THE DESIGN OF AN UNDERGRADUATE
CHIROPRACTIC CURRICULUM

by

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submitted in fulfilment of the requirements for
the degree of

MASTER OF EDUCATION

in the subject

DIDACTICS

at the

UNIVERSITY OF SOUTH AFRICA

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NOVEMBER 1998

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Evidence is provided to support Kierkegaard's phenomenology that only what is learned through experience is truly known. It is demonstrated that the chiropractic curriculum represents a unique area of investigation and that it is possible to define curriculum; to create a functional and integrative model which subsumes elements from the traditional, cyclical and process models; and to design an integrative, problem-based, evidence-based, experiential chiropractic curriculum. A taxonomy is proposed for curriculum design in four domains which deal respectively with a) curriculum processes which include the selection, motivation and interaction of curriculum developers, curriculum definitions and models, and an algorithm for curriculum design; b) curriculum organisation which addresses philosophical, sociological, cultural and psychological foundations, curriculum paradigms and a chiropractic conceptual framework; c) curriculum development which concerns design strategies, situational analysis, intent, content, design and organisation of learning experiences and assessment of student performance; and d) curriculum application, which includes the learning climate, quality management, management of change, self-evaluation and external accreditation.
MeSH:
Chiropractic, curriculum, education, competency-based assessment.

Other:
Curriculum change management, curriculum design taxonomy, curriculum paradigms, experiential learning, individualisation learning, integrative curriculum, learning ambience, medical education, problem-based learning, study guides.

ACKNOWLEDGEMENTS

Sincere thanks to Dr. Helen van R. van der Horst and Professor W.J. du Plooy for their efficient, friendly and very helpful guidance.

My deep appreciation and gratitude to Sharon Ames for her endless hours of excellent word-processing.

My gratitude to Mr. Michael Gavan for proofreading of the dissertation.

Heartfelt appreciation and thanks to my wife, Dr. Rita Kleynhans, for her endless patience and strong support.
DECLARATION

I declare that THE DESIGN OF AN UNDERGRADUATE CHIROPRACTIC CURRICULUM is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

[ANDRIES M. KLEYNHAUS]
Student number: 232-901-8.

STATEMENT

The work presented in this dissertation is also reflected in 19 peer reviewed journal publications, 2 major reports, a conference paper and a book chapter by the author. The basic outline and major concepts from this work formed the framework for the World Federation of Chiropractic Conference on Internationalisation of the Chiropractic Curriculum, held in Manila, Philippines in September, 1998 which was attended by participants from around the world.
# CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>1.1</td>
<td>The curriculum as lived experience</td>
<td>2</td>
</tr>
<tr>
<td>1.2</td>
<td>The research problem and its setting</td>
<td>5</td>
</tr>
<tr>
<td>1.3</td>
<td>The aims and objectives of this dissertation</td>
<td>17</td>
</tr>
<tr>
<td>1.4</td>
<td>Outline of the dissertation</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>A CLARIFICATION OF THE CURRICULUM PROCESS</td>
<td>22</td>
</tr>
<tr>
<td>2.1</td>
<td>The selection and role of curriculum developers</td>
<td>23</td>
</tr>
<tr>
<td>2.2</td>
<td>A definition of the chiropractic curriculum</td>
<td>29</td>
</tr>
<tr>
<td>2.3</td>
<td>Towards an algorithm for the design and vivification of a chiropractic curriculum</td>
<td>32</td>
</tr>
<tr>
<td>2.4</td>
<td>Towards a chiropractic curriculum model</td>
<td>36</td>
</tr>
<tr>
<td>2.5</td>
<td>A taxonomy for curriculum design</td>
<td>44</td>
</tr>
</tbody>
</table>
### CHAPTER 3
**A CLARIFICATION OF THE FOUNDATIONS OF THE CHIROPRACTIC CURRICULUM**

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>A clarification of the philosophical foundations of the chiropractic curriculum</td>
<td>58</td>
</tr>
<tr>
<td>3.2</td>
<td>A clarification of the sociological and cultural foundations of the chiropractic curriculum</td>
<td>87</td>
</tr>
<tr>
<td>3.3</td>
<td>A clarification of the psychological foundations of the chiropractic curriculum</td>
<td>111</td>
</tr>
<tr>
<td>3.4</td>
<td>A clarification of paradigms relevant to the chiropractic curriculum</td>
<td>119</td>
</tr>
<tr>
<td>3.5</td>
<td>A clarification of a chiropractic conceptual framework</td>
<td>132</td>
</tr>
</tbody>
</table>

### CHAPTER 4
**A CLARIFICATION OF THE DESIGN AND DEVELOPMENT OF A CHIROPRACTIC CURRICULUM**

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>A clarification of design strategies for a chiropractic curriculum</td>
<td>142</td>
</tr>
<tr>
<td>4.2</td>
<td>The situational analysis of a chiropractic curriculum</td>
<td>172</td>
</tr>
<tr>
<td>4.3</td>
<td>The identification and analysis of the intent of a chiropractic curriculum</td>
<td>199</td>
</tr>
<tr>
<td>4.4</td>
<td>The selection and organisation of content in a chiropractic curriculum</td>
<td>213</td>
</tr>
<tr>
<td>4.5</td>
<td>Clarification of the design and organisation of learning experiences in a chiropractic curriculum</td>
<td>235</td>
</tr>
<tr>
<td>4.6</td>
<td>A clarification of the evaluation of student performance in a chiropractic curriculum</td>
<td>289</td>
</tr>
</tbody>
</table>
CHAPTER 5
A CLARIFICATION OF THE APPLICATION OF A CHIROPRACTIC CURRICULUM

5.1 A clarification of the learning climate of a chiropractic curriculum 337
5.2 A clarification of the quality management of a chiropractic program 350
5.3 A clarification of the management of change in a chiropractic curriculum 373

CHAPTER 6
THE IMPLICATIONS OF THE STUDY 393

6.1 Summary 394
6.2 Findings 396
6.3 Recommendations and implications of the recommendations 411
6.4 Future research 420
6.5 Synthesis of the investigation 425

BIBLIOGRAPHY 427
<table>
<thead>
<tr>
<th></th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Typical functions, duties and responsibilities of a chiropractor</td>
<td>6</td>
</tr>
<tr>
<td>2.</td>
<td>Part disciplines of chiropractic</td>
<td>9</td>
</tr>
<tr>
<td>3.</td>
<td>Approaches to the selection of curriculum developers</td>
<td>25</td>
</tr>
<tr>
<td>4.</td>
<td>The design and function of stakeholder task-forces in curriculum</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>development</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Analysis of curriculum definitions</td>
<td>30</td>
</tr>
<tr>
<td>6.</td>
<td>Traditional algorithms for curriculum design</td>
<td>33</td>
</tr>
<tr>
<td>7.</td>
<td>Proposed algorithm for the design and vivification of a</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>chiropractic curriculum</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Analysis of the continuum of curriculum models</td>
<td>38</td>
</tr>
<tr>
<td>9.</td>
<td>Purposes and advantages of using a taxonomy for curriculum design</td>
<td>45</td>
</tr>
<tr>
<td>10.</td>
<td>A taxonomy for curriculum design</td>
<td>45</td>
</tr>
<tr>
<td>11.</td>
<td>Evaluation criteria met by the taxonomy for curriculum design</td>
<td>53</td>
</tr>
<tr>
<td>12.</td>
<td>Broad-based curriculum questions</td>
<td>54</td>
</tr>
<tr>
<td>13.</td>
<td>Curriculum design questions about the philosophical foundations of</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>the chiropractic curriculum</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Major philosophical assumptions that influence chiropractic</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>curriculum design</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Beliefs about the characteristics of chiropractic and</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>chiropractors</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Arguments in favour of a multidimensional research paradigm as a</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>basis for chiropractic education</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Chiropractic principles - basic constructs</td>
<td>70</td>
</tr>
<tr>
<td>18.</td>
<td>The importance of principles in chiropractic education</td>
<td>70</td>
</tr>
<tr>
<td>19.</td>
<td>The purposes of chiropractic principles</td>
<td>71</td>
</tr>
<tr>
<td>20.</td>
<td>The place of chiropractic principles</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>21.</td>
<td>The functions of chiropractic principles</td>
<td>72</td>
</tr>
<tr>
<td>22.</td>
<td>Comparison of the hospital-based and chiropractic models of health care</td>
<td>79</td>
</tr>
<tr>
<td>23.</td>
<td>A comparison of disease-oriented and wellness-or health-oriented models of practice</td>
<td>80</td>
</tr>
<tr>
<td>24.</td>
<td>Reasons why the chiropractic curriculum needs to reflect humanism</td>
<td>81</td>
</tr>
<tr>
<td>25.</td>
<td>Comparison of elements of scientific and humanistic medicine</td>
<td>84</td>
</tr>
<tr>
<td>26.</td>
<td>Curriculum design questions about the sociological and cultural foundations of the chiropractic curriculum</td>
<td>88</td>
</tr>
<tr>
<td>27.</td>
<td>How external groups control the chiropractic curriculum</td>
<td>91</td>
</tr>
<tr>
<td>28.</td>
<td>How internally appointed groups control the chiropractic curriculum</td>
<td>92</td>
</tr>
<tr>
<td>29.</td>
<td>The sociological and cultural rationale for first professional chiropractic courses</td>
<td>106</td>
</tr>
<tr>
<td>30.</td>
<td>The relationship between societal expectations and the philosophical foundations of chiropractic</td>
<td>107</td>
</tr>
<tr>
<td>31.</td>
<td>Curriculum design questions about the psychological foundations of the chiropractic curriculum</td>
<td>111</td>
</tr>
<tr>
<td>32.</td>
<td>How psychology influences the curriculum</td>
<td>113</td>
</tr>
<tr>
<td>33.</td>
<td>How psychosocial elements and factors influence chiropractic clinical practice</td>
<td>117</td>
</tr>
<tr>
<td>34.</td>
<td>Curriculum design questions about the major paradigms which influence curriculum design</td>
<td>119</td>
</tr>
<tr>
<td>35.</td>
<td>Characteristics of the academic rationalist paradigm</td>
<td>120</td>
</tr>
<tr>
<td>36.</td>
<td>Characteristics of the humanistic paradigm</td>
<td>121</td>
</tr>
<tr>
<td>37.</td>
<td>Characteristics of the social reconstructionist paradigm</td>
<td>122</td>
</tr>
<tr>
<td>38.</td>
<td>Characteristics of the professional reconstructionist paradigm</td>
<td>123</td>
</tr>
<tr>
<td>Number</td>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>--------</td>
<td>----------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>58.</td>
<td>The purpose of a situational analysis for curriculum purposes</td>
<td>172</td>
</tr>
<tr>
<td>59.</td>
<td>Curriculum design questions about the contextual framework of a chiropractic curriculum</td>
<td>173</td>
</tr>
<tr>
<td>60.</td>
<td>Factors which influence situational analysis of a teaching-learning situation</td>
<td>175</td>
</tr>
<tr>
<td>61.</td>
<td>Factors which influence situational analysis of a professional discipline e.g. chiropractic</td>
<td>178</td>
</tr>
<tr>
<td>62.</td>
<td>Components and subjects in a first professional chiropractic course</td>
<td>184</td>
</tr>
<tr>
<td>63.</td>
<td>The relative weighting of major course components in a first professional Australian chiropractic course</td>
<td>185</td>
</tr>
<tr>
<td>64.</td>
<td>Material resources, teaching support systems and technology for the conduct of a first professional chiropractic course</td>
<td>189</td>
</tr>
<tr>
<td>65.</td>
<td>Curriculum design problems expressed as “diseases”</td>
<td>193</td>
</tr>
<tr>
<td>66.</td>
<td>Approaches to curriculum planning</td>
<td>195</td>
</tr>
<tr>
<td>67.</td>
<td>An algorithm for competency needs assessment</td>
<td>196</td>
</tr>
<tr>
<td>68.</td>
<td>Curriculum design questions about curriculum intent</td>
<td>199</td>
</tr>
<tr>
<td>69.</td>
<td>The application of motivational theory to the determination of curriculum intent</td>
<td>200</td>
</tr>
<tr>
<td>70.</td>
<td>How student goal information can be used in curriculum design and implementation</td>
<td>201</td>
</tr>
<tr>
<td>71.</td>
<td>Attributes displayed by graduates who meet the broad educational aims of a chiropractic curriculum</td>
<td>202</td>
</tr>
<tr>
<td>72.</td>
<td>General goals of a chiropractic program</td>
<td>203</td>
</tr>
<tr>
<td>73.</td>
<td>The purpose of determining educational objectives</td>
<td>204</td>
</tr>
<tr>
<td>74.</td>
<td>The four basic principles of Bloom's taxonomy</td>
<td>205</td>
</tr>
<tr>
<td>75.</td>
<td>The objectives of a basic chiropractic education - cognitive domain</td>
<td>206</td>
</tr>
</tbody>
</table>
76. The objectives of a basic chiropractic education - psychomotor domain 208
77. The objectives of a basic chiropractic education - affective domain 209
78. Advantages of basing objectives on competencies 211
79. Professional attributes of a chiropractor 211
80. Roles and tasks of a chiropractor 212
81. Curriculum design questions about curriculum content 214
82. Methods and techniques used to determine curriculum content 215
83. The relationship between chiropractic beliefs and curriculum content 217
84. Qualitative and quantitative standards for chiropractic clinical education 219
85. Curriculum design questions about teaching-learning strategies 237
86. Framework for the analysis of teaching-learning methods - example: expository teaching 238
87. Relevance of teaching-learning (T-L) strategies to experiential learning 240
88. An algorithm for the development of a study guide 248
89. Psychological principles and assumptions about teaching-learning strategies 261
90. Curriculum design questions about the assessment of student performance 292
91. Application of the principles of motivational theory to student assessment 295
92. Application of Bloom’s taxonomy of educational objectives in the cognitive domain to competency-based assessment in chiropractic 299
93. Simpson’s taxonomy of the psychomotor domain applied to chiropractic 300
94. Educational objectives in the affective domain 303
95. Analysis of direct observation of clinical practice as an assessment strategy 308
96. Advantages of simulation techniques used for the assessment of performance of complex professional practise 309
97. Analysis of the strategies used to assess psychomotor skills 311
98. Analysis of the assessment of habitual performance using rating scales 312
99. Analysis of the structured oral self-directed learning evaluation (SOSLE) 316
100. Analysis of self-reporting survey techniques as an assessment strategy (questionnaires and interviews) 319
101. Analysis of observing charts, records and documents as a strategy in clinical assessment 320
102. Analysis of written assessment strategies 322
103. Differences between objective and subjective (essay-type) and oral assessment strategies 323
104. An indicative list of specifications for a competency-based assessment system in chiropractic 325
105. An example of the weighting of content according to performance areas (behaviours) 326
106. An example of the weighting of content according to domains and major range indicators for chiropractic 326
107. An example of the weighting of assessment according to assessment methods and techniques 327
108. An example of the weighting of content according to diagnostic technique 327
109. An example of the weighting of content according to therapeutic techniques 328
110. An example of the weighting of content in the written assessment 

111. The types of evidence provided during the assessment of chiropractic clinical practice 

112. Steps in the design of a campus environment 

113. How data on the teaching climate can be used 

114. Curriculum design questions about learning climate 

115. Research methods and techniques for the measurement of learning climate 

116. Application of the principles of motivational theory to learning climate 

117. Perspectives on person-environment interaction in relation to student development 

118. Stages of integration into the learning environment 

119. Benefits of total quality management (TQM) 

120. Curriculum design questions about the quality management, evaluation and accreditation of a chiropractic program 

121. Items to be managed which are included in Australian quality frameworks relevant to the chiropractic curriculum 

122. Principles of quality management in relation to a province of the chiropractic curriculum - competency-based assessment 

123. Performance indicators for the self-evaluation of competency-based assessment in relation to the curriculum intent of a chiropractic curriculum 

124. Characteristics of a ‘good’ accreditation system 

125. Curriculum design questions about the change process of a chiropractic curriculum 

126. Checklist of factors that facilitate the change process
<table>
<thead>
<tr>
<th></th>
<th>LIST OF FIGURES</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The continuum of curriculum models</td>
<td>39</td>
</tr>
<tr>
<td>2</td>
<td>Tyler's rational (or objectives) model of curriculum design</td>
<td>39</td>
</tr>
<tr>
<td>3</td>
<td>Taba's model of the curriculum process</td>
<td>39</td>
</tr>
<tr>
<td>4</td>
<td>The Wheeler cyclical model of the curriculum process</td>
<td>40</td>
</tr>
<tr>
<td>5</td>
<td>The Nicholls' cyclical model of the curriculum process</td>
<td>40</td>
</tr>
<tr>
<td>6</td>
<td>Bevis' interactive/dynamic approach to the curriculum process</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>6 (a) Bevis' concept of the three basic components</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 (b) Bevis' concept of content in a process</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 (c) Bevis' concept of a curriculum building setting</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>The Walker interactive model of the curriculum process</td>
<td>42</td>
</tr>
<tr>
<td>8</td>
<td>The Skilbeck interactive model of the curriculum process</td>
<td>42</td>
</tr>
<tr>
<td>9</td>
<td>Print's eclectic (or integrative) model of curriculum design</td>
<td>43</td>
</tr>
<tr>
<td>10</td>
<td>A functional and integrative model of curriculum design</td>
<td>43</td>
</tr>
<tr>
<td>11</td>
<td>A hierarchical arrangement of the human needs system</td>
<td>116</td>
</tr>
<tr>
<td>12</td>
<td>A graphic depiction of the assumed relationship between philosophy and science</td>
<td>137</td>
</tr>
<tr>
<td>13</td>
<td>A graphic depiction of the assumed relationship between philosophy and science</td>
<td>137</td>
</tr>
<tr>
<td>14</td>
<td>The relationship among the traditional domains of a chiropractic conceptual</td>
<td>138</td>
</tr>
<tr>
<td>15</td>
<td>The relationship among the traditional domains of a chiropractic conceptual</td>
<td>138</td>
</tr>
<tr>
<td>16</td>
<td>Interaction of domains in a chiropractic conceptual framework</td>
<td>138</td>
</tr>
<tr>
<td>17</td>
<td>Interaction of domains in a chiropractic conceptual framework</td>
<td>138</td>
</tr>
<tr>
<td>18</td>
<td>The reality continuum of teaching-learning strategies</td>
<td>241</td>
</tr>
<tr>
<td>19</td>
<td>The reality continuum of teaching-learning strategies</td>
<td>241</td>
</tr>
<tr>
<td>20</td>
<td>Stages in an experiential learning cycle</td>
<td>255</td>
</tr>
<tr>
<td>21</td>
<td>Stages in an experiential learning cycle</td>
<td>255</td>
</tr>
<tr>
<td>22</td>
<td>Instructions to students in carrying out an experiential learning exercise</td>
<td>255</td>
</tr>
<tr>
<td>23</td>
<td>Instructions to students in carrying out an experiential learning exercise</td>
<td>255</td>
</tr>
</tbody>
</table>
CHAPTER 1

INTRODUCTION

The purpose of the curriculum is to bring order, coherence and intellectual discipline to the transmission of stored human experience (Harden, 1986A:357).

PRÉCIS 1: Chapter 1 provides an introduction to a philosophical approach to the design of the chiropractic curriculum; clarifies the research problem and its setting; details the aims and objectives and provides an outline of the dissertation.

OUTLINE

Chapter 1 considers:

1.1 The curriculum as lived experience
1.2 The research problem and its setting
1.3 The aims and objectives of this dissertation
1.4 Outline of the dissertation
1.1.1 A Phenomenological Approach

'Throughout life, the intelligent person profits from experience in the sense that, as a result of experience, they are better prepared to meet situations of various degrees of relatedness and similarity' (Mouly 1973:298). This introduction to the chiropractic curriculum as lived experience stresses and seeks to clarify a phenomenological or experiential approach to curriculum design. Kierkegaard relates that only what is learned through experience, i.e. personally appropriated, is truly known. In this sense life is 'education' - 'the curriculum one has to run through to catch up with oneself (Pojman 1978:11). This phenomenological approach recognises the curriculum as 'lived experience' and hence the task of students and teachers as being the appropriation of lived experience. Based on the assumption that experiential learning goes to the essence or fundamental truth of what education, teaching and learning is all about, this study explores the validity of Kierkegaard's philosophical view in the context of chiropractic education. A review of current chiropractic curricula indicates the requirement for psychomotor skills development for the practice of manual diagnostic and therapeutic techniques and the need to develop clinical decision-making and reasoning processes (Schafer and Sportelli 1994:93; McNamee 1997:40-123). Since it is important that students personally appropriate psychomotor skills to carry out diagnosis and the chiropractic manual techniques that they will use in treatment, an experiential approach should be of imperative interest to chiropractic educators. Problem-solving experiences relating to patient assessment, evaluation and clinical decision-making need to be 'lived' during the course of study in order to be truly appropriated and competently carried out in future practice. Self-directedness as learners needs to be 'experienced' if it is to be carried forward into future practice where it is imperative to staying abreast in a rapidly advancing discipline, which is undergoing an information explosion. Kierkegaard's concept of curriculum provides a philosophical foundation for an experiential, self-directed, problem-solving approach to the education and training of chiropractic physicians and shall be the theme which threads through this dissertation.
1.1.2  Support for a Phenomenological Approach

There is abundant support in the literature for the view that only that which has been fully appropriated and made their own (i.e. experienced) is of benefit to learners. Dall’Alba and Sandberg (1996:411) relate competence to “lived experience” and say that it is through “lived experience” of the world that the world takes on meaning for us. Rather than competence being attribute acquisition, they see the primary focus as a broadening and deepening of the meaning of the task or work for student and professional through lived experience or Schön’s ‘knowing-in-action’ and ‘reflection-in-action’ (Schön 1987:25; Molander 1993:165). Bruner (cited by Vrey 1990:216) states ‘it matters not what we have learned. What we can do with what we have learned, this is the issue’. Harden, Sowden and Dunn (1984:3,4) state that: ‘what matters in education is what the students learn, not what the teacher teaches’. A number of authors apply these basic premises to the process of learning: e.g. Mouly (1973:298) says that the primary purpose of educational experiences both in and out of the formal curriculum is to enable the individual to meet new situations more effectively. This is argued to be fundamental to curriculum design. Stanton (1981:84) states that learning should not be seen as primarily a process of accumulating information which is then stored for use on later occasions; something more is needed which involves the student as an active participant rather than a passive recipient. Combs et al (1971:21) regard learning as the discovery of meaning which always involves two aspects: the acquisition of new knowledge or experience and the individual’s personal discovery of the meaning the information has for him or her. They add that while the provision of information can be controlled by an outsider with or without cooperation of the learner, and while it can even be provided via mechanical means which does not require a person at all, discovery of meaning can only take place in people and cannot take place without the involvement of persons (Combs et al 1971:21). Knowles (1981:8) links experiential learning directly to autonomous learning. He recognises an urgent need for all programs of higher education to be geared to developing the skills of autonomous learning at the front end of their sequence of learning experiences and that subsequent units of the sequence be designed as self-directed learning activities. He says that the new emphasis in higher education must be on the process of learning (i.e. the experiential) so that the acquisition of content, rather than the transmission of content, is a natural although not a pre-
programmed result. He quotes Faure (1972) as saying that if lifelong learning is to be the organizing principle for all of education, then the primary mission of education for children and youth must be the development of the skills of self-directed inquiry (i.e. personal experience) rather than the inculcation of subject-matter content (Knowles 1981:8). Further exploration of this theme follows in 3.3 (Psychological Foundations) and in Chapter 5 below.
1.2 THE RESEARCH PROBLEM AND ITS SETTING

1.2.1 The Setting of the Research Problem
The research problem in this dissertation concerns the education and training of chiropractors. In this context education relates to the 'how and why', and training to the 'how to' of the discipline. The setting of the problem is explicated by defining and describing chiropractic, indicating the typical functions, duties and responsibilities of a chiropractor and outlining the major purposes of chiropractic education. Chiropractic is the second largest primary health-care profession in the United States and the fastest growing primary health-care profession in the world (Schafer and Sportelli 1994:1). Extrapolation from a study by Eisenberg et al (1993:248-9) suggests that chiropractic is the largest system of treatment complementary to Western modern medicine in the world. It is therefore important, in the community interest and for the advancement of the discipline, that the curriculum design for entry-level chiropractic professional programs be clarified.

1.2.2 What is Chiropractic?

1.2.2.1 The nature of chiropractic
'Chiropractic' is derived from the Greek kheiro = hand; and practikos = to practice, to effect or to do; meaning to do or effect by hand. It is concerned with or pertaining to the diagnosis and manipulative treatment of mechanical disorders of the joints, especially of the spine' (Brown, 1993:389). 'Chiropractic is a discipline of the scientific healing arts concerned with the pathogenesis, diagnosis, therapy and prophylaxis of functional disturbances, pathomechanical states, pain syndromes and neurophysiological effects related to the statics and dynamics of the locomotor system, especially of the spine and pelvis' (European Chiropractic Union, 1974 in ACCE, 1997:8).
1.2.2.2 The health-care role of chiropractors

The following characteristics indicate what chiropractors do.

a) Chiropractors give particular attention to the relationship of structural and neurological aspects of the body in health and disease and are educated in the basic and clinical sciences as well as in related health subjects (ACCE, 1997:8).

b) Chiropractors are primary contact health care practitioners in that they receive patients directly without the requirement for prior examination or referral by another health care practitioner. They provide primary health care.

c) Chiropractors primarily use manual techniques directed at the joints and tissues to relieve human pain, dysfunction and disability. However, other modalities of treatment are also extensively used (NBCE 1994:2; Schafer and Sportelli 1994:15-17).

Table 1 details the functions, duties and activities of a typical chiropractor in routine practice. Participant observation confirms some minor jurisdictional variation.

TABLE 1 - Typical functions, duties and responsibilities of a chiropractor

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Patient Care</th>
<th>Treatment</th>
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1. During the initial patient interview and consultation, every measure of observation that substantially profiles the patient is employed and recorded.
2. The chiropractor conducts a systematic physical, neurologic and orthopaedic examination using the methods, techniques and instruments standard in all health professions. The doctor also performs postural and spinal analyses unique to chiropractic diagnostics for each case.
3. Diagnostic radiology, standard and special laboratory procedures and tests are used to arrive at a differential diagnosis.
4. The doctor of chiropractic performs or prescribes patient tests, measurements and evaluations of health status and impairment or disability in establishing or revising treatment programs and preventive programs. The doctor evaluates and updates records to determine case progress, treatment required and plans the treatment program based upon evaluation of available patient data.
5. The chiropractor corrects, reduces, mobilizes or immobilizes articular abnormalities, particularly of the spine and pelvis, to normalize structural and functional relationships and relieve attendant nerve, muscle and circulatory disturbances. These methods do not include the use of prescription drugs or major surgery.
6. If deemed necessary in case management, the doctor of chiropractic prescribes dietary regimens and nutritional supplements designed to prevent the onset or lessen the existence of some types of dysfunction of the nervous system and other tissues.
7. Physiotherapeutic methods and procedures are frequently used as adjunctive therapy to enhance reception to and the effects of the chiropractic adjustments. Such procedures may include the use of traction, diathermy, galvanic currents, infrared and ultraviolet light, ultrasound, massage, hot or cold applications, acutherapy, heel or sole shoe lifts, foot stabilizers and other modalities common to all the healing arts.
8. First aid, taping and strapping, and other forms of casting are often used in treating injuries of the extremities. Neck, lower back, elbow, knee and ankle injuries may call for the use of supportive collars, braces or corsets during recuperation to assist healing and strengthening.
Professional counselling is often given in such areas as dietary habits and physical and mental attitudes affecting health. Personal sanitation, occupational safety, posture, rest, work, rehabilitative exercises, recreational activities, health habits, adaptive life-styles and the many other activities of daily living that would enhance the effects of chiropractic health care are covered. Chiropractic care, holistic in approach, is concerned with the total health, welfare and survival of the individual.

The chiropractor orients, instructs, directs and evaluates work activities of administrative assistants and paraprofessional clinical assistants.

The doctor of chiropractic may plan and conduct lectures and training programs on health care and related subjects for chiropractic staff, students, patients and community groups. The doctor may assist in the teaching, training, and evaluation of chiropractic externs, and he or she may teach in educational institutions or conduct or participate in seminars concerning the basic and/or clinical sciences.

The chiropractic physicians may plan, develop or participate in research programs and/or development of articles for publication.

The chiropractor may limit practice to a specialized area of interest such as orthopaedics, diagnostic radiology, nutrition, athletics and sports medicine, occupational and industrial health and attain diplomate or fellowship status through postgraduate education and certification.

The practitioner may be designated doctor of chiropractic, chiropractic physician or chiropractor and may be involved in solo, partnership, group or corporate practice, or may be employed by one or more registered practitioners.

The following description has been internationally supported over a period of many years:

"The chiropractic profession occupies a position, both by tradition and status, as one of the main portals of entry for patients into the health care delivery system. As a prospective primary care health professional, the person studying chiropractic must develop a comprehensive understanding of the human organism, the disease processes that may affect it and the differential diagnosis and services that must be rendered with competence. Chiropractic education must be broad and liberal so that the practitioner of chiropractic not only seeks to master this healing art, but is also fully cognisant of professional limitations. In order to stress this point of view, subjects on management (especially interpersonal relationships, organization and administration) and the social and preventative aspects of chiropractic health care should be discussed throughout the course where their application to a particular area is deemed appropriate. The student should be presented with a holistic view of health care and be made aware of the chiropractor's responsibility to other members of the

1.2.2.3 The purpose of chiropractic education

The following description has been internationally supported over a period of many years:

"The chiropractic profession occupies a position, both by tradition and status, as one of the main portals of entry for patients into the health care delivery system. As a prospective primary care health professional, the person studying chiropractic must develop a comprehensive understanding of the human organism, the disease processes that may affect it and the differential diagnosis and services that must be rendered with competence. Chiropractic education must be broad and liberal so that the practitioner of chiropractic not only seeks to master this healing art, but is also fully cognisant of professional limitations. In order to stress this point of view, subjects on management (especially interpersonal relationships, organization and administration) and the social and preventative aspects of chiropractic health care should be discussed throughout the course where their application to a particular area is deemed appropriate. The student should be presented with a holistic view of health care and be made aware of the chiropractor's responsibility to other members of the
health team and to the community. The clinical and pre-clinical teaching should be augmented by a study of the health problems in communities, the health services designed to control such problems and epidemiology" (ACCE 1997:6).

1.2.2.4 The relationship between medicine and chiropractic

In this dissertation particular emphasis is placed on the complementary relationship between orthodox medicine and chiropractic to justify applying experiences with medical education to chiropractic, either through extrapolation or by adapting research findings mutatis mutandis to chiropractic. Several sources support the notion of commonality between the two professions. This relationship, in relation to standards for professional recognition, is eloquently addressed by Bingham (1993:iii):

Bingham (1993:iii) eloquently addresses this relationship in relation to standards for professional recognition in the United Kingdom:

"The Medical Act has come to provide the gold standard for recognition as a profession and for regulation in the public interest. It is high time that this was extended to those branches of complementary medicine that share certain key features with orthodox medicine. These features are:

1. that the therapeutic practice concerned rests on solid foundations in science and in examinable knowledge and skills;
2. that it can be demonstrated by objective standards to cure or to alleviate pain and suffering when practised skilfully, and that it has power to do harm in the wrong hands;
3. that there is a significant public demand for it; that the public requires help in differentiating reliable from unreliable practice, and would be best protected by publicly accountable self-regulation by the profession concerned."

"These features do not apply equally to all branches of complementary medicine, but they do apply to chiropractic as to osteopathy. Indeed, chiropractic has set an important precedent in terms of its openness to scientific enquiry through the Medical Research Council's randomised controlled trial of the treatment of low back pain which compared chiropractic treatment with orthodox hospital outpatient treatment - and incidentally found in favour of the former."
An analysis of the literature indicates that much of the content of the traditional chiropractic curriculum, has been based on the undergraduate medical model, albeit with substitution of manual therapeutic techniques for medicine, pharmacology and surgery (McNamee 1997; Ratliff, Rogers, Richardson 1990:76; Schafer & Sportelli 1994:93, Suh 1979:36, Wiese 1993:138). The part-disciplines of chiropractic appear in Table 2. Most subjects are also found in the medical curriculum albeit with variation in hours, content or emphasis. Subjects only found in the chiropractic curriculum are marked with an asterisk*.

**TABLE 2 - Part disciplines of chiropractic**

<table>
<thead>
<tr>
<th>SUBJECTS SHARED WITH MEDICINE</th>
<th>CHIROPRACTIC SPECIFIC SUBJECTS</th>
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<tr>
<td><strong>Basic Medical Sciences</strong></td>
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<td>Anatomy (gross and histologic)</td>
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<tr>
<td>Biochemistry</td>
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<td>Bioinstrumentation</td>
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<td>Embryology</td>
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<td>Endocrinology</td>
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<td>Genetics</td>
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<td>Histopathology</td>
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<td>Immunology</td>
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<td>Microbiology</td>
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<td>Pathology</td>
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<td>Pharmacology</td>
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<td>Physiology</td>
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<tr>
<td>Public health</td>
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<tr>
<td><strong>Diagnostic Sciences</strong></td>
<td>Radiography*</td>
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<td>Clinical diagnosis</td>
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<td>Dermatology</td>
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<td>Geriatrics</td>
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<td>Obstetrics</td>
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<td>Gynaecology</td>
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<td>Laboratory diagnosis</td>
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<td>Neurology</td>
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<td>Orthopaedics</td>
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<td>Otolaryngology</td>
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<td>Paediatrics</td>
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<td>Physical diagnosis</td>
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<td>Radiology</td>
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<td>Symptomatology</td>
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<td>Toxicology</td>
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<tr>
<td><strong>Chiropractic Sciences</strong></td>
<td>Biomechanics &amp; kinesiology*</td>
</tr>
<tr>
<td>Philosophical substrates of clinical practice</td>
<td>Principles and practice of chiropractic*</td>
</tr>
<tr>
<td>Ethics &amp; jurisprudence</td>
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</table>
It is assumed that the consequences of close adherence of chiropractic education to a medical model have been threefold:

a) The chiropractic curriculum has, to a large extent, been based on a reductionistic, medical paradigm instead of developing its own unique design.

b) Until recent years the teaching-learning strategies in both cases have been primarily discipline- and teacher-based.

c) The chiropractic curriculum has been subject to the same forces of change and malaise as the medical curriculum.

Coulter (1986:128) confirms that in certain areas the chiropractic curriculum shares the same or similar problems as medical education, particularly deficiencies in the humanities and social sciences; the patient population that students are exposed to; and the lack of integration of the curriculum (also addressed in Coulter 1981:147).

1.2.2.5 Background to the problem

Perceived problems of the chiropractic curriculum, which stimulated this research, are shared with medical education and relate to a number of elements of the curriculum discussed below:

a) Curriculum Design - The American medical curriculum is said to be fact-orientated, emphasising rote memory, and giving little attention to the application of knowledge or to the development of problem-solving abilities during the pre-clinical years. Critics have claimed that students spend the majority of their time acquiring vast stores of knowledge, much of which is outdated and forgotten before they graduate (Kantrowitz 1987:187). In fact, a 1978 World Health Organization conference on medical education specifically called for education reform and the Association of American Medical Colleges (AAMC 1984:1) has
recommended problem-solving rather than rote memory learning, stressing active rather than passive learning and emphasising student-centred rather than teacher-centred education (Kantrowitz 1987:19; Leggat 1997:93). Neame (1982:141) lists thirteen issues of concern which have been identified by reviewers of medical education, including authoritative reports issued in different countries. Some of these illustrative issues, which strongly suggest the need for change, include:

i) Absence of course objectives or learning contracts against which students and staff may assess progress and achievement.

ii) Orientation of teaching and assessment towards recall of factual information rather than towards the ability to use and apply knowledge; irrelevance of curricular content to contemporary and future needs.

iii) Adoption of educational strategies in which the student is a 'passive' learner rather than the more effective and stimulating strategies fostering 'active' student involvement (e.g. problem-solving).

A descriptive analysis of the literature and participant observation indicates that the chiropractic curriculum has for at least three decades followed the broad structure of the medical curriculum in terms of the subjects included, except for substitution of chiropractic principles, technique and practice for pharmacology, surgery and medical practice. Examples of anomalies which arose as a result of imitation of the medical curriculum include the heavy emphasis on chemistry. While Chemistry is a logical major substrate for the practice of 'chemical' medicine which deals with the application of chemical substances, it is not of equal importance to the chiropractic curriculum which is based on 'manual' medicine. Conversely, biophysics and biomechanics which are absolutely essential to the application of chiropractic manual techniques did not appear as an integral part of the curriculum until the last decade or so and still requires significant development, application and integration into the chiropractic curriculum and practice. In some chiropractic curricula, microbiology has taken up an inordinate amount of time (up to 300 hours) despite the fact that chiropractors would never use the skills learned in staining micro-organisms, isolating them and identifying them for clinical purposes. These skills could be acquired in a very short period of time should a chiropractor wish to engage in microbiological research. Instead, the focus in a microbiology course for the chiropractic curriculum should be on an understanding of interactions between the human organism and micro-organisms. The focus should be on the holistic factors which
influence same, and on the ordering and interpretation of laboratory pathology tests to facilitate interdisciplinary communication and referral in the interest of patient management. Pathology in the chiropractic curriculum tends to be taught much in the same way as in the medical curriculum with significant emphasis on pathohistology even though chiropractors would tend to never again in their professional lives following graduation look at pathohistological sections under a microscope. Instead, integration of the knowledge of relevant micro- and gross pathology directly with pathophysiology and diagnosis would be of great advantage to the developing chiropractic clinician.

b) **Context of the Curriculum** - The context of the chiropractic curriculum, as is the case with the medical curriculum, is generally poorly defined. Relevant methodologies such as a situational analysis, determination of key graduate attributes and identification of basic educational objectives in the various domains are either not clearly identified and correlated, or related to detailed objectives in relevant subjects.

c) **Curriculum Intent** - While competency-based professional standards have been developed in recent years (Kleynhans 1992A:98), the conventional chiropractic curriculum does not appear to overtly integrate the competencies with objectives and ultimately the strategies for competency-based assessment, although increasing attention is being given to this aspect.

d) **Curriculum Content** - While progress has been made with the identification of those health problems most often seen by chiropractors, many curricula have yet to structure their content in such a way as to place emphasis on those conditions. This could happen as a result of the focus by the U.S. National Board of Chiropractic Examiners in its examinations on certain conditions because of their prevalence which has been determined through studies undertaken by the Board (NBCE 1994:73). It is argued that the identification of health problems to be cared for, and other tasks which ultimately would need to be carried out by graduates should in fact determine the intent and content of the chiropractic curriculum. These considerations should provide a focus for the assessment of competency to practice in the context of the society in which they will work.
e) **Integration** - One of the greatest perceived problems with the chiropractic curriculum relates to the lack of both vertical and horizontal integration, primarily as a result of discipline-based teaching. This is aggravated by notions of departmental territoriality and the mistaken belief by staff that the subject which one teaches is the most important one in the curriculum. This contributes towards loosing sight of the imperative for integration of knowledge within a framework conducive to the preparation of the student for a lifetime of highly specific clinical tasks. Such a lack of integration can reasonably be argued to lower the quality of care, thereby increasing the risk to clients and patients. Descriptive analysis of chiropractic curricula (McNamee 1997:40) shows characteristics of fragmentation even in the presence of attempts to promote integration by teaching different subjects relating to a system or region of the body within the same semester. It is argued that this leads to poor development of the cognitive framework and lack of subsumers to be used for the orderly integration of existing and new knowledge essential to evidence-based clinical decision making.

f) **Teaching-learning Strategies** - As a result of participant observation it is suggested that many chiropractic curricula still focus on rote learning and the "regurgitation of buckets-full of facts" which may not be used and therefore be useless in subsequent practice. There is a strong focus on teaching with very little emphasis on learning. Teaching tends to be discipline or subject-based with minimal attention to vertical and horizontal transfer and very often no attention to how the information would fit into the learners' cognitive framework. Insufficient attention is placed on how cognitive frameworks can be created to assist meaningful verbal learning, mastery learning, retention, relevance etc; and there are major problems with transfer from classroom-based teaching-learning to reality learning and integration into experience in the clinical setting.

g) **Competency-based Assessment** - Participant observation indicates that there is inadequate correlation between curriculum intent and competency-based assessment used to determine whether a graduate fully meets societal requirements for practice. It is argued that this may be the result of failure or inadequate application of methods to determine societal, professional and student demands for the course and to integrate these in curriculum planning and implementation.
h) **Learning Climate** - Participant observation indicates that very scant regard tends to be paid to the creation of a favourable learning climate in which positive experiences which promote learning, professionalisation, humanism and positive role-modeling receive attention, whilst a descriptive analysis of the literature indicates the great importance of attention to the modeling of a favourable learning climate.

### 1.2.3 Statement of the Research Problem

This study undertakes, on the basis of a descriptive analysis of the literature and a case study, to determine whether there is support for the hypothesis that Kierkegaard’s phenomenology about education as *lived experience which needs to be personally appropriated by learners* is relevant to the design of a chiropractic curriculum.

**The Research Question and Sub-Questions**

The research question is: "can it be demonstrated that the personal *appropriation of lived experience* by learners is relevant to the design of a chiropractic curriculum?"

The research sub-questions include:

1. Can a framework and process be identified in terms of which an experience-based chiropractic curriculum can be defined, designed and modeled for students?
2. What does a study of the foundations and paradigms of the chiropractic curriculum indicate about the *appropriation of lived experience* by learners?
3. How does the concept *appropriation of lived experience* relate to the design and development of a chiropractic curriculum?
4. What is the relevance of *appropriation of lived experience* to the application of a chiropractic curriculum?

### 1.2.4 The Definition of Terms

a) **Dictionary**

All terms have their New Shorter Oxford English Dictionary (Brown, 1993) meaning, except where reference to other sources is made or where the usage and meaning is the basis of discussion in the study.
b) Appropriation of lived experience
Since this dissertation concerns the appropriation of lived experience, this concept is defined here. Appropriate (L appropriatus) 'means attached, or belonging (to) as an attribute, quality or right; peculiar to, inherent, characteristic; specially for or to. Appropriation means the making over into one's own' (Brown 1993:103).
Lived (f. live) 'form of life' means having a certain kind or length of life (Brown 1993:1608). Experience (L experientia) 'the action of putting to the test; a procedure carried out to demonstrate something; an experiment; actual observation of or practical acquaintance with facts or events, considered as a source of knowledge. 'The state of having been occupied in any branch of study or affairs; the extent or period of such an occupation; the aptitudes, skill, judgement, etc thereby acquired. 'Knowledge resulting from actual observation or practical acquaintance, or from what one has undergone' (Brown 1993:886).
It appears reasonable to define appropriation of lived experience about chiropractic as the acquisition of attributes and characteristics peculiar to and inherent in chiropractic practitioners by having lived through experiences during which aptitudes, skills and judgement were made one's own through observation and practical acquaintance.

1.2.5 Delimitations
While the perceived weaknesses of the current chiropractic curriculum serve as a point of departure for this investigation, the following limitations circumscribe the scope of the dissertation. This study:

a) Does not propose any evaluation of chiropractic concepts beyond broad philosophical substrates of the curriculum.
b) Limits the situational analysis to identification and brief examples of factors.
c) Limits the discussion of curriculum intent to a brief overview.
d) Limits discussion of teaching-learning strategies primarily to methods and techniques that support experiential learning.
1.2.6 **The Methods**

To conduct this study the following methods were used:

a) Descriptive analysis of the literature including monographs and serial publications on chiropractic general education and medical education; accreditation submissions and reports of educational institutions; reports published by government departments, commissions and committees of enquiry; and other relevant literature.

b) Situational analysis in a broad context, also based on descriptive analysis of the literature, is used to clarify the needs assessment for the chiropractic curriculum.

c) Participant observation to clarify issues with which the author has been intimately involved over a period of more than two decades.

d) A case study of the chiropractic program at RMIT University (Royal Melbourne Institute of Technology), Melbourne, Australia, and one of its predecessor institutions, the Phillip Institute of Technology where the first government-funded and accredited course within the mainstream of university-level education in the world was introduced in 1980. RMIT offers a five year, Bachelor of Applied Science (Clinical Science), Bachelor of Chiropractic Science, double degree course to some 300 undergraduate students.
This dissertation aims at formulating an experience-based curriculum design for a first professional chiropractic course (i.e. a course leading to registration as a practitioner) and at testing the design by determining the relationship between curriculum elements, models and needs.

