact that most of the academics were dentists.

### **Graduate Profile**

The graduate profile of this institution has changed considerably in the past ten years. The number of Indians, who made up a large majority, has decreased to some extent and the number of African graduates has increased significantly. The reasons for the low number of White and Coloured graduates need further investigation.

Another matter of concern was the disparity in the low number of graduates produced in relation to the value predicted from the enrolment figures; and needs to be considered further in the recommendations for the curriculum.

The practice patterns clearly demonstrate that most dental therapists worked in the private sector, thereby exacerbating the inequities in the provision of oral health care.

### **Graduate Perceptions**

Dental therapy graduates in general were dissatisfied with their careers in the public and private sectors. Many of them voiced the opinion that dental therapy was not their first choice, and they would have preferred to be a dentist if there was a “fully-fledged school of dentistry” in this province.

A common theme identified by all stakeholders was that dental therapy served as a stepping stone to dentistry. This fact was corroborated by a dental dean, who stated that his university readily accepted dental therapists into their dentistry programme. Almost 50% of the first-year enrolments for Dentistry comprised of dental therapists from UKZN.

He said that these students already had the necessary skills, and were generally “good students” who were able to “complete the programme in the minimum time period.”

Many stakeholders also felt that there were high levels of dissatisfaction in the public sector due to low salaries, poor working conditions, lack of materials, poor facilities, and the low priority that hospital managers assign to oral health. An employer emphasized that the rural areas were worst affected by these conditions. However, the literature showed that the same problems were identified by this profession almost 30 years ago (Prinsloo, 1993).

All of the stakeholders believed that dental therapists in the private sector were frustrated with their limited scope of practice. This often resulted in therapists working unethically outside their scope. However these frustrations were not restricted to graduates from UKZN. At a seminar on the dental therapy profession held in 2011 in Gauteng, dental therapists from other universities expressed similar concerns.

### **Academic Profile**

Even though academics at this school were not adequately credentialed, they displayed a commitment to their work. This “faculty vitality” can play a role in contributing to the success of the programme. It should also be used to encourage all academics, whether employed by the University or the Department of Health, to pursue post-graduate studies.

It is also important to remember that, if the curriculum is revised on completion of this study, all academics must be included at all stages of curriculum development.

### **External Stakeholder Perceptions**

The external stakeholders held many unfavourable perceptions on the curriculum, which included the lack of training in primary health care, comprehensive patient care, and children’s dentistry. These factors will be discussed in detail under Curriculum Inferences.

### **Online Resources**

The online resources at the training hospital were inadequate to cater for all students. However, the availability of these facilities was adequately catered for on the main campus, which was easily accessible to students.

### **7.10.2 Curriculum Inferences**

Barnett and Coate (2005, p. 109) argued that “students cannot be mere assemblies of competencies or reservoirs of knowledge.” Barnett and Coate believe that competencies and knowledge should be acquired over time. Many inferences were formulated in regard to the dental therapy curriculum, which will be discussed next.

#### **Primary Health Care**

Evaluation of the dental therapy curriculum indicated that training was based on a hospital-centric, urban-based, curative training model, which is commonly seen in developed countries (Thorpe, 2006). There was little focus on the basic tenets of the primary health care approach. This includes health promotion and prevention, the provision of high-quality, low-technology curative care, intersectoral collaboration, and community-based care.

#### **The Traditional Curriculum**

It was evident that the dental therapy curriculum followed the traditional subject-centred format. This has resulted in the perception among students that their training, in the basic, preclinical and clinical sciences, is decontextualised. The lack of integration of these modules has resulted in students being unable to provide comprehensive patient care. In addition, the general and clinical competencies are taught and assessed as two parallel processes, which has resulted in students being unable to relate and integrate these two competencies.

#### **Diagnostics Skills**

In the dental therapy curriculum, the basic, preclinical and clinical sciences are supposed to be integrated in the third-year module Diagnostics and Radiology. However, many of the students believed that this was too late in the curriculum, as they only realized the relevance of these sciences towards the end of their final year. Integration needs to start from the first year, and this should be continued through to the final year.

It was also found that the modules that contribute to the development of this skill, such as Oral Medicine, Oral Pathology, General Medicine and General Pathology, involved too many diseases that were considered to be irrelevant to this country. Therefore these

modules need to be reviewed and revised in order that students become proficient in the diagnosis, management and appropriate referral of the epidemiological priorities of South Africa.

### **General Competencies**

The evaluation of the general competencies revealed that they were not adequately developed according to trends in the recent literature. These competencies were also presented and assessed in the traditional format. The evidence in the literature showed that general competencies such as communication (Strauss et al., 2010), business and office management (Willis et al., 2009), ethical and professional issues (Christie et al., 2007), and infection control (Kanjirath et al., 2009) cannot be developed by lectures alone, as was the case in this curriculum. Integration of teaching, learning and assessment between the general and clinical competencies needs to be considered.

### **Clinical Competencies**

Training in most of the clinical modules only started at the end of the second year. This resulted in students being trained on patients for the duration of the third year only. This situation was worse in Restorative Dentistry, where the preclinical training occurred in the first six weeks of the third year. This meant that students only worked on patients for six months before they wrote their final examinations. Restorative Dentistry is considered to be the most technically-challenging module, and students rated it as “difficult” and the workload as “too much”. The timing of the preclinical and clinical components of all clinical modules should therefore be re-evaluated to ensure that the graduates produced are competent clinicians.

### **Children’s Dentistry**

The curriculum evaluation revealed that there was very little emphasis on children’s dentistry. This is an anomaly, since the damning statistics of the National Children’s Survey (van Wyk & van Wyk, 2004) revealed that over 80% of 6-year-old children have untreated dental caries. It is well recognized that this disease causes extreme pain and disfigurement and affects the quality of life (Petersen, 2003). It also results in restricted activities in school and the loss of school hours (Petersen, 2008).

## **Newer Pedagogical Methods**

On appraisal of the curriculum there was no evidence of the use of newer pedagogies such as problem-based or case-based learning. There was some evidence of competency-based learning, but most subjects were still taught in departmental silos. A glaring deficiency was the rudimentary nature of community-based dental education, which has been widely recommended in the dental literature (Hood, 2009; Lynch et al., 2010; McAndrew, 2010). Another shortcoming identified in the curriculum was the absence of the development of skills in critical thinking and lifelong learning.

## **Assessment Strategies**

The school has introduced some of the assessment strategies that have been recently described in the literature. These include computer-assisted learning and the use of portfolios. However most of assessment strategies of the school were based on the traditional curriculum. With the initiation of newer pedagogies, such as problem-based, case-based and community-based learning, innovative assessment strategies need to be introduced to the curriculum.

The general and curriculum inferences derived from this study were presented in this section. The recommendations that were formulated in response to these inferences will be discussed hereunder.

## **7.11 RECOMMENDATIONS FOR THIS STUDY**

The vision of the Department of Health (2011a, p. 11) with regard to its strategy for human resource development is to “develop a workforce through innovative education and training strategies and fit for purpose to meet the needs of the re-engineered health system and measurably improve access to quality health care for all.” This vision, combined with the mission of the University and the School, guides the researcher in formulating the recommendations of this study.

To implement any kind of change, these recommendations need to be presented to all relevant stakeholders. Some of these views have already been presented formally and informally at various stakeholder forums of the Dental Therapy Association of South Africa, and have been well received.

In line with the presentation of the inferences in this study, the recommendations have also been developed in two parts: general recommendations and curriculum recommendations.

### **7.11.1 General Recommendations**

#### **Recommendation 1: Role of the Dental Therapist**

These recommendations were developed in the context of three factors: need to improve access to oral health care among children and disadvantaged communities; frustrations and dissatisfaction within the dental therapy profession; and discord and dissonance within the oral health team of South Africa. These recommendations should be addressed to high-level stakeholders such as the Department of Health, the University Management, and the Regulatory Body for support and implementation. They reflect the personal beliefs of the researcher as an experienced academic and clinician. Some readers may find them extremist and unconventional.

#### ***The Dental Therapist should function in the public sector***

The first recommendation is that the role of all newly trained dental therapists should be revised to subscribe to the newly defined role proposed by all stakeholders in this study. The curriculum should focus on the training of mid-level workers who are competent to provide health promotion, prevention and basic curative care to schoolchildren and to disadvantaged communities, in the public sector only.

#### ***Conversion of existing dental therapists to dentists***

So what will happen to the existing dental therapists in the health care system? Even though it may seem unconventional, the researcher believes that to create an optimally-functioning oral health team, the existing dental therapists should be given the option of converting to dentistry. Personal communication with several dental therapists has revealed that many of them will convert to dentistry if they are allowed to do so. A dental dean alluded to the fact that dental schools admitted selected dental therapists into the dentistry programme each year because they were deemed to be competent in basic dentistry skills.

This conversion will decrease the number of dental therapists in the private sector, which can only be reduced by factors such as retirement from the profession or death. Over time,

as training occurs in the public sector format, and as existing therapists convert their qualifications, all dental therapists will eventually work only in the public sector.

### ***Redefinition of the scope, roles and referral patterns of the oral health team***

To improve collegiality and efficiency in the oral health team the scope and roles of each cadre of oral health worker must be clearly defined, and the referral patterns of all members of the team must be delineated. This recommendation is in line with the NHI document of the Department of Health (2011), which recommends that the role and scope of practice of all health professionals should be reviewed and that new training and career paths should be developed. This should be done within the context of the primary health care approach and the NHI so that access to basic oral health services can be expanded to all communities, resulting in an improvement of oral health status of the population.

### **Recommendation 2: Name of School**

The name of the school should be changed to the School of Dental Therapy and Oral Hygiene. This change will immediately alter the perceptions of students applying for, and entering this programme. It will also reinforce these perceptions to students already enrolled in this school.

### **Recommendation 3: Student Recruitment and Selection**

The marketing strategies of the university prospectus and handbooks need urgent revision to accurately reflect the role and scope of practice of this profession. Students should be made aware that dental therapists will need to work in disadvantaged and rural areas, so that students can make appropriate lifestyle choices.

Student selection should be focused on the active recruitment of students from underserved rural areas. A quota-based system for the selection of students from these areas should be used. The Department of Health should provide bursaries for these students, with the proviso that students return to these areas for a minimum time period.

These measures should result in an increase in the number of dental therapists working in rural areas. It should also discourage the enrolment of students who are using this programme as a “stepping stone to dentistry.”



#### **Recommendation 4: Student Perceptions**

The high levels of disillusionment among students can be allayed by engaging them with their curriculum (Barnett & Coate, 2005). These authors argued that this can be achieved by the generation of orientational, curricular and ontological positivity.

Oriental positivity refers to the students' need to feel that their programme is worthwhile and their institution is well recognized. Curricular positivity refers to the perception by students that their learning and development is proceeding successfully, and can be enhanced by the positive attitudes of lecturers. Ontological positivity occurs when students feel positive towards themselves. If these three factors are in place, students often become committed to their own development (Barnett & Coate, 2005).

Other factors that affect the positivity of students are the learning environment, lecture rooms, library and recreational facilities. Positivity can also be improved by ensuring that communication with students is kept confidential. The university does have a student monitoring system, which allows for confidential communication with students. The academics should become familiar with this form of electronic communication so that students are not exposed to humiliation among their peers.

#### **Recommendation 5: Credentials of Academics**

It is evident that academics in this School are experienced and motivated. Therefore, it is essential that both of the employers, the Department of Health and the University, should make provision for academics to further their studies. Incentives such as fee remission and bursaries, and access to sabbatical leave can be used to motivate staff to remain in the academic environment.

Barnett and Coate (2005) have argued that academics are primarily responsible for changing the form and content of the curriculum. Therefore, if the recommendations of this study are implemented, it is essential to bring on board all academics at every stage of this process.

### 7.11.2 Curriculum Recommendations

The recommendations of this study have been constructed by taking into account all the strengths and deficiencies identified by the evaluation, within the context of the newly defined role of the dental therapist. From these findings a curriculum model for health science education (Figure 19) has been developed. This model is an extension of the Hicks model which has served as the theoretical framework of this study.

This model is applicable not only to the Dental Therapy curriculum offered at this university. The researcher believes that it can be applied to health science curricula internationally, especially in developing countries.

The recommendations for the new curriculum evaluation model have been contextualized within the CIPP model of Stufflebeam (2000). Thus, the aim of this model is *not to prove, but to improve*. Stufflebeam believed that this model should be aimed at promoting growth in order to meet the needs of the population within the available resources. In this way, it would work better for the people they were intended to serve.

The model that emerged from this study is illustrated in Figure 19. All the influences proposed in the new curriculum evaluation model have been contextualized within the CIPP model of Stufflebeam (2000). These recommendations were based on the different phases within which this study was conducted. The influences that contributed to each of these phases will be discussed next.

#### CONTEXT PHASE

The three components that influenced the curriculum in this phase are the *health needs* of the country, the *scope of practice* of the health professional, and the *historical precedent* from the local, national and international perspectives. The first two aspects do not form part of the Hicks model, and are therefore regarded to be extensions of this model.

#### Health needs of the country

This phase will enable the contextualization of the role of the professional within the health care system of the country. It can be determined by examining the health care system, the training and practice patterns of health professionals, and the health status of the population.

## **Scope of Practice**

The scope of practice can be determined by examining the health care team as a whole. The role of each member of the health care team should be clearly defined; and the referral patterns should be demarcated. From this information, the scope of practice can be established.

## **Historical Precedent**

The information obtained on health care needs, combined with the redefined scope of practice, should be compared with international initiatives. This process will assist in identifying the successes, and avoiding the failures, of other programmes.

## **INPUT PHASE**

The three components that influence the curriculum in this phase are the recruitment materials, the selection process, and the perceptions of students with regard to their profession. The first two aspects do not form an overt component of the Hicks model.

### **Recruitment materials**

The recruitment materials should accurately reflect the role and scope of practice of the profession so that prospective students are aware of what this profession entails.

### **Selection Process**

The process and criteria used in the selection of students should be based on the type of professional needed for the health care system.