The general objectives are based on the view that the chiropractic curriculum should be designed to:

a) Provide guidance both to chiropractic learners and to the teachers who have to guide them.

b) Provide relevant learning experiences.

c) Meet societal needs and demands for the preparation of graduates who shall appropriate lived experience adequate to be able to fulfil their roles in professional life and community service.

d) Take cognisance of the chiropractic student's lifeworld which is characterised by increasing societal demand for competency and accountability in the professions (Dunn et al 1985:15) at a time when rapid technological advancement and information-overload place great stress on students.

Specific objectives are:

a) A clarification of the curriculum process based on the assumption that the curriculum represents a unique area of investigation.

b) Development of an algorithm for the development of a curriculum that promotes appropriation of lived experience, based on the assumption that the steps in curriculum development can be identified and structured.

c) Development of a taxonomy for the design of a holistic curriculum which promotes appropriation of lived experience based on the assumption that research by many investigators support a common classification system.

d) Development of a list of curriculum design questions to guide curriculum developers in designing a curriculum which promotes the appropriation of lived experience by learners, based on the assumption that a significant body of knowledge exists to allow such questions to be formulated.
e) A clarification of how the appropriation of lived experience is influenced by the philosophical, sociological and psychological foundations of the chiropractic curriculum, based on the assumption that a significant body of knowledge exists on the foundations of the chiropractic curriculum.

f) A clarification of the paradigms which influence decision-making about a chiropractic curriculum which promotes the appropriation of lived experience, based on the assumption that such paradigms can be identified and explicated.

g) A clarification and formulation of design strategies for a chiropractic curriculum which promotes the appropriation of lived experience, based on the assumption that such strategies can be identified and explicated.

h) A clarification of the contextual framework of a chiropractic curriculum which promotes the appropriation of lived experience, based on the assumption that relationships can be shown to exist among the foundations and intra- and extra-institutional factors which influence the chiropractic curriculum.

i) Identification and analysis of the intent of a chiropractic curriculum, which leads to the appropriation of lived experience, based on the assumption that the intent of a chiropractic curriculum, which leads to the appropriation of lived experience, can be identified and analysed.

j) Identification and analysis of the content of a chiropractic curriculum which supports the appropriation of lived experience, based on the assumption that its scope and sequence can be identified, analysed and architectonically arranged to show relevant structural and functional relationships.

k) A clarification of the design and organisation of learning experiences in a chiropractic curriculum based on the assumption that the experiences that lead to the appropriation of lived experience through a chiropractic curriculum can be clarified, designed and organised.

l) Identification and analysis of methods to assess how learners have appropriated lived experience through a chiropractic curriculum, based on the assumption that methods to assess the appropriation of lived experience through student performance in the chiropractic curriculum can be identified and analysed.
m) Identification and analysis of methods to promote the appropriation of lived experience through a positive learning climate in the chiropractic curriculum based on the assumption that factors which influence learning climate can be identified and influenced in a positive manner.

n) A clarification of the total quality management, self-evaluation and accreditation of a chiropractic program which leads to the appropriation of lived experience, based on the assumption that methods of total quality management, self-evaluation and accreditation of a chiropractic program can be identified, analysed and integrated.

o) A clarification of how the management of change in a chiropractic curriculum influences the appropriation of lived experience by learners, based on the assumption that the factors and processes which influence change in relation to the appropriation of lived experience in a chiropractic curriculum can be identified, analysed and integrated.
This study considers basic concepts relating to curriculum design and research; progressively analyses the design of each of the curriculum elements; presents a profile of chiropractic education; discusses a curriculum model suitable to chiropractic and takes a holistic approach to ensure an integrated overall design. The sequence of the dissertation is as follows:

**The Introduction** in Chapter 1 identifies a fundamental philosophical approach to this research and provides details of the research problem and its setting, the research question and sub-questions, the definition of terms, delimitations, methods, aims and objectives and an outline of the dissertation;

**Chapter 2** clarifies the curriculum process by considering the role of the curriculum developers, definitions and models of the curriculum, a definition of the chiropractic curriculum, a curriculum design algorithm, taxonomy and major curriculum design questions. Subsequent chapters and sections utilise the algorithm and taxonomy as a basis for descriptive analysis of the relevant literature and pose a wide range of detailed curriculum design questions;

**Chapter 3** clarifies the organisation of the chiropractic curriculum by considering the philosophical, sociological, cultural and psychological foundations and investigates relevant paradigms.

**Chapter 4** identifies and analyses curriculum design strategies and the context of the chiropractic curriculum; it considers chiropractic curriculum intent in terms of mission statements, aims, goals, objectives and competencies; clarifies the architectonics and nature of the content; outlines teaching-learning strategies used to organise learning experiences; and clarifies competency-based student assessment in an experiential, integrative chiropractic curriculum;

**Chapter 5** identifies and analyses methods used to create a positive learning climate and maintain a quality assurance program including, ongoing self-evaluation and course accreditation; and to establish processes and procedures for the management of change.
Chapter 6 considers the implications of the study by providing a summary; analysing the findings of the investigation; reviewing the recommendations and clarifying the implications of the recommendations for both the education and training of chiropractors and for chiropractic practice; making suggestions for future research and by concluding with a synthesis of the investigation.
CHAPTER 2

A CLARIFICATION OF THE CURRICULUM PROCESS

The curriculum process has as its focus the conceptual framework of a curriculum and consists of the appointment of a curriculum team, and of making decisions about a definition, design model, algorithm and taxonomy for the curriculum to be developed.

PRÉCIS 2: Chapter 2 concerns the selection and role of curriculum developers; and the establishment of a conceptual curriculum design framework based on definitions of curriculum, clarification of major curriculum models, a curriculum design algorithm and taxonomy and on the identification of research questions related to the taxonomy.

OUTLINE:

Chapter 2 considers:

2.1 The selection and role of curriculum developers

2.2 A definition of the chiropractic curriculum

2.3 Towards an algorithm for the design and vivification of a chiropractic curriculum

2.4 Towards a chiropractic curriculum model

2.5 A taxonomy for curriculum design
2.1 THE SELECTION AND ROLE OF CURRICULUM DEVELOPERS

2.1.1 Introduction
Curriculum developers serve the function of translating assumptions, ideas, values, knowledge and attitudes into curriculum objectives, content, learning activities and evaluation; they transmit and reflect the culture of which they are part and the starting point for any curriculum development or review project is the selection of curriculum developers (Print, 1992:58-9). They must include the persons who will implement the developed or reviewed curriculum since those responsible for implementation have 'ownership' of the curriculum, and a high degree of such involvement helps to ensure success (Print, 1992:51). However, neither the thinking of curriculum developers nor the curriculum development of which they are an integral part exists in a vacuum but both draw on a common pool of information which provides a database that becomes the foundation upon which curriculum conceptualisation is built by the curriculum developers (Print, 1992:51); excellent examples are given by Abrahamson (1978:951). Also, curriculum developers are influenced in their consideration of curricula by the three sources of curriculum foundations i.e.: philosophy, sociology and culture and psychology which produced their conceptions of the curriculum i.e.: the conceptions and foundation sources which helped create the developers' past experiences influence the nature of the final curriculum product (Print, 1992:51,52). In any event, the pattern of staff involvement in curriculum planning should be considered, e.g. involvement of individual members of staff, a working group or a large committee (Harden 1986c:2).

2.1.2 The Selection of Curriculum Developers
Because of their significant effect on curriculum outcomes, the selection of developers should be very carefully made, particularly if the group represents a small proportion of staff. Those responsible for the selection of curriculum developers should reflect on the individuals involved in curriculum development or review tasks and what, if anything, they represent; what conception of curriculum they bring with them and how this will influence the curriculum outcome; and what underlying forces have influenced their way of thinking about curriculum matters (Print, 1992:49). Indirectly, society and culture influence curriculum developers simply because they are members of a particular society (Print, 1992:59).
Leadership qualities found to be the most important to successful implementation of innovative track curriculum designs in medicine include the ability to influence others (charisma); be both credible and convincing to a broad institutional audience; be an advocate who believes strongly in the innovation; be a risk-taker with considerable self-assurance; and be flexible and able to compromise (Kantrowitz, 1987:25).

2.1.3 Approaches to Constituting Curriculum Task-Forces

Curriculum developers are organised into task-forces or committees, which can be constituted in various ways. Excellent examples are provided by Harden (1986:6), Karni et al (1998:70) and Kantrowitz (1987:25). Harden identifies five appropriately named approaches which have been summarised in Table 3.
<table>
<thead>
<tr>
<th>APPROACH/CHARACTERISTICS</th>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. United Nations Approach</td>
<td>1. Different interests are represented in decision-making.</td>
<td>1. A large group may be less effective in decision-making.</td>
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<tr>
<td></td>
<td>2. Implementation of a new curriculum is facilitated if representatives are people of power, e.g. Heads of Department.</td>
<td>2. Persons may be present to protect sectoral interests rather than because of expertise in curriculum planning.</td>
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<tr>
<td></td>
<td>3. There is a wide knowledge of what is developed.</td>
<td>3. Small sectoral groups may be excluded.</td>
</tr>
<tr>
<td>2. The People's Congress Approach</td>
<td>1. No aspects are ignored or neglected.</td>
<td>1. One or two individuals may dominate discussions and others may opt out of discussions.</td>
</tr>
<tr>
<td></td>
<td>2. Wide ownership facilitates implementation of curriculum change.</td>
<td>2. The group may be too large to reach real decisions and produce plans.</td>
</tr>
<tr>
<td></td>
<td>3. It is more democratic than other approaches and surveys a broad sample of opinion.</td>
<td>3. The group may be inefficient and costly.</td>
</tr>
<tr>
<td></td>
<td>4. Powerful personalities are overruled.</td>
<td>4. It may be difficult to continue the focus on major issues.</td>
</tr>
<tr>
<td>3. The Dictator's Approach</td>
<td>1. Strong leadership and a clear goal of progress required.</td>
<td>1. A great deal depends on one person's perception of curriculum needs and on that person's relationship with staff.</td>
</tr>
<tr>
<td></td>
<td>2. Effectiveness and efficiency in bringing about curriculum change.</td>
<td>2. Lack of staff ownership may make implementation of change difficult.</td>
</tr>
</tbody>
</table>

A group representing a wide variety of interests and constituencies, e.g., Head of Department or Faculty Board. A smaller executive group could be created.

All who are involved in any way with curriculum decision-making or teaching are involved. It provides the widest approach.

One person, e.g., Dean or Head of a School, has a very clear idea of curriculum changes desired and how to bring them about. One or two advisors may associate themselves with the change. Views of other staff may or may not be heeded.
## APPROACH/CHARACTERISTICS

<table>
<thead>
<tr>
<th>4. Consumer Approach</th>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
</tr>
</thead>
</table>
| Inclusion of students, patients and other members of the health care team on the curriculum development team. | 1. Students have been active and influential in bringing about curriculum change.  
2. Representation from patient and public groups can make a valuable contribution.  
3. Other members of the health care team provide insight to underlying problems with the curriculum.  
4. They have the greatest awareness of the hidden curriculum which influence the ambience of the learning situation.  
5. Some students are well informed and reflect unusual maturity. | 1. Student time spent on curriculum planning competes with their studies.  
2. Student involvement is temporary in nature and their focus is narrow.  
3. Patient/public comments will probably be confined to aspects of communication and interaction only. |

## CONSULTANT APPROACH

<table>
<thead>
<tr>
<th>5. Consultant Approach</th>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
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</thead>
</table>
| The consultant as outside resource assists by providing proposals or documents or by commenting on them. | 1. Provision of expert advice is based on experience with special/alternative techniques, e.g. problem-based learning, electives, etc.  
2. An objective, unbiased view of the curriculum is offered.  
3. Curriculum development can be given high priority and unbiased attention. | 1. Ownership of the curriculum by staff will need to be promoted to facilitate change. |

Approaches 1-5 have been constructed in Table format as an adaptation of material from Harden R.M. 1986C. ASME Medical Education Booklet No. 21. Approaches to curriculum planning. Medical Education, 20, 458.
An additional approach, the stakeholder task force has been found to be useful for chiropractic curriculum development in a University setting. The use of similar curriculum task groups in nursing is discussed by Bevis (1989:67). The design, function, advantages and disadvantages of a stakeholder task force appear in Table 4 where it is compared to the other approaches covered in Table 3.

**TABLE 4 - The design and function of stakeholder task-forces in curriculum development**

<table>
<thead>
<tr>
<th>STRUCTURE</th>
<th>A peak Curriculum Task Force (CTF) receives prepared documents from a range of other task-specific task forces.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Curriculum Task Force</td>
<td>In the context of a single purpose institution, the peak CTF could be an institutional self-evaluation committee, curriculum review committee, etc.</td>
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<td></td>
<td>In university context the peak CTF can be a Course Advisory Committee or expert committee with representation from the profession, experts from allied professions drawn from academic, clinical and/or research fields, staff and student representatives.</td>
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<tr>
<td>Ad Hoc Task Force</td>
<td>Ad hoc task forces are established to bring together relevant stakeholders who consider the elements for which they are responsible in the context of the overall curriculum, and provide input to the peak curriculum taskforce.</td>
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<tr>
<td></td>
<td>A small, efficient, coordinating taskforce which includes the major stakeholders i.e. students, coordinating or senior academic staff, can be organised to coordinate the overall curriculum review/monitoring program.</td>
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<td></td>
<td>Small or large ad hoc task-forces are established to address specific issues relating to the curriculum as required. Their comments are widely distributed for input, which is then considered by the peak CTF.</td>
</tr>
<tr>
<td>ADVANTAGES</td>
<td>This model has the advantage of the United Nations and People's Congress Approach i.e. there is wide knowledge of what is developed, a wide sense of ownership is developed and various interests are represented.</td>
</tr>
<tr>
<td>Wide input and awareness</td>
<td>All stakeholders ultimately have ownership, understanding of and ongoing involvement in all facets of the curriculum process in an economical, efficient and effective way.</td>
</tr>
<tr>
<td>Power of facilitation</td>
<td>Senior academics have the power to facilitate implementation of the curriculum.</td>
</tr>
<tr>
<td>Inclusion of research and consultative methods</td>
<td>This approach lends itself well to a thorough, yet realistic approach to curriculum development, monitoring and review which utilise a range of research and consultative methods including: action research workshops (a few small groups all address the same question and bring their views back to a large group for correlation and consensus); consensus methods (e.g. functional analysis workshops, nominal group technique, DACUM etc); student, staff and other surveys and data collection methods which form part of a situational analysis.</td>
</tr>
</tbody>
</table>
Systematised approach

All stakeholders and participants maintain an up-to-date file on all aspects of the curriculum to facilitate monitoring. A system can be established to facilitate coordination and implementation of the process including timelines, information flow and collation of responses. The process results in a heightened awareness of all facets of the curriculum by all stakeholders.

Inclusion of advantages of other models

It has the benefits of the dictator's approach via the project leader. It also lends itself well to inclusion of the beneficial aspects of the consultant's approach. The advantageous aspects of the consumer approach are readily included via quality assurance reports arising from student, patient and other client feedback.

Exclusion of disadvantages of other models

While it has the advantages of very broad input as in case of the United Nations and People's Congress Approach, the disadvantages of these approaches are excluded, e.g. difficulty of decision making by one very large assembled group, protection of sectoral interest, nomination of discussions by a few individuals, costs and inefficiencies of decision making by large meetings which attempt to cover the entire curriculum spectrum.

DISADVANTAGES

Key persons such as heads of departments or coordinators are involved both on a peak CTF and as leaders of the other CTF's. This may be time-consuming but is not seen as a major drawback; the project leader has a range of groups to coordinate; and while decision-making becomes an efficient process by a peak CTF, the consultative process through a range of CTF's and use of data collection systems is fairly complex - however, it has the advantage of thoroughness, ownership and wide input.

2.2 A DEFINITION OF THE CHIROPRACTIC CURRICULUM

2.2.1 Introduction
Curriculum (L. currere-run) is derived from the word racecourse. In simplistic terms it refers to a course of study at a School or University, the subjects making up such a course (Brown, 1993:574). While curriculum has historically been considered by many writers including Plato, Aristotle, Comenius and others, the term has become popular only during this century, but a search for the ideal or absolute definition of the term is not a very productive enterprise (Zais, 1976:13; Print, 1992:3). *Curriculum* is differentiated from *syllabus*, which is typically a list of content areas which are to be assessed. As such, syllabus is subsumed as a subsection within the broader concept of curriculum (Print, 1992:3).

2.2.2 Analysis of Definitions
An analysis of the more well known definitions in Table 5 indicates that all forms of curricula incorporate the following:

a) Written documentation on a formal course or program of study;
b) Planning related to the desired outcomes of student learning expressed as one or more of goals, objectives, planned events, content, experiences or course design;
c) Strategies to facilitate learning such as student guidance, curriculum implementation and mastery learning.
### TABLE 5 - Analysis of curriculum definitions

<table>
<thead>
<tr>
<th>AUTHOR/FOCUS</th>
<th>DEFINITION OF CURRICULUM</th>
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</thead>
<tbody>
<tr>
<td>Bevis (1989)</td>
<td>The totality of learning activities that is designed to achieve specific educational goals.</td>
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<tr>
<td>Content and goals</td>
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<tr>
<td>Eisner (1979)</td>
<td>A series of planned events that are intended to have educational consequences for one or more students.</td>
</tr>
<tr>
<td>Planned events and outcomes</td>
<td></td>
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<tr>
<td>Operations &amp; goals</td>
<td></td>
</tr>
<tr>
<td>Gagné (1985)</td>
<td>A series of content units arranged in such a way that learning of each unit may be accomplished as a single act, provided the capabilities described by specific prior units (in sequence) have already been mastered by the learner.</td>
</tr>
<tr>
<td>Content, sequencing, mastery learning</td>
<td></td>
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<tr>
<td>Hirst (1968)</td>
<td>A program of activities designed so that pupils will attain by learning certain specifiable ends or objectives.</td>
</tr>
<tr>
<td>Outcomes and objectives</td>
<td></td>
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<tr>
<td>Print (1992)</td>
<td>It consists of planned learning experiences, offered within an educational institution/program, represented as a document, and includes experiences resulting from implementing that document.</td>
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<tr>
<td>Documentation, planned experiences,</td>
<td></td>
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<tr>
<td>implementation</td>
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<tr>
<td>Stenhouse (1975)</td>
<td>An attempt to communicate the essential principles and features of an educational proposal in such a form that it is open to critical scrutiny and capable of effective translation into practice.</td>
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<tr>
<td>Documentation, implementation,</td>
<td></td>
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<tr>
<td>evaluation</td>
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<tr>
<td>Tanner &amp; Tanner (1980)</td>
<td>The planned and guided learning experiences and intended learning outcomes, formulated through the systematic reconstruction of knowledge and experience, under the auspices of the school, or the learner's continuous and willful growth and personal social competence.</td>
</tr>
<tr>
<td>Planning, outcomes, growth</td>
<td></td>
</tr>
<tr>
<td>Tyler (1949)</td>
<td>All of the learning of students which is planned by and directed by the school to attain its educational goals.</td>
</tr>
<tr>
<td>Planning, learning</td>
<td></td>
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<tr>
<td>Skilbeck (1984)</td>
<td>The learning experiences of students, in so far as they are expressed or anticipated in goals and objectives, plans and designs for learning and the implementation of these plans and designs in school environments.</td>
</tr>
<tr>
<td>Goals, objectives, learning experiences, design, implementation</td>
<td></td>
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<tr>
<td>Wheeler (1974)</td>
<td>The planned experiences offered to the learner under the guidance of the school.</td>
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<tr>
<td>Planning, guidance</td>
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</tbody>
</table>
2.2.3 Definition of the Chiropractic Curriculum

The following definition is proposed for the chiropractic curriculum:

The chiropractic curriculum is the documented detail of the curriculum process which provides its conceptual framework; the curriculum organisation which provides its foundations and paradigms; the curriculum development which is based on design strategies and proceeds cyclically through determination of the context, intent, content, learning experiences and student assessment; and the curriculum application including creation of a learning climate, establishment of a quality management program, management of change, self-evaluation and external evaluation of the curriculum which is designed to produce a well-rounded chiropractic practitioner with a broad liberal and professional education and training which is demonstrated, through competency-based assessment, to meet societal, professional and personal needs.
2.3 TOWARDS AN ALGORITHM FOR THE DESIGN AND VIVIFICATION OF A CHIROPRACTIC CURRICULUM

2.3.1 Introduction

The process of curriculum design or re-design is facilitated by devising an algorithm which provides step-by-step approaches to the design of subject and course patterns; organising strategies and course configuration patterns and strategies for teaching-learning and for measuring, evaluating and managing outcomes and change. Excellent recent advances in designing and redesigning a medical curriculum is presented by Karni et al (1998:75). Each of the most frequently used models of the curriculum process offers such an algorithm for solving a problem or accomplishing some end for curriculum design and traditionally follow the steps in Table 6.
<table>
<thead>
<tr>
<th>TABLE 6 - Traditional algorithms for curriculum design</th>
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<td><strong>Step 1 - Diagnosis of needs</strong></td>
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<td>1. Objectives (what educational purpose should the institution seek to attain?)</td>
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<tr>
<td>1. Diagnosis of needs</td>
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<td>1. Situation analysis</td>
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<td>1. Situational analysis</td>
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<td><strong>Step 2 - Formulation of curriculum intent: mission, aims, goals, objectives</strong></td>
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<td>2. Formulation of objectives</td>
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<td>1. Aims, goals and objectives</td>
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<td>2. Goal formulation</td>
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<td>2. Selection of objectives</td>
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<td>2. Aims, goals and objectives</td>
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<td><strong>Step 3 - Program building: selection of content and learning experiences</strong></td>
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<td>2. Selection of learning experiences</td>
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<td>3. Selection of content</td>
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<td>3. Selection and organisation of content</td>
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<td><strong>Step 4 - Implementation through organisation and integration</strong></td>
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<td>5. Selection of learning experiences</td>
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<td>6. Organisation of learning experiences</td>
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<td>4. Organisation and integration of learning experiences and content</td>
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<td>4. Interpretation and implementation</td>
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<td>4. Selection and organisation of methods</td>
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<td>(Implementation and modification)</td>
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<td>4. Learning activities</td>
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<td><strong>Step 5 - Evaluation</strong></td>
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<td>4. Evaluation</td>
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<td>7. Determination of what to evaluate and means of doing it</td>
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<td>5. Evaluation</td>
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<td>5. Monitoring, feedback, assessment, reconstruction</td>
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<td>5. Evaluation</td>
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<td>5. Evaluation procedures</td>
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</table>
2.3.2 Curriculum Vivification

Curriculum vivification, a term introduced by Bevis (1989:178-205), means to bring to life. She relates vivification to the holistic paradigm and the concept of holism introduced by Smuts. She states that: "life is the inner reality or substance of process..." Curriculum vivification is the creative element of the process of curriculum building. It is the creation of one holistic new curriculum from the many parts; it is the transition of the substance of the framework into functional forms (Bevis 1989:178). Curriculum vivification means to bring to life the individual courses (subjects) of the curriculum, i.e. to take the "many" elements of curriculum and combine them into one living, growing, changing group of learning activities which are relevant to the health needs of society and appropriate to the students ... The beginning of a dynamic curriculum - a growing, changing, becoming curriculum that is always assimilating new elements, utilising feedback, adapting and innovating (Bevis 1989:178-205).

2.3.3 An Algorithm for Chiropractic Curriculum Design and Vivification

Based on a descriptive analysis of the literature and the design and re-design of an algorithm over a period of three years, the model in Table 7 is suggested as an approach to use for the chiropractic curriculum. It consists of four phases: establishment of a conceptual framework, organisation, development and application of the curriculum, each of which, coincidentally, has five major steps as indicated in Table 7.

TABLE 7 - Proposed algorithm for the design and vivification of a chiropractic curriculum

**Establishment of a Conceptual Framework**

1. Appoint a chiropractic curriculum team.
2. Adopt or develop a definition of the chiropractic curriculum.
3. Adopt or develop a functional design model relevant to the chiropractic curriculum.
4. Adopt or develop an algorithm for the design of the chiropractic curriculum.
5. Adopt or develop a taxonomy for the design of a chiropractic curriculum.
6. Pose research questions to provide detailed guidance to implementation of a curriculum design taxonomy.
Curriculum Organisation (Presage)

7. Determine the impact of philosophy as foundation on the development of a chiropractic curriculum.
8. Determine the impact of the sociological and cultural foundation on the development and implementation of a chiropractic curriculum.
9. Determine how the psychological foundations influence the presage, development and implementation of a chiropractic curriculum.
10. Identify and select curriculum paradigms to represent the views of the program stakeholders (e.g. humanistic paradigms).

Curriculum Development

11. Identify and select curriculum design strategies for a chiropractic curriculum.
12. Determine the context and needs of a chiropractic curriculum.
13. Determine the intent of a chiropractic curriculum.
14. Select and organise the chiropractic curriculum content.
15. Design and organise chiropractic-relevant learning experiences.

Curriculum Application

17. Create a positive learning climate conducive to the education and training of chiropractors.
18. Establish and maintain a quality assurance program to ensure that societal expectations for chiropractic education and training are met.
20. Submit the chiropractic program to internal and external accreditation.
21. Establish policies and procedures for the management of curriculum change in light of new developments in chiropractic, higher education and society at large.

Constructed by the author - 1996.
2.4 TOWARDS A CHIROPRACTIC CURRICULUM MODEL

2.4.1 Introduction

A curriculum model is a miniature representation that summarises data, aids comprehension and is often depicted in a diagram (Zais, 1976:91). It is used to reduce complex curricular phenomena to simpler constructs. Models frequently used in curriculum planning are conceptual, verbal or diagrammatic; and their purpose is to effectively and economically summarise a mass of data and complex phenomena and to provide a structure for examination of the interrelationship of variables which constitute the reality of curriculum (Print, 1992:19, van Dalen, 1973:53). Table 8 provides an analysis of curriculum models including names of the developers, characteristics, strengths and weaknesses. These curriculum models form a continuum (Figure 1) - at one end are the rigid, sequential, prescriptive approaches of the rational or objectives models (Figures 2,3). This is followed by a more flexible approach offered via the cyclical models in the middle (Figures 4,5). At the other end of the continuum, the flexible, modifiable and dynamic process or interactive models offer a descriptive approach (Figures 6,7,8). Current models tend to be cyclical in nature. Consequently, any alteration to any step in the model impacts to some degree on all other steps. The eclectic or integrative model, (Figure 9), draws from the other three and adds additional dimensions which relate to presage and evaluation. Print (1992:39) suggests that models of curriculum development may be related to each other in two dimensions - the degree of prescription or description involved and the rational or dynamic emphasis given to the respective models. He sees prescriptive models as requiring a rigid set of activities to be followed and descriptive models (which are low in prescription e.g. the interactive process model), as more flexible, emphasising what *does* happen rather than what *should* happen during curriculum developments. He suggests that models low in rationality (i.e. high in interaction or process) tend to result in a non-sequential, randomised approach (Print, 1992:40). Bevis (1989:8), on the other hand, sees process as inclusive of internal organisation. She describes curriculum building as a *process* with three characteristics: (1) inherent purpose; (2) internal organisation; and (3) infinite creativity. She defines process as "the core phenomenon of all human knowledge and activities" and as "any phenomenon that shows a continuous change in time towards some objective". Process education, therefore, has a practical, systematic reality...
focus which offers a curriculum which is devised to teach 'how to' formulae which can be examined, tested, evaluated and reformulated (Bevis, 1989:11).

In Figure 10 a functional and integrative model of curriculum design is proposed. It is strongly influenced by Print's model (Figure 9), but extends beyond the phases identified by Print. It is an attempt at capturing all the major phases of the curriculum design process commencing in Phase 1 with the appointment of a curriculum development team and defining a conceptual framework within which to work i.e. to organise, develop and apply the curriculum. The organisation of the curriculum in Phase 2 relates to an investigation of the foundations, paradigms and design strategies appropriate to the discipline (e.g. chiropractic) for which the curriculum is to be designed and is much, much broader than the clarification of the context of a specific curriculum (e.g. that of the RMIT University which is considered in the case study in this dissertation). Phases 1 and 2 together comprise the curriculum presage which according to Print (1992:48) 'refers to those activities and forces that influence curriculum developers in their curriculum decision-making tasks'. Presage is presented here in a much broader context where the curriculum team is required to conduct an in-depth investigation of the five elements in each of Phases 1 and 2, and to reach decisions based on evidence from the literature.

The presage therefore presents the infrastructure that strongly influences Phase 3, the curriculum development phase, which proceeds cyclically through a number of elements. If any one of these elements is changed, it necessitates change to the other elements as well. This phase represents the graphic depiction used traditionally to represent the cyclical curriculum model. Phase 4 concerns the application of the chiropractic curriculum and is strongly influenced by the other three phases, which are in turn influenced by the consequences of this application.
Table 8 - Analysis of the continuum of curriculum models

<table>
<thead>
<tr>
<th>Rational/objectives Models</th>
<th>Cyclical Models</th>
<th>Dynamic/interactive Models</th>
<th>Eclectic Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEVELOPERS OF CURRICULUM MODELS</td>
<td></td>
<td></td>
<td>Murray Print (1992)</td>
</tr>
</tbody>
</table>

| CHARACTERISTICS OF THE MODELS | | | |
| It is analytical and prescriptive. It incorporates elements of other models. They are an extension of the rational models, are logical and sequential in approach. They see the curriculum process as a continuing activity, constantly in a state of change as new information becomes available. A degree of interaction between the curriculum elements takes place. | The curriculum process does not form a lineal pattern, but can commence with any curriculum element and proceed in any order. The needs of learners are paramount. It is a descriptive approach rather than analytical and prescriptive as the other models. | It incorporates presage procedures in the organisational phase; a cyclical approach similar to the Nicholls' model in the development phase; and implementation and monitoring of the curriculum in the application phase. |

<p>| STRENGTHS OF THE CURRICULUM MODELS | | | |
| Offers a useful planning base because it has a logical, sequential structure. Emphasises the role and value of objectives and forces conceptualisation, rational thinking and development of clear guidelines. It is student (outcomes) - centred rather than teacher-centred. | They incorporate the advantages of the rational model and overcome many of their disadvantages. Requires conceptualisation of the task (aims, goals, objectives prior to proceeding). Enhances rational thinking. The various elements are in continuous motion, able to cope with new situations and react to change with subsequent changes to other curriculum elements. | Developers are free to be more creative by avoiding the obsession of writing behavioural objectives. They represent realistic ways of handling curriculum development. | Presage requires attention to curriculum foundations, conceptions and design forces and models prior to determination of the elements in a cyclical model. Feedback from implementation and monitoring of the curriculum in the application phase influence both the organisational aspects and cyclical development phase of the curriculum. It has excellent built-in evaluation and monitoring mechanisms. |</p>
<table>
<thead>
<tr>
<th>Rational/objectives Models</th>
<th>Cyclical Models</th>
<th>Dynamic/interactive Models</th>
<th>Eclectic Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>While specific objectives are prescribed, learning occurs beyond these objectives due to unforeseen factors. Teachers often do not follow a logical, sequential approach and commence with content they prefer to know. Time required for writing objectives cause their avoidance by developers. Developers do not adequately qualify the sources of their objectives.</td>
<td>Once the stimulus for revision has been initiated within one of the curricular elements, it needs to run its course as it impacts on subsequent elements. The amount of time required for a situational analysis. These are ‘facts of life’ rather than weaknesses per se.</td>
<td>By posing few or no objectives, they provide little guidance to developers; the deliberative phase is very time-consuming and it facilitates confusion rather than clarity.</td>
<td>A stimulus for change in any phase of the model has extensive, time-consuming implications.</td>
</tr>
</tbody>
</table>
Figure 1 - The Continuum of Curriculum Models

<table>
<thead>
<tr>
<th>Rational/objectives models</th>
<th>Cyclical models</th>
<th>Dynamic/interaction models</th>
<th>Eclectic models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tyler</td>
<td>Wheeler</td>
<td>Walker</td>
<td>Print</td>
</tr>
<tr>
<td>Taba</td>
<td>Nicholls</td>
<td>Skilbeck</td>
<td></td>
</tr>
</tbody>
</table>

After Print (1992:21)

Figure 2 - Tyler's Rational or Objectives Model of Curriculum Design

<table>
<thead>
<tr>
<th>Objectives</th>
<th>What educational purposes should the curriculum seek to attain?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selecting learning experiences</td>
<td>What educational experiences can be provided that are likely to attain these purposes?</td>
</tr>
<tr>
<td>Organising learning experiences</td>
<td>How can these educational experiences be effectively organised?</td>
</tr>
<tr>
<td>Evaluation</td>
<td>How can we determine whether these purposes are being attained?</td>
</tr>
</tbody>
</table>

After Print (1992:22,24) and Tyler (1949).

Figure 3 - The Taba Model of the Curriculum Process

Step 1: Diagnosis of needs
Step 2: Formulation of objectives
Step 3: Selection of content
Step 4: Organisation of content
Step 5: Selection of learning experiences
Step 6: Organisation of learning experiences
Step 7: Determination of what to evaluate and ways and means of doing it

FIGURE 4 - The Wheeler cyclical model of the curriculum process

1. Aims, goals and objectives

2. Selection of learning experiences

3. Selection of content

4. Organisation and integration of learning experiences and content

5. Evaluation

(Based on Wheeler 1974; depicted by Print 1992:29).

FIGURE 5 - The Nicholls' cyclical model of the curriculum process

Situation analysis

Selection of objectives

Evaluation

Selection and organisation of content

Selection and organisation of methods

(Based on Nicholls and Nicholls 1978, depicted by Print 1992:30).
FIGURE 6 - Bevis' interactive/dynamic approach to the curriculum process

Figure 6(a) Bevis' concept of the three basic components of all true processes
(From Bevis 1989:14)

Figure 6(b) Bevis' concept of content in a process curriculum
(From Bevis 1989:15)

Figure 6(c) Bevis' concept of a curriculum building setting
(From Bevis 1989:16)
FIGURE 7 - The Walker interactive model of the curriculum process

(From Walker 1971, depicted by Print 1992:33).

FIGURE 8 - The Skilbeck interactive model of the curriculum process

(From Skilbeck 1976, depicted by Print 1992:35)
FIGURE 9 - Print’s eclectic (or integrative) model of curriculum design

(From Print 1992:42).

FIGURE 10 - Phases of a functional and integrative model of curriculum design

(Constructed by the Author, inspired by Print 1992, Zais 1976).
2.5 A TAXONOMY FOR CURRICULUM DESIGN

2.5.1 Introduction

'The object of conscientiously studying a given process, identifying its subjective purpose, and trying to discover the order and sequence of its inherent organisation and the manifestation of its creativity is to make it more fully applicable to its appropriate task and more easily and successfully taught to another person' (Bevis, 1989:10). A curriculum design taxonomy provides such inherent organisation and refers to a classification system, which provides a theoretical framework for curriculum process, planning and design. Taxonomy refers to the orderly classification into categories (Brown 1993:3230) (Gr. taxis=drawings up in rank and file; Gr. nomos=law; L. taxinomia). It potentially consists of domains, categories, classes and sub-classes. A domain indicates the field, sphere or scope of a thing or concept. A category is one of a possibly exhaustive set of classes among which things might be distributed. Categories are provided for each of the domains. A class is a grouping to which items are assigned during a classification process, i.e. classification simply means to arrange in classes. It is argued, therefore, that a taxonomy for curriculum design is a theoretical framework, characterised by a classification system which identifies the factors important to the development of a curriculum process. This includes curriculum organisation involving a conceptual framework relating to its development, context, intent and content; learning ambience, teaching-learning strategies and assessment; and to the evaluation, monitoring, change management and quality control of the curriculum. A brief, recent paper by Yudkowsky and Tekian (1998:258) mentions a few of the major points that were included in this work over a period of years.

2.5.2 The Purpose of a Curriculum Design Taxonomy

'Much trouble later can be avoided if serious thought is given to the approach to curriculum planning to be adopted by a program not only in terms of the questions to be asked, but also in terms of how these questions should be addressed and who should be involved in the process' (Harden, 1986C:9). The purposes and advantages of using a taxonomy for curriculum design are identified in Table 9.
TABLE 9 - Purposes and advantages of using a taxonomy for curriculum design

1. It provides for the classification of data under domains and categories of factors which determine decision-making in curriculum development, monitoring and review.

2. It provides an expandable framework to guide curriculum developers.

3. It provides a framework for a reproducible curriculum design/review process.

4. It is ideally suited for use with consensus research methods.

5. It takes minimal effort to comprehend by the consumers: curriculum developers, researchers and academics.

6. It provides a scientific framework for the determination of standards in curriculum design.

7. It provides a basis for the validation of curriculum designs.

8. It provides a basis for the standardisation of curriculum development practice by identifying the most relevant factors to be addressed given any set of situational analysis variables.

9. It increases the extent and frequency of successful achievement of the objectives of the curriculum process.

*Constructed by the author, 1993.*

2.5.3 Structure of a Curriculum Design Taxonomy

A taxonomy based on a descriptive analysis of the literature appears in Table 10.

TABLE 10 - A taxonomy for curriculum design

**DOMAIN 1 - CURRICULUM PROCESS**

1.1 Conceptual Framework of the Curriculum Process

1.1.1 Curriculum Team

1.1.1.1 Attributes
1.1.1.2 Representation
1.1.1.3 Selection criteria
1.1.1.3 Consensus approaches

1.1.2 Definition

1.1.2.1 Elements
1.1.2.2 Outcomes

1.1.3 Design Models

1.1.3.1 Rational
1.1.3.2 Cyclical
1.1.3.3 Dynamic (Process)
1.1.3.4 Eclectic
1.1.3.5 Functional-integrative
DOMAIN 2 - CURRICULUM ORGANISATION

2.1 Philosophical Foundations

2.1.1 Ontology
   2.1.1.1 Philosophy of science
   2.1.1.2 Philosophy of biology
   2.1.1.3 Philosophy of other disciplines

2.1.2 Epistemology
   2.1.2.1 Principles

2.1.3 Logic
   2.1.3.1 Logic and science
   2.1.3.2 Logic and experience

2.1.4 Axiology
   2.1.4.1 Ethics
   2.1.4.2 Aesthetics

2.1.5 Research paradigms
   2.1.5.1 Reductionism
   2.1.5.2 Holism

2.1.6 Humanism
   2.1.6.1 Humanism as learning
   2.1.6.2 Teaching of humanism

2.2 Sociological and Cultural Foundations

2.2.1 Control
   2.2.1.1 Control groups
   2.2.1.2 Methods of control
   2.2.1.3 Influence of ideologies

2.2.2 Resource allocation
   2.2.2.1 Decision making
   2.2.2.2 Influence of resource allocation

2.2.3 Structural setting
   2.2.3.1 Influence of society
   2.2.3.2 Influence of professions
   2.2.3.3 Influence of higher education system
   2.2.3.4 Influence of practice milieu

2.2.4 Ideological and cultural setting
   2.2.4.1 Ideology of the discipline
   2.2.4.2 Cultural requirements

2.2.5 Curricular dimensions of the sociological and cultural foundations
   2.2.5.1 Social role of graduates
   2.2.5.2 Curriculum needs
2.3 Psychological Foundations

2.3.1 Philosophical foundations
   2.3.1.1 Philosophy and science

2.3.2 Sociological & cultural foundations
   2.3.2.1 Cultural presuppositions
   2.3.2.2 Cultural influences on individuals

2.3.3 Curriculum context
   2.3.3.1 Influences on external decision-makers
   2.3.3.2 Influences on internal decision-makers
   2.3.3.3 Influences on curriculum developers

2.3.4 Curriculum intent
   2.3.4.1 Student intent
   2.3.4.2 Competencies
   2.3.4.3 Motivation and intent

2.3.5 Curriculum content
   2.3.5.1 Sequencing
   2.3.5.2 Scope
   2.3.5.3 Integration and transfer

2.3.6 Teaching-learning strategies
   2.3.6.1 Autonomous learning
   2.3.6.2 Involvement and transfer
   2.3.6.3 Feedback
   2.3.6.4 Motivation
   2.3.6.5 Meaningful learning

2.3.7 Learning ambience
   2.3.7.1 Motivation
   2.3.7.2 Student characteristics
   2.3.7.3 Staff characteristics

2.3.8 Student assessment
   2.3.8.1 Bias control
   2.3.8.2 Feedback
   2.3.8.3 Success experience

2.3.9 Program evaluation
   2.3.9.1 Assessor objectivity
   2.3.9.2 Communication

2.3.10 Curriculum management
   2.3.10.1 Change ownership
   2.3.10.2 Action research
2.4 Curriculum Paradigms

2.4.1 Academic rationalist
- 2.4.1.1 Knowledge-based content
- 2.4.1.2 Skills-based content
- 2.4.1.3 Values-based content

2.4.2 Humanistic
- 2.4.2.1 Holistic integration of content
- 2.4.2.2 Self-actualisation

2.4.3 Social reconstructionist
- 2.4.3.1 Societal needs-based content
- 2.4.3.2 Self-directed, critical analytical skills

2.4.4 Technological
- 2.4.4.1 Technology-based content
- 2.4.4.2 Technology-based skills

2.4.5 Evidence-based
- 2.4.5.1 Research evidence
- 2.4.5.2 Clinical learning strategies

2.4.6 Eclectic
- 2.4.6.1 Elements
- 2.4.6.2 Weighting/balance

DOMAIN 3 - CURRICULUM DEVELOPMENT

3.1 Design Strategies

3.1.1 Intent
- 3.1.1.1 Educational focus
- 3.1.1.2 Social orientation

3.1.2 Content
- 3.1.2.1 Inclusion strategies
- 3.1.2.2 Organisation strategies

3.1.3 Teaching-learning strategies
- 3.1.3.1 Learner-teacher focus
- 3.1.3.2 Learning opportunities
- 3.1.3.3 Attainment of knowledge, skills and values
- 3.1.3.4 Type of learning
- 3.1.3.5 Clinical learning framework

3.1.4 Student assessment strategies
- 3.1.4.1 Benchmark
- 3.1.4.2 Reality relationship

3.1.5 Program evaluation strategies
- 3.1.5.1 Graduate outcomes
- 3.1.5.2 Program outcomes
3.2 The Contextual Framework of the Curriculum

3.2.1 Extra-institutional Factors

3.2.1.1 Societal expectations
3.2.1.2 Professional expectations
3.2.1.3 Educational system requirements
3.2.1.4 Current content
3.2.1.5 Teaching support systems and technology
3.2.1.6 External resources
3.2.1.7 Informal curriculum

3.2.2 Intra-institutional Factors

3.2.2.1 Student attributes
3.2.2.2 Staff strengths and weaknesses
3.2.2.3 Institutional/departmental ethos
3.2.2.4 Material resources
3.2.2.5 Perceived problems
3.2.2.6 Informal curriculum

3.2.3 Curriculum Needs

3.2.3.1 Formulation of goal statements
3.2.3.2 Rating of goal statements
3.2.3.3 Ranking of goal statements
3.2.3.4 Discrepancy of goal statements
3.2.3.5 Formulation/action plan

3.3 Curriculum Intent

3.3.1 Mission

3.3.1.1 Institutional
3.3.1.2 Unit (Department)

3.3.2 Aims

3.3.2.1 Long term aims
3.3.2.2 Societal views

3.3.3 Goals

3.3.3.1 Medium to long term goals
3.3.3.2 Education and health care system expectations

3.3.4 Objectives

3.3.4.1 General
3.3.4.2 Instructional (Specific)
3.3.4.3 Behavioural

3.3.5 Competencies

3.3.5.1 Attributes
3.3.5.2 Performance indicators
3.3.5.3 Standards of practice
3.4 Content

3.4.1 Elements (nature of content)
   3.4.1.1 Knowledge
   3.4.1.2 Skills
   3.4.1.3 Values
   3.4.1.4 Competencies

3.4.2 Organisation
   3.4.2.1 Selection criteria of content
   3.4.2.2 Scope
   3.4.2.3 Sequence
   3.4.2.4 Balance

3.5 Learning Experiences

3.5.1 Expository Teaching
   3.5.1.1 Lectures
   3.5.1.2 Demonstrations
   3.5.1.3 Audio-visual presentations
   3.5.1.4 Set reading tasks

3.5.2 Interactive Teaching
   3.5.2.1 Question-discussion technique
   3.5.2.2 Computer-assisted learning (CAL)
   3.5.2.3 Computer-managed learning (CML)

3.5.3 Small Group Teaching
   3.5.3.1 Group discussions
   3.5.3.2 Tutorials
   3.5.3.3 Seminars
   3.5.3.4 Buzz Groups

3.5.4 Inquiry Teaching
   3.5.4.1 Discovery Learning
   3.5.4.2 Problem-solving
   3.5.4.3 Inductive learning
   3.5.4.4 Scientific method
   3.5.4.5 Case study method
   3.5.4.6 Group investigation

3.5.5 Individualisation Teaching
   3.5.5.1 Self-directed learning kits
   3.5.5.2 Individual learning contract

3.5.6 Reality Simulation Teaching
   3.5.6.1 Physical models
   3.5.6.2 Work models
   3.5.6.3 Simulations
   3.5.6.4 Role playing
   3.5.6.5 Patient management problems
3.5.7 Reality Teaching

3.5.7.1 Systematic
3.5.7.2 Opportunistic
3.5.7.3 Community-based
3.5.7.4 Restricted practice-based

3.6 Competency-based Assessment

3.6.1 Cognitive skills

3.6.1.1 Knowledge
3.6.1.2 Comprehension
3.6.1.3 Application
3.6.1.4 Analysis
3.6.1.5 Synthesis
3.6.1.6 Evaluation

3.6.2 Psychomotor skills

3.6.2.1 Perception
3.6.2.2 Set (preparation)
3.6.2.3 Guided response
3.6.2.4 Habitual response (mechanism)
3.6.2.5 Complex overt response
3.6.2.6 Adapting (originating) response

3.6.3 Affective skills

3.6.3.1 Receiving
3.6.3.2 Responding
3.6.3.3 Valuing
3.6.3.4 Organisation
3.6.3.5 Characterisation

DOMAIN 4 - CURRICULUM APPLICATION

4.1 Learning Climate

4.1.1 Psychosocial factors

4.1.1.1 Autonomy
4.1.1.2 Student support
4.1.1.3 Cooperation
4.1.1.4 Competition
4.1.1.5 Scholasticism
4.1.1.6 Social awareness
4.1.1.7 Moral education
4.1.1.8 Mattering

4.1.2 Integration

4.1.2.1 Entry stage
4.1.2.2 Reactive stage
4.1.2.3 Proactive stage
4.1.2.4 Integrative stage

4.1.3 Teacher-mediated climate

4.1.3.1 Responsibility
4.1.3.2 Communication
4.1.3.3 Facilitation
4.1.4 Hidden curriculum

4.1.4.1 Internal influences
4.1.4.2 External influences

4.1.5 Physical environment

4.1.5.1 Accommodation
4.1.5.2 Technological support

4.2 Quality Management (QM)

4.2.1 Basic QM activities

4.2.1.1 Setting goals and standards (derived from intent)
4.2.1.2 Evaluating practice (against standards)
4.2.1.3 Improving practice

4.2.2 Pre-requisite activities

4.2.2.1 Mapping (what has to be managed)
4.2.2.2 Establishing procedures (for encouraging and assessing quality)
4.2.2.3 Setting criteria (against which to judge performance)

4.2.3 Self-evaluation taskforce

4.2.3.1 Composition
4.2.3.2 Processes
4.2.3.3 Timelines

4.2.4 Accreditation

4.2.4.1 Internal institutional accreditation
4.2.4.2 Professional institutional accreditation
4.2.4.3 Statutory requirements

4.3 Change Management

4.3.1 External sources of change

4.3.1.1 Societal expectations
4.3.1.2 Professional expectations
4.3.1.3 Educational system requirements
4.3.1.4 Current content
4.3.1.5 Teaching support systems and technology
4.3.1.6 External resources
4.3.1.7 Informal curriculum

4.3.2 Intra-institutional sources of change

4.3.2.1 Student attributes
4.3.2.2 Staff strengths and weaknesses
4.3.2.3 Change of curriculum needs
4.3.2.4 Material resources
4.3.2.5 Perceived problems
4.3.3 Innovation and change

4.3.3.1 Relative advantage
4.3.3.2 Compatibility
4.3.3.3 Complexity
4.3.3.4 Trialability
4.3.3.5 Communicability
4.3.3.6 Status
4.3.3.7 Support


2.5.4 Evaluation of a Curriculum Design Taxonomy

The taxonomy in Table 10 meets a range of evaluative criteria depicted in Table 11.