### **Student Perceptions**

The perceptions of students in regard to their choice of programme are an important factor in this phase. If students display a passion for their profession they will focus on achieving competence. However, if they use this programme as a stepping stone to another profession, then they will aim merely to pass the different modules to enable them to gain entrance to other universities.

## **PROCESS PHASE**

Several components influence the curriculum in the phase of process evaluation. The extensions to the Hicks model in this phase include the student pass rates and the patient statistics.

### **Faculty Handbooks and School Module Portfolios**

These documents will provide information on the form and content of the curriculum.

### **Student Pass Rates and Patient/Case Statistics**

Information obtained on these two aspects will either corroborate or refute the data obtained in the analysis of the Faculty and School documents.

### **Student Perceptions**

The views of students in regard to the modules offered and their perceived competence will complement the data obtained from other sources.

### **Views of Academics**

The views of academics in regard to their ideologies, teaching styles and educational knowledge will also contribute to the evaluation of the curriculum.

### **Accessible Online Resources and Institutional Constraints**

The role of these two influences on the curriculum will provide reasons for some of the perceptions obtained in previous sections.

## **PRODUCT PHASE**

This entire phase is considered to be an extension of the Hicks model, and takes into account the profile of the graduate produced by the institution. It is made up of three aspects.

## Profile of the Graduate

The graduate profile is developed by taking into consideration the trends in the number, race and gender of graduates. This information will assist in determining whether a culturally-appropriate graduate is being produced by the School.

## Practice Patterns of Graduates

This component will evaluate whether the graduates produced are actually working in the sectors in which they are needed. It will thus consider whether graduates are working in the private sector, public service, or if they are no longer practising their profession.

## Job Satisfaction

Job satisfaction of graduates is important to encourage them to remain in the profession, and thereby contribute to the health care system of the country.

In the new model, these phases are linked by arrows showing the dynamic interactional relationship between them. This relationship has been illustrated in Figure 19, and will be discussed next.

### Context ↔ Input

- It is important to know the *needs of the population* and the *scope of practice* in order to recruit and select the appropriate type of student into the program. In the dental therapy curriculum, if the role of the therapist is to provide services to rural and disadvantaged areas, then students must be recruited and selected from these areas.
- It is also important to realize that if the needs of the population changes, then the type of student to be recruited and selected should also be reviewed.

### Context ↔ Process

- Once the appropriate students are enrolled into the program, it is necessary for the form and content of the curriculum to be relevant to the needs of the population as well as to the scope of practice.

- It is also important to recognize that curriculum development is considered to be an ongoing iterative process that needs to be re-evaluated and revised according to the changing needs of the population.

#### **Input ↔ Process**

- If students are recruited from disadvantaged communities, it is necessary to ensure that the curriculum takes into account their disparate circumstances.
- The students enrolled at the school must have the facilities and online resources which will promote a conducive working environment.
- The type of student recruited must be passionate about their profession in order for them to perform well in their studies.
- The perceptions of students must be taken into consideration on an ongoing basis to identify problems with the curriculum.

#### **Process ↔ Product**

- Training must occur within the communities they are meant to serve in order to improve the chances of students returning to these areas on graduation.
- The learning experience should be able to create a graduate who is caring, reflective and lifelong learners.
- The student must be able to integrate all aspects of their studies in order to become a competent clinician.
- On completion of their studies, graduates must be satisfied within their profession.
- The perceptions of graduates with respect to the appropriateness of their training need to be evaluated on an ongoing basis in order to identify and correct problems timeously.

#### **Product ↔ Context**

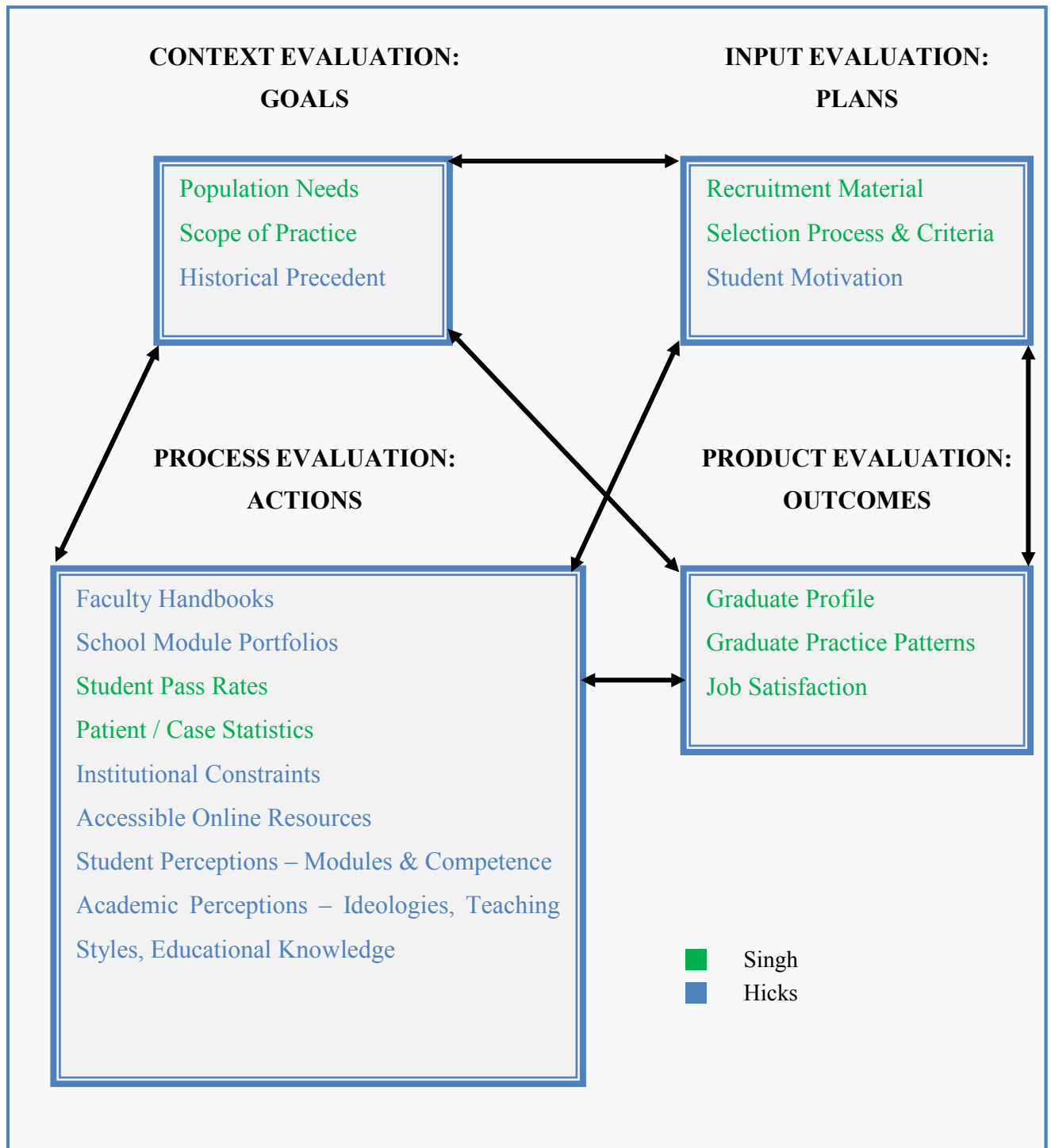
- If graduates are satisfied with their profession, they will practise within their recommended scope, and they will remain within this profession. This will ensure that health professionals are retained within the health care system. Therefore the contribution of graduates to the health care system needs to be evaluated constantly to determine whether they are meeting the needs and challenges of the country.

**Input**  $\longleftrightarrow$  **Product**

- The type of student recruited will play a role in determining the type of graduate produced. If a student is recruited from a rural area, it is possible that s/he will return to that area to work.
- If students are satisfied with their profession, it is very likely that they will practice that profession on graduation.

These discussions focused on the new curriculum evaluation model (Figure 19), that emerged from this study. This model can be used for the evaluation of health science curricula, especially in developing countries. This model is illustrated in Figure 19.

## A NEW CURRICULUM EVALUATION MODEL FOR HEALTH SCIENCE EDUCATION



**Figure 19 : Curriculum Evaluation Model for Health Science Education**



In the next section, details are presented of how this model can be implemented with respect to the dental therapy curriculum offered at this university. They are also set out in Table 18. These recommendations have been formulated at the level of each year and each semester of the curriculum at the macro-level. They do not include micro-level details or internal aspects of the curriculum design.

### **7.11.3 The Revised Dental Therapy Curriculum**

#### **Year I - Semester 1**

At this stage, it is important to realize that most students have entered university straight from school. Some have learnt English as a second language, and therefore have to become proficient in this language of instruction. Cultural diversity among students from different backgrounds also needs to be recognized in the curriculum at this stage. It is therefore essential that the curriculum engages with the student at the onset of their studies in order for them to demonstrate “energy, resilience and courage” (Barnett & Coate, 2005, p. 137).

#### ***General Foundational Knowledge***

General foundational knowledge will be introduced to the student in the form of Academic Skills and Communication Skills. The Academic Skills module is presented by the Student Counselling Services of the University. It encompasses topics such as time management, goal setting, effective communication, note taking, reading, study methods, oral presentations, stress management, self-esteem, assertiveness and conflict management. Communication skills include English Language Development and Basic isiZulu. This foundational knowledge will give students confidence to proceed with their studies.

#### ***Community-Based Education***

Community-based education will commence from this level by introducing students to the psychosocial orientation to health care. In this way, students become aware of the inequities and problems within the social, economic, health and other spheres of South African society.

### ***Basic Sciences***

The basic sciences, such as Anatomy of the Head and Neck region, and General Basic Physiology, will also be introduced at this level. Many students perceive these subjects to be difficult. Consequently the academic development officers will assist and guide students to achieve success.

### ***Dental Foundation Knowledge***

This aspect encompasses the study of the normal anatomy and physiology of the oral and dental structures in the subject Oral Biology. The main objective of this module is to introduce students to the “cognitive and psychomotor skills related to the morphology and spatial and functional relationships of human dentition” (Obrez et al., 2011, p. 797). They recommend that rather than teaching these aspects by traditional didactic methods, innovative techniques are called for. They use an integrated approach of small group discussions with patient scenario-based wax-up exercises to replace missing teeth on a mannequin. In this way the preclinical dental sciences are contextualized within the patient setting.

The foundational knowledge also includes the module Cariology, Periodontology and Prevention. This module encompasses the two most common oral diseases and their prevention. This aspect should also be taught as a combination of didactic with problem- or case-based teaching.

By the end of the first semester students should have gained some degree of confidence in their transition from school to university. The process should be initiated of conscientising them to the real world in relation to the health care system. They should have achieved a basic knowledge in the normal structures of the head and neck region. They will also be introduced to the most common pathologies experienced by the dental therapy profession, together with their prevention. This stage correlates to the base of Miller’s pyramid for assessing clinical competence (Norcini, 2003). The student “knows” information, without having access to patient care. The assessment should be constructively aligned to teaching and learning, and it usually measured by multiple-choice and short questions.

## **Year I - Semester 2**

### ***General Foundational Knowledge***

Even though this module has been completed at the end of semester one, students will be advised to attend refresher courses run by the Student Counselling Services as the need arises. The academic development officer will identify and refer students for these sessions.

### ***Community-Based Education***

The community engagement and multidisciplinary components of the primary health care approach are introduced to students during the Community Studies module. Students learn to work as part of a multidisciplinary team, together with other health science students such as pharmacists, nurses, physiotherapists, and speech and occupational therapists. They learn about the basic concepts and relationships between health and the community. They develop skills in how to approach communities to conduct research. At the end of this module they present a health promotion programme according to the needs of disadvantaged communities.

### ***Dental Foundation Knowledge***

This knowledge field should be enlarged by lectures combined with the introduction of preclinical training in the fields of prevention and radiography.

### ***Problem-Based Learning***

At this stage, an important addition to this curriculum is the introduction of the concept of problem-based learning (PBL). PBL has been used in many dental schools as part of their curriculum, although not many use this type of teaching exclusively (Kassebaum et al., 2004).

This type of pedagogy engages students in cognitive and practical activities (Barnett & Coate, 2005). It can be achieved by group work, learning journals, reflective logs and working on projects. This type of learning promotes the development of critical-thinking skills and lifelong learning (Boyd, 2002).

During these sessions, real-life problems are presented to students within a social context. These problems encompass all knowledge gained in the first and second semesters. To solve these problems successfully, students will have to integrate all this knowledge in a logical manner. However, in order for PBL to be successful, students must have space and time in their timetables to reflect on their experiences (Barnett & Coate, 2005) and to develop schemas of knowledge (Boyd, 2002).

By the end of the second semester, students should have become more familiar with the university scenario. They have been introduced to the preclinical setting, and to the concept of community-based care. Students start developing critical-thinking skills, which will play a significant role when they enter the clinic in the second year.

At this stage of Miller's pyramid (Norcini, 2003), the student "knows how" a skill is performed. Therefore students need to be able to apply biomedical knowledge in the analysis and solving of problems presented to them as cases and patient scenarios. The PBL approach is ideally suited to this type of learning. Assessment at this stage usually includes multiple-choice questions, essays relevant to a clinical scenario, and oral evaluations.

## **Year II - Semester 1**

### ***General Foundational Knowledge***

Students will have access to the Student Counselling Services as the need arises. The academic development officer monitors the progress of all students to facilitate the early identification of problems.

### ***Community-Based Education***

In the module, Community Oral Health, students will build on their knowledge gained in the previous two community-based modules. However, at this stage, the emphasis will be on developing competency in health education, promotion and prevention in dentistry. Students will learn how to conduct epidemiological surveys, and prepare proposals for their research projects. The development of this skill is essential for dental therapists if they are to play a meaningful role in the provision of appropriate health promotion and prevention programs for local communities.

### ***Diagnostics Skills***

At this stage, students are introduced to patients in the clinical environment. They learn the skills of examination, diagnosis, treatment planning and appropriate referral. The development of this skill is accomplished by several modules.

The modules General Pathology and General Medicine will enable student to establish the link between oral health and general health; which is one of the recommendations of the WHO (Petersen, 2003).