TABLE 11 - Evaluation criteria met by the taxonomy for curriculum design

<table>
<thead>
<tr>
<th>Qualitative Curriculum Practice Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The taxonomy is based on domains and elements identified by leaders in the field and contained in various models for curriculum design.</td>
</tr>
<tr>
<td>2. The categories and classes represent elements which are addressed in the current literature and classified to provide a detailed outline of relevant factors.</td>
</tr>
<tr>
<td>3. As framework, the taxonomy provides a holistic view of the curriculum process.</td>
</tr>
<tr>
<td>4. The curriculum process can be accessed in any domain, with a clear view of consequences to other domains.</td>
</tr>
<tr>
<td>5. It can be expanded to accommodate new knowledge, processes and procedures.</td>
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<tr>
<td>6. It integrates a wide range of relevant design factors.</td>
</tr>
<tr>
<td>7. It meets the needs for design of a curriculum based on current knowledge and practice.</td>
</tr>
<tr>
<td>8. It provides the basis for a wide range of curriculum design and research questions.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scientific Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Validity - it enhances the validity of curriculum practice by providing an algorithm for curriculum design and by identifying factors that need to be considered.</td>
</tr>
<tr>
<td>2. Objectivity - it promotes objectivity by identifying factors considered important by many curriculum developers.</td>
</tr>
<tr>
<td>3. Reliability of the curriculum design is increased because of the wide range of factors included in the thinking of the curriculum developers i.e. it is comprehensive.</td>
</tr>
<tr>
<td>4. Standardisation of approaches to curriculum design is enhanced.</td>
</tr>
<tr>
<td>5. Reproducibility of the curriculum design process is facilitated.</td>
</tr>
</tbody>
</table>
6. It forms a comprehensive framework within which research findings can be documented and new research stimulated.

Economic Criteria

1. Efficiency - the framework is easy to use and streamlines the design/review process; efficiency is promoted through a step-by-step design process.

2. Effectiveness is promoted by using a framework that identifies the range of factors to be considered.

3. Using the framework facilitates documentation of the design.

Constructed by the author, 1993.

2.5.5 Curriculum Research Questions

Fundamental curriculum design questions related to the taxonomy are posed to elicit data about what the expected outcomes are, what should be taught, how and when it should be taught and how outcomes can be evaluated, changes be managed and the quality of the overall process be assured.

The following pertinent questions applicable to the planning and review of a chiropractic curriculum suggest that the more thorough and wide-ranging the way in which questions are explored, the more accurate, reliable and valid the curriculum decisions will be and the better the chances for successful outcomes are. Broad-based curriculum questions appear in Table 12.

TABLE 12 - Broad-based curriculum questions

1. What is a curriculum?

2. What is the curriculum process?

3. Which activities and forces influence curriculum decision-making?

4. What is the context for the curriculum? I.e. what are the needs in relation to the product of the education and training program?

5. What is the intent (aims and objectives) of the curriculum?

6. What content should be included in the curriculum?

7. How should the content be organised?

8. What educational strategies should be adopted?

9. Which teaching/learning methods should be used to provide learning experiences necessary to moulding a future chiropractic practitioner?

10. How should assessment be carried out?
11. What educational climate (ambience or environment) should be created?
12. How should curriculum implementation, monitoring and change be managed?
13. How can the quality of the curriculum be assured?


Each broad-based question is subdivided into many questions that facilitate explication of the curriculum. Questions, published by the author (Kleynhans 1997B:117) are posed in taxonomic context in each section of each chapter below.

A very recent approach to curriculum design questions (Karni and Duckett 1998:78) lists similar questions to those appearing in this document, but in a more succinct manner and offer a few questions which do not appear below.
Summary

In Chapter 2:

1. It is demonstrated that curriculum represents a unique area of investigation and that a conceptual framework for the process of designing a chiropractic curriculum can be identified and analysed.

2. The important role of curriculum developers could be identified and recommendations made for their selection.

3. The structure, advantages and disadvantages of various curriculum development groups could be identified and analysed and recommendations made on the design and function of stakeholder taskforces for curriculum development.

4. Definitions for curriculum could be identified, analysed and recommendations made for a definition of the chiropractic curriculum which has a focus on the appropriation of lived experience and the goal of producing practitioners with the knowledge, attributes, aptitudes, skills and judgements necessary to serve society, their profession and themselves.

5. Models for curriculum development could be identified and a model for the design of a chiropractic curriculum could be created by drawing on and expanding existing curriculum design models.

6. An algorithm for the design of a chiropractic curriculum could be developed with a strong focus on determining the various factors and elements which ultimately lead to decisions about the organisation of chiropractic-relevant learning experiences and evaluation of whether goals are met.

7. A taxonomy could be developed to provide a conceptual framework for the design of a chiropractic curriculum with a focus on learner experience.

8. A range of curriculum research questions related to the taxonomy for curriculum design could be identified, both from the literature and by employing the abovementioned taxonomy.
Clarification of the curriculum foundations is part of the curriculum organisation process which involves a presage based on analysis of the philosophical, sociological, cultural and psychological foundations; curriculum paradigms and a conceptual framework which provide a basis for the selection of curriculum design strategies and the development of a chiropractic curriculum.

PRÉCIS 3: Chapter 3 has as its focus the three foundations of the curriculum and curriculum paradigms.

OUTLINE:

Chapter 3 considers:

3.1 A clarification of the philosophical foundations of the chiropractic curriculum

3.2 A clarification of the sociological and cultural foundations of the chiropractic curriculum

3.3 A clarification of the psychological foundations of the chiropractic curriculum

3.4 A clarification of paradigms relevant to the chiropractic curriculum

3.5 A clarification of a chiropractic conceptual framework
3.1 A CLARIFICATION OF THE PHILOSOPHICAL FOUNDATIONS OF THE CHIROPRACTIC CURRICULUM

3.1.1 Introduction

3.1.1.1 What is philosophy?

Philosophy impacts on the chiropractic curriculum in three major ways: as philosophical foundation to the curriculum developers in relation to the fields of education and chiropractic respectively and as course content. The word philosophy is derived from Ofr. filosofie, L. philosophia and Gk. philosophos which means love, study, or pursuit (through argument and reason) of wisdom, truth or knowledge. While philosophy literally means love of wisdom and came to stand for or to mean knowledge in general about humans and the universe, it is acquired through study, argument and reason, i.e. it requires investigation and must be pursued in an organised manner. It is also said that in knowing, unlike believing or surmising and feeling confident, we cannot be wrong (Urmson 1975:1). This suggests that the pursuit in relation to philosophy in this context is a pursuit for knowledge about education and chiropractic. It also presupposes that, in pursuit of knowledge, we will endeavour to know what philosophy is about, what the tools of philosophy are, and that we will be particularly cognisant of recognising when something we talk about or investigate has moved beyond the sphere of philosophy into the sphere of science. In that event, we will therefore embrace the greater truth about the issue under consideration. Philosophy relies on reflection and in developing its modern form has shed the sciences one by one, as they became amenable to systematic empirical study rather than armchair speculation (Lacey 1986; 176-177). Many aspects of philosophy serve as foundations to the curriculum in most disciplines i.e. ontology, epistemology, axiology, humanism, holism and phenomenology.

3.1.1.2 Methods of philosophy and research questions

Each of the major branches of philosophy is considered a philosophical method or tool which can be employed in order to acquire knowledge through reflection, argument and discourse by following the method or approach of reasoning based on the questions which are asked by using each of the methods or approaches.
The philosophical methods which are of particular relevance to asking the question *why* about the nature of education and chiropractic are clarified by adapting definitions *mutatis mutandis* to the two fields from *The New Shorter Oxford Dictionary* to chiropractic. They are also posed as curriculum design questions.

**TABLE 13 - Curriculum design questions about the philosophical foundations of the chiropractic curriculum**

<table>
<thead>
<tr>
<th>PHILOSOPHICAL METHOD</th>
<th>QUESTIONS ANSWERED</th>
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<tbody>
<tr>
<td><strong>Questions Relating to Education</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Axiology</strong></td>
<td>What is good about education? (Axiology subsumes aesthetics and ethics).</td>
</tr>
<tr>
<td><strong>Aesthetics</strong></td>
<td>What beauty and enjoyment result from experience with education?</td>
</tr>
<tr>
<td><strong>Empiricism</strong></td>
<td>What do our senses through experience and observation tell us about educational practice?</td>
</tr>
<tr>
<td><strong>Epistemology</strong></td>
<td>What can we know about educational practice; how can we know it?</td>
</tr>
<tr>
<td><strong>Ethics</strong></td>
<td>What is right and wrong about educators’ behaviour?</td>
</tr>
<tr>
<td><strong>Holism</strong></td>
<td>How does a holistic approach influence educational delivery?</td>
</tr>
<tr>
<td><strong>Humanism</strong></td>
<td>How do educators view individual human beings in terms of their intrinsic value, their worth, and their role as scholars?</td>
</tr>
<tr>
<td><strong>Logic</strong></td>
<td>How does a systematic treatment of ideas apply in education?</td>
</tr>
<tr>
<td><strong>Rationalism</strong></td>
<td>What does reason as guiding principle tell us about education?</td>
</tr>
<tr>
<td><strong>Questions Relating to Chiropractic</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Axiology</strong></td>
<td>What is good about chiropractic? (Axiology subsumes aesthetics and ethics).</td>
</tr>
<tr>
<td><strong>Aesthetics</strong></td>
<td>What beauty and enjoyment result from experience with chiropractic?</td>
</tr>
<tr>
<td><strong>Empiricism</strong></td>
<td>What do our senses through experience and observation tell us about chiropractic as compared with scientific evidence?</td>
</tr>
<tr>
<td><strong>Epistemology</strong></td>
<td>What can we know about chiropractic and how can we know it?</td>
</tr>
<tr>
<td><strong>Ethics</strong></td>
<td>What is right and wrong about chiropractic and chiropractors’ behaviour?</td>
</tr>
<tr>
<td><strong>Holism</strong></td>
<td>How does a holistic approach influence chiropractic care?</td>
</tr>
</tbody>
</table>
How do chiropractors view individual human beings in terms of their intrinsic value, their worth, and their role in chiropractic practice? This includes patients, colleagues and other members of society.

How does a systematic treatment of ideas apply in chiropractic?

How do the first principles of things, including such concepts as being, substance, essence, time, space, cause and theoretical philosophy of being and knowing (e.g. the Palmerian concept of universal intelligence) relate to chiropractic?

What is real or true about chiropractic? Is my reality the same as another person's reality?

What does reason as guiding principle tell us about chiropractic?

How does the concept of an animating force, power or principle present in all living things which is essential for continued existence (i.e. the Palmerian concept of an innate intelligence) apply to chiropractic?


### 3.1.1.3 The importance of philosophy in chiropractic

Philosophy guides the daily practice of chiropractors and other health practitioners. Kriel (1987A:2) illustrates the importance of this point: 'All practising medicine in fact have a common philosophy about what disease and health is all about. This concept of disease obviously determines what we perceive our task as doctors to be, and this understanding forms and guides our practice. This common philosophy is inculcated by our medical education system, by our role models, even by our patients, and it is reinforced by all the professional institutions that are created by us in our own image - i.e. in terms of our own philosophy. It is this implicit and subconscious philosophy that gives our way of doing things an aura of naturalness, of having-to-be-that-way, of God-given normality, and which prevents us from questioning those very assumptions. In our daily practice we are therefore acting out a series of philosophical assumptions'. He quotes Engel (1978:169) as stating 'how physicians approach patients and the problems they present is very much influenced by the conceptual models in relationship to which their knowledge and experience are organised'. Examples of such conceptual models are presented under 'holism' (3.1.6) and 'humanism' (3.1.7) below.
A descriptive analysis of the literature and participant observation supports the view that there are at least four major philosophical assumptions (Table 14) which influence chiropractic curriculum design.

Clarifying the curriculum design questions in Table 13 provides supportive evidence for the assumptions in Table 14.

### TABLE 14 - Major philosophical assumptions that influence chiropractic curriculum design

<table>
<thead>
<tr>
<th>ASSUMPTION</th>
<th>RATIONALE</th>
</tr>
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<tbody>
<tr>
<td>1. Chiropractic is founded on science</td>
<td>The undergraduate curriculum closely resembles that of medicine - with a strong foundation in the part-disciplines of chiropractic, including the basic &quot;medical&quot; sciences (anatomy, physiology, pathology etc); the diagnostic sciences, albeit with greater emphasis on the neuromusculoskeletal and radiological aspects and less on issues of infection and critical care; and the chiropractic sciences including clinical neurology, clinical biomechanics, manipulation science, chiropractic technique, etc (Author).</td>
</tr>
<tr>
<td>2. Chiropractic is a discipline of action</td>
<td>While modern chiropractic rests on a theoretical foundation provided by the sciences, like medicine, it clearly incorporates extra-scientific elements such as the practitioner's personal mastery of skills and tools - much as a craft. Clinical understanding therefore requires integration and interpretation of signs, symptoms and other clinical data and therefore does not only rest on pure objectivity. This makes room for subjectivity, ambiguity and disagreement and needs to be addressed via non-traditional methods, particularly investigations which recognise that knowledge and science are the products of a &quot;subject&quot; - the thinking and experiencing human being. (Inspired by Gremy 1989:189-194).</td>
</tr>
<tr>
<td>3. Chiropractic is a human service</td>
<td>Chiropractic is rooted not only in science and technology, but in the humanity of the chiropractor as well. Chiropractic, like medicine, belongs to the human services, such as education, the judiciary, social services etc. In this context it deals with profound human aspects e.g. alleviation of pain and disability, anxiety, health education, disease prevention, health promotion, health maintenance, rehabilitation, etc. Both chiropractic and medicine are being encouraged to pay more attention to humanism in education and practice. (Inspired by Karl Jaspers 1989:251-267).</td>
</tr>
<tr>
<td>4. Chiropractic is multidimensional</td>
<td>Multiple paradigms are needed to deal with diverse questions about chiropractic ranging across structural, functional and biomechanical aspects of the human body, psychomotor skills, humanistic elements of practice, patient education, and other aspects of the practitioner-patient interaction including anthropological issues such as caring, the experiential and the dialogical (Kleynhans 1991B:147; 1991C:164; Kleynhans &amp; Cahill 1991:105-6).</td>
</tr>
</tbody>
</table>
3.1.1.4 The application of philosophy in education

It is argued that Kriel's (1987A:2) illustration for the practice of medicine applies very much also to the field of education and the relationship between teachers and students.

The rest of this section on Philosophical Foundations is devoted to philosophy in relation to chiropractic. However, for a comprehensive understanding of the philosophical foundations of education, all the curriculum design questions in Table 13 above need to be addressed. Philosophy in education has been addressed by some medical educators e.g. Kami et al (1998:72) who write of academic freedom, excellence, student responsibility for learning, critical thinking etc.

3.1.2 Chiropractic and Ontology

Ontology is concerned with the nature of reality and it asks the question: what is real? (Print 1992:54) e.g. what is real about chiropractic? What is chiropractic reality? It may well be that some curriculum developers see their role as re-creating chiropractic reality by using the curriculum as a vehicle for change. Analysis of the chiropractic literature shows that it is replete with references to the concepts of chiropractic philosophy and philosophy of chiropractic, both of which have had tremendous influence on chiropractic teaching and ideology (Kleynhans 1990A:129); yet there is no evidence that a claim to either a philosophy of chiropractic or a chiropractic philosophy is justified by an ontological approach to chiropractic and they are not accepted as valid terms and therefore placed in italics when used below. Coulter (1991A:129) subsequently supported the same notion by presenting a paper titled: Chiropractic philosophy has no future. According to Engelhardt and Spieker (1975:2-6), it has not yet been demonstrated to the satisfaction of either philosophers or physicians that there is a philosophy of medicine as it has for example been agreed that philosophy of science or philosophy of mind are bona fide disciplines. It appears that most of what could be subsumed under a philosophy of chiropractic, as with a philosophy of medicine, relates to 'problems' which can and are already being handled elsewhere in philosophy or which are not properly philosophical at all (adapted mutatis mutandis to chiropractic from Engelhardt and Spieker 1975:231). There is an important field of philosophy called the Philosophy of Science with an increasingly important branch, Philosophy of Biology, where many problems relating to the biological side of a philosophy of chiropractic can be addressed (Kleynhans 1990A:130). In fact, Shaffer says that the Philosophy of Biology naturally subsumes: 'the
philosophical problems concerning the definition and nature of life, the kinds of laws governing living things, the kinds of analyses and explanations appropriate to living things, the concepts of cell, gene, species, instinct, race, etc., and their places in our total conceptual scheme' (Engelhardt and Spicker 1975:216).

In order to explore the notion of the existence of a discipline called philosophy of chiropractic it is necessary sensu strictori to determine what constitutes or would constitute a philosophy of chiropractic i.e. to be able to define the field and to determine its scope of interests and methods of enquiry in terms of what philosophy would accept (inspired by Engelhardt and Spicker 1975:2-6). Szumowski (1949:1138) defines the requirements for creation of a philosophy of medicine. If chiropractic is substituted for medicine in this definition, it exemplifies the vastness of conditions to be met and perhaps the vagueness of the field of a proposed philosophy of chiropractic: e.g. 'the philosophy of chiropractic is a science which considers chiropractic as a whole. It studies its position in humanity, in society, in the state and in the chiropractic schools. It embraces at a glance the whole of the history of chiropractic. The philosophy of chiropractic reviews the more general problems of the philosophy of biology. It analyses the methodological form of chiropractic thought, mentioning and explaining the errors in logic which are committed in chiropractic....'

Extrapolating from suggestions by Temkin for medicine, a philosophy of chiropractic, should it be possible to create, would present us with a chiropractic logic, a chiropractic ethics and a chiropractic metaphysics (Engelhardt and Spicker 1975:3). A respectable development in none of these areas has even been suggested or commenced and, in any event, may either not be possible or not be needed due to the fact that the problems are already handled by formal areas of philosophy. On the other hand, they quote Pellegrino (1973) as suggesting that, even if a philosophy of medicine is not yet at hand as an independent philosophical enterprise, philosophy in medicine is needed (Engelhardt and Spicker 1975:3). This same notion applies a priori to chiropractic: 'There is an urgent need to make chiropractic an examined profession, to subject all its presuppositions and axioms to rigorous re-examination by the elenctic method - the questioning of accepted opinion and belief, the rejection of unsupported dogmas, the demand for justification of beliefs however sacred. This is the only way in which chiropractic could become fully embraced in the wider world of academe, philosophy and science. 'Chiropractic, as does medicine, badly needs this illumination because its tremendous success as a clinical technique has brought it to the most dangerous level of dogmatism and
complacency ever. Authority in the clinical situation is being uncritically transferred to realms of values, morals and purposes' (adapted *mutatis mutandis* from Pellegrino (1973). However, in relation to the current state of chiropractic Charlton (1987:46) remarks that: 'those chiropractors who talk at great length about *chiropractic philosophy* typically erect dogmas to prevent the examination of unexamined assumptions, which is quite the opposite of philosophy'! Keating (1989:147) adds that 'chiropractic is unique among health care professions in that its untestable principles are less well-agreed upon and more explicit than in other fields'.

It is reasonable to conclude that there is no consensus about the meaning of the term *chiropractic philosophy* and that it is *not* any of the following: it is not a branch of philosophy; a compilation of chiropractic principles; the philosophy of the science of chiropractic; the art of chiropractic practice; the science of chiropractic; vitalism or holism or the summation of chiropractic practice experiences (Kleynhans 1990A:132). The challenge to *philosophy in chiropractic* is to make plain to philosophy and to society in general the significance and at the same time the limitations of chiropractic. To date, the profession's lack of understanding of what philosophy is all about and failure to define and systematise philosophy in chiropractic has delayed the response to this challenge. There is a need to undertake in-depth study of the philosophical and cultural bases of chiropractic and of philosophy in or applied to chiropractic (Kleynhans 1990A:130). Ultimately, this study can only be undertaken seriously if the curriculum provides future chiropractic practitioners with the tools and insights to take on this task.

The sense of reality (onticity) about chiropractic is strongly influenced by philosophical assumptions about chiropractic and chiropractors, summarised as a series of beliefs in Table 15.
TABLE 15 - Beliefs about the characteristics of chiropractic and chiropractors

1. CHIROPRACTIC IS ANTHROPOEIC BASED
   - Chiropractors accept that the individual has intrinsic value and there is worth inherent in human life.
   - Chiropractic is a patient or people service.
   - Chiropractic concerns itself with the correlation of biomechanical and pathophysiological dysfunction which interfere with the psychosocial activities of patients.
   - Chiropractic improves in appropriate patients the quality of life, productivity and health.
   - Chiropractic recognises the innate ability of patients' bodies to maintain or regain homeostasis following appropriate intervention.
   - Chiropractic practitioners respect human dignity by being sensitive to ethics and morality i.e. to their patients' modesty, dignity, privacy, sexuality, culture, ethnicity, etc.
   - The humanistic approach of chiropractic recognises equality of patients on the basis of race, sex, colour and religion and adapts patient care to meet ethnic and gender requirements.

2. RATIONALISM IN CHIROPRACTIC
   - Chiropractic is a rational activity.
   - Chiropractic is based on a scientific (logical and reasonable) approach to health care based on the basic medical sciences.
   - Chiropractic practice is based on a considerable body of knowledge that supports its theories.
   - Chiropractic has developed, identified and categorized adjustive and manipulative techniques, which require considerable psychomotor skill in their execution.
   - Chiropractic has developed a culture and set of values to support a humanistic approach to health care.

3. CHIROPRACTIC HAS A SYSTEMS APPROACH
   - Chiropractic is a process with an inherent organisation or systems.
   - Systems of chiropractic practice are well developed and organised into clinical approaches.
   - Systems of chiropractic are based on biomechanical, pathomechanical and neurological substrates.
   - Systems relate to the diagnosis and correction of neuromusculoskeletal dysfunction and conditions resulting therefrom.
   - Chiropractic is logical and is based on a systematic clinical approach.
   - Chiropractic is based on a sound diagnostic approach.
   - Chiropractic follows sound clinical decision-making procedures involving the case study method.
   - Chiropractic employs a range of therapeutic procedures based on sound rationale, empirical testing over many decades and sound clinical biomechanical principles.
   - Chiropractic recognises in the human body, responses to chiropractic care.

4. CHIROPRACTIC IS SERVICE-ORIENTED
   - Chiropractic is a reasonable and beneficial clinical pursuit.
   - Chiropractic has demonstrated clinical benefit to the community.
   - Chiropractic is a process with a central subjective purpose.
   - Chiropractic "gets patients well" by improving their physical and emotional health.
   - Chiropractic provides the best chiropractic health care possible.
5. **CHIROPRACTIC IS INTEGRATIVE AND HOLISTIC**

- Chiropractic is unique in the way that basic social and biological sciences are synthesized in functions which promote health.
- Basic biological and medical sciences are organised and brought into relationship with the clinical approaches to chiropractic including articular adjustment and manipulation, disease prevention, health promotion and other clinical activities in a unique system of healing.
- Psychosocial aspects of chiropractic involve healing through hands-on care and relief of pain and disability without the use of drugs.
- Chiropractic removes biomechanical and other interference to the transmission and expression of nerve impulses.
- Chiropractic assists a return to homeostasis where central facilitation or inhibition interferes with normal neurological function.
- Chiropractic promotes health in patients.
- Chiropractic assists patients to more fully realise their human potential.

6. **CHIROPRACTIC HAS DYNAMISM AND CREATIVITY**

- Chiropractic is a process with dynamic creativity.
- There is constant expansion of diagnostic and therapeutic approaches and techniques in chiropractic.
- There is increasing emphasis on the correlation and integration of systems of chiropractic practice in an attempt to increase the comprehensiveness and beneficial results of chiropractic care.

7. **CHIROPRACTIC HAS SOCIAL AND SOCIETAL INFLUENCE**

- Individual chiropractors as citizens have responsibility for and some control over the political and social milieu in which they live.
- Chiropractors have a large social sphere of influence.
- Chiropractors play an important and significant role in health care.
- Chiropractors have significant influence on patients.
- Chiropractors have demonstrated significant political influence that has a flow-on effect.

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This table was inspired by the work of Bevis (1989:42-50) of which the basic framework was used by the author to record observations about chiropractic gained as participant observer.

The beliefs in Table 15 are linked to curriculum content in 4.4.2.1 below.

### 3.1.3 Chiropractic and Epistemology

#### 3.1.3.1 Introduction

Epistemology (Gr. *episteme*: knowledge or science) is that part of philosophy often called the *theory of knowledge* (Brown 1993:838). Epistemology is concerned with the nature of knowledge and the nature of knowing and deals with a wide-ranging, loosely knit set of philosophical problems concerning such notions as those of knowing, perceiving, feeling sure, guessing, being mistaken, remembering, finding out, proving, inferring, establishing, corroborating, wondering, reflecting, imagining, dreaming and so on (Urmson 1975:92).
Epistemology asks what we can know and how (Lacey 1986:177), including questions such as: What is true about chiropractic? How do we know the truth about chiropractic? What consensus exists for accepting that truth? Epistemology provides a sound philosophical foundation for the generation of knowledge.

Haldeman (1990:23), says that 'the philosophy of chiropractic will determine the future direction of chiropractic and whereas scientific research is essential to a rational philosophy, it is philosophy that will define the future of chiropractic research'.

Approaches to the generation of new knowledge in chiropractic, which needs to be inculcated via the curriculum include both quantitative and qualitative research methods (Kleynhans and Cahill 1991:107). Quantitative or reductionistic research was for a long time considered to be the only "real" research. However, its limitations are now recognised and the need for qualitative methods has become apparent (Benoliel 1984:1; Kleynhans and Cahill 1991:107).

3.1.3.2 Reductionism

Named after Rene Descartes (1596-1650), Cartesian reductionism proclaimed the human body an animal machine, the phenomena of matter governed by the laws of mechanical motion, and thought, will, sensation, ideas, intelligence and consciousness was the province of the soul that inhabits the body in life and leaves it in death (Bloch 1989:1259-61). Generalisation of the reductionistic approach to include the humanities, including clinical practice with all that it entails, led to an attempt to explain humans in terms of concepts derived from the natural sciences. Humans were seen as an extension of nature, resulting in human reduction (humiliation) to things next to and like other things or objects (Oberholzer and Greyling 1981:131-2). Since its heyday during the latter half of the nineteenth century,
the physical sciences claimed that to be 'scientific', their methods had to be used - a notion that is still being continued, although more and more questioned by those involved in the human services and helping professions (Gremy 1989:189; Oberholzer and Greyling 1981:131-2). It is argued that the chiropractic curriculum should not be restricted to a reductionistic approach for the following reasons:

a) **Because of what phenomenology can offer.** As protest against the objectivisation, depersonalisation and dehumanisation of the Cartesian approach, phenomenology developed as an attempt to restore human dignity by acknowledging the exceptional position of humans. It led Husserl to point out that knowledge and science are products of a *subject* - i.e. products of the thinking and experiencing human being. Such knowledge is not a 'ready-made' article distinct from humans - but the product of selection and systematization of description, definition and understanding (Oberholzer and Greyling 1981:157). Phenomenology is one of the main qualitative research methods which allows us to examine aspects of doctor-patient interaction such as caring, the therapeutic experience, etc. In its broadest meaning, phenomenology signifies a descriptive philosophy of experience (Urmson 1975:216). According to Baron (1981:5; 1985:606; 1990:25), a phenomenologically informed view offers a discipline that serves patients, rather than a discipline served by patients. It requires, as a central task that scientific understanding be reconciled with human understanding, using the one to guide the other; it attempts to examine the ground on which natural science walks. By taking seriously questions about the world as experienced, phenomenologists seek to reunite science with life and to explore the relationship between the abstract world of the sciences and the concrete world of human experience (Baron 1981:5; 1985:606; 1990:259). It is strongly argued that chiropractic students should be introduced to phenomenology as a way in which philosophical issues related to chiropractic and the caring for patients can be scientifically investigated.

b) **Because of the role of research designers.** The presence and active participation of the subject as the designer of science should not be overlooked because the world can never be totally objectivised, distinct from the subject (Oberholzer and Greyling 1981:157).

c) **Because of the limitations of the scientific method.** Due to a radical change in opinion, physicists are now agreed that a strong subjective element has entered into their deliberations (Bell 1964:195; Bergstein 1972:X; Bohm 1952:166; 1980:134; Einstein, Podolsky, Rosen 1935:777; Zukav 1980:310) and a Cartesian view of the world is vastly
inadequate (Kleynhans and Cahill 1991:102) and recent views confirm William James' warning about exclusive attachment to the "traditional" scientific method in investigating (particularly) human behaviour (Kleynhans 1990A:132; Kleynhans and Cahill 1991:105).

d) **Because of humanism.** The need for a humanistic paradigm is not only suitable but also highly desirable to the chiropractic curriculum as discussed in 3.1.7 below.

e) **Because of the need for a new vision.** Investigation of the chiropractic phenomenon, which must be subjected to rigorous scientific approaches should include not only the traditional, Cartesian scientific method, but requires additional methods to explicate the onticities about practitioner-patient interaction in the broadest, modern, scientific and clinical context (Kleynhans 1990A:133). 'What we need, then, is a new vision of reality: a fundamental change in our thoughts, perceptions and values. The beginnings of this change, of the shift from the mechanistic to the holistic conception of reality are already visible in all fields and are likely to dominate the entire decade' (Capra 1982:xviii).

f) **Because of arguments in favour of a multi-dimensional paradigm.** These arguments are summarised in Table 16.

**TABLE 16 - Arguments in favour of a multidimensional research paradigm as a basis for chiropractic education**

1. Cartesian reductionism as research method, while exceptionally useful in case of the physical sciences, and while very important to basic chiropractic research, has limitation particularly in the study of humans and human interaction.
2. Degrading via objectivisation of humans led to Husserl's phenomenological protest, which suggests that knowledge and science are the products of a thinking and experiencing human being.
3. Limitations of the traditional scientific method recognised by William James at the turn of the century are now supported by leading physicists and philosophers.
4. New scientific methods and philosophical approaches are increasingly being employed to investigate human interactions. These include phenomenology, hermeneutics, etc.
5. Chiropractic research should be based on multiple paradigms in order to deal with the varied problems needing to be investigated, i.e. both quantitative and qualitative approaches.
6. It is too early for the presumption of exclusivity or superiority of one research approach to chiropractic over another. Which method is selected depends on the phenomenon under investigation.
7. Prioritisation of the multiple paradigms required for the investigation of chiropractic cannot reasonably be determined considering the wide-ranging views of authors on the subject.
8. A broad philosophical and scientific approach is necessary for the investigation of the anthropological, experiential and dialogical components in human behaviour and interaction, especially in the chiropractic clinical setting.
9. To investigate humans only as machines is to objectivise, degrade and dehumanise them and to deprive them of human dignity. The results of such research are invalid, limiting and essentially unscientific.

(Based on a summary of concepts from Kleynhans and Cahill, 1991; and Oberholzer and Greyling 1981).
3.1.3.3 Chiropractic principles

The generation of knowledge about chiropractic leads to the formulation of principles, theories, guidelines and concepts that are invaluable to the curriculum.

a) An explanation of basic concepts relating to chiropractic principles appears in Table 17.

TABLE 17 - Chiropractic principles - basic constructs

<table>
<thead>
<tr>
<th>CONSTRUCT</th>
<th>EXPLANATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundamental Truths</td>
<td>Chiropractic principles refer to fundamental truths as a basis of reasoning etc, (e.g. the principle of neural facilitation and inhibition); or a general law as guide to action (e.g. moral and ethical conservative principles). (Adapted from Sykes, 1978:880).</td>
</tr>
<tr>
<td>Guide to Conduct</td>
<td>A principle is a generalisation that provides a guide to conduct or procedure (Curzon 1985:3), e.g. the principle that a hypermobile articulation should not be manually adjusted.</td>
</tr>
<tr>
<td>Principles &amp; Theory</td>
<td>Because of its clinical nature, chiropractic practice can never be an exact science, i.e. it will always be dependent, to some extent, on theory. Solow sees as a supposition or system of ideas explaining something, especially that which is based on general principles independent of the facts. In this context, he says: 'all theory depends on assumptions, which are not quite true. That is what makes it theory' (Curzon 1985:3).</td>
</tr>
<tr>
<td>Principles &amp; guidelines</td>
<td>Guidelines direct principles and imply intimate knowledge of a course or way and of all its difficulties and dangers (Curzon 1985:3).</td>
</tr>
</tbody>
</table>

(Based on: Kleynhans 1991D:43).

b) The importance of principles in the chiropractic curriculum is apparent from Table 18.

TABLE 18 - The importance of principles in chiropractic education

1. Competent doctors/clinicians/scientists have to acquire knowledge, skills and values which must be learned, since their understanding of it is not inherited, i.e. they need to become accomplished in the principles of their discipline.

2. The assimilation of experience from earlier generations is at the basis of the knowledge, skills and values characterising individual professionals. It is transmitted via a personal encounter with principles in a meaningful and enriching educational experience that is provided through the guidance of an interested, caring educator.

3. Principles underpin the knowledge, skills and values which are transmitted to new members of the profession and which will determine the efficiency, effectiveness and impact of the profession and ensure its survival.

4. Successful clinical interaction with patients must be the result of the conscious application of principles, i.e. scientifically validated theory, to clinical practice situations.
5. Successful practice does not happen fortuitously; it emerges when the clinician has made, and understands, a correct working hypothesis and an analysis of the clinical situation in terms of the complex interplay of explicated elementary concepts and principles.

6. When the chiropractic clinical picture in terms of reproducibility of pain, relationship of biomechanical, neurological and other elements are understood, and the patient is seen in the context of humanness, an appropriate therapeutic rationale must be decided upon in order that the situation may be modified to meet desired ends. Such a rationale must a priori be based on sound principles.

(Adapted mutatis mutandis to chiropractic from Curzon 1985:3-8; Kleynhans 1991D:43-4).

An epistemological approach to the generation of new knowledge is reflected in e) the purposes of chiropractic principles (Table 19).

<table>
<thead>
<tr>
<th>TABLE 19 - The purposes of chiropractic principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chiropractic principles:</td>
</tr>
<tr>
<td>1. Form the basis for all reflection on chiropractic as a health care discipline and provide guidelines for clinical practice.</td>
</tr>
<tr>
<td>2. Provide a framework for scientific reflection on clinical practice.</td>
</tr>
<tr>
<td>3. Afford guidelines for planning effective clinical care programs.</td>
</tr>
<tr>
<td>4. Act as general criteria for evaluating the course of clinical events and standards of care.</td>
</tr>
<tr>
<td>5. Involve a unique terminology or descriptive language for chiropractic science derived from chiropractic and generic medicine.</td>
</tr>
<tr>
<td>6. Involve theoretical aspects that are reciprocal with the practical aspects of chiropractic.</td>
</tr>
<tr>
<td>7. Are 'interpretations' in the light of 'theories' of chiropractic practice.</td>
</tr>
</tbody>
</table>

(Adapted mutatis mutandis with augment to chiropractic from du Plooy 1985:14; Kleynhans 1991D:44-5).

d) The place of chiropractic principles is clarified in Table 20.

<table>
<thead>
<tr>
<th>TABLE 20 - The place of chiropractic principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In the teaching of chiropractic science.</td>
</tr>
<tr>
<td>2. In the teaching of chiropractic practice.</td>
</tr>
<tr>
<td>3. In research into chiropractic i.e. the establishment of a corporate body of knowledge for the discipline.</td>
</tr>
<tr>
<td>4. In the maintenance of standards which subsume evaluation in its broadest context.</td>
</tr>
<tr>
<td>5. In the growth, development and advancement of science generally and in scientific practice and professionalisation of the discipline of chiropractic.</td>
</tr>
</tbody>
</table>

(Adapted mutatis mutandis with augment to chiropractic from du Plooy 1985:14; Kleynhans 1991D:44-5).
e) The functions of chiropractic principles appear in Table 21.

**TABLE 21 - The functions of chiropractic principles**

1. Provide a framework for scientific reflection on chiropractic as a discipline, particularly at the doctor/patient interface;
2. Provide guidelines for planning effective clinical intervention;
3. Act as general criteria for evaluation of the course of doctor/patient interchange;
4. To contribute to the scientific language of chiropractic as a science;
5. Serve as building blocks for the development of a corpus of knowledge for the discipline and hence contribute to recognition of chiropractic as a profession;
6. Provide a basis for research;
7. Serve to improve chiropractic practice;
8. Serve to avoid errors in clinical practice by basing practice on principles, applying the scientific method and not depending mainly on experience from practice (which may or may not be accurately interpreted); and
9. Assist with the replication of successful clinical events.

(Adapted *mutatis mutandis* with augment to chiropractic from du Plooy 1985:14; Kleynhans 1991D:45).

f) The role of chiropractic principles in clinical practice, explicated through an analysis by the author (Kleynhans 1991D:42) shows that:

i) The practising clinician as scientist investigating chiropractic principles has the task of observing fact, formulating theory, applying it and then re-interpreting both fact and theory;

ii) As with other forms of art, practice involves a tension between the automaticity of routine practice and the inventiveness, adaptation and brilliance of adapting technique procedures to specific patient requirements, i.e. an approach based on sound principles;

iii) The practitioner must exercise qualitative judgements, based on the interpretation of principles, in the interest of achieving qualitative ends;

iv) The practice of chiropractic ought to move to a position in which it is consciously based on an application of theory abstracted from the full reality of the clinical situation and such theory and practice ought to be subjected to continuous, severe criticism; and

v) Methodological appraisal of clinical principles in practice, is therefore seen to be a pre-requisite for the construction of a comprehensive theory of chiropractic, whether it be considered a science or an art. This will form an appropriate basis for the teaching of principles.
3.1.4 Logic in Chiropractic

Logic is defined as the 'theory of proof' (Urmson 1975:162); the logician studies the structure and working of different types of argument and tries to systematically relate and integrate them. An attempt at systematically exploring basic concepts and premises of chiropractic in a logical fashion is of incalculable value to curriculum developers designing a chiropractic program. It is reasonable to assume that it will influence decisions on structure, content and ethos and influence the belief system of graduates. Two important points are made by Haldeman (1990:23-8):

a) 'It is becoming increasingly clear, however, that in the same way that chiropractic is a fact of life in the health field, philosophy is a fact of life in the chiropractic field,'

b) 'The importance of listening to patients, expressing a caring attitude, demanding a greater interest in the welfare of people instead of personal, financial gain, and an emphasis on natural healing can all be ascribed to the chiropractic philosophy of practice.'

How then should chiropractic philosophy be approached in future? Keating (1989:147) says: 'Chiropractic cannot hope for significant, profession-wide, clinical-scientific development so long as it mixes mysticism with metaphor, theology with theory, religion with science' which suggests a delineation between the elements making up the discipline and eliminating that which cannot be operationally defined. It is argued that the inseparable, interrelated elements of chiropractic as discipline should be investigated using the vast array of methods and approaches available in both philosophy and science and that they be addressed sensu strictiori in a manner that has meaning to the community at large. This means that scientific method should be applied to those elements amenable to operational definition, objective measurement, etc, and that the rigour of logic be applied to discourse in terms of epistemology, the philosophy of science, the philosophy of biology etc.

It could be argued that experience may answer many chiropractic questions since 'we know chiropractic works, we have seen it work and experienced it' which is empiricism that, in its ordinary use, means the employment of methods based on practical experience, rather than on an accepted body of theory (Urmson 1975:86). However, Polanyi (1969:183), comments as follows about reliance on practical experience to solve problems. 'Almost every major systematic error which has deluded men for thousands of years relied on practical experience.
Horoscopes, incantations, oracles, magic, witchcraft, the cures of witch doctors and of medical practitioners before the advent of modern medicine, were all firmly established through the centuries in the eyes of the public by their supposed practical successes. The scientific method was devised precisely for the purpose of elucidating the nature of things under more carefully controlled conditions and by more rigorous criteria than are present in the situations created by practical problems. These conditions and criteria can be discovered only by taking a purely scientific interest in the matter, which again can exist only in minds educated in the appreciation of scientific value.'

However, Polanyi's dissertation should not suggest that science could provide the total answer. That great scientist and philosopher, James (1983:1179), while expressing high regard for the impact of scientific methods and technique and recognising their positive value, voices a deliberate warning about its limitations: 'Science, however, must be constantly reminded that her purposes are not the only purposes, and that the order of uniform causation which she has use for, and is therefore right in postulating, may be enveloped in a wider order, on which she has no claims at all.' It therefore appears prudent to investigate elements of what has been called *chiropractic philosophy* through both science and philosophy.

Scientific investigation is of considerable importance to chiropractic as noted by Bingham (1993:iii) in 1.2.2.4 above. In fact, its full legitimization as a health science depends on it. Without it, chiropractic as separate discipline may well become an idiosyncratic irrelevance and the science and art of manipulation may well become the valued prerogative of other groups - groups who are willing to undertake the painstaking investigation necessary for the understanding and advancement of what can confidently be expected to remain a noble and important service to humanity (Kleynhans and Cahill 1991:105). Von Euler (1976:751) eloquently argues in favour of scientific research: 'Knowers, scientific and others, are valued as well as revered by their society. Their knowledge confers power, and the vast potential that is latent in scientific knowledge is the justification for the status and role of science and the scientists'.

It is argued that from the patient's viewpoint both a scientific approach (to result in better patient care) and a humanistic approach (to have consideration for human dignity) are desirable ways of investigating *chiropractic philosophy*. This theme is further considered under humanism and is discussed in 3.1.7 below.
3.1.5 Axiology in Chiropractic

Axiology is concerned with the nature of value (Print 1992:55) and includes questions such as ‘What is good about chiropractic and chiropractors?’ ‘What is desirable to patients and practitioners?’ Axiological questions are divided into two main categories: ethics and aesthetics (Zais 1976:119).

a) Ethics is concerned with concepts of good and bad, right and wrong, as they apply to a chiropractor's behaviour. The ethical positions of the curriculum developers influence the ethical bases they integrate into the curriculum (Print 1992:51). Their philosophical views will influence the ethical knowledge (of what is right and wrong) and the skills required for making future ethical decisions in chiropractic graduates.

Ethics is strongly influenced by 'human values (which) relate to the integrity of the individual, the individual's right to develop fully in harmony with their own personalities as human beings' and in this context, 'physicians are the ultimate defenders of the dignity of human beings' (Marshall 1987:215). 'To be a humane professional is to commit oneself to a critical assessment of what professions should offer, what goods they should nourish, what virtues they should make flourish' which requires 'the continuing balancing of distinct and often conflicting goals including: the good of individual patients; the good of society; the good of future patients and societies; the acquisition of knowledge; the good of the profession; and one's individual flourishing'; while 'success in balancing among these goals through the application of moral judgement will mark the professional and the profession as one that has either succumbed to excess or achieved virtue' (Engelhardt 1985:204).

The curriculum must ensure that these values are transmitted to students and that the responsibilities which students must be fully cognisant of should be experienced by way of case studies in the ethics component of the curriculum. Health care professionals are expected to be solicitous for their patients (who may be anxious or concerned about their welfare) beyond the limits of the 'practitioner-patient contract' and to help them in every way possible' i.e. the doctor, lawyer or psychologist will put the interest of the patient before their own or even their family's convenience and comfort (Marston 1979:435). It is argued that students must be provided with experiences to develop an appreciation of this part of the ethos of chiropractic, which should be inculcated during the entire course of study. Human subject research experience early in the medial curriculum is strongly advocated (Harrison 1997:212).
b) **Aesthetics** in chiropractic context is concerned with such value issues as beauty and enjoyment of human experience and practitioner-patient interaction. The improvement of human grace and form through alteration of posture through chiropractic care and the execution of well-coordinated psychomotor skills in assessing and treating patients are at the heart of aesthetics in chiropractic practice.

### 3.1.6 Holism as Philosophical Foundation

Holism, introduced into philosophy in 1926 by Smuts, has as its theme the integration of parts into wholes. It distinguishes wholes in the strict sense from mere aggregates, mechanical systems, and chemical compounds i.e. in a true whole, the parts lose forever their prior identity. Holism is seen in a philosophical and not a religious sense as a principle at work in the cosmos (Goudge 1972:69). As chiropractic philosophical foundation, holism provides a non-reductionistic approach to health care. The terms holism and wholism are interchangeable. Wholism is recognised as an "alteration" of "holism", and holds that "wholes must be studied as such, and that the parts can only be understood in relation to the wholes to which they belong" i.e. holistic or wholistic medicine therefore is a form of medical treatment that attempts to deal with the whole person and not merely with a physical condition (Simpson and Weiner 1989:549). The Penguin Macquarie Dictionary of Health Sciences (1989:156) describes holistic health as: '... a philosophy of health which considers a person as a functioning whole. All aspects of a person's life (physical, social, spiritual, mental) are regarded as integrated yet separated functional factors and therefore must be considered in health intervention programs. Such a broad concept of health care results in patient care which addresses emotional and social needs as well as physical well-being'. 'The holistic point of view sees and experiences a person or thing differently from the Cartesian (or reductionist) perspective. 'The whole, a system, is made up of parts but is something more than the sum of its parts. 'Holistic systems, by design, treat the person as a multidimensional organism in the context of her or his environment. 'Professionals draw on a variety of health-promoting or curative techniques. 'These systems are meant to appreciate patients as emotional, mental, social and spiritual, as well as physical beings' (Olsen 1991:8,4,5).
The principles of holistic medicine can be traced back through Hippocratic lineage through traditional and folk medicine with chiropractic arising from bone setting, herbalism from folk remedies, etc (Fulder 1986:235). While scientific medicine traces its origin to the same roots over the last 150 years, it diverged into an exaggerated expression of specificity principles linking ill health to a specific set of symptoms, defined as a specific disease, which is cured by the precise treatment for that condition. This is in marked contrast to the Hippocratism of holistic or traditional medicine, which regards ill health as a vulnerability derived from imbalances within the individual (Fulder 1986:235). While 'restoration of homeostasis is only possible by influencing mechanisms which facilitate the self healing capacities of the body'; the specificity approach of western medicine achieved complete dominance during the last century with the help of new drugs extracted, ironically, from the plants of the herbalist' (Fulder 1986:235). Traditional systems were effectively outlawed all over the modern world and a resurgence of interest only began in the 1960's mainly through the realisation that modern medicine bears a heavy cost in resources and side effects. In addition it became clear that many chronic conditions that are related to lifestyle such as back pain, or atherosclerosis, could yield to a more integrated or holistic approach (Fulder 1986:235). Holism in chiropractic therefore signals: a) clear recognition of the chiropractic paradigm as being different from the medical paradigm; b) recognition of a paradigm shift in health care from an essentially Cartesian reductionistic approach by western modern medicine to a holistic approach by a number of well-developed and in several instances, registered health professions with a great deal to offer the community in the choice of health care; c) a paradigm based on philosophy and science; d) a well-developed paradigm based on a recognised philosophical and scientific approach arising from the work by Smuts (1926) and a large number of workers in many fields who have applied and built on his work. Analysis of the literature indicate that not only has the paradigm gained the attention of health care practitioners in many fields, it has become a major driving force in exciting, innovative approaches in fields such as nursing, psychotherapy etc. (Fulder 1986:235; Olsen 1991:8; Library of Congress Subject Headings 1991:131).

The differences between a holistic health care discipline (e.g. chiropractic) and hospital-based orthodox western medicine illustrates a variation of philosophical approaches leading to different models and paradigms of patient care (Table 22).
An extension of the philosophy of holism in the context of modern health care relates to the concepts of wellness orientation with a focus on the whole person on one hand and disease oriented, reductionistic, orthodox medical intervention on the other. The striking philosophical differences and their influence on the curriculum appear in Table 23.
<table>
<thead>
<tr>
<th>HEALTH CARE ELEMENTS</th>
<th>A MEDICAL MODEL</th>
<th>A CHIROPRACTIC MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Orientation of health care</td>
<td>A disease orientation</td>
<td>Health oriented</td>
</tr>
<tr>
<td>2. Patient management orientation</td>
<td>Clinical management of signs and symptom complexes rather than people</td>
<td>Personalised/person oriented/offering holistic health care</td>
</tr>
<tr>
<td>3. Aim of therapeutic care</td>
<td>A therapy which aims at palliation rather than elimination of the cause</td>
<td>Care directed at the cause of the disorder</td>
</tr>
<tr>
<td>4. Field of competence</td>
<td>Competence in emergency situations</td>
<td>Demonstrating expertise in conditions affecting the musculoskeletal system</td>
</tr>
<tr>
<td>5. Diagnostic technology used</td>
<td>A reliance on advanced technology for diagnosis and patient management</td>
<td>Reliance on imaging and low technology physical and biomechanical assessment</td>
</tr>
<tr>
<td>6. Pathophysiological mechanism as focus of care</td>
<td>A focus on biochemistry both in diagnosis and treatment (drugs)</td>
<td>Focusing on biomechanical (and neural) causes of dysfunction</td>
</tr>
<tr>
<td>7. Diagnostic emphasis in relation to development of health problem</td>
<td>Diagnosis at a stage of gross structural pathology</td>
<td>Emphasising the early diagnosis of functionally reversible conditions</td>
</tr>
<tr>
<td>8. Therapeutic management rationale</td>
<td>Intervention by means of 'interference' using drugs or surgery rather than facilitating the body's healing response</td>
<td>Intervention by means of adjustment a 'hands on' approach directed at restoring or facilitating the body's natural healing potential</td>
</tr>
<tr>
<td>9. Approach to health</td>
<td>An inadequate definition of health (the absence of signs and symptoms being taken as evidence of health)</td>
<td>Recognising the central importance of the nervous system in health</td>
</tr>
<tr>
<td>10. Etiological focus of care</td>
<td>Its germ theory origins and disease prevention</td>
<td>Identifying and correcting chiropractic subluxations</td>
</tr>
<tr>
<td>11. Locus of care</td>
<td>A hospital-based system of care</td>
<td>Oriented towards health maintenance Community clinic-based care</td>
</tr>
<tr>
<td>12. Professional stratification</td>
<td>Specialisation and a professional hierarchy</td>
<td>Primarily general practice-based</td>
</tr>
</tbody>
</table>

Based on data extracted from Jamison 1985A:18.
<table>
<thead>
<tr>
<th>HEALTH CARE ELEMENTS</th>
<th>DISEASE ORIENTED MODEL</th>
<th>WELLNESS-ORIENTED MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Type of management/intervention</td>
<td>Therapy</td>
<td>Prevention</td>
</tr>
<tr>
<td>2. Stage of intervention</td>
<td>Later stage illness</td>
<td>Early departure from health</td>
</tr>
<tr>
<td>3. Processes influenced</td>
<td>Intervention in biologic processes</td>
<td>Seeking optimal operation by improving the conditions under which biologic processes operate</td>
</tr>
<tr>
<td>4. Focus of intervention</td>
<td>Focus on parts of the body</td>
<td>Focus on the total person</td>
</tr>
<tr>
<td>5. Care orientation</td>
<td>The physician</td>
<td>The patient as the source of health and the agent of care</td>
</tr>
<tr>
<td>6. Therapeutic management approach</td>
<td>Preoccupation with the disease process</td>
<td>Concern about the disease origins, from causes to the factors that permit them to be causes</td>
</tr>
<tr>
<td>7. Patient management focus</td>
<td>Specificity and multiplicity of diseases</td>
<td>Susceptibility to illness in general</td>
</tr>
<tr>
<td>8. Timeframe of therapeutic management</td>
<td>Acute crisis and episodic treatment</td>
<td>Long term care</td>
</tr>
<tr>
<td>9. Context of therapeutic management</td>
<td>Addressing acute episodic problems in isolation</td>
<td>Dealing with the context of the total life and health status of the patient</td>
</tr>
<tr>
<td>10. Clinical emphasis</td>
<td>Worship at the feet of etiologic diagnosis of disease</td>
<td>Emphasising normal structure, function and homeostasis, with its inherent rhythmicity and need for efficient neural communication</td>
</tr>
</tbody>
</table>

### 3.1.7 Humanism and Chiropractic

Humanism is any philosophy which recognises the value or dignity of humans and make them the measure of all things or somehow takes human nature, its limits, or its interests as its theme (Abbagnano 1972:69). Print (1992:67) relates the humanistic or personal conception of the curriculum to the notion that learners should be provided with intrinsically rewarding experiences to enhance personal development such as their individual self-concept in order to achieve self-actualisation. In the context of philosophy and chiropractic, humanism relates to patient care and should be seen in a wide context where the curriculum should provide experiences to inculcate in the future practitioner those humanistic values necessary for the creation of a healing climate, characterised by empathic, ethical care. This demands an attitude of caring for the patient and, in order to promote practice and teaching informed by research, a basic understanding of qualitative research methods (Kleynhans 1991C:166).

Authors and leaders from various health care disciplines and specialties call for attention to the humanistic aspects of practice which, some claim, have become lost in a technocratic society (Table 24).

<table>
<thead>
<tr>
<th>AUTHOR</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balla (1989B:vii)</td>
<td>A good doctor needs to have empathy, high ethical principles and excellent communication skills. In fact, many of the complaints leveled against the profession concern these latter issues.</td>
</tr>
<tr>
<td>Baron (1981:5; 1985:606 1990:25)</td>
<td>&quot;Patients come in with discomforts, anxieties and dysfunctions which they would like to be addressed, explained, and fixed&quot;. Clinical practice occurs at the intersection of a patient's need and the doctor's power and impotence. In applying incomplete knowledge as well as can be managed, the doctor requires above all a recognition that &quot;we have only each other to work with&quot;. In this context, misdiagnosis, loss of trust, inappropriate treatment and non-compliance may result when the patient is not allowed the opportunity of expressing their feelings.</td>
</tr>
<tr>
<td>Daniel (1990:8)</td>
<td>Among projects to advance the development of hermeneutics in medicine should be the &quot;re-examining and overcoming of the supposed dichotomy between value-free explanation in science and value-laden understanding in the humanities&quot;.</td>
</tr>
<tr>
<td>Donabedian (Quoted by Nelson 1971)</td>
<td>&quot;We need to understand more profoundly the nature of the interpersonal exchange between patient and practitioner, to learn how to identify and quantify its attributes, and to determine in what ways these contribute to the patient's health and welfare&quot;.</td>
</tr>
</tbody>
</table>
There is a pressing need for value-laden, humanistic medicine. Barbour's humanistic growth model (discussed below) should be followed. Caution should be taken against medicine being pervaded by scientism.

Fletcher (1987:106) Humanly-centred values should be the basis of biomedical ethics and should be contrasted with a theistic basis.

Fonkalsrud (1990:1255) The surgeon of today and tomorrow must maintain a humanistic relationship with the patient and the patient's family, for holding the trust of others as a professional is a privilege that carries broad responsibilities.

Kettelkamp (1989:959) The unique combination of humanistic characteristics and scientific knowledge are pre-requisites to the practice of high quality orthopaedics.

Kleynhans (1990A:133; 1991C:166) Phenomenology and other qualitative research methods should be employed to examine philosophical issues related to caring for chiropractic patients.

Kleynhans and Cahill (1991:106) Multiple paradigms should be developed in chiropractic research, including qualitative, humanistic approaches.

Nelson (1989:489) There should be a balance between the science and the art of medicine. Human understanding is needed along with technical skills and scientific knowledge in the care of the suffering. Along with humanism, diligence, altruism and ethics, doctors should develop a "special sense, instinct or heightened awareness" which is enhanced by experience, but is more than experience.

Peabody (1927:877) Medical practice in its broadest sense includes the whole relationship of the practitioner and the patient. It is an art, based to an increasing extent on science, but comprising much that still remains outside the realm of any science. The art and science of practice are not antagonistic but supplementary to each other. One of the essential qualities of the clinician is interest in humanity, for the secret of the care of the patient is in caring for the patient.

Pellegrino (1979:3-230) He gives an eloquent, extensive exposition of medicine and the idea of humanism in the prologue of his book. He covers the medical uses of the humanities, (pp.3-92) humanism and medical ethics (pp.93-152) and humanistic medical education (p.153-221). He emphasises humanism as an integral part of medical practice and in his epilogue (pp.222-230) addresses the topic 'To be a physician'.
The growth model of Barbour described by Doran (1983:1833) provides a model which eloquently addresses the humanistic aspect of practice. Barbour suggests that physicians, by seeing themselves as a catalyst or change-agent, can activate latent forces within their patients, which will both aid their healing and assist their development as persons. Physicians must have a paradigm for humanistic health care, which reminds them of relevant basic assumptions (Doran 1983:1833) a point supported by Kriel (1987A:2) discussed in 3.1.1 above. The challenge is to transmit to students the following concepts, based on Doran (1983:1833), so that they would make them their own:

a) The patient cannot be seen simply as a disease; neither can health practitioners limit their care to technology.

b) Every person achieves a unique interdependent relationship of body, mind, emotions and spirit inseparable from other individuals and society. Illness can best be understood as a disturbance within the dynamic balance of this relationship.

c) The patient and the health professional are colleagues. The patient is encouraged to be aware of choices and to become increasingly responsible for their own growth, health and fulfilment.

d) Illness may provide an opportunity for one's personal growth. The experience of disease may be used creatively to re-evaluate life goals and values. The aim of the health professional here is to help the person maintain dignity and identity, and to evolve a positive value.

e) Illness must be seen in the context of the life span of the individual'.

Some of the essential elements of the Barbour’s growth model have been incorporated by Vernon (1991:379) into an ‘illness behaviour model’ in the chiropractic management of low back pain patients and is characterised by concern for the illness behaviours of patients, emphasis on ambulatory care to maintain and attain movement of structures, rational explanation to patients, emphasis on full functional recovery rather than symptomatic relief; and the role of the chiropractor as an empathetic care giver.

Engelhardt (1985:203) says that the health care professions have both the human body and mind as their objects. It is argued that to convey this to future chiropractors and to reinforce Barbour's growth model and Vernon’s illness-behaviour modification model, teachers need to counterbalance the focus on deranged tissue in pathology with a holistic and humanistic approach to the study of diagnosis and management. When the focus of pathology is on the
disordered tissue or organ, the person of whom the tissue is a part is in a sense taken as irrelevant to the study of the disease. Conversely, a phenomenological, humanistic approach helps graduates to understand the 'unique interdependent relationship of body, mind, emotions and spirit' to which Barbour refers. More extensive focus on the various phases of the human life cycle would enhance such an appreciation. These points suggest the need for a major change to the traditional curriculum so that students may benefit from a detailed study of the differences between the traditional medical model (called *scientific medicine*) and a model for *humanistic health care* sketched by Halstead and Halstead (1978:53-7) in Table 25.

### TABLE 25 - Comparison of elements of scientific and humanistic medicine

<table>
<thead>
<tr>
<th>HEALTH CARE ELEMENTS</th>
<th>SCIENTIFIC MEDICINE</th>
<th>HUMANISTIC MEDICINE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Process</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Problem orientation</td>
<td>Disease</td>
<td>Illness</td>
</tr>
<tr>
<td>2. Physician's role</td>
<td>Doer, Knower</td>
<td>Teacher, Learner</td>
</tr>
<tr>
<td>3. Patient's role</td>
<td>Passive</td>
<td>Active</td>
</tr>
<tr>
<td>4. Physician's relation to patient</td>
<td>Reserved</td>
<td>Empathetic</td>
</tr>
<tr>
<td>5. Physician's relation to health team</td>
<td>Dominant</td>
<td>Facilitative</td>
</tr>
<tr>
<td>6. Physician's relation to colleagues</td>
<td>Competitive</td>
<td>Collaborative</td>
</tr>
<tr>
<td>7. Therapeutic approach</td>
<td>Treatment of disease</td>
<td>Management of illness</td>
</tr>
<tr>
<td><strong>B. Organizational</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Physical setting</td>
<td>Impersonal</td>
<td>Personal</td>
</tr>
<tr>
<td>9. Care orientation</td>
<td>Physician (staff) oriented</td>
<td>Patient oriented</td>
</tr>
<tr>
<td><strong>C. Outcome</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Objectives</td>
<td>Curing</td>
<td>Healing</td>
</tr>
<tr>
<td></td>
<td>Enhancing physiological function</td>
<td>Enhancing functional performance</td>
</tr>
</tbody>
</table>

From: Halstead and Halstead 1978.

#### 3.1.8 Discussion

There is evidence to suggest that while the philosophical foundations of the chiropractic curriculum have reference to ontology, epistemology, axiology, holism, logic, humanism etc; no realistic claim can yet be made for the existence of a philosophy of chiropractic and that the term *chiropractic philosophy* subsumes a nebulous array of concepts which mean different things to different people and often deals with assumptions or matters which can be readily addressed by science or philosophy, or are untestable or not properly philosophical at all (Kleynhans 1990A:134).
Current literature reveals extremes of science and of dogma in the approach to chiropractic philosophy and it is argued that adherence to dogma ex cathedra in chiropractic cannot lead to the pursuit of professional meaning, wisdom and growth. In fact, the "need" for what has been dogma in chiropractic should be satisfied by new approaches, acceptable to the academic and broadly based scientific communities, based on the teaching and investigation through qualitative methods of the humanistic elements of chiropractic practice. The terms chiropractic philosophy and philosophy of chiropractic can be profitably deleted from the curriculum and replaced with terms such as: "philosophical bases of chiropractic or philosophical approaches to chiropractic". In this process logic, as the systematic treatment of ideas, is of immeasurable value to the curriculum developer and has lasting value superior to both intuition and emotional consensus (Print 1992:57). Ontology, epistemology, axiology, ethics and holism represent the different aspects of philosophy which influence and are in need of particular consideration by chiropractic curriculum developers both to answer fundamental questions and serve as chiropractic curriculum content (Kleynhans 1991B:144), a process which should be guided by logic (Print 1992:57).

It is argued that chiropractic investigation requires not only the 'traditional' reductionistic scientific method but also qualitative approaches such as phenomenology and hermeneutics and the recognition of philosophy and a philosophical basis of chiropractic through the application of logic, ethics, holism, humanism, etc to chiropractic education and practice i.e. questions need to be addressed via the methods and processes of philosophy and science (Kleynhans 1991C:166), while chiropractic research needs to accelerate the investigation of principles through the scrutiny and discipline provided by both quantitative and qualitative research methods. To enhance chiropractic research it behoves teachers to develop in chiropractic students a love for science and scholarship based on the capacity for critical thinking (Kleynhans 1991C:166).

It is argued that it is clear from the literature (Engel 1978:169/Kriel 1987A:2 and others) that the conceptual models (philosophical views) in terms of which knowledge and experience is organised very strongly influence the way teachers and future practitioners will respectively approach and respond to their students' and patients' problems and needs. It is therefore stressed that the curriculum developers must be intimately aware of and include the curriculum considerations adequate coverage of concepts relating to the philosophy of education and to chiropractic science, human service, subjectivity, interactivity and
multidimensionality. It is argued that both teachers and learners should become thoroughly familiar with the chiropractic belief system and principles, particularly with holism and humanism as philosophical foundations including the growth model for humanistic health care, the wellness paradigm, and the chiropractic model of health care. It is also argued that learning experiences need to be created throughout the curriculum where concepts arising from the philosophical foundations can be introduced or reintroduced for learners to interact with until they have made them their own.
3.2 A CLARIFICATION OF THE SOCIOLOGICAL AND CULTURAL FOUNDATIONS OF THE CHIROPRACTIC CURRICULUM

3.2.1 Introduction

3.2.1.1 The character of a culture

The character of the culture that provides the curriculum context influences to an extremely high degree the nature and organisation of curriculum objectives, content, learning activities and evaluation' (Zais 1976:156). How changes in the social structure at various levels influence the institution offering the curriculum is elucidated by a review of the concepts culture and society. Culture is a particular form, stage, or type of intellectual development or civilisation in a society; a society or group characterised by its distinctive customs, achievements, products, outlook etc; the way of life of a society or group (Brown 1993:568). A society therefore is a collection of individuals who have organised themselves into a distinct group e.g. the chiropractic profession. However, to be a group in society, e.g. the chiropractic profession, the members of the group must perceive themselves as having things in common which enable them to belong. T.S. Eliot (1948:36) says that culture, in a sense, can be conceived as the voluntary association of like-minded individuals based upon common material interest or common occupation or profession, however culture is not merely the sum of several activities but a way of life. Concepts adapted mutatis mutandis from Zais (1976:157) and Smith, Stanley and Shores (1957:4) suggest that the chiropractic culture may be viewed as a kind of social cement that consists of the characteristic habits, ideals, attitudes, beliefs, and ways of thinking of the group. While the chiropractic profession and chiropractic culture are certainly not the same thing, without a chiropractic culture there could not be a separate chiropractic profession; and without a chiropractic profession there could not be a chiropractic culture. The importance of a chiropractic culture arises from the fact that the views of the profession expressed in terms of its core values, vision, paradigms and other determinants of a chiropractic culture, must of necessity be reflected in the chiropractic curricula of the universities which teach chiropractic, or their curricula must set out to change those assumptions (Kleynhans 1998A:49). The determination of what needs to be done by the chiropractic profession in further developing its culture therefore hangs on the ability of chiropractors to examine and re-examine what they are about in the context of the much wider society and culture which they serve (Kleynhans 1998A:49).
Sociological and cultural foundations which influence the chiropractic curriculum relate to several issues outlined in Table 26, about which Musgrave (1979:38-9) poses a range of questions in relation to society and the curriculum. Many of the questions can be answered by conducting a situational analysis of the profession as outlined below.

**TABLE 26 - Curriculum design questions about the sociological and cultural foundations of the chiropractic curriculum**

1. **Control:**
   - Which groups control the educational system, the institution and/or relevant department?
   - How do they exercise their control?
   - Which ideologies influence groups who exert control over the curriculum?

2. **Resource allocation:**
   - Who takes decisions about resource allocation?
   - What influence do decisions about resources have upon the curriculum?

3. **Structural setting:**
   - How do changes in the social structure at various levels, influence the institution offering the curriculum?

4. **Ideological and cultural setting:**
   - Which ideologies impact on academic or other issues about the curriculum?
   - What part do the belief systems about the role of chiropractors and their place in the health care community play in the curriculum?

5. **Curricular dimensions:**
   - How do social factors influence the curriculum content and approaches to its implementation and assessment?

Tabulated from the work of Musgrave (1979:38-9) and adapted *mutatis mutandis* to chiropractic.

### 3.2.1.2 Culture, education and change

The curriculum, to a large extent, "reflects" society and the profession and then leads both to change. Where it is used as a tool for change, the role of the chiropractic curriculum in deliberately changing professional, cultural and therefore societal aspects is tremendous (based on Print 1992:59). Niblett (1969:4) eloquently addresses the role and responsibility of universities in relation to societal and cultural change. He says that if even universities cannot at times stand over against their society to comment upon it, and if these cannot be places which are powerfully normative and directive in some of their influence, to what other agency can we hopefully look for leadership in our time? 'If this is not part of their job, whose job is it? It is on them more than on any other institutions that we depend for the production of enough people to run our sort of civilization - but running it includes not merely adding
technical devices to it, but supplying a good quality of motive spirit with which to make it go.'

Zais (1976:157) says that schools were invented by social groups to secure the survival of the cultural heritage and that it is therefore not surprising that society and its culture exert an enormous influence on the curriculum. These influences are in the form of traditional, often unconscious, assumptions, values, ideas and ideals about what is important or unimportant, good or bad; which are translated into curriculum objectives, content and learning activities (Zais 1976:15). Johnson (1967:131,132) in fact, notes that the source of curriculum - the only possible source - is the total available culture.

However, there is a danger of interpreting education to cover both too much and too little - too little when it implies that education is limited to what can be taught, too much when it implies that everything worth preserving can be transmitted by teaching (Eliot 1948:4). The character of the culture that provides the curriculum context influences to an extremely high degree the nature and organisation of curriculum objectives, content, learning activities and evaluation (Zais 1976:156). The Oxford Conference on Church, Community and State (1937:1) commented that:

a) Education is the process by which the community seeks to open its life to all the individuals within it and enable them to take their part in it.

b) Education attempts to pass onto students its culture, including the standards by which it would have them live.

c) Where a culture is regarded as final, the attempt is made to impose it on younger minds, where it is viewed as a stage in development, younger minds are trained both to receive it and to criticise and improve upon it.

d) A culture is composed of various elements, it runs from rudimentary skill and knowledge up to the interpretation of the universe and of man.
3.2.1.3 Research methods

This study is based only on a descriptive analysis of the literature, participant observation and a case study of aspects of chiropractic education at RMIT University. Methods to obtain information on the sociological and cultural aspects of the chiropractic profession include descriptive analysis of the literature and ethnography which is an anthropological process to develop theories about groups. It is a factual description and analysis of the way of life of a particular culture or subcultural group ranging from a broad, long-term study of a complex society (macroethnography) to single units (microethnography); for which, through participant observation and intensive interviewing, the researcher determines the meaning such subcultures attach to activities, events, behaviours, knowledge and other aspects of their lifestyle to produce an ethnography or portrait of a people (Germain 1986:147). An ethnographic study of chiropractic by Cowie and Roebuck (1975) is an example.

3.2.2 How Control is Exerted on the Chiropractic Curriculum

A range of groups both internal and external to the institution offering the program, including society itself exerts control. The groups and the way in which they exert control vary with the context in which the curriculum is managed e.g.: whether it is offered in a university or private college; how it is funded and who controls funding in a university or in a private college, etc. While curriculum developers both transmit and reflect the culture of which they are part, indirectly, society and culture influence curriculum developers, simply because they are members of a particular society (Print 1992:58-9). Social and cultural forces directly and indirectly affect profoundly every curriculum decision they make particularly on course content. Their role is discussed extensively in 2.1.2 above.

3.2.2.1 Control of the curriculum by external groups

While not directly controlling the curriculum, certain groups and organisations have well established outcome parameters to be met by the chiropractic curriculum in order to allow graduates the privilege of professional registration. In Australian context, two such organisations exist: a) The Joint Education Committee of Participating Chiropractors and Osteopaths Registration Boards (JEC) which has established extensive documentation detailing the requirements, processes and procedures for external accreditation by JEC of institutions who seek to have their awards prescribed for registration by relevant boards (JEC
The Australasian Council on Chiropractic Education is an external accrediting body which has long established, regularly updated documents including *Accreditation procedures and standards for chiropractic education* (ACCE 1997:5).

Table 27 provides details of how the external groups control the chiropractic curriculum at RMIT University.

**TABLE 27 - How external groups control the chiropractic curriculum**

| THE AUSTRALASIAN COUNCIL ON CHIROPRACTIC EDUCATION |  |
| Composition | Members drawn from educational institutions, the community, higher education institutions and the professional association. |
| Role | To accredit first professional chiropractic courses; advise prospective students, the profession, government, registration boards and the community at large on chiropractic education. To allow for reciprocity between Australian and overseas sister accrediting organisations such as the U.S. Council on Chiropractic Education. |
| Extent of Control | Institutions seeking accreditation must meet the specifications of the Council. Hence, Council exercises considerable control over minimum content and outcomes of the program. |
| Timelines for Control | Programs are accredited for 3-5 year periods and must submit annual reports. Required curriculum change is implemented over a period of 1-3 years. |
| Control Mechanism | The Commission on Accreditation of the ACCE reviews institutional progress and responses to requests for change. Such suggestions are ignored at the peril of the institution if it wishes to retain accreditation. |

| THE JOINT EDUCATION COMMITTEE |  |
| Composition | Representatives of participating registration boards, educational institutions, experts in the field of education and of chiropractic. |
| Role | Accreditation of educational programs for the purpose of prescription of awards for registration, protection of the community through maintenance of minimum, adequate educational standards for future registrants. |
| Extent of Control | Very significant in view of the fact that educational institutions need to have their graduates meet registration requirements. The Australian chiropractic curriculum therefore has to be designed to meet all specifications set by the JEC. |
| Timeline for Control | Annual reports need to be submitted. Accreditation inspections are conducted as often as necessary, normally once every five years, during which time institutions need to provide evidence that all requirements and procedures are being met. |
Institutions which do not meet the educational specifications of the JEC or implement suggested change may lose accreditation and thereby the registrability of their graduates.

3.2.2.2 Control of the curriculum by internal groups

Internal groups that exert control over the curriculum include committees, boards and councils appointed by the institution. Some consist of paid members of staff only. In case of a University or Technikon they could be either internal or external to the unit responsible for the chiropractic program, while other committees may exclusively consist of staff from the unit responsible. In a private college this includes staff who teach in the chiropractic sciences and/or in the basic medical and diagnostic sciences. An example of how control is exerted on the chiropractic curriculum at RMIT University follows in Table 28.

TABLE 28 - How internally appointed groups control the chiropractic curriculum

<table>
<thead>
<tr>
<th>STAFF-STUDENT CONSULTATIVE COMMITTEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composition</td>
</tr>
<tr>
<td>Extent of Control</td>
</tr>
<tr>
<td>Timeline for Control</td>
</tr>
<tr>
<td>Control Mechanism</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CURRICULUM REVIEW COMMITTEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composition</td>
</tr>
<tr>
<td>Role</td>
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</tbody>
</table>
A strong focus of meetings is on articulation of content through vertical and horizontal integration.

**Extent of Control**
Direct and considerable. The members may in fact be the curriculum developers for the program. The decisions of this group will almost certainly determine the effectiveness of the program and contribute to the learning climate as influenced by student workload, effectiveness of integration of content and relevance of the assessment.

**Timeline for Control**
Adjustments to curriculum implementation can be made each semester, refinements can be made annually.

**Control Mechanism**
Advice is provided to academic staff, the curriculum development group, Head of Department and Course Advisory Committee.

### CURRICULUM DEVELOPMENT COMMITTEE

**Composition**
Members of staff selected for their special skills, orientation and vision.

**Role**
To conduct a situational analysis on the basis of which the curriculum is modified and revitalised so as to meet curriculum intent.

**Extent of Control**
Maximum, direct control more than any other group although input from all other groups and consensus by all groups is highly desirable for successful implementation.

**Timeline for Control**
Every 3-5 years.

**Control Mechanism**
Advice to the head of the program and relevant university committees e.g.: a courses committee, faculty board, reaccreditation committee etc.

### COURSE ADVISORY COMMITTEE

**Composition**
External members with particular expertise derived from the profession, other higher educational programs, relevant consumer groups and internal members e.g.: a Head of Department or head of a chiropractic program where this is not the Head of Department.

**Role**
To provide advice on restructuring and implementation of the curriculum with a particular focus on community and professional needs.
### Extent of Control

Considerable direct control. While the committee only provides advice, repeated advice must be heeded in order to ensure continued participation of expert membership.

### Timeline for Control

Bi-annual meetings.

### Control Mechanism

Minutes of advice given is transmitted to relevant department and faculty committees including faculty board.

### STAKEHOLDER TASK FORCE GROUPS

#### Composition

Members of staff with a direct interest in curriculum delivery for a specific year (horizontal integration) or a specific discipline or sub-discipline (vertical integration).

#### Role

To focus on fine aspects of integration and to make fine adjustments in relation to minor variations relating to cohorts of students taken into the course.

#### Extent of Control

Major, direct control over the implementation of finer aspects of the curriculum.

#### Timelines for Control

Every semester and year is reviewed on a regular basis.

#### Control Mechanism

Awareness of detailed content and finer approaches to teaching-learning strategies and assessment enable students to have minimum overlap, maximal integration of content, greatest relevance, lack of overload and hopefully a better learning climate.

---

(Based on observation and analysis of practice at RMIT University, Australia).

The considerable influence exerted on the curriculum as a result of the worldview and ideologies of curriculum developers is discussed in 2.1 above. It seems reasonable to argue that these principles can be applied to some extent to all persons involved on internal and external groups who make decisions about the chiropractic curriculum.
3.2.3 Resource Allocation to the Chiropractic Curriculum

Decision-making about resource allocation is greatly influenced by the source(s) of funding e.g. a government funded course at a university; a fee paying course at a university; a fee paying course at a private, single purpose institution with or without some form of government grant (such as capitation grants in the U.S. and county scholarships in the U.K.); or any other situation. While a full review of this process internationally is beyond the scope of this dissertation, an illustrative case appears below.

The resources available will determine which teaching-learning strategies are able to be implemented and will have particular relevance to the establishment of tutorial groups as compared with lectures; the size of the practical groups vital to the teaching of chiropractic and diagnostic psychomotor skills; the extent of the supervision which can be applied in the clinical setting (i.e.: a student:staff ratio of 7:1 may need to be implemented due to lack of resources while a 3:1 ratio would be more appropriate, especially during the initial months of clinical practicum training) and the extent to which class materials, teaching-learning equipment and modern technology can be introduced.

External funding determines course duration and teaching load and hence influences the extent to which content may be included in the curriculum. Because of information overload and fiscal and time constraints, curriculum time has to be carefully apportioned to the various discipline areas.

Participant observation by the author in the context of RMIT University indicates that resource allocation decisions are made at several levels:

- The Department of Employment, Education and Training of the Federal government allocates funding for approved university courses on a weighted formula basis e.g. the weighting for medicine being more than double that for accounting. Funding is supplied to universities on the basis of weighted student numbers.

- Universities have the right internally to establish their own weightings on the basis of which funds are then supplied to faculties.

- The faculties have the right to establish their own internal funding formulae on the basis of which commonwealth operating grant (COG) funds for education are distributed to the teaching departments. Currently this is on a weighted equivalent full time student unit (WEFTSU) basis with a factor built in to reward research in the departments via a formula related to a 'research quantum'.


At departmental level the Head of Department has discretion in the expenditure of COG funds which are used almost 100% to cover staff salaries. A small amount is used for operating expenses, which need to be mainly covered through external earnings by the department from various sources. How much of the government-funded resources are eventually made available for the implementation of the chiropractic curriculum at departmental level is influenced to a considerable degree by the proportions deducted for university and faculty overhead costs. These provide infrastructure support in terms of teaching and learning facilities including clinics, library and learning resource services; support for an education quality research and development group, maintenance of student data bases; etc. In any event, participant observation suggests that the impact exerted on the chiropractic curriculum by resource allocation is very considerable and can greatly influence outcomes in terms of the quality of graduates.

A significant sociological problem affecting the chiropractic curriculum is attributable to the fact that chiropractic has not been part of the mainstream of health services in Australia until recently and is not included in hospital-based services. Other health professions e.g.: physiotherapy, medical laboratory technology, radiography and radiotherapy, have for a long time undertaken part of their training in government-funded hospitals where money has been provided via the State Health Department to cover their training in return for which hospitals were provided with trainee services. In practical terms, this means that the training of health professionals in medicine, physiotherapy etc is supported through both the education budget as well as the health budget while chiropractic education is supported solely through the education budget which has to be augmented through the operation of private, fee-paying public clinics to offset running costs while also supplying the patient base necessary for clinical practicum training of students. Resource allocation to the chiropractic curriculum is therefore severely curtailed by the socio-cultural milieu in which the program has been established. Since no provision is made in either the education or the health budgets to provide for the clinical training of practitioners, ongoing work will be required to reach optimum funding levels and this will depend on greater acceptance of chiropractic educational requirements and the benefit of chiropractic services to society by the decision-makers at various levels, both external and internal to the university.
3.2.4 Structural Setting of the Chiropractic Curriculum

3.2.4.1 Introduction

The setting is determined by influences exerted, *inter alia*, by society, the professions, the higher education system and the teaching-learning milieu. Some variation can be expected to occur depending on placement of the chiropractic program in a multi-disciplinary University or a single-purpose, private college. While the influences exerted by society, via the statutory boards or the general public perception and the demand for services are assumed to be similar, the way and extent to which the profession and governing boards (e.g. Board of Trustees or College Council) exert influence on the curriculum appears to vary greatly. It is argued that such varying influences result in perceptible differences in the ethos of different chiropractic institutions and in the world-views of their students and graduates. Ideological differences among chiropractic groups are apparent, and prompted Owens (1991:1) to say that cultural and social changes and expectations, rather than the views of special interest groups in the profession, should influence chiropractic curriculum development. Drake (1990:1) relates the influences of ideology and philosophy on the curriculum to accreditation: 'CCE (U.S. Council on Chiropractic Education) standards do not discriminate against any particular type of philosophy or college of chiropractic, and they do not prohibit any institution from espousing a particular philosophy or school of thought. However, if that school of thought or philosophy has been translated into institutional policy so that it directs and limits the curriculum and education and training available to its students, it has the potential for affecting the accreditation of the institution.'

3.2.4.2 Professional influences

Participant observation indicates that the chiropractic profession in Australia has the following avenues through which influence can be exerted on the chiropractic curriculum:

- Representation on Course Advisory Committees.
- Representation on inspection teams of the ACCE and the JEC mentioned above.
- Representation on internal accreditation committees of the Universities.
- Direct liaison between the professional association and educational institution.
Groups within the profession who exert very considerable influence on the chiropractic curriculum by influencing students through seminars and workshops conducted external to the institution. These are heavily based on ideological concepts related to the so-called chiropractic philosophy considered in 3.1.2 above and have a major impact on the informal curriculum and the professional ethos established through these various activities. This influence creates a tension between students and teaching staff who are not ideologically aligned.

- Professional documentation of standards of practice, codes of conduct and position papers developed by the professional associations.

- Role-modeling provided by practitioners in terms of the practices and procedures they embrace and the types of patients they see (NBCE 1994:73-75; 83-91)

While receiving extensive input in various ways from the profession, chiropractic educational institutions have the responsibility to lead the profession by preparing future practitioners who have those attributes which the institution undertakes to instil in future graduates via the educative moulding process. This is usually with concurrence of the profession but not necessarily so. This concept is further discussed under the professional reconstructionist paradigm in Table 38 under 3.4.2 below.

3.2.4.3 Higher education system influences

The major role of universities which is to preserve, generate and transmit knowledge, values and skills and Warren Piper (1993:81-85) suggests that validation through research is required of what is taught. Influence of the Higher Education System on universities and courses has been extensive through ongoing publications and research, in some cases linked to funding strategies (Examples include: Anderson 1990:22; Anderson and Jones 1986:1; Brubaker 1977; Bruner 1965; Carnegie Commission on Higher Education 1973:1; Eggins 1988; Moses and Trigwell 1993; Nisbet 1988:90; Tight 1988; Tinkler et al 1994; Sheldrake PF et al 1978:1; Sheldrake and Linke 1979:1).
Analysis of the directory by McNamee (1997) indicates that major chiropractic pre-registration programs in various countries produce graduates of approximately the same standard. There is, however, a significant difference in entry levels, duration of training and nomenclature due to differences among educational systems. In the U.S.A., (based on the German model of education), a doctorate is awarded as the first professional award in chiropractic (D.C.), medicine (M.D.), osteopathy (D.O.), and dental science (D.D.S.). Since the inception of chiropractic education at the turn of the century, the U.S. award has been the Doctor of Chiropractic (D.C.) degree. In Australia, RMIT University awards a double bachelor, analogous to that in medicine (RMIT 1997:43).