The module Oral Medicine, Oral Pathology and Clinical Pharmacology will provide information on the diagnosis, management and referral of the most common oral conditions. It is necessary to review these modules to eliminate uncommon conditions.

The Radiography module will enable students to take radiographs for the diagnosis of common conditions. The Dental Specialties module will provide students with basic information on the treatment modalities available in each specialty. This information will enable therapists to advise patients about the different treatment options, and to refer them appropriately, where it is necessary.

### ***Clinical Competencies***

Students will also build on their preclinical skills that were developed in the previous year with respect to the fields of prevention and dental radiography. They will examine child, adult and disabled patients, provide basic preventive care, and do scaling and polishing of teeth. In this way, students become competent in the management of patients in the clinical environment.

### ***General Competencies***

The basic principles and procedures involved in the development of the general competencies are presented to students in the form of lectures and clinical demonstrations in the first semester. These competencies include communication skills in the dental practice, infection control, practice management, and professional ethics.

At the end of this semester, student should have developed competence in the examination, diagnosis, treatment planning and appropriate referral of adult, child and

disabled patients. The general competencies are introduced to the student within the clinical setting. Students also develop competence in community-based dental education.

At this stage, students should have developed competence at the third level of Miller's pyramid (Norcini, 2003). They are able to "show how" to apply patient care skills. Therefore the assessment methods need to be more advanced to determine whether students can "show how" they apply knowledge and skills under controlled well-supervised conditions. Clinical competency examinations, combined with a significant theoretical component, are ideally suited to demonstrate competence at this level.

## **Year II - Semester 2**

### ***General Foundational Knowledge***

The referral of students to Student Counselling Services is continued on an ongoing basis as the need arises. Monitoring is done by the academic development officer.

### ***Community-Based Education***

At this stage, students should conduct epidemiological surveys and research projects within the local area to determine and address the needs of the community. At this stage, students should not only develop programs related to oral health, they should also try to integrate oral health into the general health programmes of that area. They should be placed in district clinics, schools and municipal wards to provide oral health promotion and preventive care to local populations. This will ensure that students feel comfortable and competent within the settings prescribed by the NHI.

### ***Diagnostics Skills***

At this stage, students should have achieved a greater level of competence in regard to diagnostic skills. They should be able to establish relationships between oral and general health. They should be competent to diagnose, manage and refer the most common oral and dental conditions. At this stage, students should also have developed competence in the taking of radiographs.

### ***Integration of Clinical and General Competencies***

At this stage, students develop basic clinical competencies through the learning stages in the continuum described by Chambers (1994). Students should have achieved the level of *competent* in this continuum in the skills of preventive care, and scaling and polishing.

During these sessions, it is also necessary to integrate the general competencies (communication, infection control, practice management, and professional ethics) into the clinical setting. Therefore these competencies must be developed and assessed together in this domain.

### ***Preclinical Competencies***

In this model, development of the preclinical competencies in Minor Oral Surgery (extractions) and Restorative Dentistry (fillings) has been moved from the third year to the second. This is because students and academics believed that training time in these clinical disciplines were inadequate. Both these disciplines involve the development of motor skills. The literature indicates that only way motor skills can be improved is by practice and repetition. The student improves performance through practice until the correct performance of the motor skill becomes automatic (Hauser & Bowen, 2009).

### ***Case-Based Learning***

Another change to the dental therapy curriculum is the introduction of case-based learning. In this form of learning, students work as small groups around a patient to develop a comprehensive clinical picture (Kassebaum et al., 2004). This type of learning is used by many dental schools as part of their curriculum.

Case-based learning was introduced to complement the lectures presented in the General Medicine, General Pathology, Oral Medicine and Oral Pathology modules. It will enable the student to develop conceptual, procedural and metacognitive knowledge for the development of higher-order thinking (Boyd, 2002).

At the end of this semester, student should have developed competence in the examination, diagnosis, treatment planning and appropriate referral of adult, child and disabled patients. They should also have achieved competence in preventive care, and scaling and polishing. The general competencies are integrated into the development and assessment of clinical competencies, within the clinical setting. Students also develop

competence in community-based dental education at all levels of the NHI. The development of preclinical skills in the modules Restorative Dentistry and Minor Oral Surgery also occur at this stage. Case-based learning is introduced to develop skills in critical thinking, and in reflective and lifelong learning.

At this stage, students would remain at the third level of Miller's pyramid (Norcini, 2003). In order to "show how" to apply patient care skills in simulated clinical situations, the assessment methods need to be more advanced, as has been described in the previous section.

### **Year III - Semesters 1 and 2**

#### ***General Foundational Knowledge***

This service would remain open to students who need any form of assistance. Monitoring would be conducted by the academic development officer.

#### ***Clinical Competencies***

From mid-January to mid-May, students would develop their competences in the clinical disciplines by working on patients in the training hospital. They would work on patients in the specific disciplines of Restorative Dentistry and Minor Oral Surgery from mid-January (start of semester 1) to mid-May (end of semester 1). It is envisaged that during this period, students would be exposed to between 12 and 15 hours of clinical training per module. Thus, over a period of four months the student should develop an acceptable level of competence in these clinical disciplines (Chambers, 1994).

#### ***Community-Based Education***

From mid-May to mid-July, students would be sent rural clinics to provide basic dental care under supervision of an experienced dentist or dental therapist working in that situation. They would provide all procedures prescribed by the basic oral health package (Department of Health, 1997).

All final year students work on the Phelophepa Health Train for about two weeks during their July vacation. In the qualitative interviews, the student Fatima said that she "loved the experience." The academic interview with Mrs Ally revealed that students returned from the Phelophepa experience "competent and confident."



However it is important that community-based training should be directed at specific community needs, and should be integrated into the academic programme (Department of Education, 2004). It should form an integral component of the dental therapy curriculum, and should be credit-bearing and assessed. CBDE will encourage the integration of community service into teaching, learning and research. It will also result in the mutual enrichment of student learning through service to the community. It will also enhance the service component of the Department of Health (Council on Higher Education, 2010).

The teledentistry facilities located at the training hospital can play a vital role in the introduction of CBDE into the curriculum. It can support students and academics if they are faced with difficulties, and can therefore enable them to practise confidently within these settings.

Before these rural electives are implemented, it is necessary, however, for all dental facilities to be fully-functional. This can be achieved by the Department of Health (2011) as part of the proposed initiative to upgrade all public sector facilities before implementation of the NHI. It is therefore necessary for the Oral Health Directorates in each province to ensure that public sector dental clinics are upgraded to a reasonable level to promote student training. In addition, it may be necessary to provide workshops for clinicians at the rural clinics to enhance their skills in the clinical supervision of students.

### ***Integration of General and Clinical Competencies***

During these clinical sessions, it is necessary to integrate the general competencies (communication, infection control, practice management, and professional ethics) into the clinical setting. These competencies must be developed and assessed together in the clinical domain.

### ***Comprehensive Patient Care***

From August to October, clinical training would entail the comprehensive provision of the basic oral health care package to children and adults. Students would rotate between the training hospital, schools, urban clinics and rural clinics. This experience will ensure that dental therapists are clinically competent to fulfil their role in the NHI of this country.

### ***Case-Based Learning***

To improve comprehensive patient care by reflective learning, one case-based learning session would be provided each week in the third year. This type of learning would enhance the conceptual, procedural and metacognitive knowledge of the student (Boyd, 2002). This can be achieved by the use of reflective logs, learning journals or portfolios throughout the programme (Barnett & Coate, 2005).

During these exercises, students will write down what the problem was, what actions were taken to resolve the problem, and an evaluation of those actions. This is a form of self-reflection, where students learn that some experiences are not learnt from lectures and can only be attained by performing a variety of clinical procedures. In this way, students will be able to develop schemas or knowledge structures which differentiate the novice clinician from the expert clinician. For students to be able to absorb their experience and knowledge into memory, it is necessary, though, for them to have space and time in their timetables (Barnett & Coate, 2005).

At this stage, students would have reached the tip of Miller's pyramid (Norcini, 2003), which is represented by the "does" level. Students are required to "do" all tasks prescribed by their scope of practice in real-life working conditions, over an extended period of time, with minimal supervision. They need to show that they have mastered the competencies needed for independent practice, and can reproduce these skills over a prolonged period of time.

Table 18 sets out these recommendations for the dental therapy curriculum in tabular form.

**Table 18 : The Revised Dental Therapy Curriculum**

LEVEL 1		LEVEL 2		LEVEL 3	
Semester 1	Semester 2	Semester 1	Semester 2	Semester 1	Semester 2
GENERAL FOUNDATIONAL KNOWLEDGE i. Academic Skills & Clinical Practice ii. English Language Development iii. Basic / Intermediate isiZulu	DENTAL FOUNDATIONAL KNOWLEDGE i. Oral Biology Structures  PRECLINICAL i. Radiography & Photography ii. Cariology, Periodontology and Prevention	DIAGNOSTICS SKILLS i. Diagnostics, Infection Control & Dental Specialties ii. Ethics iii. Practice Management	PRECLINICAL i. Minor Oral Surgery ii. Restorative Dentistry  	CLINICAL Mid-Jan to Mid-May Restorative Dentistry Theory & Clinic at the training hospital  CLINICAL Mid-Jan to Mid-May Minor Oral Surgery, include Emergency Care Theory & Clinic at the training hospital	CLINICAL August to October Restorative Dentistry Rotation between hospital, schools, rural & urban clinics  CLINICAL August to October Minor Oral Surgery Rotation between hospital, schools, rural & urban clinics
COMMUNITY-BASED STUDIES i. Psychosocial Orientation for Health Care, including ethics ii. Introduction to Anatomy and Head & Neck Anatomy iii. General Basic Physiology	COMMUNITY-BASED STUDIES i. Community Studies - Multidisciplinary with other Health Science Professions	COMMUNITY-BASED STUDIES i. Health as a human right ii. Health education & promotion iii. Preventive care iv. Dental epidemiology v. Research proposal	COMMUNITY-BASED STUDIES Schools & Community Clinics i. Health Education & Promotion, ii. Prevention iii. Epidemiological Surveys iv. Research study	COMMUNITY-BASED STUDIES Comprehensive patient care in rural clinics, schools and municipal wards as part of the NHI Mid-May to Mid-July (8 weeks)	
DENTAL FOUNDATIONAL KNOWLEDGE i. Oral Biology – Embryology and Physiology ii. Cariology, Periodontology and Prevention – introduction	PROBLEM-BASED LEARNING Integration of the foundational knowledge in the basic, dental, preclinical and community-based aspects will be integrated.  Reflective logs, portfolios and learning journals will facilitate such learning.	CASE-BASED LEARNING link between oral and general health & focus on oral health priorities i. General Pathology & Microbiology ii. General Medicine & Special Patients iii. Oral Medicine, Oral Pathology & Clinical Pharmacology Reflective logs, portfolios and learning journals will facilitate such learning.  CLINICAL Health Promotion & Prevention, Scaling & polishing, Dental Radiography	CLINICAL Radiography Clinical Dentistry – holistic patient management – with clinical diaries	PROBLEM-BASED AND CASE-BASED LEARNING TO FACILITATE COMPREHENSIVE PATIENT CARE i. Diagnostics & Radiology Foundational knowledge is combined with the preclinical and clinical domains, and the community-based studies to develop competence in comprehensive patient care. Reflective logs, portfolios and learning journals will facilitate such learning.	

The salient differences between this model and the original curriculum are summarized in Table 19.

**Table 19 : Differences Between the Old and Revised Curricula**

	<b>OLD CURRICULUM</b>	<b>NEW CURRICULUM</b>
<b>Community-based learning</b>	CBDE was taught in <i>pockets</i> in the different years in specific disciplines. Most teaching occurred in the training hospital.	CBDE would be introduced as a competency with increasing depth and breadth from the first to the final year. This form of learning would enhance general competencies such as communication skills, health as a human right and cultural awareness. It would enable the dental therapy graduate to provide the basic oral health care package competently at all levels.
<b>Competency-based learning</b>	Training in the clinical and general competencies occurred by means of the discipline-based traditional curriculum. Students learnt in departmental silos, with little evidence of integration of this knowledge.	Competency-based learning provided a sequence of defined learning experiences which would enable the development of competences prescribed in the scope of practice of dental therapists. However, due to the fact that it focused on the mastery of skills, without considering the psychosocial and reflective aspects of learning, other forms of learning were introduced.
<b>Problem-based learning</b>	There was no evidence of problem-based learning.	Foundational knowledge in the basic and preclinical sciences would be integrated in the first year by the introduction of problem-based learning. This type of learning would thereby facilitate the development of critically-thinking health professionals.
<b>Case-based learning</b>	There was no evidence of case-based learning.	This type of learning would be used to integrate all knowledge fields in the second and third years. Case-based learning would facilitate comprehensive patient care by developing reflective lifelong learners.
<b>New epidemiological priorities</b>	Patient management concentrated on the two most common dental diseases: dental caries and periodontal disease. Students were trained by theory only in the diagnosis and management of multiple oral diseases. Many of them were uncommon in South Africa. There was little emphasis on conditions that were deemed to be epidemiological priorities of this country.	The training did not concentrate only on the treatment of the two most common oral diseases. It also focused on the new epidemiological priorities of the country, thereby making the curriculum relevant to the needs of the population.
<b>Link between oral &amp; general health</b>	Health education, promotion and preventive efforts focused only on oral health care. It did not take into consideration the link between oral health and general health.	In this curriculum, health promotion, prevention and curative care did not only concentrate on the oral and dental aspects. It tried to encourage the link between oral and general health in the development of programmes appropriate to the local population. This recommendation was in line with international bodies such as the WHO.

From the discussion and inferences of the results of this study, general and curricular recommendations were made, leading to the development of a new curriculum model for health science education. This model is an extension of the Hicks model, which served as the theoretical framework of this study. A detailed explanation of how this model can be implemented, with respect to the dental therapy curriculum offered at this university, was also presented.

In the words of Grumet (1976, p. 130): “*Currere* is a reflexive cycle in which thought bends back upon itself and thus recovers its volition.” It would therefore be wrong to see the results of this evaluation as the end-point of the process, for that would mean perpetuation of the old dental therapy curriculum. The old curriculum was designed and implemented over thirty years ago and has never been evaluated since then. If the recommendations of this study are implemented, it must be considered as the first stage of an ongoing cycle of design, dissemination, implementation and re-evaluation (Carl, 2010).

Conclusion of this study must include presentation of its findings and assessments to all stakeholders. Their views should be taken into consideration when the macro and micro-level aspects of the curriculum are re-designed. The revised curriculum must also be disseminated to these stakeholders for their opinions. When all stakeholders are appropriately satisfied, the curriculum should be implemented. Within a specified time period, the revised curriculum should again be re-evaluated. By evaluating the curriculum on an ongoing basis, it will eventually achieve the missions of the University of KwaZulu-Natal (2011b) and the School of Dentistry (2011); and the vision of the Department of Health (2011a).

## **7.12 DELIMITATIONS OF THIS STUDY**

This study was confined to the evaluation of the dental therapy curriculum at the University of KwaZulu-Natal, although it is only one of the two universities offering this programme. This delimitation did yield some results that had specific reference to this school, including the frustrations of graduates not having had the option of a fully-fledged dental school in KwaZulu-Natal. Other results that were affected by the delimitation were the application, enrolment and graduate profiles which differed from those at the other dental school.

However the wider implications for the curriculum are applicable to any dental school in the country. Consequently, when other dental schools develop their curricula to train dental therapists, the model proposed in this study could serve as a template for the training institutions and the Department of Health.

### **7.13 LIMITATIONS OF THIS STUDY**

The restriction of the study to this institution (UKZN) decreased the generalizability of the findings. However this does not compromise the applicability of the new proposed model to any health science curriculum in South Africa.

The low number of students used in the quantitative component also compromised the validity of the research findings. But because they were combined with an extensive range of qualitative data, the representativeness/saturation rule was implemented (Teddlie & Tashakkori, 2009).

### **7.14 SIGNIFICANCE OF THIS STUDY**

This study can play a significant role in influencing the three components involved in the development of human resources for health, listed by the World Health Organization as planning, production and management (O'Brien-Pallas, Birch, Baumann & Murphy, 2001).

Planning human resources for health professions must be done many years in advance since it takes a long time to train and socialize health professionals (Department of Health, 2011a). Decisions regarding the training of health personnel produce long-lasting effects, and are often difficult to reverse. Because it is envisaged that the NHI will be implemented in stages over a period of 10 to 15 years there is adequate opportunity for this study to be used to guide health planners in the provision of equitable and appropriate oral health care.

The researcher has worked in the academic (production) and service (management) components for many years. She has identified many problems in regard to the dental therapy profession which have resulted in discord and dissatisfaction among the oral health team. This situation has resulted in increasing inequities in the provision of oral health care, especially among children and in disadvantaged and rural communities.

Since all dental schools have been asked by the Department of Health (2006) to start training dental therapists, she believes that the findings of this study can provide a template for the appropriate training of this cadre of oral health personnel, especially within the context of the NHI.

The policy documents of the NHI provide little detail on how oral health will fit into the new health system. Therefore oral health managers can use the recommendations of this study in devising ways for the different members of the oral health team to function within the health care system.

## **7.15 MY CONCLUDING STATEMENTS**

In a country like South Africa with its history of deprivation, the nature of the problems that exist in education and training are multifaceted and it would be naïve to think that there is a single solution (SAQA, 2000, p. 16).

I have defined myself as a community-orientated oral health professional, who has over twenty years' experience in the field of dentistry. During the apartheid era, I participated in the national oral health survey conducted at that time. The problems then identified by these surveys included the lack of access to basic dental services for disadvantaged communities. The main type of treatment provided at public clinics was extractions for the relief of pain and sepsis for adult patients. Very few children presented to the public sector. Health education, promotion and preventive care, and other dental treatment modalities, were rudimentary or non-existent.

Twenty year later, in a democratic South Africa, this situation still persists. There have been so many technological advancements in the field of dentistry in South Africa and internationally. But the inequities in access to basic dental services still persist among the disadvantaged sectors of the population.

I declared in the introductory chapter of this thesis that I wanted my research to be useful, practical and applicable to my profession. I therefore chose to evaluate the dental therapy profession in general and the dental therapy curriculum in particular. I wanted to find the reasons for the propagation of these inequities.

However this study should not be considered as the end-point of the discussions on the dental therapy curriculum. These evaluations should be conducted iteratively, taking into consideration the views of all stakeholders. The South African Qualifications Authority (2000, p. 14) stated that when a student is awarded a qualification, society needs to be reassured that s/he has demonstrated applied competence in specific skills and content areas. Therefore all deliberations should be based on sound theoretical foundations.

When the NHI was mooted by the Department of Health, I immediately identified a role for the dental therapist in this system. The international literature clearly demonstrated that this oral health professional has played a significant role in improving access to basic dental services. I therefore believe that the dental therapist, if trained appropriately, can provide basic oral and dental services to children and underserved communities. This would redress some of the inequities of the past. But this prospect can only be achieved if the training institutions, the regulatory body, and the Department of Health commit themselves to the primary health care system.

The patterns of training of oral health personnel have resulted in inequities in the provision of health care. Therefore training institutions need to review their curricula on an ongoing basis to ensure that all cadres of oral health personnel are appropriately trained to meet the needs and challenges of the country. The newly proposed NHI provides the low-priority oral health sector with a window of opportunity to create a niche in the health care system.

Noel Gough (2002, p. 18) stated that “futures in curriculum are not out there waiting for us to arrive. We must visualize them here and now.” I would therefore like to end this thesis with a quotation from a group of highly regarded health practitioners and academics from South Africa (Coovadia et al., 2009), who said,

Seize the moment, translate policy into practice, strengthen service delivery, secure health while confronting disease, and save the future.



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## Annexure 1: Ethical Clearance



05 December 2009

Dr P K Singh  
23 Elwak Road  
Reservoir Hills  
DURBAN  
4091

Dear Dr Singh

**PROTOCOL: The Dental Therapy Curriculum: Meeting needs and challenges for oral health care in South Africa**

**ETHICAL APPROVAL NUMBER: H55/0867/2009: Faculty of Education**

In response to your application dated 20 November 2009, Student Number: 208525917 the Humanities & Social Sciences Ethics Committee has considered the abovementioned application and the protocol has been given **FULL APPROVAL**.

**PLEASE NOTE: Research data should be securely stored in the school/department for a period of 5 years.**

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

**Professor Steve Collings (Chair)**  
**HUMANITIES & SOCIAL SCIENCES ETHICS COMMITTEE**

SC/sn

cc: Dr M Combrinck  
cc: Ms Rishandhani Govender

Forwarding Copies to: ☒ Edgewood ☒ Howard College ☒ Medical School ☒ Pietermaritzburg ☒ Westville

## Annexure 2: Gatekeeper Permission



21<sup>st</sup> June 2010

Prof S Y Essack  
Dean: Faculty of Health Sciences  
University of KwaZulu-Natal

Dear Prof Essack

### **GATEKEEPER PERMISSION: DATA FROM DMI, UKZN**

As you are aware, I am currently reading for a PhD through the Faculty of Education, where I am studying the Dental Therapy Curriculum at UKZN.

In order to compile a comprehensive profile of our graduates, I am requesting permission to use Student Data which is available from the Data Management Information System of UKZN on:

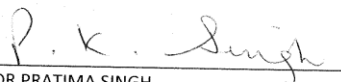
Applicants – number

Enrollees – number, race, gender, age

Graduates – number, race, age, gender, and contact details.

This information will greatly enhance my study.

Thank you  
Yours sincerely



DR PRATIMA SINGH  
SCHOOL OF DENTISTRY  
FACULTY OF HEALTH SCIENCES  
UNIVERSITY OF KWAZULU-NATAL

*Approved*  
*S. Y. Essack*  
*22/06/10*

Founding Campuses: ■ Edgewood ■ Howard College ■ Medical School ■ Pietermaritzburg ■ Westville

### Annexure 3: External Stakeholder Interview – Gatekeeper Letter

1<sup>st</sup> November 2009

To: Mr \_\_\_\_\_

Dear Sir/ Madam

#### **REQUEST FOR INTERVIEW: DENTAL THERAPY IN SOUTH AFRICA**

I have registered for a PhD in the Faculty of Education at the University of KwaZulu-Natal. As you are aware, I have taught at the School of Dentistry at this institution for over 18 years, and I am conversant with the many problems facing our graduates today. I am also well acquainted with the many controversies facing the dental therapy profession in South Africa. Consequently, I have decided to choose a research topic which will shed light on these problems, and which may assist in alleviating some of them. My research topic is: The Dental Therapy Curriculum: Meeting needs and challenges for oral health care in South Africa.

I will be doing in-depth interviews with key stakeholders involved in this profession, and that is why I am requesting an interview with you. I believe that, in your role as the *Official Designation*, you will be able to make a significant contribution to my study.

I have attached the interview questions to this letter, and I request just half an hour of your time in order to conduct this interview. I would like to conduct a face-to-face interview, and record it on a tape-recorder so that it is accurately transcribed. Absolute confidentiality will be maintained in all interviews. Once I have completed this study, I will disseminate the findings to the relevant stakeholders. As per the rules of the University, the transcripts and tapes will be stored for a minimum of five years in the Faculty of Education, and will be destroyed by shredding and incineration. Participation in this study is voluntary, and you are welcome to opt out of this study at any stage.

For further information, my supervisor is Dr Martin Combrinck from the Faculty of Education at the University of KwaZulu-Natal, who can be contact at [combrinckm@ukzn.ac.za](mailto:combrinckm@ukzn.ac.za). I really hope that you will agree to participate in this study in spite of your busy schedule as I believe that this

study will enable us to make informed decisions with regard to the dental therapy profession and also to the provision of optimal oral health care in South Africa.

I look forward to your response as soon as possible.

Thank you

Yours sincerely

Dr Pratima Singh



#### Annexure 4: External Stakeholder - Interview Schedule

DATE: \_\_\_\_\_ TIME: \_\_\_\_\_ VENUE: \_\_\_\_\_

NAME: \_\_\_\_\_

POSITION: \_\_\_\_\_

QUESTIONS:

Historically, can you please tell me your views of why dental therapy was introduced in South Africa?

Do you think that dental therapists are satisfied within their present careers?

Please elaborate on your response.

Do you believe that dental therapists can play an important role in of the oral health team of South Africa? What would you say is that role?

Do you think that the training of dental therapists is appropriate to meet the oral and dental health care needs and challenges experienced in South Africa presently?

Do you believe that the curriculum offered at the dental schools enable its graduates to practice competently within the scope of practice prescribed by the Health Professions Council of South Africa?

Do you have other comments to make on this issue?

## Annexure 5: Academic Interview – Gatekeeper Letter

1<sup>st</sup> September 2009

TO: STAFF IN THE SCHOOL OF DENTISTRY

Dear \_\_\_\_\_,

### **REQUEST FOR INTERVIEW**

I have registered for a PhD in the Faculty of Education at the University of KwaZulu-Natal. As you are aware, I have taught at the School of Dentistry at this institution for over 18 years, and I am aware of the many problems facing our graduates today. I am also well acquainted with the many controversies facing the dental therapy profession.

Consequently, I have decided to choose a research topic which will shed light on these problems, and which may assist in alleviating some of them. My research topic is:

The Dental Therapy Curriculum: Meeting needs and challenges for oral health care in South Africa.

I will be doing in-depth interviews with staff, students and recent graduates, and I have chosen you as one of the staff participants for this study due to your experience and knowledge of this curriculum. I really hope that you will agree to participate in this study as I believe that your input will be able to make a significant contribution.

I have attached the interview questions to this letter, and I request just half an hour of your time in order to conduct this interview. I would like to conduct a face-to-face interview, and record it on a tape-recorder so that it is accurately transcribed. Absolute confidentiality will be maintained in all interviews. Once I have completed this study, I will disseminate the findings to the relevant stakeholders. The tapes and transcripts will be stored for a minimum period of 5 years in the Faculty of Education, and will be destroyed by incineration and shredding. Participation in this study is voluntary, and you are welcome to opt out of this study at any stage.

For further information, my supervisor is Dr Martin Combrinck from the Faculty of Education at the University of KwaZulu-Natal, who can be contact at [combrinckm@ukzn.ac.za](mailto:combrinckm@ukzn.ac.za). I hope that you will participate in this study in spite of your busy schedule as I believe that it will enable us to make informed decisions with regard to the dental therapy profession and also to the provision of optimal oral health care in South Africa.

Thank you

Yours sincerely

PRATIMA SINGH

E-MAIL: [kissoomp@ukzn.ac.za](mailto:kissoomp@ukzn.ac.za)

## Annexure 6: Academic - Interview Schedule

DATE: \_\_\_\_\_ TIME: \_\_\_\_\_ VENUE: \_\_\_\_\_

NAME: \_\_\_\_\_ POSITION: dentist/ dental therapist/ oral hygienist

### QUESTIONS:

Question 1: What do you believe is the role of the dental therapist in the health care system of South Africa?

Question 2: Are your students aware of their scope of practice from the beginning of their studies? Do you think that they would have had different views on this profession if they had known about the scope of practice?

Question 3: Do you think that the current dental therapy curriculum is able to meet the oral health needs and challenges experienced in South Africa today?

Question 4: Does the programme follow basic educational principles and practices? Do you have any training in education?

Question 5: Do you feel that our students are adequately trained at the university in order to go out and practice their profession competently with regard to:

Community Engagement – is training in your discipline purely hospital-based or are students trained to function at community level?

Clinical Skills – in your discipline, do you think that the clinical skills and competence can be adequately developed during a shorter time period? (three years of Dental Therapy versus five years of Dentistry.)

Private practice – are our graduates competent to treat the patient holistically and appropriately in independent practice?

Appropriate Referral - are graduates able to identify and treat common pathologies, and refer patients appropriately to other health professionals?

Ethical Considerations - does the curriculum inform students of their scope of practice throughout their training and are they tempted to perform procedures out of their scope of practice?