3.2.4.4 The influence of teaching learning milieu

Niblett (1969:254) says that in order to become a person, an individual needs to grow up in a culture, and the richer the culture the more of a person he/she has a chance of becoming. He states that the central purpose of institutions of higher education is to educate adults as well as young people; and the aim of education is to develop each individual as fully as possible, to make persons more human. He suggests that education depends heavily upon the culture of the society in which it is given - a culture produced and sustained by shared experiences, often expressed through symbols (Niblett 1969:254). Education for individual development is therefore inconceivable without a curriculum deeply based in a cultural heritage (Sanford 1969:11) which is provided in the teaching institution. Cultural values, attitudes and beliefs are acquired by individuals unaware of that process, yet, once acquired, these cultural traits become consolidated and affect social behaviour (Print 1992:59). In this regard Niblett (1969:255) cautions that if universities are preoccupied with research or exact scholarship as ends in themselves, they will fail to influence society or social development as it is imperative they should do. An example of how the teaching-learning milieu can be influenced by focusing on the student as client and by emphasising student support is given in 5.1 below.
3.2.5 The Ideological and Cultural Setting of the Chiropractic Curriculum

The ideology of the discipline is expressed in terms of the chiropractic culture, social role of health care practitioners in general and of chiropractors in particular:

3.2.5.1 Towards the definition of a chiropractic culture

a) Chiropractic work as cultural act

A UNESCO collaboration of six European countries concluded that every individual and every culture must be allowed to develop on the basis of their own potentialities and needs, but that we need to be aware that there are conflicts between different patterns of life associated with work (Heurling 1989:1). They say that work can be seen as a cultural act. Work, as a dominating element in chiropractors’ lives can be created and stimulated but it may also have a detrimental effect, imposing a ceiling on development. It is argued that a too narrow definition of chiropractic or oversimplification of a chiropractic paradigm will in fact impose such a ceiling on the professional development of individuals and hence the advancement of the profession as a cultural group. Heurling also says that work constitutes a part of people’s pattern of life and different groups have different life patterns in common that give them a sense of identity. By adapting the work of Heurling and others, it is argued that there is a degree of internal differentiation, i.e. a plurality of bodies of knowledge that have been made to evolve and co-exist within the wider universe of chiropractic knowledge. It is further argued that, as a result of this internal differentiation, there is a type of boundary-formation between major sub-cultural groups within chiropractic with a tendency to develop boundaries between their bodies of knowledge which, at the extremes of the continuum, tend to be crisp with clear differentiation between the ideological approach at the one extreme and a very broad-based eclectic approach at the other. Towards the centre of the continuum the boundaries tend to be more blurred and fluctuating while, at the extremes of the continuum, the boundaries tend to be very stable with little chance of people changing their minds. It is argued, on the basis of participant observation, that, in general terms, the life patterns associated with work as a chiropractor, an osteopath and a medical practitioner are in fact different and give to each group a separate identity. It is further argued that even within the closely knit culture of chiropractic, as a result of different life patterns such as those associated with a limited scope chiropractic practice as compared with a broad scope of
practice (utilising multiple modalities of therapeutic intervention), the necessary conditions exist for cultural multiplicity and pluralism to prevail.

b) Chiropractic culture and symbolsim

Geertz (1973) says that culture is not something locked inside people’s heads, but rather is embodied in symbols through which the members of a culture communicate their world-view, value-orientations, ethos and all the rest to one another, to future generations and to society at large. Gamst and Norbeck (1979:6) states that culture is viewed as a group’s way of maintaining the life of and perpetuating their culture, a system of learned and socially transmitted ideas, sentiments, social arrangements and objects that depend for their formulation and continuation upon those persons’ ability to create symbols. Chiropractic has a rich symbolism relating to philosophical issues and to the art of chiropractic practice. Symbolism in chiropractic has been mainly expressed in terms of words used to describe the phenomena chiropractors deal with on a daily basis in their practices and therefore is central to the work which is so important to chiropractic culture. This is extensively discussed elsewhere (Kleynhans 1998A:50).

To show how the symbolism of chiropractic culture is transmitted, chiropractic institutions could be likened to the family unit which imparts concepts early in a professional’s life. Eliot (1948:41) says that the primary channel of transmission of culture is the family and no person wholly escapes from the kind or wholly surpasses the degree of culture which is acquired from their early environment. The most important channel of transmission of culture remains the family; and when family life fails to play its part, we must expect our culture to deteriorate. In the context of chiropractic as cultural group, participant observation by the author strongly supports the notion that the chiropractic family is definable and that the chiropractic culture imprinted on members of the profession can often be readily traced back to the early environment of their chiropractic education. Each chiropractic institution displays its own distinct ethos which, in many instances, have tended to leave a life-long imprint on graduates. The chiropractic profession as family continues to play an important role in the professional lives of chiropractors for a long period of time.
3.2.5.2  The social role of health care practitioners

a)  Reason for the existence of health care professionals - The health care professions have come into existence in order to free individuals from pains they judge to be unacceptable, to maintain the abilities and functions they hold to be proper, to maintain or achieve the minimum states of grace and human form they hold to be acceptable, and to postpone what they hold to be a premature death - without obeisance to the deliveries of evolution or the usual state of humans - the health care professions have the human body and mind as their objects (Engelhardt 1985:203).

b)  Goals of a health care professional - Engelhardt (1985:204) says that health care practitioners need to come to terms with and balance at least six distinct, often conflicting, goals: the good of individual patients; the good of society; the good of future patients and societies; the acquisition of knowledge; the good of the profession; and their own individual flourishing and that the development of the virtuous professional requires a moral judgement that will allow that individual successfully to balance among these competing goals. He suggests that success in this task will mark the professional and the profession as one that has either succumbed to excess or achieved virtue.

c)  Contributions of health care professionals to society - Engelhardt (1985:204) sees the contributions of health care professionals to society and to their own cultures as reflected in human values '.... views of pain, understanding of proper function, and images of acceptable human form and grace exist within a geography of values sustained by a culture. The professional, unlike the pure technician, will be able to aid both individuals and society in coming to terms with the task of realizing particular understandings of the human good, where nature and chance conspire to limit human capacities. The health care professions are, after all, strategies for finite beings - beings who are finite in reserves of energy and finance, beings finite in their life scopes, beings subject to the circumscription of their goals and purposes by diseases, disability and deformity'.

Marshall (1987:216), a solicitor, urges physicians to make a special contribution to society: 'Beyond the field of your professional activities, I would urge that you bring to your responsibilities as citizens, the same strong commitment, the same courageous activity that you bring to your responsibilities as physicians"....Recognise the reality - because of your understanding and compassion, you are the ultimate repository of human values, the ultimate defenders of the dignity of man. You, of the medical profession, have no axe to grind in public life'.

3.2.5.3 The social role of chiropractors

This role is reflected in a range of areas:

a) Responsibilities of chiropractors as health care professionals - These are discussed in detail under 'Axiology' in 3.1.5 a) above.

b) Chiropractic as primary contact health care. An analysis of chiropractic legislation worldwide indicates that chiropractors receive patients directly without the requirement for prior examination or referral by another health care practitioner. This brings with it the responsibility to assess the health status of patients and to make decisions about responsible care and referral. It also requires that 'chiropractic must develop clear boundaries around the number and extent of the conditions it claims to treat, and must substantiate its claims with valid clinical trials' (Sanchez 1991:165). Rather than reject the paradoxical nature of their role as primary care physicians and specialists in spine-related disorders, chiropractors should embrace this uniqueness and establish themselves as an integral component of the health care network (Sanchez 1991:165). Public education, improved diagnostic skills, a clear scope of practice, higher educational requisites for admissions to chiropractic colleges, licensing and practice, careful monitoring of the growing number of chiropractors, a closer connection with the scientific establishment, improved relations with medical and other health professionals and a positive and clear message to the public about chiropractic's role in the treatment of spine-related pain are all components in the continued success of this discipline (Sanchez 1991:176).

Jamison (1987:5), a medical practitioner, suggests that Australian chiropractors have achieved functional integration into a referral network within conventional health care. She states that the image of contemporary chiropractic is increasingly one of conventional health care and that chiropractic has met the criteria for categorization as a profession; it has accomplished legal recognition and achieved structural incorporation into the orthodox health
care system in Australia. Chiropractic has emerged as an autonomous consulting profession within orthodox health care and certain barriers to functional integration of chiropractic into the orthodox health care system have been removed; others are being addressed (Jamison 1987:5). She says it is important that barriers, both real and imagined, to functional acceptance of chiropractors within conventional health care be overcome and that optimal health care in Australia can only be achieved when all members of conventional health care have ready access to the total resources of the health care system (Jamison 1987:5).

c) **Chiropractic as primary health care** - Table 1 under 1.2.2.2 details the functions, duties and responsibilities of a typical chiropractor in routine practice with some jurisdictional variation.

d) **Part disciplines of chiropractic** - Details appear in Table 2 under 1.2.2.4 above.

e) **The philosophical foundations of the chiropractic curriculum** - These are discussed in 3.1 above.

f) **The purpose of chiropractic education** - This is discussed under 1.2.2.3 above.

An integration of the abovementioned details indicate a very clear and comprehensive social role for chiropractors which, in the sociological and cultural context, leads to essential, broad-based philosophical questions, based on concepts from Bevis (1989:42-50) and Engelhardt (1985:204), which need to be constantly reviewed in order to define chiropractic culture:

i) What is the nature of chiropractic?
   - what are its essential truths (ontologies)?
   - what are its value systems (axiology)?

ii) What is health?
   - what is holism?
   - what is vitalism?

iii) What is the nature of the chiropractic patient?

iv) What does society expect from chiropractic?
   - what is ethics?
   - what is responsibility?
   - what is accountability?
   - what is competence?
The relationship between sociology and philosophy of chiropractic is shown by Coulter (1991C:149) while application of Bevis' (1989:42) concepts to chiropractic suggests that identification, understanding and unification of the philosophical, cultural and practical elements common to most chiropractors serve as a source of power which will help chiropractic to: better develop its sense of identity, security and confidence in society; identify its major sense of purpose; evolve a system of organising the body of knowledge, skills and values essential to the evolution of chiropractic; and create innovative approaches to chiropractic principles and practice in the interest of better patient care and community service. The philosophical and practical elements which characterise the belief systems about the role of chiropractors and chiropractic as a cultural sub-group and their place in the health care community is analysed in Table 14 in 3.1.2 above.

3.2.6 Curricular Dimensions of the Sociological and Cultural Foundations of Chiropractic

3.2.6.1 Overview

How the socio-cultural foundations of chiropractic impact on the curriculum is indicated *inter alia* by a) analysing the relationship between the chiropractic belief system and curriculum content to indicate the subjects needed to transmit and validate those beliefs, b) by analysing the social role of graduates to provide a cultural rationale for the curriculum; and c) by analysing societal expectations from chiropractors in philosophical context to indicate which branches and concepts of philosophy are relevant to the curriculum.

3.2.6.2 The social role of graduates

An analysis of the sociological and cultural rationale for first professional chiropractic courses appears in Table 29. The aims and objectives for an undergraduate chiropractic course are predicated on various assumptions relating to people, the nature of primary health care, statutory requirements, chiropractic and education, outlined below.
<table>
<thead>
<tr>
<th>ASPECT OF THE CURRICULUM</th>
<th>SOCIOLOGICAL CONSIDERATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liberal Education</td>
<td>The education of persons undertaking to become chiropractors must be broad and liberal so that as practitioners of chiropractic, they not only seek to master this healing art, but are also fully cognizant of their limitations. In order to stress this point of view, subjects on management (especially interpersonal relationships, organization and administration) and the social and preventative aspects of chiropractic health care are discussed throughout the course where their application to a particular area is deemed appropriate. Students are presented with a holistic view of health care and are made aware of the chiropractor's responsibility to other members of the health team and to the community.</td>
</tr>
<tr>
<td>Health Sciences</td>
<td>The clinical and pre-clinical teaching should be augmented by a study of the health problems in communities, the health services designed to control such problems and epidemiology.</td>
</tr>
<tr>
<td>Primary Contact Status</td>
<td>Since the chiropractic profession occupies a position, both by tradition and status, as one of the major points of entry for patients into the health care delivery system, persons studying chiropractic must develop a comprehensive understanding of the human organism, the disease processes that may affect it, and the differential diagnosis and services that they must be qualified to render.</td>
</tr>
<tr>
<td>Curriculum Change (Vivification)</td>
<td>The curriculum should be an almost living entity and there should be no fear of making change if change will improve the product. The curriculum therefore is also based on the following premises:</td>
</tr>
<tr>
<td></td>
<td>. Education in the health sciences is a life-long process with extensive social interaction.</td>
</tr>
<tr>
<td></td>
<td>. All current relevant knowledge and skills cannot be conveyed to the student during the formal course.</td>
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<tr>
<td></td>
<td>. The rapid expansion and increasing sophistication of biological knowledge will continue.</td>
</tr>
<tr>
<td></td>
<td>. The program must be continually under review to keep it abreast of changes in the characteristics of incoming students, the development of scientific information and the needs of society.</td>
</tr>
<tr>
<td>Interdisciplinary Emphasis</td>
<td>The course should have an interdisciplinary emphasis. Since the course includes various pre-clinical sciences (life sciences, basic chiropractic sciences and social sciences); pathology, clinical sciences (chiropractic science, diagnosis and practice and chiropractic radiology); clinical practicum and residency (fieldwork), fragmentation has to be avoided at all times. A basic teaching objective is therefore to achieve conceptual wholeness through coordination and integration of all teaching areas at various levels of instruction.</td>
</tr>
</tbody>
</table>
The type and duration of a course designed to educate primary contact health care practitioners is to a large extent dictated in terms of statutory registration requirements.

- Chiropractic is recognised as a primary contact health care service in all jurisdictions where registration is available.
- The chiropractor's primary role in life is to treat disorders by adjustment and manipulation of the articulations of the human body.
- A patient does not have to be referred to a chiropractor by a medical practitioner.

Because some students who undertake the course may wish to proceed to other chiropractic institutions or centres for postgraduate education, or to practise in foreign jurisdictions, it is essential that the course meets international requirements.

Based on an analysis of information from SOCO (1988).

3.2.6.3 Societal expectations and philosophical foundations

Correlation of certain elements of the philosophical and the sociological and cultural foundations of the chiropractic curriculum in Table 30 indicate that philosophical approaches and concepts can be identified in relation to societal expectations. This relationship suggests the need in the curriculum for an introduction to methods of philosophy either as a separate subject or in other subjects or units (e.g. historical chiropractic, principles, epidemiology, ethics etc) where appropriate.

<table>
<thead>
<tr>
<th>SOCIETAL EXPECTATIONS</th>
<th>METHODS/CONCEPTS OF PHILOSOPHY</th>
</tr>
</thead>
<tbody>
<tr>
<td>An emphasis on community-based, prevention-oriented primary care</td>
<td>Holism</td>
</tr>
<tr>
<td>Need for humanistic care</td>
<td>Humanism, scientism</td>
</tr>
<tr>
<td>Scientifically and technologically effective care</td>
<td>Philosophy of science, reductionism</td>
</tr>
<tr>
<td>Understanding of practitioner-patient interaction</td>
<td>Philosophical principles of phenomenology, hermeneutics, grounded theory, ethnography</td>
</tr>
<tr>
<td>Problem-solving diagnostic and therapeutic skills</td>
<td>Epistemology, logic</td>
</tr>
<tr>
<td>Ethical practitioners</td>
<td>Philosophical (differentiated from religious) ethics</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>Ability to handle large amounts of information</td>
<td>Logic, informatics</td>
</tr>
<tr>
<td>Ability to conduct practice-based research</td>
<td>Philosophy of science, reductionism, phenomenology, hermeneutics, critical analysis, ethnography, grounded theory</td>
</tr>
<tr>
<td>Development of a professional ethos</td>
<td>Historical chiropractic philosophical concepts—vitalism, theism and metaphysics to understand historical constructs</td>
</tr>
<tr>
<td>Understanding of the central physical, chemical and biological principles and mechanisms that underlie human health and disease</td>
<td>Epistemology, logic, philosophy of biology, philosophy of science</td>
</tr>
<tr>
<td>Understanding of the emotional, psychological and cultural underpinnings of human behaviour</td>
<td>Hermeneutics, phenomenology, ethnography, critical analysis, grounded theory</td>
</tr>
<tr>
<td>Understanding of the interweaving of mind and body in illness and health</td>
<td>Mind-body dualism</td>
</tr>
<tr>
<td>To know the financial and organisational aspects of health care</td>
<td>Ethics</td>
</tr>
</tbody>
</table>


### 3.2.7 Discussion

It is demonstrated that the social and cultural foundations of the chiropractic curriculum can be explicated.

A chiropractic culture has been identified which subsumes some elements common to all health care practitioners and elements unique to the profession.

Evidence is provided that there are identifiable groups that control the chiropractic curriculum.

The effects of resource allocation on the design of a chiropractic curriculum could be explicated and important influences identified.

The structural, ideological and cultural settings of the chiropractic curriculum can be explicated and the curricular dimensions of the sociological and cultural foundations can be analysed and outlined as a basis for the understanding of curriculum intent and content.
The symbolism of chiropractic culture could be related to the existence of two major subcultures. The implications of the way in which the chiropractic profession presents itself to the wider society could be related to education.

The character of a culture could be explicated as a result of a descriptive analysis of the literature while the sociological and cultural foundations of the chiropractic curriculum could be addressed in terms of the groups which control the chiropractic educational system, how they exercise their control and how ideology influences groups who exert such control.

The ideologies which impact on academic and other issues about the curriculum and the part that belief systems play in clarifying the role of chiropractors and their place in the health care community could be shown. It could also be shown how the social role relating to the chiropractic profession influence curriculum content, implementation and assessment.

It could be shown how control over the curriculum is exerted by external accrediting agencies (The Australasian Council on Chiropractic Education Limited and the Joint Education Committee of Participating Australasian Chiropractors and Osteopaths Registration Boards) and by internal groups including a student:staff consultative committee, curriculum review committee, curriculum development committee, course advisory committee and stakeholder taskforce groups.

In analysing the cultural setting of the chiropractic curriculum it could be demonstrated how the chiropractic profession, the higher education system, and cultural values, attitudes and beliefs ultimately influence the teaching-learning milieu.

The reason for the existence of health care professionals, their goals, contribution to society, and responsibilities could be explicated to show that identification, understanding and unification of the philosophical, cultural and practical elements, common to most chiropractors, serve as a source of power which will help chiropractic in society to develop a sense of identity, security and confidence.

The sociological and cultural rationale for first professional chiropractic courses could be explained in terms of the provision of liberal education, contribution to the health sciences, primary contact status of chiropractors, implications for curriculum change; interdisciplinary implications for service teaching, statutory and international requirements placed on the curriculum.
The societal expectations of the chiropractic curriculum could be related to its philosophical foundations, showing how relevant branches of philosophy need to support teaching-learning in relation to community-based, prevention-oriented primary care; humanistic care; scientifically and technologically effective care; in relation to understanding of practitioner:patient interactions; problem solving, diagnostic and therapeutic skills and the ethical behaviour of practitioners.
3.3 A CLARIFICATION OF THE PSYCHOLOGICAL FOUNDATIONS OF THE CHIROPRACTIC CURRICULUM

3.3.1 Introduction

3.3.1.1 Psychology and the curriculum

This section demonstrates how psychology as foundation influences all phases of curriculum design and how, as curriculum content, is important to patient care. It becomes apparent that psychology impacts to some extent on all domains and most categories of the taxonomy for curriculum design. However, the focus is on those psychological foundations which are of particular importance to the design of the experiential curriculum. Because of the importance of the psychological foundations to the understanding of a number of the elements of the curriculum and in order to promote a holistic view, mechanisms and processes relating to some areas (e.g. intent, teaching-learning strategies, climate, etc) are considered in an integrative manner in relevant sections below and are only summarised in this section. A brief section is also included on the influence of psychosocial factors on chiropractic practice, relevant to curriculum content.

3.3.1.2 Curriculum design questions

A range of questions posed in Table 31 indicate the importance of the psychological foundations to all four domains of the curriculum design process. Only major questions have been posed which can be subdivided to deal in greater depth with this important element of curriculum design.

TABLE 31 - Curriculum design questions about the psychological foundations of the chiropractic curriculum

<table>
<thead>
<tr>
<th>PSYCHOLOGY OF THE CURRICULUM PROCESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Curriculum Team</td>
</tr>
<tr>
<td>1.1 Which sectors of the institution and/or program should be represented on the curriculum team(s)?</td>
</tr>
<tr>
<td>1.2 Which assumptions do they bring with them?</td>
</tr>
<tr>
<td>1.3 How can a balance be created in terms of views, assumptions, personal attributes and interactive characteristics of team members?</td>
</tr>
<tr>
<td>1.4 Which psychological interactions play a role in the implementation of each of the curriculum models?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PSYCHOLOGY AND CURRICULUM ORGANISATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Psychology and Philosophical Foundations</td>
</tr>
<tr>
<td>2.1 How does knowledge of psychology influence the need for philosophical beliefs?</td>
</tr>
</tbody>
</table>
3. Psychology and Sociological and Cultural Foundations
   3.1 How does psychology influence the development of cultural presuppositions?
   3.2 How are individuals influenced by their culture?

4. Psychology and Curriculum Paradigms
   4.1 Which psychological principles apply to each of the curriculum paradigms?

PSYCHOLOGY AND CURRICULUM DEVELOPMENT

5. Psychology and Curriculum Design Strategies
   5.1 Which psychological principles are important to each of the curriculum design strategies?

6. Curriculum Context and Needs Assessment
   6.1 How does knowledge of psychology that relates to people interaction influence the curriculum?

7. Psychological Foundations of Curriculum Intent
   7.1 How does motivational theory influence curriculum intent?

8. Psychology Foundations and Curriculum Content
   8.1 How do psychological principles influence the organisation of the scope of the curriculum content?
   8.2 How do psychological principles influence the sequencing of curriculum content?
   8.3 How does transfer of learning influence the integration of content?
   8.4 Which psychology subject content is relevant to this curriculum?

9. Psychological Foundations of Teaching-learning Strategies
   9.1 Which psychological principles support experiential learning?
   9.2 Which psychological principles influence autonomous learning?
   9.3 Which psychological principles relating to teaching-learning strategies influence motivation?
   9.4 Which psychological principles promote meaningful learning?

10. Psychological Foundations of Student Assessment
    10.1 How do psychological principles of motivation influence student assessment?
    10.2 Which psychological factors play a role in student selection?
    10.3 Which psychological factors influence the reliability, validity and fidelity of assessment of student performance?

PSYCHOLOGY AND CURRICULUM APPLICATION

11. Psychological Foundations of Learning Climate
    11.1 How does the setting of objectives influence learning climate?
    11.2 How does human development influence student adaptation to the learning milieu?
    11.3 How do staff characteristics relating to self concept, confidence etc influence the learning climate?

12. Psychological Foundations of a Quality Assurance System
    12.1 What are the psychological substrates of quality management?
    12.2 How is a culture of quality developed through behavioural change?

13. Psychological Foundations of Curriculum Change Management
    13.1 Which psychological factors influence the dynamics of curriculum change?
    13.2 What is the psychological basis of curriculum change strategies?

14. Psychological Foundations of Institutional Self-evaluation
    14.1 Which psychological principles apply to interpersonal communication and interaction related to the self-evaluation of a curriculum?
    14.2 How can staff and students be motivated to evaluate their program objectively?
15. Psychological Foundations of External Evaluation  
15.1 Which psychological factors influence the people involved in the curriculum accreditation process (e.g. the assessors, the management, staff and students of the program being assessed)?

PSYCHOLOGY AS CURRICULUM CONTENT

16. Psychological Aspects of Practice  
16.1 How do psychosocial elements and factors influence chiropractic clinical practice?

3.3.2 The Influence of Psychological Foundations on the Curriculum

The overview in Table 32 touches only briefly on the impact which psychology has on curriculum design and reference is made in square brackets to those sections of the dissertation where more detailed consideration is provided.

TABLE 32 - How psychology influences the curriculum

<table>
<thead>
<tr>
<th>CURRICULUM PROCESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Curriculum Team</td>
</tr>
<tr>
<td>- The personality characteristics and interpersonal interactions of curriculum developers have strong psychological foundations. [2.1.1, 2.1.2]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CURRICULUM ORGANISATION (PRESAGE)</th>
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</thead>
<tbody>
<tr>
<td>2. Philosophy as Foundation</td>
</tr>
<tr>
<td>- The need for philosophical beliefs decreases as an understanding of the psychological foundations of the curriculum increase, thereby resulting in a more scientific approach to curriculum development, implementation and management (Lewin 1942).</td>
</tr>
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<tbody>
<tr>
<td>3. The Sociological and Cultural Foundations</td>
</tr>
<tr>
<td>- Education depends heavily upon the culture of the society in which it is given - a culture produced and sustained by shared experiences which are often expressed through symbols (Niblett 1969:254) i.e. influenced by the psychological foundations.</td>
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<tbody>
<tr>
<td>4. Curriculum Paradigms</td>
</tr>
<tr>
<td>- In developing and expressing a world-view, each person involved with the curriculum process is strongly influenced by their previous experiences, personal and cultural views and practices which is assumed to have considerable impact on decision making about the paradigm(s) which are adopted for a curriculum.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>CURRICULUM DEVELOPMENT</th>
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</thead>
<tbody>
<tr>
<td>5. Curriculum Design Strategies</td>
</tr>
<tr>
<td>- An understanding of the psychological foundations greatly facilitate decision making about curriculum design strategies since these deal with issues such as student-based versus teacher-based teaching-learning, problem solving, integration of content etc.</td>
</tr>
</tbody>
</table>
6. **Curriculum Context and Needs**
   - The psychological foundations play a major role in determining the context of the chiropractic curriculum since it relates to the influences on external and internal decision makers and on issues such as student attributes, staff strengths and weaknesses, institutional/departmental ethos, perceived problems - all of which may have psychological overtones. [4.1.1.3]

7. **Curriculum Intent**
   - Knowledge of the psychological foundations is important in determining general, instructional and behavioural objectives; and in understanding the attributes which undergird the competencies which need to be demonstrated by entry level practitioners. [4.2.1.3]

8. **Curriculum Content**
   - Knowledge of psychology is important to the understanding and transmission of knowledge, skills, values and competencies.
   - The psychology of learning is crucial to the understanding of selection, sequencing, balancing, scope and vertical and horizontal integration of content.
   - The subject matter of psychology as discipline is directly included in many health-care curricula to assist future practitioners in their understanding of normal and abnormal human behaviour, necessary to interpersonal skills and clinical effectiveness; it is both a pre-requisite to and part of the chiropractic curriculum in the U.S. and Canada (McNamee 1992:9, 55-57, 79-155) and part of the curriculum elsewhere.

9. **Learning Experiences**
   - Psychological evidence about the various types of teaching is crucial to the understanding necessary to guide the selection of teaching-learning strategies for a course or specific sections of a course and relate to issues such as autonomous learning, involvement, transfer, feedback, motivation and meaningful learning. [4.4.2]

10. **Competency-based Student Assessment**
    - Educators draw on the research of educational psychologists on assessment issues such as: instruments to measure students' performance, norm vs. criterion-referenced assessment; role of formative assessment; assessment of cognitive, affective and technical skills, clinical problem solving, psychomotor and interpersonal skills, professional attitudes and habits. The control of assessor bias and the value of feedback and success experience, etc. [4.5.1.2]

**CURRICULUM APPLICATION**

11. **Positive Learning Climate**
    - Individual differences amongst students influence climate and relate to factors such as: personality, cognitive and affective development, motivation, learning styles, etc;
    - Individual differences amongst staff influence climate and relate to factors such as personality, teaching styles and understanding and use of group dynamics, teaching methodology, motivation etc.
    - Learning climate is strongly influenced by the motivation and characteristics of students and staff.
    - Knowledge of the psychology of intercultural interaction which influences climate is indispensable to multicultural student groups. [5.1.2]

12. **Quality Assurance**
    - The use of various psychological techniques to influence attitudes important to the implementation of quality assurance is important to a successful outcome.

13. **Management of Curriculum Change**
    - Psychological foundations of the dynamics of curriculum change and management of the change process relate to issues of ownership of the change and the methodology of action research.
14. **Self-evaluation**
   - The psychological foundations of institutional/departmental self-evaluation relate to issues of communication, elimination of bias (objectivity), action research, perception etc.

15. **External Evaluation/Accreditation**
   - The psychological foundations of program evaluation relate strongly to assessor objectivity and communication skills and processes.

**3.3.3 Motivation**

It is argued that the study of motivation, as the driving force behind all behaviour, is fundamental to clarification of the psychological foundations. Seen in the context of adult, experiential chiropractic education, it involves self-concept, self-esteem, success experience, emotional security, setting and attaining goals, maintenance and enhancement of the perceived self of all persons involved with the chiropractic curriculum, including students, curriculum developers and other staff, administrators, members of advisory committees, and relevant internal and external boards and councils such as statutory boards, accrediting authorities etc. It influences a wide range of human behaviours, not only in the learning situation but during the deliberations which result in the curriculum design process, organisation, development and application.

Every human being possesses different needs to increase the concept of an adequate self. Tough (quoted by Knowles 1988:31,197) states that internal motivators such as personal needs and desires e.g.: to improve perception of the adequate self, are emphasised by creative leaders over external motivators such as a demand by another person to take on a task. Motivation is highly personal and is influenced by many factors, e.g. personal, socio-economic and cultural. In some persons motivation is innate whilst in others it needs to be created. Different persons respond to different motivators.

The hierarchy of needs in the human needs system, originally conceived by Maslow, now includes:

- **a)** physiological needs such as hunger, thirst, etc;
- **b)** safety needs such as a feeling of security; lack of persecution; acceptance by a group;
- **c)** love and belonging needs such as friendship;
- **d)** self-esteem needs such as success;
- **e)** self-actualization needs such as the desire for self-fulfilment; and
- **f)** desire for knowledge and understanding and for aesthetics (beauty).
Curzon (1985:78-81), in discussing Alderfer’s theory, says that levels 1 and 2 are also called *existence needs*; levels 3 and 4, *relatedness needs*; and levels 5 and 6 represent *growth needs* and explains that when lower level (physiological or existence) needs in Maslow’s hierarchical arrangement of human needs are adequately satisfied, the higher levels can progressively come into play. At any moment a person’s behaviour is dominated by the needs with greatest potency.

Levels 1, 2 and 3 are related to *extrinsic* motivation and require external input for satiation while motivation at levels 4, 5 and 6 is referred to as *intrinsic* motivation and require internal factors to realise. Beatty and Clark (quoted by Vrey 1990:229) hold that ‘a motivational state is the necessity to make congruent some discrepancy in the self-system’ i.e. when persons perceive a gap between the perceived self-in-the-world and the concept of the adequate self, a motivational state develops and they are then motivated to embark on a course of action which they believe will eliminate this difference. Based on participant observation it is argued that these principles apply to interaction between participants in meetings as much as to teaching and learning.

**Figure 11 - A hierarchical arrangement of the human needs system**

![Hierarchical Arrangement of Human Needs System](image)

3.3.5 The Influence of Psychosocial Factors on Chiropractic Practice

The overview in Table 33 touches only briefly on the impact that psychosocial factors have on the art of practice. It is argued that motivation as the driving force behind all behaviour is fundamental to clarification of the psychosocial elements of practice. Seen in the context of chiropractic practice in any setting, the experience of chiropractic and wellness care involves self-concept, self-esteem, success experience, emotional security, setting and attaining health goals, maintenance and enhancement of the perceived self, etc of all persons involved with chiropractic care, including patients, doctors of chiropractic, support staff and staff of third party payer agencies, registration boards and professional associations.

Psychosocial factors influence a wide range of human behaviours, not only in the practice situation, but within the wider health care community and society at large. Every human being possesses different needs to increase the concept of an adequate self and internal motivators (such as personal needs for better health and fitness) and desires (e.g. to improve perception of the adequate self) are emphasised by creative doctors of chiropractic over external motivators such as a demand by another person to request chiropractic care.

Motivation is highly personal and is influenced by many factors e.g. personal, socioeconomic and cultural. Chiropractors also need to establish a therapeutic alliance and promote patient satisfaction with their care (Jamison 1996B:15; 1996C:94). This required the application of psychosocial constructs.

TABLE 33 - How psychosocial elements and factors influence chiropractic clinical practice

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.</strong> Practice Team</td>
<td>The personality characteristics and interpersonal interactions of doctors of chiropractic have strong psychological foundations.</td>
</tr>
<tr>
<td><strong>2.</strong> Relationship to Philosophy as Chiropractic Foundation</td>
<td>The need for philosophical beliefs decreases as an understanding of the psychosocial elements of practice increase, thereby resulting in a more scientific approach to chiropractic and wellness care implementation and management.</td>
</tr>
<tr>
<td><strong>3.</strong> Relationship to Sociocultural Foundations</td>
<td>The art of chiropractic practice depends heavily upon the culture of chiropractic that is produced and sustained by shared experiences which are often expressed through symbols influenced by the psychosocial elements of practice.</td>
</tr>
<tr>
<td><strong>4.</strong> Chiropractic Practice Paradigms</td>
<td>In developing and expressing a world-view, each doctor of chiropractic is strongly influenced by their previous experiences, personal and cultural views and practices which are assumed to have considerable impact on decision-making about the paradigm(s) which are adopted in their day-to-day interaction with patients, e.g. it can be strongly philosophically or scientifically influenced or be eclectic and draw in a balanced way from several paradigms.</td>
</tr>
</tbody>
</table>
5. **Practice Orientation and Psychosocial Factors**
An understanding of the psychosocial elements greatly facilitate decision-making about practice approaches and strategies, since these deal with issues such as the context of chiropractic practice which has to be sensitive to the influences of external and internal decision-makers such as third party payers, patient attributes, staff strengths and weaknesses, practice ethos, perceived problems—all of which may have psychosocial overtones.

6. **Knowledge of Psychosocial Elements in Patient Care**
This is crucial to practitioners in their understanding of normal and abnormal patient behaviour which is necessary for interpersonal skills and effective clinical management.

7. **Learning Experiences for Patients**
Psychosocial evidence about the various types of teaching is crucial to the understanding necessary to the selection of teaching-learning strategies by doctors of chiropractic for patient education in wellness management.

8. **Positive Clinical Climate or Milieu**
Individual differences amongst patients influence climate and relate to factors such as personality, motivation to recover, learning ability, etc. Individual differences amongst staff influence climate and relate to factors such as personality, patient handling styles and understanding and use of interpersonal and group of dynamics in the reception room. Knowledge of psychosocial factors in intercultural interaction which influences climate is indispensable to multicultural chiropractic practices.

9. **Quality Assurance**
The use of various psychosocial techniques to influence attitudes important to the implementation of quality assurance in practice is important to a successful outcome.

10. **Management of Behavioural Change**
Psychosocial foundations of the dynamics of patient behavioural change management which is so important to healing and wellness care relate to issues of ownership of the change and the motivation to get well, i.e. for patients to assume responsibility for the improvement and maintenance of their own health, albeit with assistance from doctors of chiropractic and their innate capacity to improve within the limits of their recuperative ability. This could include the use of wellness triggers.

11. **Self-Evaluation**
The psychosocial elements of practitioner, staff and practice self-evaluation and improvement relate to issues of communication, elimination of bias (objectivity), perception, motivation, etc.
3.4 A CLARIFICATION OF PARADIGMS RELEVANT TO THE CHIROPRACTIC CURRICULUM

3.4.1 Introduction

3.4.1.1 Influence of paradigms

A worldview or paradigm is a general perspective, a way of breaking down the complexity of the real world (Kuhn 1970:176). Paradigms are what members of a scientific community share and conversely, a scientific community consists of those who share paradigms which are deeply embedded in the socialisation of adherents and practitioners - they tell them what is important, legitimate and reasonable; they are a discipline's way of solving a puzzle, of viewing human experience and of structuring reality - a way of viewing phenomena in the world (Kuhn 1970:176). Curriculum paradigms can therefore be regarded as conceptions or orientations, which holistically synthesise many factors which influence the way curriculum developers think about and deal with curriculum matters. It is argued that the decision about which paradigm(s) to adopt directly influences the selection of curriculum developers, the curriculum designs that are adopted by them, how design forces are to be used and which implementation and evaluation techniques are to be employed. The development of paradigms leads to a research tradition - a set of assumptions about how entities interact - and assumptions about methods used for constructing and testing theories about a phenomenon in a domain of study e.g. the curriculum (Laudan 1977:97).

3.4.1.2 Curriculum design questions

The questions in Table 34 depict the focus of each of the major curriculum development paradigms, which are subsequently explicated on the basis of a descriptive analysis of the literature.

TABLE 34 - Curriculum design questions about the major paradigms which influence curriculum design

1. Which paradigm(s) will enhance cognitive, psychomotor and affective skills in chiropractic learners?
2. Which paradigm(s) will allow intrinsically rewarding experiences relevant to learners to be provided in the chiropractic curriculum?
3. Which paradigm(s) take into account the needs for the betterment of society through a chiropractic curriculum?
4. Which paradigm(s) address the needs for the betterment of the profession through implementation of a chiropractic curriculum?
5. Which paradigm(s) consider the competency-based professional standards that should be attained by the end of the chiropractic curriculum?

6. Which paradigm(s) relate to the technologies and techniques that should be mastered by chiropractic learners?

7. Which paradigm(s) promotes evidence-based clinical decision-making?

8. Which paradigms should be integrated into an eclectic paradigm for the chiropractic curriculum?

3.4.2 Analysis of Paradigms

The major characteristics of each paradigm are considered in Tables 35 to 41 below where they are analysed in terms of a framework including the focus, outcomes, implementation and evaluation.

TABLE 35 - Characteristics of the academic rationalist paradigm

<table>
<thead>
<tr>
<th>Focus</th>
<th>To enhance learners' intellectual abilities through:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a) Acquisition of generic cognitive skills, e.g. problem solving.</td>
</tr>
<tr>
<td></td>
<td>b) Acquisition of the cognitive, psychomotor and affective skills integral to discipline-specific areas.</td>
</tr>
<tr>
<td></td>
<td>c) Enhancing knowledge via relevant course content.</td>
</tr>
<tr>
<td>Outcome</td>
<td>a) An effective member of society and of the relevant profession.</td>
</tr>
<tr>
<td></td>
<td>b) The systematization of accumulated wisdom into fields of study and bodies of knowledge.</td>
</tr>
<tr>
<td></td>
<td>c) Teaching and learning informed by research.</td>
</tr>
<tr>
<td>Implementation</td>
<td>Emphasis is on:</td>
</tr>
<tr>
<td></td>
<td>a) Didactic, expository methods of transmitting knowledge, skills and values, in which the disciplines ideas are ordered, illustrated and explored; and the learner becomes the depository of the accumulated wisdom of the discipline.</td>
</tr>
<tr>
<td></td>
<td>b) Development of logical, systematic reasoning through problem-solving, discovery learning, scientific methods and the enquiry approach. In this way, cognitive skills are developed which are transferable to other contexts.</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Curricula based on the academic rationalist paradigm emphasise examination and testing of knowledge, skills and values in formative and summative approaches.</td>
</tr>
</tbody>
</table>

**TABLE 36 - Characteristics of the humanistic paradigm**

<table>
<thead>
<tr>
<th>A. The student-based humanistic paradigm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focus</strong></td>
</tr>
<tr>
<td>Intrinsically rewarding experiences of personal relevance to learners. Personal growth is enhanced through a humanistic, experiential and phenomenological approach to teaching and learning. 'The ideal of the self actualising person is at the heart of the humanistic curriculum' (McNeil, 1981:4). Opportunities are consciously provided to enhance the individual's self concept in order to achieve self-actualization through personal growth, integrity and autonomy of the learner.</td>
</tr>
<tr>
<td><strong>Outcome</strong></td>
</tr>
<tr>
<td>An integration of the cognitive, affective and psychomotor domains and the production of a sense of unity within the learner.</td>
</tr>
<tr>
<td><strong>Content</strong></td>
</tr>
<tr>
<td>Valuing situations, social emphasis and self-understanding experiences, which are vital, enriching and serve as a liberating force which enhances the learner's growth towards self-actualization.</td>
</tr>
<tr>
<td><strong>Implementation</strong></td>
</tr>
<tr>
<td>An environment based on a holistic, integrated, real life approach to learning provides a supportive climate to enhance self-learning. The teacher as supportive and understanding guide serves as facilitator and resource person. Experiential learning is facilitated through guided self-directed learning, encounter groups and syndicate groups designed to enhance personal growth based on mutual trust between learner and teacher.</td>
</tr>
<tr>
<td><strong>Evaluation</strong></td>
</tr>
<tr>
<td>Qualitative, rather than quantitative techniques are used for assessment, including observation, interviews and assignments.</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>B. The patient-based humanistic paradigm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focus</strong></td>
</tr>
<tr>
<td>Chiropractic education and research with a focus on a) patient satisfaction and the uniqueness of the philosophical first principles of chiropractic that provide the basis for chiropractic practice; b) the self-organising and self-regulating human being rather than the conversion of the sick person to pathophysiological and pathological processes which are labelled and where the &quot;label&quot; is treated rather than the person cared for; c) the personal, familial, social and environmental factors that promote health, prevent illness and encourage healing; d) a uniquely chiropractic curriculum (based on Gatterman 1995:371).</td>
</tr>
<tr>
<td><strong>Outcome</strong></td>
</tr>
<tr>
<td>a) Chiropractors with thorough, scientific understanding of the patients who come for help and care (as compared with understanding of the disease for which the patient comes for treatment) (based on Engel 1978:173); b) chiropractors with understanding of all three levels (i.e. biological, psychological and social) which are taken into account in every health care task (based on Engel 1978:179,181); and particular appreciation of the patient as a self-organising and self-regulating organism, as a whole person, not a syndrome-bearing organism (Gatterman 1995:371); c) chiropractors who emphasise the self-responsibility of patients for their own health and the importance of mobilising their own health capacities rather than treating illness only from the outside; d) chiropractors who are: caring, compassionate, dedicated to patients, committed to work, learning, rationality, science and to servicing society; ethically sensitive, with moral integrity, with equanimity, humility and self-knowledge (Coulter 1986:131).</td>
</tr>
</tbody>
</table>
Implementation

Patient-based education and training based on chiropractic principles will require the curriculum to be based on a biopsychosocial model which includes considerable content on: a) psycho-neuro-immunology and the mechanisms of homeostasis to provide for an understanding of the inherent capacity of the body to heal itself; b) significant content on the neurosciences, particularly the relationship between the nervous system and dysfunction of the articulations of the body; c) an in-depth study of the philosophical foundations of the chiropractic curriculum (as detailed above) including humanism, so that human interests, values and dignity may predominate in thinking and practice; rationalism so that scientific method, logic and evidence will predominate in clinical decision-making; holism so that the focus in practice is the patient as a whole rather than a depersonalised problem which is labelled and treated as a label; the wellness model of health care so that a focus will be on disease prevention and health promotion; the growth model and illness behaviour model to facilitate educating patients to assume responsibility for their recovery and health; vitalism to promote an appreciation of the inherent capability of the body to heal itself; d) the basic medical sciences necessary to the understanding of homeostasis, muscle and joint structure including their implications and relevance in normal and abnormal function and disease; e) the chiropractic-specific and general medical diagnostic sciences used by chiropractors to provide a sound basis for patient assessment and safe management; f) chiropractic clinical care options available within the statutory responsibilities of chiropractors; g) clinical decision-making skills.

Evaluation

Assessment should be heavily based on formative, assessment of competency in cognitive, psychomotor and affective skills in the real-life clinical situation.


TABLE 37 - Characteristics of the social reconstructionist paradigm

Focus

On using the curriculum to effect social reform and help produce a better society for all. The needs and betterment of society are placed above the needs of individuals. It is believed that reform will be facilitated in future by making students critically aware of their environment at large, thereby fostering critical discontent.

Outcome

The development of learners with processes and skills required to be able to assess problems effectively and make useful critical comments. Skills include analysis, deduction, information processing and enquiry to facilitate the organisation of critically oriented knowledge.

Implementation

Acquisition of the methods to be developed is considered more important than the nature of the content itself. Such methods are acquired through group activity such as group discussions, group experiences to achieve consensus, involvement in community activities, group investigation of social problems etc.

Evaluation

While traditional assessment techniques such as examinations and tests are used, learners are encouraged to be involved in the construction and administration of assessment techniques as a way of overcoming traditional biases of the instruments used.

**TABLE 38 - Characteristics of the professional reconstructionist paradigm**

<table>
<thead>
<tr>
<th>Focus</th>
<th>Outcome</th>
<th>Implementation</th>
</tr>
</thead>
</table>
| The needs and betterment of the profession are seen as crucial to the professional development of the individual who will attain self-actualization while contributing to professional development and advancement. The development of performance capabilities essential to professional practice must be integrated with propositional knowledge relevant to current or future practice. Epistemologically there is no clear-cut distinction between theory and practice. The central focus is therefore on how much of the curriculum should be performance-based and what should be the nature of the propositional knowledge presented. | a) An effective member of the profession, cognisant of the professional ethos, needs for development and advancement through research and high standards of professional practice.  
b) A clearly defined professional knowledge and skills base.  
c) Entry level competency in professional practice characterised by integration of knowledge, skills and values.  
d) A sound professional basis for future self-directed learning and continuing and postgraduate professional education and research. | a) Performance-based teaching in order to ensure professional accountability.  
b) Blocks of propositional knowledge should be kept as short as possible and ample opportunities should be provided for the knowledge to be applied in practice related processes.  
c) Processed knowledge of all kinds should be considered of central importance.  
d) Professional learning and development in the curriculum should be clearly identified and progressively built upon to produce the outcomes desired both in terms of producing a competent professional and providing a solid substrate for life-long learning, postgraduate education and discipline-based research either in practice or a research setting. |


**TABLE 39 - Characteristics of the competency paradigm**

<table>
<thead>
<tr>
<th>Focus</th>
<th>Outcome</th>
<th>Implementation</th>
</tr>
</thead>
</table>
| Professional competency at the level of entry into the profession. | The attributes (knowledge, skills and values) necessary to undertake professional practice at a level acceptable to society and the profession.  
The purpose of competency-based education and training is to drive the system from the starting point of competence and standards. This process replaces what is imagined to be the former situation - where learning and assessment drive the system, based on curricula which are descriptions of what people ought to be able to do' (Mansfield 1989:27). | Competency-based teaching can be expected to place more emphasis on some of the less academic areas such as communication, working with people, team work, writing skills and some of those more fundamental things that are required in any job are built into the course. |
"It is important to recognise and emphasise that competency standards do not specify the process of education that should take place, but rather focus on the outcome of what the graduate should be able to do. This means that educational institutions retain individuality and flexibility in determining course content, educational processes, and assessment practices. In meeting the challenge for competency-based education, it is important that the methods best suited to producing the desired outcomes be employed such as problem based, self-directed learning which provides ample opportunities for simulated professional practice, ongoing formative assessment with emphasis on the assessment of profession based competencies demonstrated in the workplace" (Gibson and Lawson 1993:8).

Assessment methods are required which test professional skills through performance as well as their traditional assessment of disciplinary knowledge. These include a series of practicals where students are required to simulate the real life situation of a practising professional, where competence in problem framing and solving are assessed.


**TABLE 40 - Characteristics of the technological paradigm**

<table>
<thead>
<tr>
<th><strong>Focus</strong></th>
<th>The effective and efficient resolution of pre-determined ends through the use and mastery of technology and techniques. It is to a large extent based on the principles of behavioural science with an emphasis on the attainment of psychomotor skills and knowledge in relation to the use of technology.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcome</strong></td>
<td>Learners are able to demonstrate that they are able to use technologies related to disciplines and that they have mastered psychomotor skills such as diagnostic and manipulative techniques, computer skills etc.</td>
</tr>
<tr>
<td><strong>Implementation</strong></td>
<td>Learning is made effective by using a behaviourist approach where learning is viewed as a process of reacting to stimuli and as such is predictable and systematic. This process is facilitated through drill and practice sessions, as in the development of psychomotor skills; and repetition and practice as in computer assisted learning. If learners fail to achieve specified objectives, stimuli should be made more effective. A mastery learning approach is used where learning is acquired through an organised, criterion-referenced basis.</td>
</tr>
<tr>
<td><strong>Evaluation</strong></td>
<td>Traditional testing procedures are used and can be facilitated through pre-testing and comparison with post-testing on a criterion-referenced basis.</td>
</tr>
</tbody>
</table>

**TABLE 41 - Characteristics of the evidence-based paradigm**

<table>
<thead>
<tr>
<th>Focus</th>
<th>Outcome</th>
<th>Implementation</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematic clinical experience based on a pathophysiologic rationale as sufficient grounds for clinical decision-making guided by examination of evidence from clinical research.</td>
<td>Practitioners who practice evidence-based health care intervention. More efficient, effective and economical health care. Decrease of the uncertainties of chiropractic practice.</td>
<td>Practitioners who are able to ask appropriate clinical questions, have well-developed abilities in life-long learning, in the collection and organisation of clinical knowledge and in evidence-based decision-making.</td>
<td>Methods and techniques to assess competency in complex clinical tasks.</td>
</tr>
<tr>
<td>Conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients, more effective and efficient diagnosis and more thoughtful identification and compassionate use of individual patients' predicaments, rights and preferences in making clinical decisions about their care (Sackett et al 1997:2).</td>
<td></td>
<td>Clinical learning strategies supported by chiropractic relevant research and a clinical decision-making framework based on classification and categorisation of factors important to practice. Development of a cognitive framework rich in subsumers relevant to evidence-based clinical practice.</td>
<td></td>
</tr>
</tbody>
</table>

Based on analysis of a report by the Evidence-Based Medicine Working Group, McMaster University 1992; Gray 1997; Sackett, Richardson, Rosenberg and Haynes 1997; and concepts of the author.

**TABLE 42 - Characteristics of the eclectic or integrative paradigm**

<table>
<thead>
<tr>
<th>Focus</th>
<th>Outcome</th>
<th>Implementation</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>In case of complex, professional educational programs, it becomes necessary for curriculum developers to align with two or more curriculum paradigms in order to meet the outcomes required. While this is both feasible and logical, the emphasis placed on paradigms of essentially opposite nature will need to favour one over another, e.g.: the humanistic paradigm may be in conflict with the social reconstructionist. Curriculum developers who understand basic paradigms are better able to formulate their own ideas when devising a curriculum. When the attributes of the paradigm(s) adopted are clear, the chances of it being comprehended and adopted successfully are greatly enhanced (Print 1992:72).</td>
<td>Potentially, a competent professional with a broad, liberal education, able to undertake professional tasks and equipped with a sound basis for future research and postgraduate professional education.</td>
<td>The paradigms embraced in the eclectic approach would be curriculum dependent and include such methods and techniques of teaching which are necessary to transfer the necessary content in terms of knowledge, skills and values required to meet the goals, aims, objectives and competencies required.</td>
<td>Assessment and evaluation include those methods and techniques most suitable to assess each of the various components of the curriculum with emphasis on complex clinical practice.</td>
</tr>
</tbody>
</table>

The analysis of paradigms above is applied in the synthesis of a conceptual view of the chiropractic curriculum (Table 43). In order to decide on which paradigm to adopt for the chiropractic curriculum, groups of curriculum elements and outcome factors are considered in relation to each paradigm in Table 43 including: i) philosophical foundations; ii) social and cultural foundations; iii) psychological foundations; iv) disciplines and subjects traditionally contained in the chiropractic curriculum; and v) the roles and tasks of practitioners. The analysis shows an intricate mosaic of interrelated paradigms and elements.
<table>
<thead>
<tr>
<th>CURRICULUM ELEMENTS AND CURRICULUM OUTCOME FACTORS</th>
<th>PARADIGMS RELEVANT TO ELEMENTS AND OUTCOME FACTORS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Academic Competency</td>
</tr>
<tr>
<td>A. PHILOSOPHICAL FOUNDATIONS</td>
<td>Rationalist  Eclectic Evidence-based Humanistic</td>
</tr>
<tr>
<td></td>
<td>Professional Reconstr. Social Reconstr. Technolog.</td>
</tr>
<tr>
<td>- Ontology - understanding the truth about</td>
<td>X   x   x   x   x   x   x   x   x   x</td>
</tr>
<tr>
<td>chiropractic</td>
<td></td>
</tr>
<tr>
<td>- Epistemology - chiropractic is founded on</td>
<td>x   x   x   x   x   x   x   x   x   x</td>
</tr>
<tr>
<td>science; research approaches to chiropractic</td>
<td></td>
</tr>
<tr>
<td>developing a research consciousness</td>
<td></td>
</tr>
<tr>
<td>- Logic - systematic rational treatment of ideas</td>
<td>x   x   x   x   x   x   x   x   x   x</td>
</tr>
<tr>
<td>about chiropractic</td>
<td></td>
</tr>
<tr>
<td>- Holism - integration of knowledge; view patients</td>
<td>x   x   x   x   x   x   x   x   x   x</td>
</tr>
<tr>
<td>wholistically</td>
<td></td>
</tr>
<tr>
<td>- Humanism - making the patient the focus of all</td>
<td>x   x   x   x   x   x   x   x   x   x</td>
</tr>
<tr>
<td>things</td>
<td></td>
</tr>
<tr>
<td>- Axiology - ethics of practice</td>
<td>x   x   x   x   x   x   x   x   x   x</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>B. SOCIAL AND CULTURAL FOUNDATIONS</td>
<td></td>
</tr>
<tr>
<td>- Social structure in which chiropractic fits</td>
<td>x   x   x   x   x   x   x   x   x   x</td>
</tr>
<tr>
<td>- Ideological setting in which chiropractic fits</td>
<td>x   x   x   x   x   x   x   x   x   x</td>
</tr>
</tbody>
</table>

TABLE 43 - The relationship between curriculum elements and outcome factors and educational paradigms.
<table>
<thead>
<tr>
<th>CURRICULUM ELEMENTS AND CURRICULUM OUTCOME FACTORS</th>
<th>PARADIGMS RELEVANT TO ELEMENTS AND OUTCOME FACTORS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Academic Competency Eclectic Evidence- based Humanistic Professional Social Techno-</td>
</tr>
<tr>
<td></td>
<td>Rationalist</td>
</tr>
<tr>
<td>- Social role of chiropractors</td>
<td>x</td>
</tr>
<tr>
<td>- Liberal education</td>
<td>x</td>
</tr>
<tr>
<td>- Primary contact status</td>
<td>x</td>
</tr>
<tr>
<td>- Interdisciplinary emphasis</td>
<td>x</td>
</tr>
<tr>
<td>C. PSYCHOLOGICAL FOUNDATIONS</td>
<td>x</td>
</tr>
<tr>
<td>- Autonomous learning</td>
<td>x</td>
</tr>
<tr>
<td>- Self-directedness</td>
<td>x</td>
</tr>
<tr>
<td>D. DISCIPLINES AND SUBJECTS</td>
<td>x</td>
</tr>
<tr>
<td>(Refer to Table 2)</td>
<td>x</td>
</tr>
<tr>
<td>- Basic medical sciences</td>
<td>x</td>
</tr>
<tr>
<td>- Diagnostic sciences</td>
<td>x</td>
</tr>
<tr>
<td>- Chiropractic sciences</td>
<td>x</td>
</tr>
<tr>
<td>- Ancillary therapies</td>
<td>x</td>
</tr>
<tr>
<td>- Humanities</td>
<td>x</td>
</tr>
<tr>
<td>CURRICULUM ELEMENTS AND CURRICULUM OUTCOME FACTORS</td>
<td>PARADIGMS RELEVANT TO ELEMENTS AND OUTCOME FACTORS</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Academic Competency Eclectic Evidence- Humanistic Professional Social Techno-logical</td>
</tr>
<tr>
<td>E. ROLES AND TASKS (Refer to Table 1)</td>
<td>Rationalist based</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>X</td>
</tr>
<tr>
<td>Patient care</td>
<td>X</td>
</tr>
<tr>
<td>Treatment</td>
<td>X</td>
</tr>
<tr>
<td>Practice management</td>
<td>X</td>
</tr>
<tr>
<td>Health education</td>
<td>X</td>
</tr>
<tr>
<td>Research and scholarly activities</td>
<td>X</td>
</tr>
</tbody>
</table>

TABLE 45: doc-MEC
3.4.3 The Case in Favour of an Eclectic Paradigm

It is argued that the chiropractic curriculum should be based on an eclectic paradigm, which includes views from each of the other paradigms for the following reasons:

a) A wide range of disciplines are represented in the chiropractic curriculum e.g. basic life sciences, humanities, diagnostic sciences and professional (chiropractic) sciences. No single paradigm listed in Tables 35-42 (under 3.4.2) above can satisfy all of the views that should be reflected in the design of the chiropractic curriculum. A need exists therefore to develop an inclusive, comprehensive eclectic paradigm.

b) Based on the functions, duties and responsibilities of a chiropractor (Table 1) and the assumptions, purpose and nature of chiropractic education (1.2.2.3 above) it is clear that a wide range of part-disciplines (Table 2), need to be represented in an integrated, holistic manner in the curriculum.

c) In view of the requirement for a holistic conception of the chiropractic curriculum, multiple paradigms need to be integrated as part of an eclectic paradigm.

In light of the fact that the overall profile of a chiropractor is based on definition of the roles and tasks of practitioners and on the part disciplines which need to be mastered, it is reasonable to suggest that the chiropractic curriculum paradigm should be eclectic. The eclectic paradigm needs to integrate a number of conceptions and orientations if it is to serve as a valid and appropriate construct for the design and testing of a chiropractic curriculum and should provide for the concurrent implementation of both liberal and competency-based education. The conundrum of combining an academic rationalist paradigm (Table 35) which calls for a broad, liberal education with a competency paradigm (Table 39), is eloquently addressed by Webb (1993): 'Universities and employers agree that, to be effective, graduates should have high generic skills, not just specialist knowledge which has an ever-diminishing half-life. Universities for their part emphasise that their courses develop analytical capacity and communication ability, in the context of focussed attention to particular disciplines and professional requirements... There is substantial evidence that, when it comes to the crunch, those graduates who have performed well in technical, specialist, professionally-oriented courses have an advantage over those who have done equally well in courses of a more general, less technical nature.'
It has been demonstrated that the chiropractic curriculum is complex since it has to transmit knowledge, skills and values covering a wide range of part-disciplines and lead, through experiential learning, to competency in professional practice while ensuring that, in addition to a vocational/professional education, students also receive a liberal education. It is therefore argued that the chiropractic curriculum should be based on an eclectic paradigm, which subsumes a range of other paradigms, all of which are important to the views which the curriculum developers can be expected to bring to their task.
3.5 A CLARIFICATION OF A CHIROPRACTIC CONCEPTUAL FRAMEWORK

3.5.1 Introduction
Conceptual (F-conceptualis) means of or pertaining to mental conception or concepts (Brown 1993:467) while framework refers to a structure made of parts joined to form a frame...designed to support (Brown 1993:1019). Thus, a framework designed to support the thinking and concepts in chiropractic and by chiropractors is called a conceptual framework of chiropractic, and is heavily influenced by its culture. The culture of chiropractic has been extensively addressed in 3.2 above.

3.5.2 Constructs in a Chiropractic Conceptual Framework
The outline of a conceptual framework of chiropractic could be regarded as an identification of major elements of the organised body of knowledge of chiropractic which are expressed as constructs, which, while separate, form part of an integrated and interrelated mosaic of factors (Kleynhans 1998B:91).

Table 44 provides a concept map of the many constructs which constitute and influence the thinking of chiropractors. It reflects some of the foundations discussed above. The construction of the concept map is a necessary step in organising an approach to studying the discipline of chiropractic.

Table 45 in the next part, sets out to clarify the purposes and functions of dealing with knowledge, skills and values in each of the domains of a chiropractic conceptual framework. While considered to be strongly indicative of each of the domains in the field of chiropractic, the listed constructs, purposes and functions represent a first approach to explicate such a conceptual framework which requires further research.
<table>
<thead>
<tr>
<th>Domain</th>
<th>Characteristics/Constructs</th>
<th>Purposes</th>
<th>Functions</th>
</tr>
</thead>
</table>
| Philosophy             | • A point of view  
                        • Belief construct  
                        • Speculation about the nature or value of things                      | • To answer the question: Why?                                           | • Deals with beliefs and values                                           |
|                        |                                                                    | • To explore values                                                     | • Looks at wholes and their relationships to other wholes                 |
|                        |                                                                    | • Through a clear conception of values, to provide a rationale and wisdom for making choices | • Provides the rationale and wisdom for making choices                     |
| Science                | • Theories  
                        • Hypotheses  
                        • Postulates  
                        • Prepositions  
                        • Paradigms  
                        • Facts  
                        • Principles                                                    | • To answer: When? Where? How?                                          | • Deals with theories, hypotheses, facts                                  |
|                        |                                                                    | • To study and describe                                                 | • Breaks things into component parts to study, describe, explain          |
|                        |                                                                    | • To explain how things work                                            |                                                                           |
| Art/Practice           | • Actualisation  
                        • Enactment  
                        • Application  
                        • Implementation  
                        • Interpretation                                                      | • To apply theories and skills                                          | • Puts theories into practice                                             |
|                        |                                                                    | • To actualise, enact and apply chiropractic process                    | • Makes choices                                                          |
|                        |                                                                    | • To apply ethical guidelines                                          | • Applies beliefs and values in practice                                  |
| Socio-cultural         | • Responsibility  
                        • Accountability  
                        • Competence  
                        • Symbolism  
                        • Standards  
                        • Education                                                       | • To provide a portrait of the profession                               | • Determines competency-based professional standards                      |
|                        |                                                                    | • To provide professional cohesion                                      | • Establishes standards-of-practice guidelines                             |
|                        |                                                                    | • To provide a professional ethos                                       | • Establishes mechanisms for quality assurance                             |
|                        |                                                                    |                                                                           | • Analyses societal needs                                                 |
|                        |                                                                    |                                                                           | • Analyses professional relationships                                     |
|                        |                                                                    |                                                                           | • Analyses professional values, beliefs, etc                              |
| Psychosocial           | • Human behaviour  
                        • Communication  
                        • Patient needs  
                        • Practitioner qualities                                               | • To study doctor-patient interaction                                     | • Analyses doctor-patient interaction                                     |
|                        |                                                                    | • To study communication processes                                      | • Investigates healing qualities of human interaction                     |
|                        |                                                                    | • To identify psychological needs of patients at different ages         | • Analyses patients’ psychological needs in chiropractic care              |
|                        |                                                                    | • To study attributes of practitioners                                  |                                                                           |
|                        |                                                                    | • To study patient characteristics                                       |                                                                           |

From: Kleynhans 1998B.
3.5.3 A Taxonomy for a Chiropractic Conceptual Framework

The foundations of the chiropractic conceptual framework fit within the context of a taxonomy and can be seen as an inter-related system of premises that provide guidelines or ground rules for making all decisions about chiropractic as discipline and the chiropractors making up the profession, i.e. mission, aims, objectives, value statements, vision statements, strategic planning, implementation of strategic planning, education of future members of the profession, continuing education and continuous updating of knowledge, skills and values of members of the profession.

The chiropractic conceptual framework forms a very strong blueprint that attempts to take into account all identifiable constructs of the chiropractic philosophical set and culture. This allows the profession not only to develop a very strong self-image, but to better know how to deal with internal diversity and pluralism, and particularly how to position itself with credibility in society at large.

The chiropractic conceptual framework also provides the database from which professional development and planning guidelines are derived, while philosophy provides the value system for prioritising and selecting from among the various data in the framework. In summary, the chiropractic conceptual framework makes it possible to draw from philosophy, science, sociocultural and psychosocial factors in a way that presents a balanced view of chiropractic art or practice (Inspired by Bevis 1989:34).

While philosophy alone is a weak keystone for professional development and advancement, in conjunction with other components of the chiropractic conceptual framework it provides a point of reference or a point of departure for reflection, knowledge generation, professional development and strategic planning. In fact, philosophy strengthens the chiropractic conceptual construct (Inspired by Bevis 1989:34).

It is argued that it should be readily accepted that a range of values, beliefs and points of view exist among chiropractors. While every chiropractor will not agree with all of these and will not prioritise them in the same sequence, their identification, discussion, classification, analysis and evaluation facilitates direct coping with them and reduces the possibility of irrelevant and unrelated battles over them. This means that proper understanding of philosophy in chiropractic can be expected to promote professional cohesion and advancement.

An initial taxonomy for a conceptual framework of chiropractic is presented in Table 45.
<table>
<thead>
<tr>
<th>DOMAINS</th>
<th>CATEGORIES</th>
<th>CLASSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philosophy</td>
<td>Beliefs</td>
<td>Philosophical beliefs about the:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• science of chiropractic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• art of chiropractic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• sociocultural element of chiropractic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• psychosocial element of chiropractic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• personal belief system about chiropractic</td>
</tr>
<tr>
<td></td>
<td>Values</td>
<td>Value statements relating to:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• philosophy and chiropractic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• chiropractic science</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• chiropractic art/clinical practice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• sociocultural aspects of chiropractic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• psychosocial aspects of chiropractic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• personal philosophical beliefs of chiropractic</td>
</tr>
<tr>
<td></td>
<td>Models</td>
<td>Philosophical models relating to the:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• science of chiropractic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• art of chiropractic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• sociocultural aspects of chiropractic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• psychosocial aspects of chiropractic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• personal philosophical beliefs of chiropractic</td>
</tr>
<tr>
<td>Science</td>
<td>Principles</td>
<td>Philosophical models relating to the:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• life sciences</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• diagnostic sciences</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• chiropractic sciences</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• sociocultural elements</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• psychosocial elements</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• evidence-based practice of chiropractic</td>
</tr>
<tr>
<td></td>
<td>Theories</td>
<td>Theories relating to chiropractic in each of the same classes as for</td>
</tr>
<tr>
<td></td>
<td></td>
<td>principles above</td>
</tr>
<tr>
<td></td>
<td>Propositions</td>
<td>Propositions relating to chiropractic in each of the same classes as</td>
</tr>
<tr>
<td></td>
<td></td>
<td>for principles above</td>
</tr>
<tr>
<td></td>
<td>Models</td>
<td>Models relating to chiropractic science in each of the same classes as</td>
</tr>
<tr>
<td></td>
<td></td>
<td>for principles above</td>
</tr>
<tr>
<td></td>
<td>Paradigms</td>
<td>• Philosophy-based paradigms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Rational scientific paradigms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Practice-based paradigms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Sociocultural paradigms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Psychosocial paradigms</td>
</tr>
<tr>
<td>Art/Clinical Practice</td>
<td>The intent of practice</td>
<td>• Objectives</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Aims</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Goals</td>
</tr>
<tr>
<td></td>
<td>Competency-based professional standards</td>
<td>Each domain in a taxonomy of chiropractic practice is a separate class</td>
</tr>
<tr>
<td></td>
<td>Standards of practice guidelines</td>
<td>Practice-based models relating to:</td>
</tr>
<tr>
<td></td>
<td>Models</td>
<td>• Disease orientation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Wellness orientation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Sociocultural models</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Psychosocial models</td>
</tr>
</tbody>
</table>
### Socio-cultural
- Control (of chiropractic practice)
- Resource allocation (for chiropractic services)
- Structural setting (of chiropractic practice)
- Ideology and culture
- Chiropractic education

### Resource allocation
- Societal control of chiropractic
- Health system control of chiropractic
- Education system control of chiropractic
- Professional control of chiropractic practice and chiropractors
- Sources of cost recovery
- Influence of health care economics
- Models of chiropractic service delivery
- Patterns of service delivery
- Social role of chiropractors
- The work of chiropractors
- The place of chiropractic in generic medicine
- Control of the curriculum
- Standards of education
- Resource allocation
- Structural setting
- Curricular dimensions

### Patient characteristics
- Demographic profile
- Needs (presenting signs, symptoms, syndromes, disease prevention, health promotion)

### Practitioner characteristics
- Attributes relating to ethical, compassionate, patient-centred care, and to practice management

### Doctor-patient interaction
- Verbal communication
- Non-verbal communication
- Wellness triggers
- Therapeutic alliance

### Intra-professional interaction
- Communication

### Inter-professional interaction
- Communication

---

**From: Kleynhans 1998B.**

### 3.5.4 The Relationship Between Domains

#### 3.5.4.1 Overview

Much chiropractic literature, when referring to elements of what constitutes a conceptual framework of chiropractic, refers to the philosophy, science and art of chiropractic as if they were separate, discrete entities, and most authors communicate concepts and theories relevant to the philosophy in chiropractic, the science and the art of chiropractic to the exclusion of factors from other domains instead of, wholistically, relating all three to a continuum which starts with philosophy and progresses to science, so that both influence the appreciation and understanding of the art of chiropractic (Figure 12).
3.5.4.2 Relationship among the traditional domains of a chiropractic conceptual framework

It is argued that Figure 13 depicts this relationship which should have, as its focus, patient care. It is also argued that patient care must be placed in a Sociocultural and Psychosocial context.

3.5.4.3 An Expanded Chiropractic Conceptual Framework

It is further argued that instead of including only "philosophy, science and art" in the conceptual framework as has been traditionally done, it should be expanded as indicated in Figure 14 which shows the interaction among five domains with the focus on the art of practice i.e. patient service.

FIGURE 12 - A graphic depiction of the assumed relationship between philosophy and science in chiropractic.

<table>
<thead>
<tr>
<th>DOMAIN</th>
<th>PHILOSOPHY</th>
<th>SCIENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construct</td>
<td>Philosophical Concept</td>
<td>Theory ⇒ Hypothesis ⇒ Evidence</td>
</tr>
<tr>
<td>Example</td>
<td>Innate Intelligence</td>
<td>Homeostasis ⇒ Neuronal balance/imbalance</td>
</tr>
<tr>
<td>Application</td>
<td>Belief</td>
<td>Knowledge of specific mechanism</td>
</tr>
</tbody>
</table>

FIGURE 13 - The relationship among the traditional domains of a chiropractic conceptual framework that impact on patient care

From: Kleynhans 1998B:97.

FIGURE 14 - Interaction of domains in a chiropractic conceptual framework

Kleynhans 1998B:104.
Summary

In Chapter 3:

Philosophical Foundations
1. It is demonstrated that a significant body of knowledge exists in relation to the philosophical, social, cultural and psychological foundations of the chiropractic curriculum and that an eclectic paradigm is in fact necessary to adequately integrate concepts arising as a result of the richness of the diverse range of part disciplines in the curriculum.

2. It is demonstrated how philosophy guides the daily lives of chiropractors who are a) strongly influenced by a belief system, b) require a multidimensional research paradigm, c) are guided by a wide range of principles, logic and ethics and d) take a holistic and humanistic view in order to optimally serve society, their profession and themselves.

3. The philosophical foundations of chiropractic could be identified as having roots in a large number of methods and approaches in formal philosophy which can and should constantly be employed in developing and testing new knowledge in this field.

4. In pragmatic terms, philosophy in chiropractic relates to values, beliefs and models of health care. These are found in the field of chiropractic, where they can be objectively studied, and also in the personal world of the doctor of chiropractic, where they become a personal choice and relate to issues that have no more impact on the practice and understanding of the discipline than do any person's personal beliefs, faith and sociocultural values.

5. The scientific foundations of chiropractic could be explicated in terms of the intent and functions of science, the value and important role of principles. The nature of paradigms in science could be defined.

Sociological and Cultural Foundations
6. It is demonstrated how sociological and cultural foundations impact on the design of the chiropractic curriculum by identifying the groups which exert control, and allocate resources; analysing the structural, ideological and cultural setting in which the curriculum is developed and by illustrating how social factors influence various curricular dimensions.
7. The constructs within the sociocultural and psychosocial domains of chiropractic could be identified and the purposes and functions of study in their various categories explicated. These are new additions to the traditional chiropractic foundations of philosophy, science and art. It becomes obvious that they are valuable additions to the chiropractic conceptual framework, particularly the belief system.

Psychological Foundations
8. The influence of psychology on all phases of curriculum design could be identified and basic concepts on motivation explicated.

9. The importance of psychosocial factors in clinical practice could be explicated and the need for psychology as curriculum content shown.

Paradigms
10. Paradigms that are linked to the philosophical, sociological, cultural and psychological foundations and the discipline content of the curriculum could be identified and explicated and an eclectic paradigm for a chiropractic curriculum design strategy could be formulated.

11. A study of the foundations and paradigms of the chiropractic curriculum indicates that learners need to appropriate lived experiences concerning the philosophical assumptions and paradigms which will set them aside and empower them to make their own unique contribution as health practitioners.

A Chiropractic Conceptual Framework
12. The elements of a chiropractic conceptual framework could be identified and placed within a taxonomy to serve the purpose of better organising the body of knowledge of the field of chiropractic and to make it more useable, applicable and able to be expanded and further developed.

13. The relationships between and among elements of a chiropractic conceptual framework could be graphically depicted in an attempt to find new and better ways to study the foundations of chiropractic as health care discipline.

14. The art or practice of chiropractic, with the patient as focus, is at the core of the study of chiropractic.

15. It could be demonstrated how inter-relating domains are integrated to focus on the art of chiropractic.
CHAPTER 4

A CLARIFICATION OF THE DESIGN AND DEVELOPMENT OF A CHIROPRACTIC CURRICULUM

The curriculum design strategies depend on the curriculum paradigm(s) adopted as a result of clarification of the curriculum foundations and form the basis for curriculum development which proceeds cyclically through a situational analysis and needs assessment; determination of the curriculum intent and content; the organisation of content; development of teaching-learning strategies; organisation of learning experiences and the development of competency-based formative and summative assessment.

PRÉCIS 4: Chapter 4 clarifies the curriculum design strategies, context, intent, content, implementation and student evaluation.

OUTLINE 4:

Chapter 4 considers:

4.1 A clarification of design strategies for a chiropractic curriculum
4.2 The situational analysis of a chiropractic curriculum
4.3 The identification and analysis of the intent of a chiropractic curriculum
4.4 The selection and organisation of content in a chiropractic curriculum
4.5 Clarification of the design and organisation of learning experiences in a chiropractic curriculum
4.6 Clarification of the assessment of student performance in a chiropractic curriculum
4.1 A CLARIFICATION OF DESIGN STRATEGIES FOR A CHIROPRACTIC CURRICULUM

4.1.1 Introduction

4.1.1.1 Definitions

'Curriculum design (as process) is concerned with the arrangement of curriculum elements to produce a unified curriculum' (Print 1992:16). The curriculum design, pattern or structure (as noun), refers to the arrangement or relative relationship of the elements of a curriculum including aims, goals, objectives, content, implementation of learning activities and evaluation (Bevis, 1989:178; Print, 1992:181). 'The nature of these elements and the pattern of organisation in which they are brought together as a unified curriculum constitute the curriculum design' (Zais 1976:16).

4.1.1.2 Curriculum design questions

Analysis of the literature produces a range of recommendations relevant to the design of medical programs, notably from the major report on ‘Physicians for the twenty-first century’ by the Association of American Medical Colleges (AAMC 1984); statements by the UK General Medical Council quoted by Lowry (1992A:1277; 1992C:1409), and a report from a government enquiry in Australia (Doherty 1988:1), which tend to include the following points: 'transmission of factual information should be curtailed to a manageable level; introduce both a 'core' component and 'electives'; provide early clinical contact; introduce a substantial component of problem-based learning; instruct less and educate more; encourage students to develop self-directedness in learning to prepare for continuing education beyond university; define what students do not need to learn since this reduces anxiety in courses with a large element of self-directed learning; ensure that all students develop a firm understanding of scientific method etc. Further development of some points is provided by Harden, Sowden, Dunn (1984:11) and Tekian (1997:217).

A wide range of questions in taxonomic context are offered to clarify major issues about decision-making about the design of a chiropractic curriculum.
In order to overcome the perceived problems with the medical curriculum, innovative design strategies were introduced (Kantrowitz et al 1987:1) notably the problem-based curriculum at McMaster University in Canada (Barrows 1983:3077; Norman 1988:279); Newcastle University in Australia (Neame 1981:94; 1982:141; Leeder 1984:158; Leggat 1997:93); the University of New Mexico (Mennin and Kaufman 1989:9); and Harvard University (Bok 1982:1; 1984:32); the Rijksuniversiteit (Schmidt 1983:11) and Linköping (Areskog 1995:371). Neame (1981:94) notes that while earlier reports identified many of the problems (e.g. Flexner 1910; Royal College of Physicians Planning Committee 1944, and the Royal Commission on Medical Education 1968) which are still valid today, they had little influence on conventional medical education. The first significant change came from introduction of the problem-based curriculum at McMaster in 1969 (Neufeld 1984:263). Innovation in terms of a problem-solving curriculum design for physical therapy was introduced by Barr (1977:262) and curricular change in osteopathic medicine described by Crow et al (1989:293). The management of change to improve curriculum design is discussed at length in 5.3 below. The first innovative, problem-based learning program in chiropractic commenced at the Los Angeles College of Chiropractic in 1990 (Adams, Miller and Miller 1991:122; LACC 1990:1).

### TABLE 46 - Curriculum design questions about design strategies for the chiropractic curriculum

<table>
<thead>
<tr>
<th></th>
<th>Design of intent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Should the educational focus be liberal, professional/vocational or both?</td>
</tr>
<tr>
<td>1.2</td>
<td>Should the social orientation be towards community responsibility or institutional tradition?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Design of content</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Should inclusion strategies provide for electives or be based on traditional, standard subject content?</td>
</tr>
<tr>
<td>2.2</td>
<td>Should content be organised in an integrative, multidisciplinary (broad fields) or a discipline (specialty) based design?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Design of teaching-learning strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Should the focus be on learners (student-centred or andragogic) or teachers (pedagogic)?</td>
</tr>
<tr>
<td>3.2</td>
<td>Should learning opportunities be systematically designed or opportunistically provided?</td>
</tr>
<tr>
<td>3.3</td>
<td>Should knowledge, skills and values be attained through a content/time-based or a competency-based design?</td>
</tr>
<tr>
<td>3.4</td>
<td>Should learning be primarily competency- and problem-based or information gathering?</td>
</tr>
<tr>
<td>3.5</td>
<td>Should clinical learning experiences be predominantly provided in a hospital, or institutional clinic or in the community?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Design of student assessment strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Should assessment be based on norm- or criteria-referenced benchmarking?</td>
</tr>
<tr>
<td>4.2</td>
<td>Should assessment focus on reality (real life situations) or on written and oral assessment?</td>
</tr>
</tbody>
</table>
5. Design of a learning environment
5.1 Should the learning be based in a classroom/laboratory, hospital or community clinic setting?

6. Design of program evaluation strategies
6.1 Should graduate outcomes focus on competency-based assessment against performance indicators or on completion of time and content?
6.2 Should program outcomes focus on quality measurements against performance indicators or evaluation based on peer assessment with focus on content, time, facilities and traditional teaching strategies?


4.1.1.3 Contradistinctive design strategies

Harden et al (1984:2) identify six innovative curriculum design strategies for medical education. Each design strategy is presented as a spectrum between two extremes with the more innovative approaches on the one side and the more traditional on the other and where, at the extreme, the most innovative approach represents fully integrated teaching with no discipline-based or departmental teaching. It is named the SPICES model - an acronym for the following design strategies: Student-centred, Problem-based, Integrated, Community-based, Electives, Systematic. The SPICES model is recommended by its developers for use in curriculum analysis, review and development, either in part or in total (Harden et al 1984:2; Tekian 1997:217). Table 47 compares the "SPICES" model on the left with the more traditional curriculum strategies on the right. The competency-based design strategy has been added. The items on the left and right on each line are extremes on a continuum.

TABLE 47 - Contradistinctive curriculum design strategies in health sciences

<table>
<thead>
<tr>
<th>CURRENT/INNOVATIVE DESIGNS</th>
<th>TRADITIONAL DESIGNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Student-centred</td>
<td>Teacher centred</td>
</tr>
<tr>
<td>2. Problem-based</td>
<td>Information gathering</td>
</tr>
<tr>
<td>3. Integrated</td>
<td>Discipline-based</td>
</tr>
<tr>
<td>4. Community-based</td>
<td>Hospital-based</td>
</tr>
<tr>
<td>5. Electives</td>
<td>Standard program</td>
</tr>
<tr>
<td>6. Systematic</td>
<td>Apprenticeship-based or opportunistic</td>
</tr>
<tr>
<td>7. Competency-based</td>
<td>Content/time-based</td>
</tr>
</tbody>
</table>

Items 1-6 from the SPICES model after Harden RM, Sowden S, Dunn WR. 1984:284; item 7 after Thurman and Sanders 1987:164-9.
Table 48 compares the differences in relation to a range of curriculum elements between current, innovative and the traditional strategies of curriculum design. Each of the modern, innovative strategies is discussed below.
Table 48 - A comparison of innovative and traditional curriculum design strategies

<table>
<thead>
<tr>
<th>CURRICULUM ELEMENT</th>
<th>INNOVATIVE STRATEGIES</th>
<th>TRADITIONAL STRATEGIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Curriculum intent</td>
<td>Community-oriented approach; focus on responsibility to society</td>
<td>Institution-oriented approach</td>
</tr>
<tr>
<td></td>
<td>Professional education predominates</td>
<td>Liberal education component predominates</td>
</tr>
<tr>
<td>2. Curriculum content</td>
<td>Elective elements are included to reduce overload</td>
<td>Standard program only is provided</td>
</tr>
<tr>
<td>3. Organisation of content</td>
<td>Broad fields or multidisciplinary design which promotes integration and efficiency</td>
<td>Discipline or specialty-based design which promotes fragmentation and overload</td>
</tr>
<tr>
<td>4. Learning ambience (climate)</td>
<td>Student-centred (andragogic)</td>
<td>Teacher-centred (pedagogic)</td>
</tr>
<tr>
<td></td>
<td>Humanistic-based</td>
<td>Content-based</td>
</tr>
<tr>
<td></td>
<td>Activity/experience-focused</td>
<td>Information focussed</td>
</tr>
<tr>
<td>5. Learning strategies</td>
<td>Problem-based</td>
<td>Information gathering</td>
</tr>
<tr>
<td></td>
<td>Competency-based</td>
<td>Opportunistic (apprentice approach)</td>
</tr>
<tr>
<td></td>
<td>Self-directed</td>
<td>Teacher directed</td>
</tr>
<tr>
<td>6. Student assessment</td>
<td>Criterion-referenced evaluation ensures competency</td>
<td>Norm-referenced evaluation cannot ensure competency</td>
</tr>
<tr>
<td>7. Program evaluation</td>
<td>Evidence of desired outcomes based on meeting performance indicators</td>
<td>Evaluation based on peer assessment with focus on content, time, facilities and traditional teaching strategies</td>
</tr>
<tr>
<td></td>
<td>Quality measurements feasible</td>
<td>Quality measurements difficult</td>
</tr>
<tr>
<td>8. Curriculum outcome</td>
<td>Competency (at entry level standard in all domains of practice including the management of a full range of pre-determined conditions)</td>
<td>Qualification, having completed a ‘standard’ curriculum</td>
</tr>
</tbody>
</table>

4.1.2 Curriculum Design Strategies in Relation to Intent

4.1.2.1 Educational focus

At issue is whether the education should have a 'liberal' or 'professional/vocational' focus. Birch (1988:8,46) in writing about Oxford, illustrates how the ethos of a liberal education was codified in the writings of Cardinal Newman in 1852: 'this process...by which the intellect, instead of being formed or sacrificed to some particular, accidental purpose, some specific trade or profession, or study or science, is disciplined for its own sake, for the perception of its proper object and for its own highest culture is called liberal education'. While the adherence to a liberal education concept has obviously contributed greatly to the advancement of science and learning, it appears to no longer fully meet societal needs. It has therefore become necessary to seek a more purposive extension of its values within a broader academic ethic by drawing attention to the basic importance of problem-based learning (Birch 1988:8,46).

4.1.2.2 Social orientation

In curriculum design this relates to how seriously curriculum developers take the notion of designing a program to meet societal needs referred to in 3.2.5.1 and 3.2.6.2 above and 4.2.3.1 below as compared to adherence to a 'traditional' subject-based program with a focus on time and content rather than on competency of graduates. In view of the points made in the sections referred to above, it is argued that as we proceed towards the year 2000 the design focus has to be on a social orientation which serves community needs.

4.1.2.3 Professional focus

This is discussed in relation to Ellis’ action-focus curriculum in 4.1.3.2 below.

4.1.3 Curriculum Design Strategies in Relation to Content

4.1.3.1 Inclusion strategies

These relate to the question of remaining with a 'traditional' design which makes no provision for electives or the inclusion of electives as a strategy to decrease student overload and increase motivation through choice and interest. An 'electives' program design allows learners to select some electives as part of their program in contrast with a 'standard' program design, which requires all learners to take identical subjects. Harden, Sowden and Dunn (1984:10,11) suggest the following factors in support of an "electives" design: a) since the health sciences
curriculum cannot be expected to cover all relevant areas because of the information explosion, electives will allow students to correct what they see as deficiencies in their own education; b) it provides learners with increased responsibility to further their own learning (to become self-directed learners); c) it facilitates career choice; d) electives can meet learner's individual aspirations; and e) electives can bring about attitudinal change in relation to patient care (Cassileth and Egan 1979:797).

In explicating the rationale for a standard rather than an elective design in medicine (and ipso facto chiropractic), Harden, Sowden and Dunn (1984:11,12) suggest the following factors: a) electives can overload teachers with work; b) lack of interest and awareness by staff; c) impact of electives on other course work; d) difficulty in designing a satisfactory assessment scheme for elective work; and e) the notion that electives should be done after completion of the formal program.

Recommended for medicine by the U.K. General Medical Council (Lowry 1992C:1409), the introduction of electives in the chiropractic curriculum is a novel idea which is bound to meet considerable resistance because of curriculum overload and the assumption that so much is considered to be "core" that little room is left for electives. Also, financial constraints would prevent division of a class into even a few elective streams, which would escalate teaching costs, unless the electives were done as independent projects.

### 4.1.3.2 Content organisation strategies

This concerns the question of integration of the content as compared with organising it on a discipline-based design. Ellis (1992:75) supports the notion of integration based around the student's action as professional and as such it incorporates integration of all other design strategies. Ellis (1992:75) speaks of the action-focus curriculum and in this approach, as the name implies, the student's action as a professional is made the central focus of the curriculum. This action is conceived as having three stages: planning, implementation and evaluation. Implementation is the central part of a professional's work; it is the behaviour of the professional, it is the things he or she does for, with, or to patients or clients. He suggests that work that students do in college should make sense when they are out working in practice. Thus the essays, written examinations, role-plays and other activities which occupy students during their course, should be seen as relevant to their work out on placement. At a more sophisticated level, it may refer to the integration of various kinds of knowledge. There are those derived from relevant academic disciplines, those that come from the body of
knowledge which the profession has and those that arise before, during and after professional practice (Ellis 1992:70). The action focus curriculum is consonant with Kierkegaard's philosophy of lived experience and allows for the integration of both a broad, liberal education and competency-based skills development.

Harden and Davis (1995:125) present an excellent discourse on content organisation with a focus on core and special study options.

4.1.3.3 Integration of content

Lack of integration in the medical curriculum received a great deal of attention from medical educators and is one of the points of departure of some of the new medical schools which introduced problem-based curricula (Barrows and Tamblyn 1980:1). In traditional schools attempts at integration through a return to basic science, after clinical exposures, have been reported as successful (Patel and Dauphinee 1984:244) and rely largely on increasing the student's perception of the relevance of pre-clinical knowledge to clinical problems. Another approach revolves around a pre-clinical curriculum specifically designed to help students appreciate the relevance of basic science to their clinical work, increasing their motivation to a deep approach to learning (Eizenberg 1986:21). Balla (1989A:14,15) suggests that by helping students to 'integrate their knowledge and making them understand the complexities of the clinical process, we should expect the doctors of the future to not only have a good knowledge of the scientific foundations of medicine, but also to practise clinical medicine in a scientific manner'; and that 'we can only hope to achieve this by investing a great deal of time and effort to gain further insights into the learning processes of students, so that we shall alter not only the perceptions of doctors as they see their patients but also the perceptions of students as they experience the clinic'.