Articulation - do the preclinical and clinical training articulate appropriately during the clinical years to achieve clinical competence?

Integration of theoretical knowledge and clinical practice - are students able to integrate information received in the different clinical and non-clinical disciplines to obtain holistic knowledge?

Question 6: What are your views about the dental therapy profession in South Africa today, and do you think that dental therapists are satisfied within their present careers? Please elaborate on your response.

Question 7: Do you have other comments or suggestions to make with reference to on the education and training of dental therapists?

## Annexure 7: Graduate Interview – Gatekeeper Letter

1<sup>st</sup> November 2009

Mr / Ms \_\_\_\_\_

Graduate/ Student: School of Dentistry, University of KwaZulu-Natal

Dear Sir/ Madam,

### REQUEST FOR INTERVIEW

I have registered for a PhD in the Faculty of Education at the University of KwaZulu-Natal. As you are aware, I have taught at the School of Dentistry at this institution for over 18 years, and I am conversant with the many problems facing our graduates today. I am also well acquainted with the many controversies facing the dental therapy profession. Consequently, I have decided to choose a research topic which will shed light on these problems, and which may assist in alleviating some of them. My research topic is: The Dental Therapy Curriculum: Meeting needs and challenges for oral health care in South Africa.

I will be doing in-depth interviews with recent graduates, and have chosen you as one of the participants for this study. I really hope that you will agree to participate in this study as I believe that your input will be able to make a significant contribution to this study. I have attached the interview questions to this letter, and I request just half an hour of your time in order to conduct this interview. I would like to conduct a face-to-face interview, and record it on a tape-recorder so that it is accurately transcribed. Absolute confidentiality will be maintained in all interviews. Once I have completed this study, I will disseminate the findings to the relevant stakeholders. As per University rules, the tapes and transcripts will be stored for a minimum of five years in the Faculty of Education offices, and will be destroyed by incineration and shredding. Participation in this study is voluntary, and you are welcome to opt out of this study at any stage.

For further information, my supervisor is Dr Martin Combrinck from the Faculty of Education at the University of KwaZulu-Natal, who can be contacted at [combrinckm@ukzn.ac.za](mailto:combrinckm@ukzn.ac.za). I really hope that you will agree to participate in this study in spite of your busy schedule as I believe that this study will enable us to make informed decisions with regard to the dental therapy profession and also to the provision of optimal oral health care in South Africa. I look forward to your response as soon as possible.

Thank you

Yours sincerely

Dr Pratima Singh

Cell: 0846 22 44 11

e-mail: [kissoomp@ukzn.ac.za](mailto:kissoomp@ukzn.ac.za)

## Annexure 8: Graduate / Student - Interview Schedule

DATE: \_\_\_\_\_ TIME: \_\_\_\_\_ VENUE: \_\_\_\_\_

NAME: \_\_\_\_\_

CURRENT POSITION: private/ public/ student/ other \_\_\_\_\_

### QUESTIONS:

Question 1: Can you please explain to me why you chose dental therapy as your profession?

Question 2: Were you aware of your scope of practice from the beginning of your studies? Would you have had different views on this profession if you had known the scope of practice?

Question 3: Did you feel that you were adequately trained at the university in order to go out and practice your profession competently?

Question 4: Do you think that the current dental therapy curriculum is able to meet the oral health needs and challenges experienced in South Africa today?

Question 5: What are your views about the dental therapy profession in South Africa today, and do you think that dental therapists are satisfied within their present careers? Please elaborate on your response, with emphasis on what can be done to improve the situation.

Question 6: Do you have other comments to make on these issues?

## Annexure 9: Student Interviews - Gatekeeper Letter

1<sup>st</sup> September 2009

Dear Students,

You have reached your final year of study in Dental Therapy. I am therefore requesting you to share your views and experiences regarding your training from first to final year. I am currently doing a PhD study in the Faculty of Education, where I am studying The Dental Therapy Curriculum: Meeting needs and challenges for oral health care in South Africa. I am hoping to address the problems that students encounter in the training programme, and also identifying the role of the dental therapist in the health care system of South Africa.

This study will be done in two parts:

### PART I: QUANTITATIVE INTERVIEWS

The first part of my study will be a questionnaire to be filled in by all students. I would really appreciate it if you fill in each part with much thought and commitment as this will enhance the outcomes of this study, and assist future generations of dental therapists.

### PART II: QUALITATIVE INTERVIEWS

In the second part of the study, I will be doing in-depth interviews with some of you. If you are chosen, I request just half an hour of your time in order to conduct this interview. I would like to conduct a face-to-face interview, and record it on a tape-recorder so that it is accurately transcribed. Absolute confidentiality will be maintained in all interviews. Once I have completed this study, I will disseminate the findings to the relevant stakeholders. The tapes and transcripts will be stored for a minimum of five years in the Faculty of Education, and will be destroyed by shredding. Participation in this study is voluntary, and you are welcome to opt out of this study at any stage.

For further information, my supervisor is Dr Martin Combrinck from the Faculty of Education at the University of KwaZulu-Natal, who can be contact at [combrinckm@ukzn.ac.za](mailto:combrinckm@ukzn.ac.za). I really hope that you will agree to participate in this study as I believe that your input will be able to make a significant contribution to this study.

Thank you so much for your cooperation.

Yours sincerely

DR PRATIMA SINGH

SCHOOL OF DENTISTRY

Phone: 031-260 7826/ 7557 Cell: 0846 22 44 11 e-mail: [kissoomp@ukzn.ac.za](mailto:kissoomp@ukzn.ac.za)

## Annexure 10: Student Biographical Interview

Please mark the appropriate box with an **X**:

<b>1. Age</b>	
17–20	
21–25	
26–30	
30+	

<b>2. Gender</b>	
Male	
Female	

<b>3. Number of years in the School of Dentistry</b>	
3	
4	
5	
6 or more	

<b>4. Indicate your first language</b>	
English	
Afrikaans	
Zulu	
Xhosa	
Other	

<b>5. Was Dental Therapy your first choice at University?</b>	
Yes	
No	
If No, what was your first choice	

<b>6. After you graduate, are you going to:</b>		
Practice as a Dental Therapist	Yes	No
Study Further	Yes	No
If so, what are you going to study?		
Are you satisfied in your educational experience?	Yes	No
What can be done to improve the educational experience		

**Annexure 11: Student Competency Evaluation**

**Please rate what you think is your level of competence on the different areas of the dental therapy curriculum. Use the attached sheet and fill in the appropriate number on a scale of 1–5.**

Please note: (1=excellent), (2=very good), (3=average), (4=below average), (5=poor)

**1. Provide skilled oral health care with the highest professional attitude, judgment and ability**

Interpersonal skills is demonstrated by communicating effectively

A professional attitude and identity are displayed

Statutory and professional obligation pertaining to dentistry is strictly adhered to during patient care

The professional code of ethics is applied in all endeavours of patient care

Professional growth and lifelong learning is developed through reflection and self-assessment

Appropriate empathy and humane attitudes to patient, and colleagues are demonstrated

**2. Manage a practice or clinic effectively**

Patient records are kept consistently and accurately

A recall system is effectively implemented

Stock supplies and materials are effectively managed

Equipment and instruments are kept in optimal working condition

Occupational hazards are identified and appropriate preventive measures are implemented

Hazardous materials such as needles and sharps are handled according to a recognised protocol

**3. Manage patient care according to approved protocols**

Appropriate cross infection techniques and measures are selected and implemented

Signs and symptoms of anxiety are recognized and psychological distress are successfully managed

Emergency situations encountered in the practice of dentistry are recognised and successfully managed

Emotional and/or physical neglect/abuse are recognised and managed appropriately

**4. Assess the patient's general medical and oral health**

The main complaint of the patient is recorded and properly attended to

The medical, and dental history of the patient is correctly interpreted and treatment modified accordingly

Behavioural & risk factors for medical compromised/emergency patients are identified and managed according to protocol

The clinical/intra/extra-oral examination is performed according to a prescribed protocol

Appropriate Radiological diagnostic images are selected and prescribed and produced



<b>5. Diagnose diseases and conditions relating to the practice of dentistry and refer patients correctly</b>
The collected information are analyzed, interpreted and translated into a differential or a definite diagnosis.
Patients are referred for a definitive diagnosis when the disease or condition falls outside of the defined scope of dental therapy.
Patients with complex orthodontic problems are recognised and referred to the dentist or orthodontist.
Minor trauma to the teeth are recognised and treated and major forms of dento-facial trauma are referred.
Developmental or acquired occlusal/ facial abnormalities of the primary, mixed and permanent dentitions are recognised and appropriately referred.

<b>6. Develop and present an appropriate treatment plan</b>
An appropriate safe best practice comprehensive treatment plan attending to the needs of the patient is developed.
The treatment plan is explained to the patient and the necessary consent and signature of patient is obtained and recorded
The patient is referred according to his/her specific needs in terms of procedures that fall outside the scope of dental therapy.

<b>7. Implement the preventive treatment plan successfully</b>
The patient is informed regarding the necessary knowledge concerning the primary prevention of oral diseases which support the enhancement of general and more specifically that of oral health.
The patients values and motivation level is determined and the necessary motivation strategies is implemented to change the patients behavioural pattern and values concerning his oral health.
The necessary self-care instructions using interpersonal communication skills and strategies, to promote optimal health is communicated and demonstrated to the patient.
The patient is counselled on matters such as oral hygiene, diet and tobacco smoking.

<b>8. Provide pain control and medical emergency care</b>
Minor dental operative and surgical procedures are provided limited to the removal of teeth and roots by means of hand instruments and placement of sutures under local and regional anaesthesia, within the scope of a dental therapist.
Emergency treatment regarding diseases of pulpal origin such as pulpal exposures, in the primary, mixed and permanent dentitions are performed, and the patient is referred for endodontic treatment.
Medical emergency encountered in practising general dentistry are prevented, diagnosed and managed.
Basic life-support for medical emergencies, including the ability to establish a patent airway, are provided

<b>9. Provide therapeutic dental care to all patients</b>
Atraumatic scaling and polishing of teeth are performed correctly.
Individual fluoride treatment, are selected and performed according to an evidence-based protocol to reverse caries
Limited developmental or acquired occlusal abnormalities of the primary, mixed and permanent dentitions are recognised and referred.
Oral diseases and disorders including potentially malignant disease are recognised and referred appropriately
Cytological smears are taken and appropriate antimicrobial medication is prescribed.
Temporomandibular disorders are recognised and referred
Bleaching of discoloured enamel lesions is performed.
Oral rinses, fluoride tablets and antibacterial agents are prescribed according to the need of the patient
The Atraumatic Restorative Technique (ART) using glass-ionomer cement is performed.
Minor traumatic injuries of the teeth and surrounding tissues are treated successfully
Reversible forms of periodontal disease (where the only treatment necessary is scaling and polishing) is performed and the treatment possibilities of patients with established and advanced disease including regeneration and implant techniques and when and how to refer the patient, is understood.

<b>10. Provide Curative and surgical treatment</b>
Patients with acute and chronic oro-facial pain or discomfort are provided treatment or referred when indicated.
Minor curative procedure using temporary and direct filling materials for caries in the primary, mixed and permanent dentitions are performed and patients are referred for major curative and rehabilitative procedures.
The surgical removal of teeth and roots under local and general anaesthesia are successfully performed.
The assessment and management of trauma to the maxillofacial and oral complex and related structures are understood

<b>11. Provide maintenance service to retain the patient's oral health</b>
The outcome of the treatment is evaluated and remedial steps taken to optimise the patient's oral health where necessary.
An appropriate, individual maintenance programme for the patient is planned, prescribed and performed

<b>12. Provide health promotion and oral disease prevention for the community</b>
Dental therapist assumes a leadership role in improving the oral health of individuals, families and groups in the community.
Data from an epidemiological survey are interpreted correctly
Oral health programmes for diverse populations are initiated and implemented.
Individuals and populations at risk for oral diseases are identified
Basic concepts of research, i.e. literature review, methodology, etc. are understood.
The dental therapist assumes a leading role in a community research project

Reproduced by kind permission of Prof W D Snyman (2009), University of Pretoria.