4.1.4 The Design of Teaching-Learning Strategies

4.1.4.1 Learner-teacher focus

This important topic concerns the way the relationship between and roles of students and teachers are viewed. It is argued that 'student-centred learning' rather than 'teacher-centred teaching' is what should 'drive' the design of a chiropractic curriculum. Major contributions to this field of study were made by Knowles (1981;1988) and Tough (1971;1978:250; 1979). Student-centred education at University level can be defined as 'andragogic education'.
Andragogics is derived from Gr. *andros* or man and *agein* which means to guide or accompany. The *agogical* therefore deals with modes of guidance at different ages. In the andragogic, it is of one adult by another; in the pedagogic of a child by an adult (Oberholzer and Greyling 1981:5). While many ancient, great Chinese, Hebrew, Greek and Roman teachers taught adults, invented techniques especially for them (e.g. case-method parables and Socratic dialogue), and philosophised about the aims and ends of adult education; it is only shortly after World War I that a growing body of concepts and assumptions or notions about the unique characteristics of adults as learners started to emerge and only in the past two decades that these evolved into a comprehensive theory of adult learning (Knowles 1988:26-31). Knowles (1988:61-63) says that pedagogical bases, which are still prevalent in most university teaching, have strong historical roots in terms of assumptions about teaching and learning which evolved between the 7th and 12th centuries in the monastic and cathedral schools of Europe out of experience in teaching basic skills to boys. He suggests that education, even for adults, has essentially been frozen in the pedagogical mode or framework (i.e. it is still based on pedagogical assumptions, beliefs and blind spots which have persisted for centuries) and a case can be made to support the notion that the pedagogic mode became entrenched in the most prestigious of institutions in terms of a liberal education. Knowles (1988:61-63) relates two fundamental postulates of problem-based learning based on the work of Lindeman which correspond with the andragogical approach: a) learning through problem-solving is much more effective for creating a body of knowledge useable in the future than is traditional memory-based learning; and b) the physician's skills most important for patients are problem-solving skills not memory skills.

Andragogics is a system that includes assumptions some of which are alternative to and some consonant with pedagogical assumptions. In case of the adult learner, if a pedagogical assumption is realistic in goal-attainment, then a pedagogical strategy is appropriate to use. Examples include rote learning of Greek and Latin root words, directional terms, cranial nerves, etc. or introductory lectures on basic biomechanical laws. This is then followed by andragogical modes, e.g. problem solving, interactive and experiential learning. A major role of teachers is to determine which assumptions are realistic in a given situation. Table 49 compares assumptions about andragogic and pedagogic approaches to learning and teaching and indicates how basic assumptions about teaching-learning strategies may influence curriculum design strategies.
TABLE 49 - A comparison of assumptions about andragogics and pedagogics in chiropractic curriculum design

<table>
<thead>
<tr>
<th>LEARNING BASED ON ANDRAGOGICS</th>
<th>TEACHING BASED ON PEDAGOGICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learners become increasingly self-directed</td>
<td>Learners are dependent and need to be directed</td>
</tr>
<tr>
<td>Learners are ready to learn to meet the demands of a professional career</td>
<td>Learners don’t know what is best for them and require social pressure to learn</td>
</tr>
<tr>
<td>Learning is immediately applied</td>
<td>Application of learning is postponed to the clinical practicum</td>
</tr>
<tr>
<td>External motivation comes from the work-prospects and prestige of being a chiropractor</td>
<td>External motivation comes from fear of failure and the desire to please teachers, parents or spouses</td>
</tr>
<tr>
<td>Internal motivation comes from self-satisfaction; interest; increased self-esteem and prospects of improved quality of life</td>
<td>Internal motivation comes from the good fortune of passing tests</td>
</tr>
<tr>
<td>Curriculum is adjusted to the learner’s needs and interests (e.g. becoming a chiropractor)</td>
<td>The learner is adjusted to the curriculum which is designed by the teacher or School to impart what is perceived to be a basic chiropractic education</td>
</tr>
<tr>
<td>Problem-centred learning: The approach is via learning situations; experiential techniques based on inquiry; problem units based on patterns of learning experiences, sequenced in terms of readiness</td>
<td>Subject-centred learning: The approach is via subjects; lectures; unguided reading of masses of information, rote memorisation etc</td>
</tr>
<tr>
<td>Learner’s experience is of major importance</td>
<td>Learner’s experience is of little consequence</td>
</tr>
<tr>
<td>Non-authoritarian, experiential, self-directed, problem-centred learning</td>
<td>Authoritative teaching; rigid pedagogic formulae; learner dependency</td>
</tr>
<tr>
<td>Textbooks and teachers play a secondary role - learner’s experience is of primary importance</td>
<td>Textbooks and teachers play a primary role</td>
</tr>
<tr>
<td>Qualitative learning: experiential learning leading to optimum development of the cognitive framework and many subsumers for relevant useful information integrated with skills and attitudinal development</td>
<td>Quantitative learning: ‘regurgitation of bucketsful of facts’ forgotten long before clinical practice</td>
</tr>
</tbody>
</table>

4.1.4.2 Learning opportunities

These can be either systematically designed or opportunistically provided (in a 'traditional' design with a focus on time and content).

Traditional health science programs tend to focus on a framework of content and time (Thurman and Sanders 1987:167) instead of on performance-based criteria related to the roles and tasks which practitioners will in future be required to meet in the community interest. It is argued that benefits from a systematic program as compared to a program with a content/time focus or an 'apprenticeship-type' clinical training (with exposure to whichever cases happen to be available), relate to the control of the following factors in the systematic program: a) the range and variety of health problems experienced by learners will be better controlled (Harden, Sowden and Dunn 1984:12) providing an important quality assurance measure; b) students will be able to focus on: a range of competencies required for effective entry level practice; all key concepts considered to be essential to their professional discipline; all psychomotor skills essential to competent patient assessment, communication, management and care; and the health problems which they would most often be called upon to manage; and curriculum time can be better rationalised with a systematic, well-monitored approach (Harden, Sowden and Dunn 1984:12) compared with an approach based on the broad objectives in a traditional content/time-based design.

4.1.4.3 Attainment of knowledge, skills and values

It is argued that the desired outcome of competent chiropractic graduates is best attained by choosing a competency-based rather than a content/time-based design. Thurman and Sanders (1987:165-6), state that 'with mounting public concern for educational effectiveness and accountability, competency-based education emerges as the instructional method of choice'. May (1979:166) states that: ...'competency-based education (CBE) is a system of education designed to maximise student learning and acquisition of necessary skills...(It) is adaptable to any discipline; a vehicle for equal opportunity for students, and inclusive of the cognitive, affective and psychomotor aspects of the performance' while Norton, Harrington and Fardig (1980:5) relate CBE to the 'real world of work' which is particularly important in terms of safety and effectiveness in health care: 'CBE acknowledges and in fact, capitalizes on the facilitation of effective and efficient learning, which is relevant to the real world of work, by employing the learning principles of motivation, individualization, reinforcement of learning,
self-pacing, recognition of differing learning styles, provision of frequent feedback, opportunities for practice, and active participation'.

A pilot study with radiography students by Thurman and Sanders (1987:164) indicates statistically that the CBE design is more effective than a 'traditional design' in improving student learning and performance (Table 50).

**TABLE 50 - A comparison of competency-based and traditional education designs**

<table>
<thead>
<tr>
<th>COMPETENCY-BASED EDUCATION</th>
<th>TRADITIONAL CONTENT/TIME-BASED EDUCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CURRICULUM INTENT</strong></td>
<td></td>
</tr>
<tr>
<td>Student attainment of publicly stated and validated cognitive, affective and psychomotor learning outcomes</td>
<td>Student attainment of broad educational objectives which may or may not be referenced to terminal competencies of the program</td>
</tr>
<tr>
<td><strong>IMPLEMENTATION - INSTRUCTIONAL PROCESS</strong></td>
<td></td>
</tr>
<tr>
<td>Individually paced learning</td>
<td>Group paced learning</td>
</tr>
<tr>
<td>Performance based processes</td>
<td>Content/time based process</td>
</tr>
<tr>
<td>Alternative instructional strategies supplement or replace the lecture method</td>
<td>Lecture/demonstration is the primary instructional method</td>
</tr>
<tr>
<td>Learners accept responsibility for meeting identified performance standards</td>
<td>Learners have no set minimal mastery level for each objective</td>
</tr>
<tr>
<td><strong>STUDENT ASSESSMENT</strong></td>
<td></td>
</tr>
<tr>
<td>Criterion-referenced evaluation to measure student attainment of specific objectives</td>
<td>Norm referenced evaluation to measure student attainment of general, broad objectives</td>
</tr>
<tr>
<td>Course completion is dependant on performance of specified, validated competencies at specific mastery level.</td>
<td>Course completion is dependant on unit evaluation with an overall &quot;C&quot; average to pass</td>
</tr>
<tr>
<td>Passing is proof of learner competence in the area</td>
<td>Learners could fail or barely pass important units of work and still pass</td>
</tr>
</tbody>
</table>

Based on analysis and extrapolation from a narrative publication by Thurman and Sanders (1987:164-9).
As a result of more recent studies (Dall’Alba and Sandberg 1992:1; 1996:411), it has become very clear that competency-based learning cannot be viewed merely in terms of attributes such as knowledge, skills and attitudes but as a way of ‘experiencing’ practice with a focus on lived experience involving knowing-in-action and reflection-in-action (Schön 1987:25). In medical (and therefore chiropractic) education this necessitates understanding of the meaning that professional practice has for students through enriched experience of practice (Dall’Alba 1993:299; Dall’Alba 1995:3) or lived experience.

Toulmin (1976:32) quoted by Dall’Alba (1995:3) says: the doctor’s way of conceiving, thinking about and viewing his own knowledge and understanding directly shapes the manner in which he perceives, thinks about and treats his patients who are the object of that knowledge or understanding. It is argued, therefore, that a competency-based chiropractic curriculum design must be founded on a phenomenological foundation of the ‘lived-experience’ of the student, particularly during clinical interaction with peers and patients.

4.1.4.4 Type of learning

A distinction is made primarily between 'traditional' information transfer and information gathering as a result of expository teaching as compared with inquiry teaching such as problem-based learning. Problem-based learning (PBL) is a strategy that is said to 'provide students with knowledge suitable for problem solving' (Schmidt 1983:11). The essential characteristics of PBL include:

a) Curricular organization around problems rather than disciplines.

b) An integrated curriculum rather than one separated into basic and clinical science components.

c) An inherent emphasis on cognitive skills as well as on knowledge (Barrows and Tamblyn 1980; Walton and Matthews 1989:555).

Knowles (1988:61-63) suggests that while the merits of problem-based learning as a process of guided individual discovery and learning were recognised by Dewey in 1916, progress in its use has been slow in higher education. Introduction of an andragogic problem-based approach to teaching-learning at the Medical School of McMaster University in Canada led to much improved medical education characterised by strong student motivation for learning and a positive stimulus to staff (Kantrowitz, 1987:17; Neufeld 1984:264; Neufeld et al 1989:423). Excellent recent publications on problem-based strategies add to this discussion (Harden and Davis 1998:317; Hughes et al 1997:440).
4.1.5 The Design of Student Assessment Strategies

4.1.5.1 Benchmarking

A fundamental design decision is whether to base student assessment on norm-referenced or criterion-referenced measurements that are discussed in 4.6.1.1 below. It is argued that student assessment should be based on criterion-referenced evaluation to measure student attainment of specific objectives linked to validated competency-based professional standards to provide validation of learner competence in each area because learners could fail or barely pass important units of work and still be accorded a pass based on norm-referenced evaluation (Thurman and Sanders 1987:164-9). Assessment of student performance in complex professional practice is discussed in 4.6.6 below where it is demonstrated that formative and summative assessment in the 'real life' situation is crucial to the validation of competency. It is also argued to be the only way in which to competently assess affective skills and advanced psychomotor skills.

4.1.6 The Design of a Clinical Learning Environment

This concerns only the clinical component of the course, which has to provide experiences adequate to ensure that graduates are competent to meet societal needs. Participant observation indicates that chiropractors mainly work in a private practice based in the community. It is therefore argued that they should receive primarily community-based education.

Harden et al (1984:8) say that medical students have much to gain from undertaking community-based education to enhance the hospital-based exposure which is limited to a much smaller proportion of the patients they will need to service when in a community-based general practice. Lack of access to hospitals has compelled other groups e.g. chiropractors to obtain their education almost exclusively in institutionally operated outpatient clinics. While medical students would benefit greatly from exposure to community-based practices, chiropractic students would benefit from hospital rounds to gain greater understanding of the types of patients who require emergency and hospital-based care. Although chiropractic teaching clinics provide learners with excellent learning experiences involving cases from the same population that they will encounter in future practice, observations at different institutions indicate that the range and numbers of cases which students are able to interact
with are limited. Students would therefore benefit from placement in private practice settings in a preceptorship program during the first professional course of training or as a residency program following course completion but prior to full registration. Community-based education provides a community orientation to education and training thereby increasing relevance. Harden, Sowden and Dunn (1984:9,10) make the following important points about community-based education:

- It provides role models in a relevant clinical setting and useful learning experiences which use untapped resources that can offset some of the problems associated with institutional funding constraints.
- It encourages active, experiential learning which can be highly motivating and avoids the 'student-wise' patients of teaching clinics and hospitals.
- It allows an effective introduction to the health care system including patterns of service delivery, practice management decision-making economics and quality control.

There is strong evidence to suggest that it is of benefit to identify and analyse what happens in the typical community practice and to incorporate such experiences in simulated reality teaching. However, the ultimate aim of direct participation in reality teaching (discussed in 4.5.6 and 5.1.4.5 below) via clinical placements in private chiropractic practices should always be pursued.

4.1.7 The Design of Evaluation Strategies

4.1.7.1 Graduate outcomes

It is argued that a design decision needs to be made early whether graduate outcomes should relate to course completion i.e. based on a time-content completion or on the demonstration of competency-based professional standards at entry-level into the profession. Competency involves the ability of an individual with a given level of expertise or educational background to carry out and assume responsibility for a total performance (Aston-McCrimmon and Hamel, 1983:78; Dunn et al, 1985:15; May, 1977:28).
The present-day popularity of competency-based education is explained by the fact that society has become increasingly concerned with the 'sibling issues of competency and accountability in the professions' (Dunn et al., 1985:15). Competency-based education and training is an appealing concept because of 'compactness' and particularly because of the fact that society has become increasingly concerned with the issues of competence and accountability in the professions (Dunn et al., 1985:15). The competencies as content are related to the student's environment, intellectual needs and societal requirements, i.e. the professional competencies required from a chiropractor in a particular jurisdiction. Identification of content, including competency statements relating to undergraduate programs, make it easier for educators to design and provide well-articulating continuing education programs (Heymann and Roberson, 1984:167; Dunn et al., 1985:16; Aston-McCrimmon and Hamel, 1983:79). Competency-based education and training is the raison-d'être for the design of operationally defined course objectives in the health care disciplines. It involves deciding on the competencies that practitioners must have to competently practice and then designing or re-designing a higher education program to ensure that graduates possess these competencies. 'Competency-based education, very simply, is a system of education based on the specification of what constitutes competency in a given field. The emphasis is on achievement and the psychological viewpoint is that learning is enhanced if the student is actively involved in the achievement of the objectives. The goal is to have at least 90% of the students achieve 90% of the competencies 90% of the time and the instructional events are designed to this end. Criteria-referenced examinations are utilised to determine if the student has achieved the desired competencies' (May, 1977:28). To ensure the attainment of curriculum aims, it is therefore necessary that content monitoring and evaluation should be based on competency statements. Dunn and Hamilton (1986:209), say that competency-based education is becoming more and more popular in educating professionals because of the relevance of the competency-based curriculum to the practice situation. They suggest that the success of any competency-based curriculum is almost totally dependent on the quality of its research base, i.e. the correct identification of competencies for a profession. The identification is practice-based and was discussed above. 'A competent professional can be defined as a person who has the attributes necessary for job performance to the appropriate standard' and focuses on three elements: 'attributes, performance and standards. 'Attributes such as knowledge, skills and attitudes, in combination, underlie
competence. 'A competency is a combination of attributes underlying some aspect of successful professional performance' and 'competencies are observed and tested via performance on tasks or on wider domains or areas of professional practice. Standards are the criteria against which performance is judged. Thus, a competency-based standard is a level of achievement required for some area of professional practice. When such standards are specified for a selected range of areas, the result is a set of competency-based standards for the profession' (Gonczi, Hager and Oliver 1990:4).

It is argued that a strong focus on competency-based student assessment in the chiropractic clinical setting can be expected to improve the validity of curriculum outcomes assessment because it relates to identifiable units of content which can be biased to provide predetermined emphases in the relevant areas being assessed in a 'real life' practice situation. Contrasted with a traditional focus on the time and content of a course, it is argued that an innovative, competency driven design strategy will ensure that graduates are competent and accountable in meeting societal needs for community-based chiropractors able to care for patients who typically see them and be able to intelligently and effectively refer patients they cannot assist. Competency-based design strategies can reasonably be expected to improve articulation between semesters and therefore vertical integration because of a clear definition of which competencies are met at each stage of the curriculum. It therefore serves as a systematic design strategy, which promotes integration in order for competency to be demonstrated, particularly in higher order, clinical decision-making processes. However, in the final analysis it should be viewed in the context of the phenomenological foundations discussed in 4.1.4.3 above.

4.1.7.2 Program outcome

A fundamental design strategy relates to the evaluation of the program either via peer assessment with a focus on content, time, facilities, traditional teaching strategies etc, or via evidence of desired outcomes based on the measurement of performance against indicators such as graduate outputs, research and scholarship quantum (e.g. number of publications; completed projects etc). This is further discussed in 5.4 and 5.5 below. It is argued that program evaluation should be so designed that institutional performance indicators form the main basis for assessment.
4.1.8 Towards an Integrative Chiropractic Curriculum Design

4.1.8.1 Introduction
In order to meet the wide-ranging needs and address the fundamental problems of the traditional chiropractic curriculum, a totally new design is proposed (Kleynhans 1997A:78). It is firmly based on the following principles:

a) **Intent** - the point of departure is the context in which future practice by graduates is to take place e.g. the signs, symptoms and syndromes they will need to manage; the principles of disease prevention and health promotion they will need to inculcate and the socio-cultural and legal context in which practice is to take place;

b) **Content** - the use of a clinical decision-making framework to organise content and which simultaneously serves as a cognitive framework, to promote learning and retention. In this framework or taxonomy, domains, categories and classes provide cognitive subsumers for the integration of new knowledge, skills and values; and the effectiveness of the framework results from its use both for each major region of the body and also in micro form for each health problem for which chiropractic clinical intervention occurs;

c) **Teaching-learning strategy** - identification of the factors which influence evidence-based decision-making and reinforcement of this process through problem-based learning discussed in 4.1.8.2 below;

A curriculum implementation system which uses the same integrative framework as a basis for the design of cross-referenced subject guides, study guides, readers, practical manuals, clinical practicum manuals, case studies both for problem-based learning and for clinical decision-making in clinical practice;

e) **Evaluation** - the implementation of competency-based assessment strategies for professional entry level chiropractors as curriculum outcome assessment.

4.1.8.2 Characteristics of a chiropractic clinical decision-making process

a) **Overview** - it is argued that, as chiropractic increasingly strives to validate its principles and practices, it is faced with the responsibility of demonstrating accountability and competence at the practitioner and professional level; explicit standards and guidelines for clinical care; and a scientific framework or taxonomy within which clinical practice and future research can be conducted. Such a taxonomy is also seen as a means of bridging theoretical and simulated reality-teaching and clinical reality-teaching in respect of clinical
decision-making. It is argued that the design of a taxonomy which promotes chiropractic clinical decision-making could serve as a theoretical and practical framework for the selection of chiropractic clinical interventions; that it can reasonably be based on the assumptions in Table 50 and that it can form the central focus for the design of an integrative undergraduate chiropractic curriculum. In this context chiropractic clinical interventions are the diagnostic and therapeutic procedures applied by a chiropractor (referred to in Table 1 in 1.2.2.2 above) for the purposes of enabling a patient to prevent developing or to recover from abnormal function and disability, thereby relieving pain and/or improving function.

b) **The selection of chiropractic management options** - the selection of chiropractic clinical options involves the identification, correlation and integration of a large amount of data drawn from all the part-disciplines of chiropractic, including the life sciences such as anatomy, physiology etc; the clinical sciences such as chiropractic diagnosis and practice, differential diagnosis and other subjects in order to arrive at a chiropractic management plan. This work presents an approach to the selection of chiropractic clinical management options which is based on the identification of factors which should be considered by the chiropractor as physician in making clinical decisions. This approach provides a theoretical framework based on a classification system (or taxonomy) of factors that influence clinical decision making. It is useful in application of the hypothetico-deductive method of clinical decision making and is a practical approach in the clinical setting and is applied on a holistic, a regional and a systemic basis. The taxonomy offers a framework for consensus methods research and for the creation of a database to supply current research data to practitioners to ensure that issues of standards of practice in clinical decision making are met, which is crucial to an evidence-based curriculum. To students it is important as a framework for the integration and learning of information essential to future practice. It assists in correlating information covered in many previous subjects and integrating it in a clinically meaningful and functional manner.

c) **The importance of individuality** - Not all human beings are structured alike or suffer the same morphological and pathophysiological changes over time. Structural and functional differences appear to be the rule rather than the exception. It therefore appears reasonable to hypothesise that the identification and classification of factors which influence the selection of clinical care options for patients, facilitate case management and particularly that they improve safety and compliance during application of chiropractic clinical options such as
chiropractic manual technique (CMT). A fundamental reason for classifying factors which influence therapeutic decision-making, is to be able to adapt techniques and other clinical options to patients, instead of adapting patients to a practitioner's potentially limited, preferred repertoire of procedures and techniques. A wide range of clinical options including CMT are used by chiropractic practitioners, yet, the number of chiropractic manual techniques suitable to the correction of specific biomechanical derangements (the subluxations, lesions or dysfunctions of specific spinal synovial joints) in any one region of the spine is limited. If these techniques are selected on the basis of the patient's age; the humanistic (philosophical, psychological and socio-cultural) factors; and with reference to factors related to the patient's morphology (structure), pathophysiology (dysfunction), the underlying pathology and diagnosis, the choice of suitable techniques in a rational approach to the patient becomes rather limited. It has been demonstrated below that a framework to facilitate decision-making can be designed to contribute to quality chiropractic care by assisting practitioners, through the correlation and integration of factors, to arrive at the most appropriate procedures in caring for a patient. These groups of factors are designated as "domains". Hence, to select and apply the technique(s) and other clinical options most appropriate to the situation of a specific patient, there is a need to evaluate patients and carefully determine how factors in each domain influence CMT selection to management in general. As chiropractic increasingly strives to validate its principles and practices, it is faced with the responsibility of demonstrating: a) accountability and competence at the practitioner and professional level; b) implicit standards and guidelines for clinical care; and c) a scientific framework (taxonomy) within which clinical practice and future research can be conducted. This framework is expected to assist the chiropractic profession in attaining these societal expectations.

d) Domains of factors in chiropractic clinical decision-making - Analysis of information indicates that the factors relevant to chiropractic clinical decision-making can be classified under nine interactive domains which influence the selection of CMT and other chiropractic clinical management options.
TABLE 51 - Domains in a taxonomy for the selection of chiropractic clinical options

1. The life cycle domain that relates to seven age groups, i.e. young adult, middle age, older age, pregnant, neonate/infant, pre-school/school age and adolescent.
2. The humanistic domain which relates to philosophical, psychological and socio-cultural factors.
3. The morphology domain which relates to normal and developmental structure.
4. The function/dysfunction domain which relates to normal and abnormal physiology (function), including biomechanics and pathomechanics.
5. The pathology domain which relates to change in tissue structure and function.
6. The domain of diagnostic (clinical assessment) options.
7. The domain of clinical intervention (chiropractic therapeutic care) options.
8. The domain of signs, symptoms and syndromes amenable to chiropractic care.
9. The domain concerned with response to care.

e) The chiropractic clinical decision-making framework - The framework is used by applying to patients who fit one of the age groups in the life cycle domain (#1 in Table 51), relevant information from each of the other eight domains (#2-9 in Table 51). In the framework below, domains appear in bold (e.g. functional morphology) and categories are indicated as sub-groups (e.g. 1.1, 1.2 etc).

TABLE 52 - A framework for chiropractic clinical decision-making

1. Humanistic factors relevant to chiropractic management
1.1 Philosophical factors which influence management
1.2 Psychological factors which influence chiropractic management
1.3 Socio-cultural factors which influence chiropractic management

2. Functional morphology
2.1 Functional anatomy of the human body in overview
2.2 The relevance of gender to patient management
2.3 The relevance of anthropometry to patient management
2.4 The relevance of developmental morphology to patient management

3. Normal and abnormal function in relation to patient management in overview
3.1 Biomechanical basis of management
3.2 The relevance of circulatory factors to patient management
3.3 The relevance of hormonal and metabolic factors to patient management
3.4 The relevance of functional neurological factors to patient management

4. Pathology which modifies chiropractic management
4.1 The relevance of mechanical pathologies (developmental anomalies) to management
4.2 The relevance of pathomorphology to management
4.3 Contraindications to chiropractic patient management
4.4 Restricted indications for chiropractic patient management
5. Chiropractic options in patient assessment
5.1 History taking
5.2 Observation
5.3 Anthropometry
5.4 Temperature assessment
5.5 Skin and dermatoscopy
5.6 Circulatory change
5.7 Percussion
5.8 Auscultation
5.9 Sphygmomanometry
5.10 Ophthalmoscopy
5.11 Otoscopy
5.12 Transillumination
5.13 Static palpation
5.14 Motion palpation
5.15 Postural and gait assessment
5.16 Range of motion assessment
5.17 Muscle assessment
5.18 Orthopaedic assessment
5.19 Neurological assessment
5.20 Diagnostic imaging assessment
5.21 Clinical laboratory diagnosis

6. Therapeutic care in chiropractic management
6.1 Chiropractic adjusting techniques
6.2 Chiropractic mobilization techniques
6.3 Chiropractic soft tissue techniques
6.4 Chiropractic non-force techniques
6.5 Mechanically assisted chiropractic techniques
6.6 Procedures adjunctive to chiropractic manual techniques
6.7 Preventative chiropractic care

7. The chiropractic management plan
7.1 Symptoms
7.2 Signs
7.3 Syndromes
7.4 Disease prevention
7.5 Health promotion

8. The relevance of therapeutic care outcomes to chiropractic management
8.1 Improvement
8.2 No improvement
8.3 Deterioration
The framework in Table 52 is used for the mastery of knowledge, skills and values relating to the following areas where it is considered for each age group:

Chiropractic Management in Overview 1 (holistic view of the body)
Chiropractic Management of the Low Back, Pelvis and Abdomen
Chiropractic Management of the Lower Extremities
Chiropractic Management of the Thorax
Chiropractic Management of the Head and Neck
Chiropractic Management of the Upper Extremities
Chiropractic Management in Overview 2

f) Assumptions - The design of this taxonomy, which serves as a theoretical and practical framework for the selection of chiropractic procedures, is based on the assumptions detailed in Table 53:

<table>
<thead>
<tr>
<th>TABLE 53 - Assumptions about chiropractic clinical decision-making</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The process of CMT selection is complicated because of:</td>
</tr>
<tr>
<td>a) The numerous factors which play a role in the clinical decision-making process.</td>
</tr>
<tr>
<td>b) The need to take a holistic view of each patient who is different from all other patients (even though similarities abound) and therefore should receive an individualised CMT approach suitable to that patient's age, morphology, dysfunction, diagnosis and humanistic factors; and limited by pathological factors.</td>
</tr>
<tr>
<td>c) The availability of numerous, often not clearly explicated, systems, methods and techniques which are applied to patients because they are suitable to or preferred by the practitioner rather than being primarily suitable to a specific patient. This may be the reason why chiropractic care, provided in the wider community, has such tremendous inter-practitioner variability e.g. patients visiting different chiropractors for, say, low back pain due to facet syndrome, will most likely experience a range of techniques to be applied with varying degrees of specificity and success.</td>
</tr>
<tr>
<td>2. A finite range of diagnostic and therapeutic procedures can be identified and in the management of symptoms, signs and syndromes these can be categorised according to suitability given a range of factors including structure, function, dysfunction, pathomechanics, pathology, age, humanistic factors and response to care.</td>
</tr>
<tr>
<td>3. CMT selection is based primarily on the patient's age, structural and functional (dysfunctional or pathophysiological) factors.</td>
</tr>
<tr>
<td>4. Clinical decisions based on age, structure and function are modified by consideration of pathological factors which clarify indications, relative indications (which are also relative contraindications), and contraindications to manual technique applications.</td>
</tr>
<tr>
<td>5. Overall patient management is strongly influenced by humanistic factors.</td>
</tr>
<tr>
<td>6. Structural and functional differences among patients are the rule.</td>
</tr>
<tr>
<td>7. Competent practitioners are able to adapt their therapeutic interaction to meet individual patient needs.</td>
</tr>
<tr>
<td>8. An approach based on adapting procedures to patient needs allows for optimal care on the basis of individual variation and predilection and provides a realistic (possibly the only realistic) basis for standardisation in the practice of manual techniques.</td>
</tr>
</tbody>
</table>
9. Inter-relatedness of structure and function is extensively discussed in the chiropractic and osteopathic literature, often without full explication. This lack of correlation by authors may be due to the complexity of individual variation and the need for patient-specific application, both of which are necessary in order to be able to fully explicate the concept.

10. Standardisation of CMT selection can be based on a multifactorial approach, including consideration of factors such as acuteness of complaint, age, neurological and biomechanical factors, contraindications, gender, patient flexibility, joint mobility, muscle tone, pathophysiological manifestations, patient intolerances, psychological factors, response to movement, somatotype, etc.

11. Systematic analysis, classification, correlation and integration of multiple factors into a suitable, scientific framework can form a basis for the development of a standardised patient management rationale amenable to peer review.

12. Clinical decision-making should be evidence-based.

Developed by the author 1990-1996.

g) How the selection of chiropractic clinical options is influenced by the domains -

The three core (primary) domains which play a major role in the selection of chiropractic clinical options, are:

Patient age

Morphology (including pathomorphology and representing structural aspects)

Pathophysiology (dysfunction).

While techniques can be readily classified on the basis of these three groups of primary factors, modifiers or secondary factors have been identified which serve to refine the process and make it clinically and scientifically acceptable.

Modifiers (secondary domains) in the selection process are classified under the remaining six domains:

Pathology factors are modifiers which include those conditions where there is pathological alteration of tissue e.g. carcinoma and/or a predilection to injury such as vertebro-basilar insufficiency and include relative contraindications (relative indications) and absolute contraindications to chiropractic methods and techniques.

Diagnostic factors resulting from assessment could suggest modification in the light of other mechanical or non-mechanical factors which influence the patient.

Humanistic modifiers relate to:

- Philosophical factors (e.g. issues of principles in the light of logic, holism, ethics, etc).

- Sociological and cultural factors which dictate against touching of certain regions, exposure of tissue etc.
Psychological considerations (e.g. neurosis, intolerance to manual technique, psychological aspects of caring for patients at different ages).

**Chiropractic Therapeutic Care Options** have inherent factors that may mitigate against their use.

**Response to Previous Care** could also strongly influence selection of therapeutic care procedures.

**Purpose of a Chiropractic Clinical Decision-making Framework**

The development of a framework for individualised patient care is based on a wide array of factors which play a role in clinical decision making and was seen as necessary for:

a) Improving the sophistication of scientific approaches to CMT.

b) Forming a reference point for research on technique selection, validation and standards of practice.

c) Improving prognosis based on CMT intervention.

d) Establishment of standards of care for the application of chiropractic manual techniques (CMT).

e) The development of a basis for patient referral.

An appreciation of the application of the framework is facilitated through individual case studies where factors classified under the major areas or domains can be drawn together to provide a basis for the selection of manual techniques and other clinical options in a holistic approach to a single case.

**Advantages of a Selection System**

The advantages of using a framework for selecting chiropractic clinical options are listed in Table 54.

<table>
<thead>
<tr>
<th>TABLE 54 - Advantages of using a framework to select chiropractic clinical options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. It provides for the classification of data into the main categories of factors that influence the selection of chiropractic clinical options.</td>
</tr>
<tr>
<td>2. It is expandable.</td>
</tr>
<tr>
<td>3. It is ideally suited for use with consensus research methods.</td>
</tr>
<tr>
<td>4. It takes minimal effort for the consumers (students, field practitioners, researchers and academics) to master the principles.</td>
</tr>
<tr>
<td>5. It provides a scientific framework for the determination of standards of care.</td>
</tr>
</tbody>
</table>
6. It provides a basis for the validation of chiropractic procedures and theories.

7. It provides a basis for the standardisation of chiropractic practice by identifying the most appropriate procedures, given any set of patient-related variables.

The clinical, scientific and economic criteria met by the selection framework are listed in Table 55.

**TABLE 55 - Criteria met by the framework for the selection of chiropractic clinical options**

The framework meets the following clinical criteria:
1. Emphasises patient safety
2. Promotes patient compliance
3. Integrates relevant clinical factors
4. Enhances prognostication
5. Facilitates necessary referral
6. Meets patient needs
7. Provides a humanistic approach
8. Is based on principles of disease prevention, health promotion and pain relief
9. Emphasises evidence-based decision-making

The framework meets the following scientific criteria:
1. Validity
2. Objectivity
3. Standardisation
4. Reproducibility
5. Repeatability
6. Emphasises evidence-based decision-making

The framework is characterised by the following economic criteria:
1. Ease of implementation
2. Efficiency
3. Effectiveness
4. Ease of documentation

Clinical Questions which are Addressed

The following questions that underlie decisions about the selection of chiropractic clinical options have been identified:

1. Which humanistic (philosophical, psychological, cultural and sociological) factors influence selection of clinical options?
2. Which morphological factors play a role in the selection of CMT and other clinical procedures?
3. Which biomechanical, pathomechanical, physiological and pathophysiological factors influence chiropractic clinical decision-making?
4. Which pathological factors influence the selection of CMT and other clinical procedures?
5. Which diagnostic (patient assessment) options are available to chiropractors?
6. Which clinical management options are available in chiropractic practice?
7. Which signs, symptoms and syndromes are amenable to chiropractic intervention and how are disease prevention and health promotion principles applied?
8. How does response to previous care influence decision making?
9. Which age categories most accurately classify patients according to morphological, functional, diagnostic and humanistic factors relevant to the selection of CMT and other chiropractic clinical care options?

Outline of an Integrative Chiropractic Curriculum

A comparison of the outline in Table 56 with the “traditional” outline in Table 57 indicates the dramatic change brought about through the integrative design.

TABLE 56 - Outline for a 5 year integrative chiropractic curriculum

<table>
<thead>
<tr>
<th>CORE CLINICAL SUBJECTS</th>
<th>ANCILLARY SUBJECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>YEAR 5</strong></td>
<td>Chiropractic Management in Overview 3</td>
</tr>
</tbody>
</table>
| **YEAR 4** | Chiropractic Management of the Upper Extremities 2  
Chiropractic Management of the Head & Neck 2  
Chiropractic Management of the Thorax 2 | [Jurisprudence and Practice Administration 1]  
[Pathology 2] |
| **YEAR 3** | Chiropractic Management of the Lower Extremities 2  
Chiropractic Management of the Low Back, Pelvis and Abdomen 2  
Chiropractic Management in Overview 2 | [Pathology 1]  
[Microbiology]  
[Physiology 3] |
| **YEAR 2** | Chiropractic Management of the Upper Extremities 1  
Chiropractic Management of the Head & Neck 1  
Chiropractic Management of the Thorax 1 | [Physiology 2]  
[Biochemistry]  
[Anatomy 2] |
| **YEAR 1** | Chiropractic Management of the Lower Extremities 1  
Chiropractic Management of the Low Back, Pelvis and Abdomen 1  
Chiropractic Management in Overview 1 | [Biophysics]  
[Medical Biology]  
[Biological Chemistry]  
[Physiology 1]  
[Anatomy 1] |
TABLE 57 - Outline of a 'conventional' chiropractic curriculum

<table>
<thead>
<tr>
<th>YEAR</th>
<th>CHIROPRACTIC SCIENCES</th>
<th>DIAGNOSTIC SCIENCES</th>
<th>LIFE SCIENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>PRINCIPLES PRACTICE</td>
<td>DIAGNOSIS</td>
<td>PATHOLOGY</td>
</tr>
<tr>
<td></td>
<td>CLINICAL PRACTICUM</td>
<td></td>
<td>PHYSIOLOGY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DIAGNOSTIC IMAGING</td>
<td>MICROBIOLOGY</td>
</tr>
<tr>
<td>4</td>
<td>PRINCIPLES PRACTICE</td>
<td>DIAGNOSIS</td>
<td>PATHOLOGY</td>
</tr>
<tr>
<td></td>
<td>CLINICAL PRACTICUM</td>
<td>DIAGNOSTIC IMAGING</td>
<td>PHYSIOLOGY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DIAGNOSIS</td>
<td>MICROBIOLOGY</td>
</tr>
<tr>
<td>3</td>
<td>PRINCIPLES PRACTICE</td>
<td>RADIOTHERAPY</td>
<td>ANATOMY</td>
</tr>
<tr>
<td></td>
<td>CLINICAL PRACTICUM</td>
<td>DIAGNOSIS</td>
<td>BIOCHEMISTRY</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>&amp; PHYSIOLOGY</td>
</tr>
<tr>
<td>2</td>
<td>PRINCIPLES PRACTICE</td>
<td>BIOPHYSICS</td>
<td>ANATOMY</td>
</tr>
<tr>
<td></td>
<td>CLINICAL PRACTICUM</td>
<td>BIOMECHANICS</td>
<td>BIOLOGICAL</td>
</tr>
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<td></td>
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<td>CHEMISTRY</td>
</tr>
<tr>
<td>1</td>
<td>PRINCIPLES PRACTICE</td>
<td></td>
<td>ANATOMY</td>
</tr>
<tr>
<td></td>
<td>CLINICAL PRACTICUM</td>
<td></td>
<td>MEDICAL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>BIOLOGY</td>
</tr>
</tbody>
</table>
The integrative chiropractic curriculum design is extensively discussed in each remaining section below. The following comments provide an overview:

The main features which set this integrative chiropractic curriculum apart from other curriculum designs are: a) it differs from the traditional subject-centred, teacher-centred curriculum insofar as it places content from a range of subjects in each semester within an integrative framework to promote the development of clinical decision-making skills and aid meaningful and mastery learning by providing a cognitive framework with subsumers which is repeated for 13 subjects and potentially hundreds of health problems; it extensively employs problem-based learning within a structured approach which is centred around the attributes and tasks required of future chiropractors practicing in local context; it is strongly student-centred allowing self-pacing and self-directed learning but with student support via tutorials designed to their needs (i.e. to answer questions about their work and to work through clinical problems as a group); and via structured practicals to develop psychomotor skills within the cognitive framework of each subject (i.e. the practicals and tutorials are keyed in to the framework to reinforce concepts and develop skills related to the various categories and classes with each domain of the decision-making taxonomy); b) the integrative chiropractic curriculum differs from the problem-based learning curriculum of McMaster, Newcastle and other 'innovative track' medical programs in that a significant amount of guidance is provided via study guides and readers in which work is organised according to the cognitive, integrative framework; the structured practicals for psychomotor skills development provide a deliberate, necessary focus which, while reducing student flexibility and self-pacing, ensures mastery of all necessary procedures and greatly reduces the cost of administering the program compared with providing guidance upon demand in a small group situation; c) the integrative program is seen as more adaptable to a range of learners (i.e. students need not be specially selected for their ability as self-directed learners as is the case with some innovative track programs; d) the integrative curriculum also offers the benefit of a special curriculum in which patient management in overview is repeated twice and the management of all other regions is repeated once, thereby building on previous knowledge and reinforcing the cognitive framework; e) the integrative curriculum very directly applies several fundamental concepts of the psychology of learning e.g. the psychological basis for the integration of content (4.4.5.3 below) including positive, negative, lateral, vertical and sequential transfer of learning; psychological foundations of teaching-learning strategies such
as principles which support experiential learning (4.5.5.1 below); autonomous (4.5.5.2 below) learning; motivation and learning (4.5.5.3 below); meaningful learning (4.5.5.4 below) and constructivism promoted through electronics communication (4.5.5.5); and psychological substrates of competency-based assessment (4.6.1.6 below); f) the approach to an integrative chiropractic curriculum is also seen as being consonant with the expressions on integration of content in 4.1.3.3 above.
4.2 THE SITUATIONAL ANALYSIS OF A CHIROPRACTIC CURRICULUM

4.2.1 Introduction

4.2.1.1 Overview

Situational analysis of the learning situation is a critical appraisal of the context in which a curriculum is developed and is influenced by a series of external and internal factors which ultimately relate to societal and professional needs, the needs of students, teachers and the institution; and which facilitates planning and/or subsequent curriculum development and review and provides a systematic database for determining curriculum goals and objectives. In fact, it could be considered to be a systematic, scientific examination conducted to devise a reliable, valid database, of all the elements which influence curriculum decisions i.e. it is the point of departure for all curriculum development. Its purpose is outlined in Table 58.

TABLE 58 - The purpose of a situational analysis for curriculum purposes

1. The diagnosis of curriculum and learner needs.
2. To determine the context into which the curriculum is to be placed.
3. To determine the possibilities and limitations of a particular course relative to the various curriculum elements.
4. To relate the curriculum to the needs of society, a profession or group and to individual students.
5. To facilitate curriculum planning, monitoring and review.


4.2.1.2 The contextual framework

The clarification of the context of a chiropractic curriculum is part of a process, which clarifies the wider conceptual framework of a curriculum. Bevis (1989:26) suggests that just as each person has a frame of reference that is influenced by life experiences, ethnicity, philosophy and personality, so each (chiropractic) program's conceptual framework is influenced by its culture (see 3.2.1.1 above) i.e.: its philosophical set, educational setting, the community it serves, the students who attend and the characteristics of its academic staff - their beliefs (about chiropractic), learning and people. She says that these elements comprise an implied and expressed value system and provide explicit decision-making rules for curriculum. Print (1992:48,81) suggests that the contextual framework of the chiropractic
curriculum therefore can be argued to refer to the situation into which the curriculum is to be placed including the community; society which is subject to cultural change and technological development; the chiropractic profession with its requirements; the students, teachers and administrators; and the resources available. The contextual framework of a curriculum is determined through a presage, which refers to those activities and forces that influence curriculum developers in their curriculum decision-making tasks. During the presage, curriculum developers draw on knowledge gained from analysis of the factors which form part of the steps recommended in 2.3.3, Table 7 and explicated elsewhere i.e. the philosophical foundations discussed above in 3.1; the sociological and cultural foundations in 3.2; the psychological bases in 3.3; the paradigms in 3.4 and the design strategies in 4.1; all of which in turn influence the intent, content and implementation of the chiropractic curriculum in response to questions raised above about curriculum design strategies in Table 46 under 4.1.1.2.

Some issues relevant to this section have already been considered above under Section 3.2, titled “The Sociological and Cultural Foundations”, where they are analysed in the context of influences (3.2.4.2-3.2.4.4) and control (3.2.2) in relation to the curriculum and the social role of chiropractors (3.2.5.2) while this section is concerned primarily with a case study of RMIT university in Australia and the global issues affecting the chiropractic curriculum.

4.2.1.3 Curriculum design questions

The activities and forces which influence chiropractic curriculum decision-making i.e. the factors which influence the situational analysis and needs assessment of an existing or new curriculum are extensive and diverse as depicted in section 3.2 of the taxonomical outline in Table 10 above and reflected in the curriculum design questions in Table 59 below.

These questions are fundamental to overall curriculum design and relate directly to the curriculum presage. The major question is ‘which curriculum action plan in terms of situational analysis and needs assessment is most suitable for a chiropractic curriculum?’ Sub-questions appear in Table 59.