## Annexure 12: Student Module Evaluation

Please answer the following questions by rating each of the following modules with an X:

<b>1. I have learnt something valuable in this module.</b>					
	Minor Oral Surgery	Restorative Dentistry	Diagnostics & Radiology	Oral Health	Ethics & Practice Management
5 Strongly agree					
4 Agree					
3 Uncertain					
2 Disagree					
1 Strongly disagree					

<b>2. The workload is too much for such a short time</b>					
	Minor Oral Surgery	Restorative Dentistry	Diagnostics & Radiology	Oral Health	Ethics & Practice Management
5 Strongly agree					
4 Agree					
3 Uncertain					
2 Disagree					
1 Strongly disagree					

<b>3. This module is very difficult</b>					
	Minor Oral Surgery	Restorative Dentistry	Diagnostics & Radiology	Oral Health	Ethics & Practice Management
5 Strongly agree					
4 Agree					
3 Uncertain					
2 Disagree					
1 Strongly disagree					

<b>4. I clearly understood the objectives of the module</b>					
	Minor Oral Surgery	Restorative Dentistry	Diagnostics & Radiology	Oral Health	Ethics & Practice Management
5 Strongly agree					
4 Agree					
3 Uncertain					
2 Disagree					
1 Strongly disagree					

<b>5. Course materials are well prepared</b>					
	<i>Minor Oral Surgery</i>	<i>Restorative Dentistry</i>	<i>Diagnostics &amp; Radiology</i>	<i>Oral Health</i>	<i>Ethics &amp; Practice Management</i>
<i>5 Strongly agree</i>					
<i>4 Agree</i>					
<i>3 Uncertain</i>					
<i>2 Disagree</i>					
<i>1 Strongly disagree</i>					

<b>6. Teaching was mainly done in the Oral &amp; Dental Hospital</b>					
	<i>Minor Oral Surgery</i>	<i>Restorative Dentistry</i>	<i>Diagnostics &amp; Radiology</i>	<i>Oral Health</i>	<i>Ethics &amp; Practice Management</i>
<i>5 Strongly agree</i>					
<i>4 Agree</i>					
<i>3 Uncertain</i>					
<i>2 Disagree</i>					
<i>1 Strongly disagree</i>					

<b>7. Teaching was also done in community clinics/ outreach programmes</b>					
	<i>Minor Oral Surgery</i>	<i>Restorative Dentistry</i>	<i>Diagnostics &amp; Radiology</i>	<i>Oral Health</i>	<i>Ethics &amp; Practice Management</i>
<i>5 Strongly agree</i>					
<i>4 Agree</i>					
<i>3 Uncertain</i>					
<i>2 Disagree</i>					
<i>1 Strongly disagree</i>					

<b>8. I am able to identify and treat common pathologies and refer patients appropriately to other health professionals</b>					
	<i>Minor Oral Surgery</i>	<i>Restorative Dentistry</i>	<i>Diagnostics &amp; Radiology</i>	<i>Oral Health</i>	<i>Ethics &amp; Practice Management</i>
<i>5 Strongly agree</i>					
<i>4 Agree</i>					
<i>3 Uncertain</i>					
<i>2 Disagree</i>					
<i>1 Strongly disagree</i>					

<b>9. I feel competent to treat patients holistically and appropriately in independent practice</b>					
	Minor Oral Surgery	Restorative Dentistry	Diagnostics & Radiology	Oral Health	Ethics & Practice Management
5 Strongly agree					
4 Agree					
3 Uncertain					
2 Disagree					
1 Strongly disagree					

<b>10. I was aware of the scope of practice of dental therapy from first to final year</b>					
	Minor Oral Surgery	Restorative Dentistry	Diagnostics & Radiology	Oral Health	Ethics & Practice Management
5 Strongly agree					
4 Agree					
3 Uncertain					
2 Disagree					
1 Strongly disagree					

<b>11. A strong ethical ethos was maintained through all stages of my study</b>					
	Minor Oral Surgery	Restorative Dentistry	Diagnostics & Radiology	Oral Health	Ethics & Practice Management
5 Strongly agree					
4 Agree					
3 Uncertain					
2 Disagree					
1 Strongly disagree					

<b>12. The preclinical and clinical training articulated appropriately during the clinical years to achieve clinical competence</b>					
	Minor Oral Surgery	Restorative Dentistry	Diagnostics & Radiology	Oral Health	Ethics & Practice Management
5 Strongly agree					
4 Agree					
3 Uncertain					
2 Disagree					
1 Strongly disagree					

<b>13. I was able to integrate information received in the different clinical and non-clinical disciplines to be able to treat the patient holistically</b>					
	<i>Minor Oral Surgery</i>	<i>Restorative Dentistry</i>	<i>Diagnostics &amp; Radiology</i>	<i>Oral Health</i>	<i>Ethics &amp; Practice Management</i>
<i>5 Strongly agree</i>					
<i>4 Agree</i>					
<i>3 Uncertain</i>					
<i>2 Disagree</i>					
<i>1 Strongly disagree</i>					

<b>14. My clinical skills and competence were adequately developed during the duration of the degree</b>					
	<i>Minor Oral Surgery</i>	<i>Restorative Dentistry</i>	<i>Diagnostics &amp; Radiology</i>	<i>Oral Health</i>	<i>Ethics &amp; Practice Management</i>
<i>5 Strongly agree</i>					
<i>4 Agree</i>					
<i>3 Uncertain</i>					
<i>2 Disagree</i>					
<i>1 Strongly disagree</i>					

<b>15. I feel competent to practice independently as a dental therapist on graduation</b>					
	<i>Minor Oral Surgery</i>	<i>Restorative Dentistry</i>	<i>Diagnostics &amp; Radiology</i>	<i>Oral Health</i>	<i>Ethics &amp; Practice Management</i>
<i>5 Strongly agree</i>					
<i>4 Agree</i>					
<i>3 Uncertain</i>					
<i>2 Disagree</i>					
<i>1 Strongly disagree</i>					

### Annexure 13: Consent Form

I, \_\_\_\_\_, hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project. I understand that I am at liberty to withdraw from the project at any time, should I so desire.

SIGNATURE OF PARTICIPANT: \_\_\_\_\_

DATE: \_\_\_\_\_

## Annexure 14: Key External Stakeholder Interview Schedule

DATE (2010)	DESIGNATION	DURATION (minutes)	PSEUDONYM	RACE	GENDER
02 May	EMPLOYER: DEPARTMENT OF HEALTH	25:23	Dr Jones	White	Male
10 June	EMPLOYER: DEPARTMENT OF HEALTH	47:46	Dr Patel	Indian	Male
07 May	REGULATORY BODY HPCSA: Professional Board of Dental Therapy, Oral Hygiene and Dental Assisting	32:18	Mr Mkhize	African	Male
02 May	DEAN: Dental School at another university	23:59	Professor Tom	African	Male
13 June	PAST DEAN: Dental School at UDW	35:00	Professor Philips	Indian	Male
05 May	PROFESSIONAL ASSOCIATION: representing dental therapists	48:15	Mr John	Indian	Male
N/A	PROFESSIONAL ASSOCIATION: representing dentists	N/A	N/A	Indian	Male
N/A	DEPARTMENT OF HEALTH: Human Resource Directorate	N/A	Dr Shabalala	African	Male



### Annexure 15: Student Interview Schedule 2009

DATE	PSEUDONYM	RACE	GENDER	DURATION (MINS)
24 Nov	Joseph	African	Male	17:07
24 Nov	Colin	Indian	Male	22:31
25 Nov	Fatima	Indian	Female	18:32
25 Nov	Mala	Indian	Female	16:34
25 Nov	Brandon	Indian	Male	17:17

### Annexure 16: Focus Group Interview Schedule 2010

DATE	PSEUDONYM	RACE	GENDER	DURATION (MINS)
24 Nov	Vuyo	African	Male	Focus Group Discussion (60 minutes)
	Pretty	African	Female	
	Tandi	African	Female	
	John	African	Male	
	Nelson	African	Male	
	Robin	African	Male	

### Annexure 17: Graduate Interview Schedule 2010

DATE	PRACTICE	PSEUDONYM	RACE	GENDER	DURATION (MINS)
14 March	Urban Private & Public	Prem	Indian	Female	18:52
14 March	Urban Private & Public	Shirley	Indian	Female	19:07
2 June	Urban Private & Training	Anita	Indian	Female	21:03
25 May	Rural Private & Public	Sibusiso	African	Male	30:35
12 May	Rural Private	Vuyo	African	Male	25:38

### Annexure 18: Dental Therapist Academics Interview Schedule

DATE (2010)	ROLE	PSEUDONYM	RACE	GENDER	DURATION (MINS)
14 March	Course Coordinator	Mrs Ally	Indian	Female	17:05
26 February	Lecturer	Mrs Chetty	Indian	Female	16:38
26 February	Course Coordinator	Mrs Lawrence	Indian	Female	19:42

## Annexure 19: Other Academics Interview Schedule

DATE (2010)	ROLE	PSEUDONYM	RACE	GENDER	DURATION (MINS)
19 May	Lecturer	Dr Alan	Indian	Male	25:54
26 Feb	Course Coordinator	Dr Barry	Indian	Male	27:50
26 Feb	Course Coordinator	Dr Crystal	Indian	Female	21:21
14 Mar	Lecturer	Ms Dhlomo	African	Female	21:58
6 June	Lecturer	Mr Findley	Indian	Male	56:30

Annexure 20: Curriculum for Bachelor of Dental Therapy			
CODE	NAME OF MODULE	CRED	SEM
<b>LEVEL 1 TOTAL CREDITS 128</b>			
DENT111WI	Psychosocial Orientation for Health Care	16	1
ANAT105WI	Introduction to Anatomy and Neuroanatomy	16	1
HPHS111WI	General Basic Physiology	16	1
DENT113W1	Oral Biology – Structures	8	1
ANAT106W2	Anatomy of the Head, Neck and Back	8	2
DENT112W2	Oral Biology – Embryology and Physiology	8	2
DENT116W2	Cariology, Periodontology and Prevention – preclinical	8	Year
HLSC116W2	Community Studies	16	2
DENT122W2	Radiography and Photography – Preclinical Practice	8	2
DENT110WY	Academic Skills and Clinical Practice	8	Year
<b>for students who fail the English Placement Test – See FHEL2</b>			
ELDV100WB	English Language Development *	16	1
for students who pass the English Placement Test to choose <b>ONE</b> of the following:			
ZULN101W1	Basic isiZulu Communication Skills	16	1
ZULM103W1	Intermediate Zulu	16	1
(UKZN, 2011)			

CODE	NAME OF MODULE	CRED	SEM
<b>LEVEL 2 TOTAL CREDITS 128</b>			
DENT213W1	Community Oral Health ( Epidemiology/Promotion)	8	1
DENT219W1	General Pathology and General Microbiology	8	1
DENT223W1	Radiography – Preclinical Practice	8	1
DENT228WY	Diagnostics, Infection Control & Specialities	8	1
DENT214W2	Community Oral Health ( Ethics, Law, Practice)	8	1
DENT215WY	Cariology, Periodontology and Prevention – Clinical Practice	16	Year
DENT 226W2	Radiography – Techniques and Clinical Practice	8	2
DENT217WY	General Medicine and Special Patients	24	Year
DENT221WY	Oral Medicine, Oral Pathology and Clinical Pharmacology	24	Year
DENT224WY	Minor Oral Surgery – Theory and Local Anaesthesia	8	Year
DENT216WY	Restorative Dentistry and Dental Materials – Preclinical	8	Year
<b>LEVEL 3 TOTAL CREDITS 128</b>			
DENT 313WY	Restorative Dentistry and Dental Materials – Clinical	48	Year
DENT 315WY	Diagnostics and Radiology	24	Year
DENT 317WY	Minor Oral Surgery	48	Year
DENT 318WY	Medical Emergencies and Clinical Pharmacology	8	Year
<b>TOTAL CREDITS FOR BACHELOR OF DENTAL THERAPY 384</b>			

# Annexure 21: Clinical Competency 1 – Diagnosis and Treatment Planning

**Table 20 : Content Evaluation - Diagnosis and Treatment Planning**

LEVEL	WHERE	HOW	ASSESSMENT	COMPETENCE	% PASS RATE	
1	Intro to Anatomy & Neuroanatomy ANAT105 (Sem 1)	Lectures, practicals, seminars	CAM 25% EXAM 75%: • 1 X 2 hour paper • 1 X 45 minute OSCE	To provide foundational knowledge with regard to body systems, brain and spinal cord		
1	Anatomy of Head, Neck & Back ANAT106 (Sem 2)	Lectures, practicals, seminars	CAM 25% EXAM 75%: • 1 X 2 hour paper • 1 X 45 minute OSCE	To provide foundational knowledge with regard to structures in the head and neck region		
1	General Basic Physiology HPHS111 (Sem 1)	Lectures, practicals, seminars	CAM 40% EXAM 60%: • 1 X 2 hour paper • 1 X 45 minute practical	To provide foundational knowledge with regard to structure & function of the various organ systems in the human body		
1	Clinical Practice DENT 110 (Sem 2)	Observation and assisting senior students and staff	Attendance only Evaluation by clinical operator	Basic competence is developed by observation and assisting	2007 2008 2009 2010	100 100 89 94
2	Diagnostics, Infection Control & Specialities DENT 228 (Sem 1)	Lectures, clinical demonstrations and experience on diagnosis and treatment planning	CAM 40%: • 4 theory tests • 1 clinical test EXAM 60%: • 1 X 2 hour paper • 1 X 45 minute OSCE	Competence maintained by extension into the clinical modules	2007 2008 2009 2010	82 98 100 100

LEVEL	WHERE	HOW	ASSESSMENT	COMPETENCE	% PASS RATE	
2	General Pathology & Microbiology DENT219 (Sem 1)	Lectures, practicals, seminars	CAM 40%: <ul style="list-style-type: none"> <li>2 theory tests</li> <li>1 practical test</li> </ul> EXAM 60%: <ul style="list-style-type: none"> <li>1 X 2 hour paper</li> </ul>	To provide foundational knowledge with regard to pathology & microbiology relevant to the oral cavity	2007 2008 2009 2010	100 78 69 96
2	General Medicine & Special Patients DENT217 (Sem 1 & 2)	Lectures Patient Clinics for disabled and medically-compromised patients	CAM 40%: <ul style="list-style-type: none"> <li>2 theory tests</li> <li>Pass mark of 50% in daily clinical assessments</li> </ul> EXAM 60%: <ul style="list-style-type: none"> <li>1 X 2 hour paper</li> </ul>	To provide understanding of common physical and mental disorders; and the ability to manage such patients in the dental clinic	2007 2008 2009 2010	94 100 88 100
2	Oral Medicine, Oral Pathology, Clinical Pharmacology DENT221 (Sem 1 & 2)	Lectures, seminars	CAM 40%: <ul style="list-style-type: none"> <li>4 theory tests</li> </ul> EXAM 60%: <ul style="list-style-type: none"> <li>1 X 2 hour theory paper</li> <li>1 X 45 minute OSCE</li> </ul>	To provide a basic knowledge aetiology, clinical and radiological features, differential diagnosis and management of common oral diseases	2007 2008 2009 2010	89 100 92 100
2	Cariology, Periodontology & Prevention DENT 215WY (Sem 1 & 2)	Lectures 4 X 2 hour clinical sessions/week X 30 weeks. Patients include adults, children and patients with special needs.	CAM 40%: <ul style="list-style-type: none"> <li>Daily clinical assessment by supervisor &amp; student</li> <li>4 clinical tests - 1 per term</li> </ul> EXAM 60%: <ul style="list-style-type: none"> <li>Theory paper 2 hr (40)</li> <li>OSCE (20)</li> <li>Clinical Exam (20)</li> <li>Patient Portfolio (20)</li> </ul>	To develop diagnostic and clinical skills in preventive care, scaling and polishing. Skills are carried over to Level 3 clinical disciplines	2007 2008 2009 2010	98 95 100 100

LEVEL	WHERE	HOW	ASSESSMENT	COMPETENCE	% PASS RATE	
3	Diagnostics & Radiology DENT315 (Sem 1 & 2)	Capstone module where students learn to integrate all competencies. Oral Pathology & Radiology cases, General Dentistry Group seminars, Research projects	CAM 100%: <ul style="list-style-type: none"> <li>2 Tests - oral medicine, general dentistry</li> <li>2 Clinical Assessments</li> <li>Research project</li> <li>2 Group Seminars</li> <li>Portfolio of work done throughout the year</li> </ul> An oral examination is conducted at end of year	To develop competency in the holistic management of a patient in private and public sectors.	2007 2008 2009 2010	100 100 93 100
3	Minor Oral Surgery DENT317 (Sem 1 & 2)	Lectures weekly 4 X 2 hour clinical sessions/week X 30 weeks.	CAM 40%: <ul style="list-style-type: none"> <li>Daily clinical assessment by supervisor &amp; student</li> <li>4 clinical tests - 1 per term</li> </ul> EXAM 60%: <ul style="list-style-type: none"> <li>Theory paper 2 hr (50)</li> <li>OSCE (20)</li> <li>Clinical Exam (30)</li> </ul>	Competence in diagnosis and treatment planning enhanced with increased clinical exposure.	2007 2008 2009 2010	100 100 100 100
3	Restorative Dentistry DENT313 (Sem 1 & 2)	Lectures weekly 4 X 3 hour clinical sessions /week X 26 weeks	CAM 40%: <ul style="list-style-type: none"> <li>Daily clinical assessment by supervisor &amp; student</li> <li>4 clinical tests - 1 per term</li> </ul> EXAM 60%: <ul style="list-style-type: none"> <li>Theory paper 2 hr (40)</li> <li>OSCE (20)</li> <li>Clinical Exam (40)</li> </ul>	Competence in diagnosis and treatment planning enhanced with increased clinical exposure.	2007 2008 2009 2010	74 71 76 100



**Table 21 : Student Competency Evaluation - Diagnosis and Treatment Planning**

Student Response	Excellent		Very Good		Average		Total	
Competent to diagnose & refer patients appropriately	Frequency 6	% 20	Frequency 18	% 60	Frequency 6	% 20	Frequency 30	% 100
Able to develop an appropriate treatment plan	Frequency 14	% 46.7	Frequency 14	% 46.7	Frequency 2	% 6.7	Total 30	% 100

**Table 22 : Student Module Evaluation - Diagnosis and Treatment Planning**

Student Response	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree	Mean
Learnt something valuable	0	0	2	4	24	4.7
Workload too much	6	16	2	6	0	3.7
Module is very difficult	8	16	6	0	0	4.1
Clearly understood objectives of module	0	0	2	14	14	4.4
Course materials well prepared	0	0	6	16	8	4.1
Feel competent to treat patients holistically and appropriately in independent practice	0	2	2	10	16	4.3
Preclinical and clinical training articulated appropriately during clinical years	0	0	2	14	14	4.4
Clinical skills and competence adequately developed	0	0	2	12	16	4.5
Feel competent to practice independently after graduation as a dental therapist	0	0	6	8	16	4.3

## Annexure 22: Clinical Competency 2 - Primary Preventive Measures

**Table 23 : Content Evaluation - Primary Preventive Measures**

LEVEL	WHERE	HOW	ASSESSMENT	COMPETENCE	% PASS RATE	
1	Cariology, Periodontology & Prevention DENT114 (Sem 2)	Lectures Practicals – fissure sealants, fluorides Preclinical Instrumentation on phantom heads X 13 weeks	CAM 40%: • Preclinical assessment – theory & practical tests • Continuous clinical assessments EXAM 60%: • 1 X 2 hour paper • 1 X 45 minute OSCE	To provide foundational knowledge with regard to dental caries and periodontal disease, and the prevention thereof.	2007 2008 2009 2010	93 97 69 85
2	Cariology, Periodontology & Prevention DENT215 (Sem 1 & 2)	Lectures 4 X 2 hour clinical sessions/week X 30 weeks. Patients include adults, children and patients with special needs.	CAM 40%: • Daily clinical assessment by supervisor & student • 4 clinical tests - 1 per term EXAM 60%: • Theory paper 2 hr (40) • OSCE (20) • Clinical Exam (20) • Patient Portfolio (20)	To develop clinical skills in preventive care, scaling and polishing. Skills are carried over to Level 3 clinical disciplines.	2007 2008 2009 2010	98 95 100 100
3	Restorative Dentistry DENT313 (Sem 1 & 2)	Lectures weekly 4 X 3 hour clinical sessions /week X 26 weeks	CAM 40%: • Daily clinical assessment by supervisor & student • 4 clinical tests - 1 per term EXAM 60%: • Theory paper 2 hr (40) • OSCE (20) • Clinical Exam (40)	Competence in clinical skills in prevention enhanced with increased clinical exposure.	2007 2008 2009 2010	74 71 76 100

**Table 24 : Student Competency Evaluation - Primary Preventive Measures**

Student Response	Excellent		Very Good		Average		Total	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Provide health promotion & oral disease prevention	6	20	14	46.7	10	33.3	30	100
Implement preventive care	4	13.3	16	53.3	10	33.3	Total 30	% 100
Provide maintenance service	14	46.7	10	33.3	10	20	Total 30	% 100

**Table 25 : Student Module Evaluations - Primary Preventive Measures**

	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree	Mean
Learnt something valuable	0	0	2	10	18	4.5
Workload too much	10	18	2	0	0	4.3
Module is very difficult	14	14	2	0	0	4.4
Clearly understood objectives of module	0	0	0	16	14	4.5
Course materials well prepared	0	6	0	14	10	3.9
Feel competent to treat patients holistically and appropriately in independent practice	0	0	2	8	20	4.6
Preclinical and clinical training articulated appropriately during clinical years	0	0	4	12	14	4.3
Clinical skills and competence adequately developed	0	0	0	10	20	4.7
Feel competent to practice independently after graduation as a dental therapist	0	0	2	8	20	4.6

### Annexure 23: Clinical Competency 3 - Scaling and Polishing

**Table 26 : Content Evaluation - Scaling and Polishing**

LEVEL	WHERE	HOW	ASSESSMENT	COMPETENCE	% PASS RATE	
1	Cariology, Periodontology & Prevention DENT114 (Sem 2)	Lectures Practicals – fissure sealants, fluorides Preclinical Instrumentation on phantom heads X 13 weeks	CAM 40%: • Preclinical assessment – theory & practical tests • Continuous clinical assessments EXAM 60%: 1 X 2 hour paper 1 X 45 minute OSCE	To provide foundational knowledge with regard to periodontal disease, and the prevention thereof	2007 2008 2009 2010	93 97 69 85
2	Cariology, Periodontology & Prevention DENT215 (Sem 1 & 2)	Lectures 4 X 2 hour clinical sessions/week X 30 weeks. Patients include adults, children and patients with special needs.	CAM 40%: • Daily clinical assessment by supervisor & student • 4 clinical tests - 1 per term EXAM 60%: • Theory paper 2 hr (40) • OSCE (20) • Clinical Exam (20) • Patient Portfolio (20)	To develop clinical skills in preventive care, scaling and polishing. Skills are carried over to Level 3 clinical disciplines	2007 2008 2009 2010	98 95 100 100

Table 27 : Student Competency Evaluation - Scaling and Polishing

Student Response	Excellent		Very Good		Average		Total	
Provide therapeutic dental care	Frequency 10	% 33.3	Frequency 14	% 46.7	Frequency 6	% 20	Frequency 30	% 100
Provide health promotion and oral disease prevention	Frequency 6	% 20	Frequency 14	% 46.7	Frequency 10	% 33.3	Total 30	% 100

Table 28 : Student Module Evaluation - Scaling and Polishing

	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree	Mean
Learnt something valuable	0	0	2	10	18	4.5
Workload too much	10	18	2	0	0	4.3
Module is very difficult	14	14	2	0	0	4.4
Clearly understood objectives of module	0	0	0	16	14	4.5
Course materials well prepared	0	6	0	14	10	3.9
Feel competent to treat patients holistically and appropriately in independent practice	0	0	2	8	20	4.6
Preclinical and clinical training articulated appropriately during clinical years	0	0	4	12	14	4.3
Clinical skills and competence adequately developed	0	0	0	10	20	4.7
Feel competent to practice independently after graduation as a dental therapist	0	0	2	8	20	4.6

## Annexure 24: Clinical Competency 4 - Restorative Dentistry

**Table 29 : Content Evaluation - Restorative Dentistry**

LEVEL	WHERE	HOW	ASSESSMENT	COMPETENCE	% PASS RATE	
1	Oral Biology DENT113 (Sem 1)	Lectures, practicals	CAM 40%: • 2 Theory tests • 2 Practical tests EXAM 60%: • 1 X 2 hour paper • 1 X 45 minute OSCE	To provide foundational knowledge with regard to macro- and microscopic structures of the head and neck region	2007 2008 2009 2010	97 88 83 92
1	Cariology, Periodontology & Prevention DENT114 (Sem 2)	Lectures Practicals – fissure sealants, fluorides Preclinical Instrumentation on phantom heads X 13 weeks	CAM 40%: • Preclinical assessment – theory & practical tests • Continuous clinical assessments EXAM 60%: • 1 X 2 hour paper • 1 X 45 minute OSCE	To provide foundational knowledge with regard to dental caries and periodontal disease, and the prevention thereof	2007 2008 2009 2010	93 97 69 85
1	Clinical Practice DENT110 (Sem 2)	Observation and assisting senior students and staff	Attendance only Evaluation by clinical operator	Basic competence is developed by observation and assisting	2007 2008 2009 2010	100 100 89 94

LEVEL	WHERE	HOW	ASSESSMENT	COMPETENCE	% PASS RATE	
2	Cariology, Periodontology & Prevention DENT215 (Sem 1 & 2)	Lectures 4 X 2 hour clinical sessions/week X 30 weeks. Patients include adults, children and patients with special needs.	CAM 40%: • Daily clinical assessment by supervisor & student • 4 clinical tests - 1 per term EXAM 60%: • Theory paper 2 hr (40) • OSCE (20) • Clinical Exam (20) • Patient Portfolio (20)	To develop diagnostic and clinical skills in preventive care, scaling and polishing. Skills are carried over to Level 3 clinical disciplines.	2007 2008 2009 2010	98 95 100 100
2	Restorative Dentistry & Dental Materials Preclinical DENT216 (Sem 2)	Lectures Practicals on dental materials	CAM 40%: • 2 Theory tests EXAM 60%: • Theory paper 2 hr (60) • OSCE (40)	Introduction to Restorative Dentistry and Dental Materials forms the foundation for the Level 3 clinical module.	2007 2008 2009 2010	83 98 78 96
3	Restorative Dentistry DENT313 (Sem 1 & 2)	Lectures weekly 4 X 3 hour clinical sessions /week X 26 weeks	CAM 40%: • 3 Theory Tests • 1 Preclinical Test • Daily clinical assessment by supervisor & student • 4 clinical tests - 1 per term EXAM 60%: • Theory paper 2 hr (40) • OSCE (20) • Clinical Exam (40)	Competence in diagnosis and treatment planning enhanced with increased clinical exposure.	2007 2008 2009 2010	74 71 76 100

**Table 30 : Student Competency Evaluation - Restorative Dentistry**

Student Response	Excellent		Very Good		Average		Total	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Provides curative and surgical treatment	8	26.7	14	46.7	8	26.7	30	100

**Table 31 : Student Module Evaluation - Restorative Dentistry**

	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree	Mean
Learnt something valuable	0	0	2	12	16	4.5
Workload too much	0	4	4	8	14	1.9
Module is very difficult	0	4	8	8	10	2.2
Clearly understood objectives of module	0	2	4	16	8	4
Course materials well prepared	0	2	6	12	10	4
Feel competent to treat patients holistically and appropriately in independent practice	0	0	6	16	8	4.1
Preclinical and clinical training articulated appropriately during clinical years	2	0	4	12	12	4.1
Clinical skills and competence adequately developed	0	0	4	12	14	4.3
Feel competent to practice independently after graduation as a dental therapist	0	0	6	16	8	4.1



## Annexure 25: Clinical Competency 5 - Minor Oral Surgery

**Table 32 : Content Evaluation - Minor Oral Surgery**

LEVEL	WHERE	HOW	ASSESSMENT	COMPETENCE	% PASS RATE	
1	Intro to Anatomy & Neuroanatomy ANAT105 (Sem 1)	Lectures, practicals, seminars	CAM 25% EXAM 75%: • 1 X 2 hour paper • 1 X 45 minute OSCE	To provide foundational knowledge with regard to body systems, brain and spinal cord		
1	Anatomy of Head, Neck & Back ANAT106 (Sem 2)	Lectures, practicals, seminars	CAM 25% EXAM 75%: • 1 X 2 hour paper • 1 X 45 minute OSCE	To provide foundational knowledge with regard to structures in the head and neck		
1	General Basic Physiology HPHS111 (Sem 1)	Lectures, practicals, seminars	CAM 40% EXAM 60%: • 1 X 2 hour paper • 1 X 45 minute practical	To provide foundational knowledge regarding the structure and function of the various organ systems in the human body		
1	Clinical Practice DENT110 (Sem 2)	Observation and assisting senior students and staff	Attendance only Evaluation by clinical operator	Basic competence is developed by observation and assisting	2007 2008 2009 2010	100 100 89 94
2	Diagnostics, Infection Control & Specialities DENT228 (Sem 1)	Lectures, clinical demonstrations and experience on diagnosis and treatment planning	CAM 40%: • 4 theory tests • 1 clinical test EXAM 60%: • 1 X 2 hour paper • 1 X 45 minute OSCE	Competence maintained by extension into the clinical modules	2007 2008 2009 2010	82 98 100 100

LEVEL	WHERE	HOW	ASSESSMENT	COMPETENCE	% PASS RATE	
2	General Pathology & Microbiology DENT219 (Sem 1)	Lectures, practicals, seminars	CAM 40%: • 2 theory tests • 1 practical test EXAM 60%: • 1 X 2 hour paper	To provide foundational knowledge with regard to pathology & microbiology with relevance to the oral cavity	2007 2008 2009 2010	100 78 69 96
2	General Medicine & Special Patients DENT217 (Sem 1 & 2)	Lectures Patient Clinics for disabled and medically-compromised patients	CAM 40%: • 2 theory tests • Pass mark of 50% in daily clinical assessments EXAM 60%: • 1 X 2 hour paper	To provide understanding of common physical and mental disorders; and the ability to manage such patients in the dental clinic	2007 2008 2009 2010	94 100 88 100
2	Oral Medicine, Oral Pathology, Clinical Pharmacology DENT221 (Sem 1 & 2)	Lectures, seminars	CAM 40%: • 4 theory tests EXAM 60%: • 1 X 2 hour theory paper • 1 X 45 minute OSCE	To provide a basic knowledge aetiology, clinical and radiological features, differential diagnosis and management of common oral diseases	2007 2008 2009 2010	89 100 92 100
3	Minor Oral Surgery DENT317 (Sem 1 & 2)	Lectures weekly 4 X 2 hour clinical sessions/week X 30 weeks.	CAM 40%: • Daily clinical assessment by supervisor & student • 4 clinical tests - 1 per term EXAM 60%: • Theory paper 2 hr (50) • OSCE (20) • Clinical Exam (30)	Competence in diagnosis and treatment planning enhanced with increased clinical exposure	2007 2008 2009 2010	100 100 100 100

**Table 33 : Student Competency Evaluation - Minor Oral Surgery**

Student Response	Excellent		Very Good		Average		Total	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Competent to provide curative and surgical care	8	26.7	14	46.7	8	26.7	30	100

**Table 34 : Student Module Evaluation - Minor Oral Surgery**

	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree	Mean
Learnt something valuable	0	0	0	2	28	4.9
Workload too much	6	24	0	0	0	4.2
Module is very difficult	10	18	2	0	0	4.3
Clearly understood objectives of module	0	0	0	14	16	4.5
Course materials well prepared	0	0	2	14	14	4.4
Feel competent to treat patients holistically and appropriately in independent practice	0	0	2	12	16	4.5
Preclinical and clinical training articulated appropriately during clinical years	2	0	2	6	20	4.4
Clinical skills and competence adequately developed	0	0	0	6	24	4.8
Feel competent to practice independently after graduation as a dental therapist	0	0	0	12	18	4.6

## Annexure 26: Clinical Competency 6 - Dental Therapeutics

**Table 35 : Content Evaluation - Dental Therapeutics**

LEVEL	WHERE	HOW	ASSESSMENT	COMPETENCE	% PASS RATE	
1	Cariology, Periodontology & Prevention DENT114 (Sem 2)	Lectures, practicals	CAM 40%: • Theory & practical tests EXAM 60%: • 1 X 2 hour paper • 1 X 45 minute OSCE	To provide foundational knowledge with regard to dental caries and periodontal disease, and the prevention thereof	2007 2008 2009 2010	93 97 69 85
2	Oral Medicine, Oral Pathology, Clinical Pharmacology DENT221 (Sem 1 & 2)	Lectures, seminars	CAM 40%: • 4 theory tests EXAM 60%: • Theory paper - 2 hour • 1 X 45 minute OSCE	To provide knowledge in the pharmacology of drugs used in the management of common oral diseases	2007 2008 2009 2010	89 100 92 100
3	Medical Emergencies & Clinical Pharmacology DENT318 (Sem 2)	Lectures, clinical demonstrations	CAM 40%: • 2 Theory tests EXAM 60%: • 1 X 2 hour paper + oral if necessary	To provide information regarding the clinical application of the drugs used in the management of common oral diseases	2007 2008 2009 2010	100 100 100 100
3	Minor Oral Surgery DENT317 (Sem 1 & 2)	Lectures weekly 4 X 2 hour clinical sessions/week X 30 weeks.	CAM 40%: • Daily clinical assessment • 4 clinical tests EXAM 60%: • Theory paper 2 hr (50) • OSCE (20) • Clinical Exam (30)	Competence in management of common dental diseases by prescribing medication. Competence enhanced with increased clinical exposure	2007 2008 2009 2010	100 100 100 100

Table 36 : Student Competency Evaluation - Dental Therapeutics

Student Response	Excellent		Very Good		Average		Total	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Provide pain control and medical emergency care	8	26.7	18	60	4	13.3	30	100
Provide therapeutic dental care	10	33.3	14	46.7	6	20.0	Total 30	% 100

## Annexure 27: Clinical Competency 7 - Dental Radiography

**Table 37 : Content Evaluation - Dental Radiography**

LEVEL	WHERE	HOW	ASSESSMENT	COMPETENCE	% PASS RATE	
1	Intro to Anatomy & Neuroanatomy ANAT105 (Sem 1)	Lectures, practicals, seminars	CAM 25% EXAM 75%: <ul style="list-style-type: none"> <li>1 X 2 hour paper</li> <li>1 X 45 minute OSCE</li> </ul>	To provide foundational knowledge with regard to body systems, brain and spinal cord		
1	Anatomy of Head, Neck & Back ANAT106 (Sem 2)	Lectures, practicals, seminars	CAM 25% EXAM 75%: <ul style="list-style-type: none"> <li>1 X 2 hour paper</li> <li>1 X 45 minute OSCE</li> </ul>	To provide foundational knowledge with regard to structures in the head and neck region		
1	Oral Biology DENT113 (Sem 1)	Lectures, practicals	CAM 40%: <ul style="list-style-type: none"> <li>2 Theory tests</li> <li>2 Practical tests</li> </ul> EXAM 60%: <ul style="list-style-type: none"> <li>1 X 2 hour paper</li> <li>1 X 45 minute OSCE</li> </ul>	To provide foundational knowledge with regard to macro- and microscopic structures of the head and neck region	2007 2008 2009 2010	97 88 83 92
1	Radiography DENT122 (Sem 2)	Lectures Preclinical Practical on models	CAM 40%: <ul style="list-style-type: none"> <li>2 Theory tests</li> <li>2 Practical tests</li> </ul> EXAM 60%: <ul style="list-style-type: none"> <li>1 X 2 hour paper</li> <li>1 practical exam</li> <li>1 OSCE</li> </ul>	To provide foundational knowledge with regard to radiation physics and its application in the clinical situation, and Basic intra-oral radiographic techniques	2007 2008 2009 2010	93 97 84 97

LEVEL	WHERE	HOW	ASSESSMENT	COMPETENCE	% PASS RATE	
2	Radiography DENT223 (Sem 1)	Lectures Clinical sessions	CAM 40%: • 2 Theory tests • 2 Clinical tests EXAM 60%: • 1 X 2 hour paper • 1 clinical exam • 1 OSCE	To provide the theoretical and clinical knowledge necessary to take intra- and extra-oral radiographs	2007 2008 2009 2010	100 100 100 100
2	Radiography DENT226 (Sem 2)		CAM 40%: • 2 Theory tests • 2 Clinical tests EXAM 60%: • 1 X 2 hour paper • 1 clinical exam • 1 OSCE	To provide the theoretical and clinical knowledge necessary to take intra- and extra-oral radiographs	2007 2008 2009 2010	95 100 100 100
3	Diagnostics & Radiology DENT318 (Sem 1 & 2)	Capstone module where students learn to integrate all competencies	CAM 100%: • A portfolio of activities conducted throughout the year develop clinical competence in this function	To develop competency in the holistic management of a patient in private and public sectors	2007 2008 2009 2010	100 100 93 100
3	Minor Oral Surgery DENT317 (Sem 1 & 2)	Daily 4 X 2 hour clinical sessions/ week X 30 weeks	Daily clinical sessions	Competence in radiography and radiology is achieved by increased clinical exposure	2007 2008 2009 2010	100 100 100 100
3	Restorative Dentistry DENT313 (Sem 1 & 2)	4 X 3 hour clinical sessions /week X 26 weeks	Daily clinical sessions	Competence in radiography and radiology is achieved by increased clinical exposure	2007 2008 2009 2010	74 71 76 100

## Annexure 28: Clinical Competency 8 - Children's Dentistry

**Table 38 : Content Evaluation - Children's Dentistry**

LEVEL	WHERE	HOW	ASSESSMENT	COMPETENCE	% PASS RATE	
1	Cariology, Periodontology & Prevention DENT114 (Sem 2)	Lectures Practicals – fissure sealants, fluorides Preclinical Instrumentation on phantom heads X 13 weeks	CAM 40%: • Preclinical assessment – theory & practical • Daily clinical assessments EXAM 60%: • 1 X 2 hour paper • 1 X 45 minute OSCE	To provide foundational knowledge with regard to dental caries and periodontal disease, and the prevention thereof.	2007 2008 2009 2010	93 97 69 85
2	Cariology, Periodontology & Prevention DENT215 (Sem 1 & 2)	Children are treated as part of this module 1 X 2 hour clinical sessions/week X 15 wks	CAM 40%: • Daily clinical assessments by supervisor & student • 2 clinical tests EXAM 60%: • Theory paper 2 hr (40) • OSCE (20) • Clinical Exam (20) • Patient Portfolio (20)	To develop clinical skills in preventive care, scaling and polishing. Skills are carried over to Level 3 clinical disciplines.	2007 2008 2009 2010	98 95 100 100
2	Diagnostics, Infection Control & Specialities DENT 228 (Sem 1)	6 Lectures in Pedodontics	CAM 40%: • 1 theory test EXAM 60%: • 1 X 2 hour paper (20%) • 1 X 45 minute OSCE	Competence maintained by extension into the clinical modules.	2007 2008 2009 2010	82 98 100 100
3	Restorative Dentistry DENT 313 (Sem 1 & 2)	As part of the Restorative Dentistry Clinic – not specific to child patients only	CAM 40%: • Daily clinical assessment EXAM 60%: • Theory paper 2 hr (40) • OSCE (20) • Clinical Exam (40)	Competence in management of child patients enhanced with increased clinical exposure.	2007 2008 2009 2010	74 71 76 100



## Annexure 29: Clinical Competency 9 - Medical Emergencies

**Table 39 : Content Evaluation - Emergencies in the Dental Practice**

LEVEL	WHERE	HOW	ASSESSMENT	COMPETENCE	% PASS RATE	
1	Intro to Anatomy & Neuroanatomy ANAT105 (Sem 1)	Lectures, practicals, seminars	CAM 25% EXAM 75%: • 1 X 2 hour paper • 1 X 45 minute OSCE	To provide foundational knowledge with regard to body systems, brain and spinal cord		
1	Anatomy of Head, Neck & Back ANAT106 (Sem 2)	Lectures, practicals, seminars	CAM 25% EXAM 75%: • 1 X 2 hour paper • 1 X 45 minute OSCE	To provide foundational knowledge with regard to structures in the head and neck		
1	General Basic Physiology HPHS111 (Sem 1)	Lectures, practicals, seminars	CAM 40% EXAM 60%: • 1 X 2 hour paper • 1 X 45 minute practical	To provide foundational knowledge regarding the structure and function of the various organ systems in the human body		
1	Clinical Practice DENT 110 (Sem 2)	Observation and assisting senior students and staff	Attendance only Evaluation by clinical operator	Basic competence is developed by observation and assisting	2007 2008 2009 2010	100 100 89 94
2	First Aid (Sem 2)	Lectures & practical demonstrations	Theory & Practical Test	Competence maintained by extension into the clinical modules.	2007 2008 2009 2010	100 100 100 100
3	Medical Emergencies & Clin Pharmacology DENT 318 (Sem 1)	Lectures & Practicals weekly X 13 weeks – Sem1	CAM 40%: • 1 theory test EXAM 60%: • Theory paper 2 hr • Oral if necessary	Competence enhanced with increased clinical exposure	2007 2008 2009 2010	100 100 100 100

**Table 40 : Student Competence Evaluation - Emergencies in the Dental Practice**

Student Response	Excellent		Very Good		Average		Total	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Provide pain control and medical emergency care	8	26.7	18	60	4	13.3	30	100

**Table 41 : Student Evaluation: Training mainly conducted in the Training Hospital**

	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree	Mean
Minor Oral Surgery	0	2	2	6	20	4.5
Restorative Dentistry	0	2	2	12	14	4.3
Diagnostics& Radiology	0	2	2	10	16	4.3
Oral health	0	0	2	12	16	4.5
Ethics & Practice Management	0	2	4	12	12	4.1

**Table 42 : Student Evaluation: Training mainly conducted in Community Clinics**

	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree	Mean
Minor Oral Surgery	0	2	2	8	18	4.4
Restorative Dentistry	8	4	6	10	2	2.8
Diagnostics & Radiology	8	8	8	4	2	2.5
Oral Health	6	6	6	4	8	3.1
Ethics & Practice Management	12	6	6	0	6	2.4

### Annexure 30: Patient Statistics for 2010

Data Element	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Headcount under 5 yrs	38	30	0	31	30	0	0	0	0	0	0	0
Headcount 5 yrs and older	2354	2281	1760	2201	2193	234	255	804	1154	1878	485	0
Dental Visit	2392	2311	1760	2232	2223	247	255	804	1154	1878	485	0
No. of X-rays done	346	268	29	490	326	355	362	961	1362	1545	520	0
Examination and charting	0	421	268	11	1684	120	116	304	1154	696	135	0
Oral scaling and polishing	30	84	87	6	117	35	44	143	183	218	16	0
Tooth Restoration	4	0	1	0	11	25	15	137	194	194	100	0
Oral Hygiene Instruction	11	65	43	1350	185	49	47	57	299	394	81	0
Tooth Extraction	1627	1430	1556	0	1512	58	45	185	253	321	92	0
Fissure Sealant	0	0	0	0	113	15	6	50	203	162	0	0
Fluoride Application	3	0	0	0	15	9	9	13	87	85	0	0
Oral Minor Surgery	0	61	85	27	35	37	27	1	0	28	23	0
Oral Treatment Services	0	756	198	65	256	32	28	299	12	337	149	0
Referred to dental specialist	291	110	210	122	250	9	7	37	33	28	7	0

(Oral & Dental Training Hospital, 2010)