TABLE 59 - Curriculum design questions about the contextual framework of a chiropractic curriculum

| 1. | Extra-institutional factors which influence curriculum context: |
| 1.1 | Societal demands: |
| - | Why does the course exist? (Why is it proposed?) |
| - | Is the course appropriate to the needs and interests of students? |
| - | Does the course meet societal needs? |
| - | Which external groups influence this curriculum and how do they do it? |
1.2 Educational system requirements:
- Is the course appropriate to the needs and interests of students?
- Does this course fit in with other courses?
- Which aspects of the course are unique?
- What is being done on similar courses?
- What do other professionals think the course should do?

1.3 Professional profile, needs and requirements
- What levels of competency are required to meet course goals, aims and objectives?
- What knowledge, skills and values are reflected in current literature in relation to the level of this course?
- What are the current conceptions, designs, foundations and curriculum models for the discipline?
- Which curriculum innovations are applicable to this discipline?
- Has recent research anything to say which will influence the design?

1.4 Teaching support systems and technology:
- Which teaching systems and strategies are available for use in this course?
- Which evaluation methods are available for this course?

2. Intra-institutional factors which influence curriculum context:
2.1 Student attributes:
- What is the student profile in terms of age, gender, prior education, level of intelligence, internal and external motivation, socio-economic and cultural background, psychological development, abilities, aptitudes, attitudes to learning, self-directedness, self-discipline and other relevant factors?

2.2 Staff strengths and weaknesses:
- What skills, experience, teaching style, values, special strengths and weaknesses do staff or should staff represent?
- What do staff think should be taught?
- What are the particular interests of staff?
- Do staff agree with the course aims?
- Do staff agree with the curriculum strategies?

2.3 Institutional and departmental ethos:
- How is power distributed in the School or Unit?
- Which operational procedures are followed?
- What is the extent of social and professional cohesiveness?
- How are students viewed?
- What learning climate is created?
- What is the extent of staff and student consultation prior to curriculum decision-making?

2.4 Material resources:
- What land, buildings, equipment and other curriculum resources (e.g. books, materials) exist and what financial resources for future purchases are available?
- What potential resources can be generated for future developments?

2.5 Perceived problems:
- Which problems do students perceive?
- Which problems do staff perceive?
- Which problems have been identified by society?
- Which problems does the profession served by this course perceive?
- Which positive and negative influences are created by the informal (covert) curriculum?

3. Curriculum needs which influence curriculum content:
3.1 Which goals can be stated for the course?
- What does society expect from the course?
- What does the profession served by this course expect?
- What will students expect when they enrol?
- What does the staff think should be taught?
- Which competencies should learners attain?
3.2 What rating should be given to each goal stated?
- What priority rating is given to each goal statement on a scale of 1-5?
3.3 What ranking should be given to goal statements?
3.4 What discrepancies exist between desired goals and existing practice?
- Which goals have negligible discrepancy?
- Which goals have moderate discrepancy (moderate need for change)?
- Which goals have high discrepancy (greatest need for change)?


4.2.1.4 Psychological foundations relevant to the determination of curriculum context

It is argued that the curriculum context is to a large extent influenced by people e.g. society, the profession, teachers, students and administrators. What motivates groups and individuals in each group and how persons interact when they meet to determine factors relating to situational analysis concerns the psychological foundations of curriculum context.

4.2.2 Situational Analysis

4.2.2.1 Situational analysis of a program

The factors that influence situational analysis of the teaching-learning situation of an educational program are analysed in Table 60 and some are further clarified by also conducting a situational analysis of a profession, discussed below.

**TABLE 60 - Factors which influence situational analysis of a teaching-learning situation**

<table>
<thead>
<tr>
<th>EXTERNAL FACTORS</th>
<th>INTERNAL FACTORS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MACRO-ANALYSIS AT INSTITUTIONAL LEVEL</strong></td>
<td></td>
</tr>
<tr>
<td>Cultural and social changes and expectations</td>
<td>Institutional mission</td>
</tr>
<tr>
<td>Educational system requirements and challenges</td>
<td>Institutional relationship</td>
</tr>
<tr>
<td>Changing nature of content</td>
<td>Institutional relationship to the community</td>
</tr>
<tr>
<td>Changing methods of teaching/learning and student support</td>
<td>Future planning</td>
</tr>
<tr>
<td>Resource allocation</td>
<td>Strategies to improve educational access, effectiveness and efficiency</td>
</tr>
<tr>
<td></td>
<td>Resource allocation</td>
</tr>
<tr>
<td></td>
<td>Institutional ethos</td>
</tr>
</tbody>
</table>
### MESO-ANALYSIS AT DEPARTMENTAL LEVEL

<table>
<thead>
<tr>
<th>Influence of the informal curriculum</th>
<th>Student target group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource allocation or extraneous income</td>
<td>Teachers</td>
</tr>
<tr>
<td></td>
<td>Departmental ethos</td>
</tr>
<tr>
<td></td>
<td>Material resources</td>
</tr>
<tr>
<td></td>
<td>Perceived problems</td>
</tr>
<tr>
<td></td>
<td>Subject content</td>
</tr>
</tbody>
</table>

### MICRO-ANALYSIS AT THE PERSONAL LEVEL

#### 1. Students

<table>
<thead>
<tr>
<th>Extrinsic motivational factors</th>
<th>Intrinsic motivational factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Year of study</td>
<td>Age</td>
</tr>
<tr>
<td>Attitude to course and institution</td>
<td>Potential of student(s)</td>
</tr>
<tr>
<td>Previous experience/achievement</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Home, family and environmental conditions</th>
<th>Attention span</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level of development</td>
</tr>
<tr>
<td></td>
<td>Skills</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specific nature of the community in which the student lives</th>
<th>Level of independence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initiative</td>
</tr>
<tr>
<td></td>
<td>Range of interests</td>
</tr>
<tr>
<td></td>
<td>Psychological needs</td>
</tr>
<tr>
<td></td>
<td>Level of literacy (entry requirements)</td>
</tr>
<tr>
<td></td>
<td>Personality factors</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Peer pressure</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Influence of the informal curriculum</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 2. Teachers

<table>
<thead>
<tr>
<th>Teacher support available</th>
<th>Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Experience</td>
</tr>
<tr>
<td>- Education development</td>
<td>Teaching style</td>
</tr>
<tr>
<td>unit</td>
<td>Values</td>
</tr>
<tr>
<td>- Courses and programs</td>
<td>Special strengths and weaknesses</td>
</tr>
</tbody>
</table>

#### 3. Subject Content

<table>
<thead>
<tr>
<th>Competing courses</th>
<th>Relationship to objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning resources available for acquisition</td>
<td>Amount to be learned</td>
</tr>
</tbody>
</table>

|                                                           | Year of study/level for which intended |
|                                                           | Level of difficulty |
|                                                           | Learning resources required |
|                                                           | Learning resources available internally |
|                                                           | Time scheduling |
|                                                           | Structure of content |

4.2.2.3 **Situational analysis of a profession**

As a result of descriptive analysis of the literature it is argued that situational analysis of the learning situation is supported and augmented by situational analysis of the professional discipline for which the curriculum is developed or reviewed and which serves to determine the competencies and broad philosophical and educational concepts and decision-making processes needed by future professionals. It is suggested to be a detailed examination of the context in which professionals function and the application of that analysis to the identification of competency-based professional standards. A descriptive analysis of documents is used to determine societal expectations and requirements in a changing community. The analysis has regard for legal requirements for practice; views of governmental enquiries (e.g. Inglis 1979; Webb 1975); surveys and other studies of the profession; local and overseas standards and professional competency documents; test plans for the evaluation of entrants to the profession; education and training requirements and changing relationships and roles in the community. This situational analysis of a profession is an examination of all elements that contribute towards the establishment of professional, competency-based standards at the level of entry into professional practice. It also provides a basis for the establishment and continual review and updating of the professional competencies. At the *macro* level, this process helps to determine which broad areas of professional competencies society demands of a profession. At the *meso* level, situational analysis determines the general areas of competency, which concern the profession. At the *micro* level, the analysis includes competency-based professional standards which individual entry-level practitioners should possess. Table 61 outlines factors involved in a situational analysis to determine professional requirements.
### MACRO ANALYSIS - FACTORS EXTERNAL TO THE PROFESSION

<table>
<thead>
<tr>
<th>Factors</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Cultural and social changes and requirements:</td>
<td>Factors derived from major changes to society which may result in additional or modified competencies. Such factors include e.g. the chiropractor's responsibility to competently care for a growing aging population; and greater demand for accountability, responsibility and competency.</td>
</tr>
<tr>
<td>2 Health system requirements and challenges:</td>
<td>Systematic influences such as policy requirements, inquiry reports, external examinations and major professional analysis projects.</td>
</tr>
<tr>
<td>3 Changing nature of the health care community:</td>
<td>Changing patterns of health service supply, utilization, etc.</td>
</tr>
<tr>
<td>4 Economics of health care:</td>
<td>Costs, arrangements and patterns of service delivery.</td>
</tr>
</tbody>
</table>

### MESO ANALYSIS - FACTORS INTERNAL TO THE CHIROPRACTIC PROFESSION

<table>
<thead>
<tr>
<th>Factors</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Professional recognition profile:</td>
<td>Legal recognition; compensation for services; educational programs and standards.</td>
</tr>
<tr>
<td>2 Professional ethos:</td>
<td>Significant historical and philosophical factors which influence the identification development, acceptance, implementation and evaluation of competencies.</td>
</tr>
<tr>
<td>3 Professional demographic profile:</td>
<td>Age of practitioners, training, practice experience, etc.</td>
</tr>
</tbody>
</table>

### MICRO ANALYSIS - FACTORS RELATING TO INDIVIDUAL ENTRY LEVEL CHIROPRACTORS

<table>
<thead>
<tr>
<th>Factors</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Practice environment:</td>
<td>Practice milieu and business management of chiropractic practice.</td>
</tr>
<tr>
<td>2 Patient:practitioner interface:</td>
<td>Patient assessment, diagnostic and therapeutic decision-making, disease prevention, health promotion and interpersonal skills.</td>
</tr>
<tr>
<td>3 Personal management;</td>
<td>Professional ethics and attitudes, professional growth and personal qualities.</td>
</tr>
<tr>
<td>4 Research:</td>
<td>Interpretation of research data, planning and implementation of research.</td>
</tr>
<tr>
<td>5 Theoretical knowledge:</td>
<td>Knowledge of the life sciences, microbiology and pathology, diagnostic sciences and chiropractic sciences.</td>
</tr>
</tbody>
</table>
### 4.2.2.4 Needs analysis

Although the concept of *diagnosis of needs* has been around for some time and was outlined by Taba in 1962, situational analysis as an approach was not devised and disseminated until Skilbeck introduced it in 1976 (Print 1992:81,84). Analysis of *The chiropractic college directory* (McNamee 1997:vii) suggests that different situations are faced by institutions and programs in different societal, cultural and chiropractic developmental contexts due to variations in extra- and intra-institutional factors and curriculum needs.

#### 4.2.2.5 Case study

The situational analysis of a chiropractic curriculum is illustrated via a case study of The Chiropractic Unit at RMIT University in Melbourne, Australia.

### 4.2.3 Extra-Institutional Factors which Influence the Context of the Chiropractic Curriculum

The extra-institutional factors which influence the context of the chiropractic curriculum at RMIT concerns the expectations of Australian society, the local and international chiropractic profession, the Australian Higher Education system; the available chiropractic knowledge base; the teaching support systems and technology; and the external resources available.

#### 4.2.3.1 Societal expectations for the chiropractic curriculum

Cultural and social changes and basic health care requirements determine the societal expectations, which influence the chiropractic curriculum. Analysis of the literature suggests that society requires competent, accountable and responsible practitioners (Dunn et al 1985:15) of chiropractic to provide quality, community-based, primary contact, broad diagnostic scope chiropractic care with a focus on conservative management of neuromusculoskeletal disorders (Vear 1992:2); and disease prevention and health promotion (Jamison 1985B:245; 1987:5). In fact, societal requirements for competency has resulted in competency-based professional standards for chiropractic being developed through
government encouragement or dictate throughout the western world (Kleynhans 1992A:99; CCE(US) 1997:1).

a) Societal requirements for quality assurance in chiropractic practice

'Recent decades have witnessed a growing public clamour for improved quality of care and clinical outcomes by all health care professions' (Vear 1992:2). 'As primary contact health care providers and a portal of entry to the health care delivery system, there is a responsibility for chiropractic practitioners to adopt and practice a standard of quality care commensurate with that mandate' (Vear 1992:xiii). Objectives for the quality clinical practice of chiropractic, first developed in 1988 (Hansen 1988:1) and later expanded, form an essential basis for the clinical training of future chiropractors. There is growing evidence that the accredited chiropractic colleges are going to be required to assist, if not accept full responsibility for developing acceptable standards of practice for the chiropractic profession. What is acceptable within the chiropractic community is usually defined in terms of what is taught in accredited chiropractic colleges (Vear 1985:33). Vear (1985:33) sees quality assurance standards of chiropractic practice as representing the patient's bill of rights in matters of health care while Bouchard, Tufo and Beaty (1985:1146) explain the need for quality assurance in relation to cost of health care: 'The rising cost of medical care has become a major national issue involving government, industry, labour, the health professions, and the individual patient. 'As available resources become limited, the physicians will be asked increasingly to make judgements concerning the management of quality in the provision of medical care'. 'We believe that the medical profession must develop models for managing quality and care as it applies to daily practice'. Such models are of course intimately linked to educational programs. As government, business, and other payers search for methods to reduce their health care costs, and as competition intensifies in the health sector, efforts to preserve the quality of health care will become increasingly important and public debate will increasingly focus on how to define and measure quality, as health professions, payers and consumers address such issues as ensuring quality of care (Council on Medical Service 1986:1032).

Burakoff and Demby (1985:427) see quality assurance in dentistry as a continuum commencing at one end with aptitude tests developed to screen potential dental school applicants and continuing through the credentialing process (years of dental education, registration or licensure) and ending within the legal domain of malpractice. In fact, they
view malpractice as the inadequacy of quality assurance efforts. They see quality assurance as a dynamic system with important future trends.

The link between chiropractic education and quality assurance in practice is clearly identifiable. 'There are two levels of standards of practice that need to be recognised. 'First, those standards of practice taught by accredited chiropractic educational institutions, which represent the highest level of standards, eclectic but ethical. 'Second are those standards of practice dictated by state or provincial statute governing the practice of chiropractic in a particular jurisdiction'. These latter standards may well be at a level below that taught by chiropractic institutions' (Vear 1985:33).

b) Societal requirements for diagnostic competency

That society expects chiropractors to be prepared as primary contact, broad diagnostic scope, primary health care practitioners is apparent from the following:

i) The requirements for chiropractors to practice in the context of primary contact practitioners are well summarised in the report by Bingham (1993:16): 'The aims of chiropractic education are to provide students with:

i) A sound, integrated, pre-clinical and clinical knowledge base.

ii) The ability to diagnose a patient's complaint.

iii) The ability to recognise when to consult with or refer a patient to other health care professionals.

iv) Specialised training in clinical biomechanics.

v) A wide range of manual treatment techniques.

ii) Vear (1992:69) states that: 'a chiropractic physician who accepts the patient for any professional reason, has a duty and a responsibility to perform an appropriate clinical evaluation and to arrive at a clinical impression or diagnosis of the patient's complaint before proceeding with care, consultation, or referral.'

Based on a descriptive analysis of the literature, he demonstrated that this is a premise required by the profession, wherever chiropractic physicians practice, and as a prescription in the educational standards of all chiropractic accrediting agencies including the US Council on Chiropractic Education, the Canadian Council on Chiropractic Education, the Australasian Council on Chiropractic Education and the European Council on Chiropractic Education.
iii) Well accepted definitions of chiropractic by these accrediting agencies clarify this primary contact and specialised role e.g.: 'Chiropractic is a discipline of the scientific healing arts concerned with the pathogenesis, diagnosis, therapy and prophylaxis of functional disturbances, pathomechanical states, pain syndromes and neurophysiological effects related to the statics and dynamics of the locomotor system, especially of the spine and pelvis' (adopted from the European Chiropractic Union, 1974:ACCE 1997:8).

'As a member of the healing arts, the chiropractor is a primary-care health professional. A chiropractor gives particular attention to the relationship of structural and neurological aspects of the body in health and disease and is educated in the basic and clinical sciences as well as in related health subjects' (ACCE 1997:8).

c) **Statutory requirements** - The type and duration of a course designed to educate primary contact health care practitioners is to a large extent dictated in terms of statutory registration requirements enforced by professional registration boards. The chiropractor's legal role which reflects societal requirements is defined or acknowledged in the various acts as the treatment of disorders by adjustment and manipulation of the articulations of the human body, especially the spine, as appropriate. Since patients do not have to be referred to chiropractors by medical practitioners, the Acts in all relevant jurisdictions, therefore recognise chiropractic as a primary contact health care service, which can be offered alongside the services of the medical profession. Participant observation indicates that this applies in all jurisdictions where registration is available including all states in the U.S.A., all Canadian provinces, Switzerland, South Africa, Zimbabwe, Hong Kong, all Australian jurisdictions, New Zealand, U.K. and other jurisdictions.

Because some students who undertake a course in one country or jurisdiction may wish to proceed to chiropractic institutions or centres for postgraduate education and research, or to practise in another jurisdiction, it is essential that chiropractic courses be recognised worldwide as of equivalent level.
d) **Conditions to be managed**

It is reasonable to suggest that society also specify its requirements for the chiropractic curriculum through the range of conditions for which patients seek chiropractic services. A review of the literature suggests that approximately 85% of patients present to chiropractors for care related to neuromusculoskeletal problems, approximately 9% for visceral conditions and the balance for vascular-related, nutritional and other problems (Year 1972:9; American Chiropractic Association 1990:2). It is therefore clear that the major focus of the chiropractic curriculum is to prepare students to provide competent patient care with a heavy focus on the neuromusculoskeletal problems; and the ability to differentially diagnose them from more serious, life-threatening conditions. An occupational analysis of chiropractors in Australia and New Zealand resulted in a detailed list of conditions which are a) routinely seen, b) sometimes seen, c) rarely seen and d) virtually never seen (NBCE 1994:73-75). The results from this study are invaluable in the ranking of conditions on the basis of emphasis required in the curriculum. It must be accepted, however, that, in order to meet societal requirements for diagnostic skills, the chiropractic curriculum needs to include a study of the full range of health problems. Another Australian study (Kleynhans and Jamison 1995:157) produced a priority allocation of chiropractic clinical content for competency-based assessment of chiropractors according to health care conditions. It consisted of amendments to and validation for Australia by a consensus group of a study previously undertaken in the U.S. by Adams and Traina (1989:1). These health problems are further discussed in 4.4.2.5 below.

e) **Societal expectations in relation to change**

The curriculum must be responsive to cultural and social changes and expectations i.e. it must be sensitive to the changing role of the health practitioner in society (Cavanaugh 1991; Harden, 1985:136; Kantrowitz, 1987:19; Lowry 1993D:255).

f) **A humanistic approach to patients**

Societal requirements for a more humanistic approach by health care practitioners is manifested through recent legislation to appoint statutory persons (e.g. Health Services Commissioners in Australia) with responsibility to ensure that patients are properly treated by health professionals with due regard to their basic human rights of privacy; consent; quality of care; considerate care etc (Victorian Parliament 1987).

g) **Value judgements**
Balla (1989A:7) states that if we accept that social influences on the practice of a clinical profession are significant, then we must be aware of the difficulties faced by a profession practising under conditions where they may be influenced by other than purely biological considerations. For example, value judgement will become more important and will need to stand up to close examination by outside bodies as well as the increasingly sophisticated public, who are the patients. The social role of chiropractors is therefore fundamental to the understanding, which must be inculcated in students about their responsibilities as health care professionals.

h) Expanded community-based care

Needs for health care are changing from hospital-based, disease-oriented services to community-based, prevention-oriented primary care (Freyman 1989:761). The next generation of chiropractors must therefore be prepared to meet relevant needs in this context. This suggests a strong need for inclusion of a holistic approach to practice in the curriculum with a focus on community-based practice, conservative management of neuromusculoskeletal disorders and disease prevention and health promotion (Jamison 1986:31).

i) Subject content

Australian society, via the statutory boards, has provided broad specifications (Table 62) for subject content against which the RMIT University chiropractic curriculum is evaluated (JEC 1995A:22-34). The relative weighting for the various components which have to be complied with appear in Table 63.

<table>
<thead>
<tr>
<th>COMPONENTS</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASIC SCIENCES</td>
<td>Chemistry; physics; biology; biochemistry;</td>
</tr>
<tr>
<td>HEALTH SCIENCES</td>
<td>Anatomy (histology, embryology, gross anatomy, neuroanatomy); physiology; pathology (basic and systemic pathology); and microbiology (basic and clinical microbiology)</td>
</tr>
<tr>
<td>CLINICAL SCIENCES</td>
<td>Chiropractic history and principles; biomechanics including functional anatomy; clinical and functional neurology; diagnosis and management of the musculoskeletal system (orthopaedics, neurology, radiology, dermatology, laboratory diagnosis, postural and gait analyses, clinical kinesiology, remedial exercise and rehabilitation, etc); and diagnosis (history, physical assessment, differential diagnosis, systemic diagnosis, contraindications to manual management); diagnostic imaging interpretation; and pain</td>
</tr>
</tbody>
</table>
Clinical Skills

Practical training in diagnostic and therapeutic manual techniques; first aid and other management skills.

Clinical Practicum

Application in the clinical setting of various skills learned in the classroom, including the progressive introduction and development of skills and responsibilities necessary for the attainment of a competent professional. It includes: history taking, clinical examination, diagnostic procedures, differential diagnosis and prognosis in at least 25 cases; and clinical introductions to special areas of psychiatry, paediatrics, geriatrics, gynaecology, psychology, dermatology; ear, nose and throat; clinical and laboratory diagnosis; professional ethics, jurisprudence and practice management.

Based on analysis of guidelines from: JEC 1995A:22-34.

Table 63 - The relative weighting of major course components in a first professional Australian chiropractic course

<table>
<thead>
<tr>
<th>ELEMENTS</th>
<th>% OF COURSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Sciences</td>
<td>7-15</td>
</tr>
<tr>
<td>Health Sciences</td>
<td>20-25</td>
</tr>
<tr>
<td>Clinical Sciences</td>
<td>25-30</td>
</tr>
<tr>
<td>Clinical Skills</td>
<td>12-20</td>
</tr>
<tr>
<td>Clinical Practicum</td>
<td>12-20</td>
</tr>
</tbody>
</table>


j) Changing health care needs - Needs for health care are changing from hospital-based, disease-oriented services to community-based, prevention-oriented primary care (Freyman 1989:761). The next generation of chiropractors must therefore be prepared to meet relevant needs in this context. This suggests a strong need for inclusion of a holistic approach to practice in the curriculum with a focus on community-based practice, conservative management of neuromusculoskeletal disorders and disease prevention and health promotion (Jamison 1986:31).

4.2.3.2 Professional requirements for the Australian chiropractic curriculum

Competency-based professional standards as one of the professional requirements for the chiropractic curriculum in Australia have been progressively clarified over the last two decades, including through a government funded research project to establish competency-based professional standards for chiropractors (Kleynhans 1993:1) discussed in 4.2.4.7 g) below; and to develop competency-based assessment strategies for chiropractors (Kleynhans and Jamison 1995:1). The statutory registration boards now require that those competencies be met by educational institutions (JEC 1995B:37). The goals and objectives for a basic
chiropractic education are also outlined by the Registration Boards (JEC 1995A:10-14) as indicated in Tables 67,68 and 69 below.

4.2.3.3 The changing nature of chiropractic subject matter

The dramatic increase in publications on chiropractic science and all part-disciplines of chiropractic signals the need for a regular, thorough review of content to keep the curriculum abreast with developments. An analysis of the current database is outside the scope of this dissertation.

4.2.3.4 Teaching support systems and technology for the chiropractic curriculum

External systems enhance teaching and learning strategies, content updates, evaluation techniques and teaching media (Print 1992:84). Tinkler et al (1994:13) suggest that application of state-of-the-art technologies in the delivery of higher education have the potential of providing much more flexibility in the time, place and format of learning than is provided by traditional classroom-centred education, with great potential for the enhancement of quality of learning, flexibility and adaptation to the individual learner i.e.: individualisation of learning. It is reasonable to suggest that application of this technology will enhance experiential learning and through the flexibility it provides, will improve self-directedness and hence the quality of learning. It provides a greater range of choices in the control of four variables which affect the quality of learning, i.e.: what is to be learnt; how it is to be learnt; when it is to be learnt; and where it is to be learnt (Tinkler et al 1994:14)

4.2.4 Intra-Institutional Factors which Influence the Context of the Chiropractic Curriculum

The intra-institutional factors which influence curriculum context concern the attributes of students and staff, the institutional ethos, availability of material resources and perceived problems.
4.2.4.1 The attributes desired in chiropractic students

Analysis of the work of Adey et al (1991) suggests that entry requirements with reference to student abilities, psychological, emotional and social development and educational needs influence curriculum design and outcomes. The selection of students who are expected to meet the characteristics desirable in future practitioners is therefore crucial. In fact The Association of American Medical Colleges (AAMC 1984:72-73) suggested that a new, substantially changed, Medical College Admissions Test (MCAT) should put more emphasis on "humanistic" skills in selecting MD's for the twenty first century and Nelson (1989:490) advised that this was being implemented. Bennett (1982A:1) provides an excellent outline of the principles and applicants' attributes to be considered during the selection process. Descriptive analysis of the literature reveals considerable evidence on work done on student attributes in relation to course selection. Examples include:

- How do students differ from each other? (Ewan 1982A:16).
- Sociodemographic characteristics, career choice and job satisfaction of mature age entrants (Harth et al 1990:488).
- Student selection (Lowry 1992B:1352).
- Strategies for refining the admission process (Maheux et al 1992:525).
- Students and quality (Ramsden 1988:107).
- Transition from high school to college (Stern 1961:33).

4.2.4.2 The attributes desired in academic staff involved with the chiropractic curriculum

A study by Main (1993:4-6; 22) identified behaviour relevant to the role of university teachers in eight broad categories including:

- Course objectives
- Understanding rules of the course or program
- Understand own role/limitations
- Identify student learning needs
- Understand diversity of students
- Prepare materials/strategies
- Manage staff/student and student/student interaction
In addition total quality management can be added as discussed by Bing-You (1997:205). Main (1993:2) found that only about 1% of tenured academic staff at British, Canadian and Australian universities have had substantial training in pedagogy or andragogy prior to recruitment to the academic profession. Most academic staff are not expected to have undertaken formal training in areas such as:

- The determination of students' learning needs
- Curriculum and course design
- Development of teaching/learning situations
- Choice of teaching/learning methods
- Resources for teaching and learning
- Assessment of student performance
- Evaluation of courses and of teaching

It is argued that staff development programs will become increasingly important to meet the challenges of implementing teaching-learning in innovative, flexible learning programs and that this process will be facilitated by strategies such as the development of a clinical skills matrix to plan and monitor teaching (Dacre and Nicol 1996:318); teach-the-teacher programs (e.g. Lowry 1993B:127; Rayner et al 1997:209; Rotem 1982:40; Sackett et al 1997; Watts 1990:184) and teachers' manuals to guide staff in the implementation of learning experiences for students.

It also appears necessary that the characteristics of good teachers be ascertained through surveying both staff and students (e.g. the study by Das et al 1996:141) as a basis for staff development and promotion (Gjerde and Colombo 1982:157; Newell and Price 1983:12).

It appears reasonable to suggest that attention should be given to these aspects when appointing and training academic staff for implementation of the chiropractic curriculum.

4.2.4.3 A desirable ethos for a chiropractic program

The climate or environment of the unit (institution, school, centre or department) responsible for the teaching of chiropractic is influenced by power distribution, social cohesiveness, operational procedures; and professional influences and the cohesiveness of the academic leaders and staff (Skilbeck 1976:96). An extensive discussion on learning climate in 5.1 below expands on this topic.
### Material resources required for a chiropractic program

The material resources and teaching support systems and technology required for the implementation of the chiropractic curriculum are identified in Table 64.

**TABLE 64 - Material resources, teaching support systems and technology for the conduct of a first professional chiropractic course**

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>MATERIAL RESOURCES/SUPPORT SYSTEMS/TECHNOLOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy</td>
<td>Anatomical models, specimens (including cadavers and prosections); histology slide collection; potted or plastinated dissections; charts; bonesets; etc. Computerised learning system e.g.: <em>Slice of Life, Adam</em>. Anatomy laboratories including space for: - Histology including one microscope per student per practical class. - Dissection laboratory to accommodate 4-8 students per cadaver. - Facilities for the preparation of prosections and museum specimens. - Anatomy museum with an adequate collection of spinal, joint and neurological dissections as well as an adequate range of dissections of other regions. - Tutorial rooms for the study of prosected specimens.</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>Laboratory equipped with benches supplied with gas and water, balance room, equipment and consumables necessary for conducting basic biochemical experiments in a chiropractic or medical course.</td>
</tr>
<tr>
<td>Chiropractic Technique</td>
<td>Laboratories with one bench/table for every two students in a practical group including Gonstead benches; <em>Zenith-type</em> tables for Diversified technique and side posture tables for upper cervical recoil technique. Thompson terminal point type tables; Cox-McManus tables for distraction technique. Equipment for postural analysis (four students per station). Instrumentation: temperature differential instruments; soft tissue T-bars; wedges, pillows etc to demonstrate mechanically assisted techniques.</td>
</tr>
<tr>
<td>Physiological Therapeutics</td>
<td>A sufficient number of modalities for students to practice application of ultrasound, interferential current, actinotherapy, cryotherapy, moist heat application and other relevant modalities.</td>
</tr>
<tr>
<td>Radiography</td>
<td>X-ray generators enclosed in lead-lined cabinets or free standing for the production of x-rays of human tissue equivalent models; models of the axial skeleton (e.g.: 3M); ancillary equipment and instruments for the calculation of x-ray factors and production of radiographs; equipment to evaluate radiographic quality.</td>
</tr>
<tr>
<td>Clinical Practicum</td>
<td>Out-patient clinical facility including as a minimum a reception area; records office; supply room; waiting area; reception desk; computer facilities for patient scheduling, record keeping and research; radiology room including x-ray equipment, processing facilities; and ancillary equipment; consulting rooms equipped with x-ray illuminator; diagnostic equipment; modern chiropractic benches/tables; desk, chairs, etc appropriate to the conduct of high quality chiropractic practice; minimum pathology services.</td>
</tr>
</tbody>
</table>
Laboratory with diagnostic examination tables and equipment appropriate to the teaching of physical assessment; models of ear, breast, female pelvis, scrotum, joints etc; ophthalmoscopic slides; video, laser disc and CD ROM depicting clinical conditions in various systems; heart and lung sound simulator; diagnostic charts; students to purchase and use their own diagnostic equipment including stethoscope; diagnostic set; reflex hammer; tape measure; tuning forks; and consumables.

Pathology museum with gross pathology specimens relating to most organs and systems with a special focus on bone and joint pathology; collection of histopathology slides; laboratory with benches equipped with one microscope per student per practical group; charts and models.

Laboratory with gas and water supply, a microscope for each student in a practical group; steriliser for preparation of agar plates; consumables needed for inoculation, incubation and staining of micro-organisms.

Classrooms; tutorial rooms; lecture theatres equipped with multimedia delivery systems (e.g. video, audio, overhead and 35mm projection).

All chiropractic serials and monographs available; CD Rom and other search facilities (e.g. Medline, Chirolars etc). Chiropractic archives. Video, audio, slide and other multi-media packages.

There is extensive evidence from the literature that a significant body of knowledge exists in relation to the methods and techniques for the preparation and implementation of multi-media learning materials including:

- Preparation of original graphics (Deason and Oakley 1982:138; Ewan 1982C:144).
- Teaching with television (Ewan 1982E:186).
- Choosing and using learning resources (Ewan 1982F:189).
- Materials for teaching with tape slides (Ewan 1982D:171).
- Computer-based learning packages:
  • Customising software to student needs (Janssen et al 1996:237).
  • Pathology (Hawkins et al 1997:45; Vardaxis 1997:19).
  • Rheumatology (Jones et al 1987:433).
- PowerPoint technology (Holzl 1997:175).
- Use of simulators and models in medical education (Jamison 1989:10).
- Using the overhead projector in medical teaching (Lee and Pashuk 1982:174).
- Planning a teaching session (Bandaranayake 1982B:57).
- Preparing slides (Bandaranayake 1982C:135).
- Teaching clinical skills in the hospital setting (McCarthy 1982:102).
- Clinical teaching strategies:
  • Briefing students before seeing patients (Miflin et al 1997:143).
  • Use of standardised patients (Miller 1990:77).
  • Worksheet to structure teaching and learning in outpatient internal medicine (Roth 1996:125).
- Videoconferencing as a tool for learning anatomy (Peplow 1996:309)
- Model for performance simulation (Rucker 1986:1)
- Computer assisted instruction (Robbins and Chalmers 1982:164)
- Technology assisted mentoring (Volkoff et al 1997)

4.2.4.5 Perceived or potential problems of the chiropractic curriculum

Analysis of the literature indicates that potential problems of the curriculum are wide-ranging and relate both to a number of curricular elements and to approaches to curriculum planning. Examples of curriculum problems derived from analysis of the literature (e.g. Abrahamson 1978:951; Harden 1986C:46) include: uncontrollable growth or retention of hours in a specific component resulting in imbalance; problems with vertical and horizontal integration;
general dissatisfaction; constant changing without thoughtful review and use of a framework such as the algorithm and taxonomy offered in this dissertation; overcrowding; poor teaching; unresponsiveness to needs; over-simplification of aims; overemphasis of aims and objectives to the minimisation of all other aspects; overemphasis on learning methods and techniques to the neglect of intent, etc; overemphasis of content; excessive emphasis on timetabling while neglecting other elements and staying with the status quo, etc. The perception of unfulfilled needs or problems motivates curriculum change.

A number of potential curriculum problems such as those mentioned above have been identified and their identification and acceptance by those responsible for a chiropractic program will initiate and facilitate the implementation of curriculum changes which are discussed in 5.3 below. Twelve curriculum problems have been classified and metaphorically termed diseases of the curriculum by Abrahamson (1978:951) and are presented in summary form with the addition of more diseases in Table 65; while Table 66 analyses nine approaches to curriculum planning identified by Harden (1986C:458) which indicate how different planning strategies used by curriculum developers can result in advantages accompanied by problems and disadvantages - some of which would cause serious concern to curriculum implementation and the meeting of its intent.
**TABLE 65 - Curriculum design problems expressed as "diseases"**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hardening of departmental territoriality (Curriculum sclerosis)*</td>
<td>A social power struggle to retain curriculum hours through vested interest rather than curriculum needs.</td>
<td>Normal curriculum function and development is inhibited and stifled.</td>
</tr>
<tr>
<td>2. Uncontrollable growth of one segment or component (Carcinoma of the curriculum)*</td>
<td>As a result of changes in technology and growth of knowledge in certain fields, newer learning experiences</td>
<td>Minor adjustments are made, resulting in uncontrollable growth and unbalancing of the curriculum.</td>
</tr>
<tr>
<td>3. Articulation problems (Curriculum arthritis)*</td>
<td>Problems with vertical and horizontal integration characterised by a low quality of interaction among staff which can lead to discomfort and dissatisfaction and subsequent resistance to continue the effort at communication which further vexes the problem.</td>
<td>Gaps in the curriculum or excessive repetition of content may result. Students may be unprepared for subsequent content.</td>
</tr>
<tr>
<td>4. Overall discomfort about the curriculum (Curriculum disesthesia)*</td>
<td>Expressions of dissatisfaction about the curriculum and even the evidence that things are not working well.</td>
<td>Changes may be made to the curriculum without determining a specific, clearly identifiable problem.</td>
</tr>
<tr>
<td>5. Tampering or meddling with the curriculum (Iatrogenic curriculitis)*</td>
<td>The constant shifting, changing, modifying and adjusting allow no opportunity for thoughtful review or evaluative research.</td>
<td>A diagnosis is not made of what is wrong and appropriate action is therefore not taken. This does not detract from the fact that the curriculum should be a dynamic entity which should be expected to change in response to such forces as student needs, staff concerns and societal demands.</td>
</tr>
<tr>
<td>6. Overcrowding (Curriculum hypertrophy or curriculomegaly)*</td>
<td>As a result of dramatic expansion of the knowledge base, there is a tendency to add to content without deleting what is already included in the curriculum.</td>
<td>Hours of work required from students are increased or practicals are sacrificed at the expense of lectures while outmoded content is not deleted or content in another area is deleted, causing imbalance.</td>
</tr>
<tr>
<td>7. Poor teaching disguised as a curriculum problem (Idiopathic curriculitis)*</td>
<td>Poor teaching</td>
<td>Attributing the results of poor teaching to curriculum design is a continuation of the problem.</td>
</tr>
<tr>
<td>Problem</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Unresponsiveness to societal needs (Intercurrent curriculitis)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Stagnation (Ossification of the curriculum)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Narrowness of approach ** (Curricular anemia)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Imbalance between science and humanism** (Curriculum neurosis)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Irritation of uncontrolled external influences (Pruritis curriculi)+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater emphasis is placed on the preparation of practitioners who will meet societal demands.</td>
</tr>
<tr>
<td>Unwillingness to make any changes because &quot;we have always done it this way&quot;.</td>
</tr>
<tr>
<td>Emphasis on competencies at the expense of a broad education.</td>
</tr>
<tr>
<td>Scientism - an ideological or religious acceptance of science resulting in scientific and technological effectiveness and lack of a liberal component of philosophy and literature (Doran 1983:1832).</td>
</tr>
<tr>
<td>Excessive uncontrolled oversimplification of the aims and requirements of clinical practice. Excessive emphasis on financial gain at the expense of rational clinical practice</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>The institutional mission and curriculum goals and objectives are not met.</td>
</tr>
<tr>
<td>A curriculum which does not meet societal demands, student needs and staff development opportunities in a fast developing technocratic society.</td>
</tr>
<tr>
<td>An emphasis on competencies required of doctors on qualification can conflict with the education of doctors as professionals rather than technicians (Harden). There has to be a balance between general education and preparation for task-related competencies.</td>
</tr>
<tr>
<td>Lack of humanistic qualities in the graduate due to curriculum imbalance.</td>
</tr>
<tr>
<td>Graduates with ideological concepts which are not consonant with the aims of a rational, scientific approach. Student confession about knowledge values and skills to be developed</td>
</tr>
</tbody>
</table>

*Based on analysis and tabulation of data from Abrahamson, 1978; ** Based on a concept from Doran (1983:1832); and + added by the author
Table 66 - Approaches to curriculum planning

<table>
<thead>
<tr>
<th>APPROACH/FOCUS</th>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
</tr>
</thead>
</table>
| 1. Engineering Approach:  
The focus is on institutional and course aims and objectives - all other curricular activity is secondary. | 1. It appears to be a logical approach.  
2. Students know what they have to learn and teachers what they need to teach | 1. Intended outcomes cannot always be pre-specified, especially with broad areas of knowledge, understanding and appreciation.  
2. Overall aims and concepts are obscured by excessively detailed statements of objectives.  
3. Revision and updating of objectives is time-consuming.  
4. Objectives must be constantly updated otherwise they become obsolete. |
| 2. Mechanic's Approach:  
The focus is on learning experiences: the teaching methods and techniques used to execute the curriculum including computer assisted learning, problem-solving, lectures, hands-on experience etc. | 1. Development of skills with teaching methods and techniques. | 1. It neglects the other elements of the curriculum continuum - aims, objectives, content. |
| 3. Cookbook Approach:  
The focus is on elements of the curriculum content. | 1. It is easier to think in terms of content than objectives.  
2. Content is easier to handle where there is a large body of knowledge and less emphasis on skills. | 1. It focuses on detail and does not take a holistic view.  
2. The approach ignores overall policy or strategy.  
3. Content may be selected on the basis of staff interest rather than student need  
4. Horizontal and vertical integration may suffer  
5. Time allocation and relevance to practice and education may cause problems. |
<table>
<thead>
<tr>
<th>APPROACH/FOCUS</th>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Railway or Timetable Approach: The focus is on timetable sequencing.</td>
<td>1. It is immediately implementable. 2. It is a practical approach which takes logistics into account i.e. human and other resources available. 3. Staff and students readily understand this format of curriculum.</td>
<td>1. It directs attention away from aims, objectives and teaching methods. 2. Does not serve curriculum review well. 3. Maintains the status quo.</td>
</tr>
<tr>
<td>5. Detective Approach: The focus is on identifying problems in the existing curriculum. Hidden and dispersed curriculum information is obtained.</td>
<td>1. It focuses on areas where change may be beneficial. 2. Motivation for change arise from problem identification. 3. Staff involved in problem identification are likely to &quot;own&quot; the problems and help resolve them.</td>
<td>1. Teachers may feel they are being investigated - creating lack of cooperation. 2. The focus is on past and present - not the future. 3. Principal design problems are not identified and corrected. 4. It provides an organisational instead of a rational, objective-based approach.</td>
</tr>
<tr>
<td>6. Religious Approach: The focus is on an approach, idea or tenet which dominates planning and becomes like an act of faith eg. problem-based learning, integration, small group teaching, lectures, etc. These become end objectives instead of tools for curriculum implementation.</td>
<td>1. Emphasis on an idea in this way ensures its success during implementation.</td>
<td>1. There is no choice, discussion or critical appraisal in relation to the basic &quot;tenets&quot; or idea. 2. Curriculum strategies are accepted or rejected on the basis of consonance with the &quot;tenet&quot;. 3. It inhibits changes to the basic idea, hence integration with conventional ideas.</td>
</tr>
<tr>
<td>APPROACH/FOCUS</td>
<td>ADVANTAGES</td>
<td>DISADVANTAGES</td>
</tr>
<tr>
<td>---------------</td>
<td>------------</td>
<td>---------------</td>
</tr>
<tr>
<td>7. Bureaucratic Approach: The major focus is on rules and regulations of the School, e.g. length and number of semesters, subjects taught, qualification of teachers, time of examinations etc.</td>
<td>1. Basic guidelines are necessary for the orderly running of the curriculum.</td>
<td>1. When bureaucratic rules dictate the character and shape of the curriculum, educational objectives are ignored and problems arise.</td>
</tr>
<tr>
<td>8. Public Relations Approach: Focus is on the public relations image of the School and its curriculum - the perception of outside bodies, e.g. training of researchers.</td>
<td>1. A strong focus e.g. training of graduates with a certain strength permeates the curriculum.</td>
<td>1. What matters to public perception may prevent investigation of existing policy and the details and facts of the curriculum as it exists. 2. Good public acceptance of a deficient curriculum makes change difficult.</td>
</tr>
<tr>
<td>9. Magician Approach: A curriculum which appears suddenly without a clear indication where it comes from and who is responsible.</td>
<td>1. The process is accomplished with remarkable speed.</td>
<td>1. The curriculum may not be accepted by those who need to implement it because of lack of ownership.</td>
</tr>
</tbody>
</table>

(Based on analysis of: Harden RM 1986C:458).
4.2.4.6 **The informal curriculum**

Also called the covert or complementary curriculum, it is argued that it plays a major role in the moulding of future chiropractors. It is discussed further under learning climate in 5.1 below.

4.2.5 **Curriculum Needs Assessment**

4.2.5.1 **Overview**

Needs assessment is done as part of or following a situational analysis to determine the context of a curriculum (Print 1992:89). Print (1992:89-90) states that there are numerous ways for curriculum developers to undertake a needs assessment and advocates a five phase approach employing a discrepancy concept to determine needs based on formulation, rating, ranking and determining the discrepancy of goal statements and subsequently developing a plan of action for prioritisation of goals which demonstrate a high discrepancy to exist between what is preferred (ranked goal) and what exists in the observed learner state or current needs statements i.e.: objectives. A number of research questions are posed in Table 50 in 4.1.1.2 above which influence the selection of contents and can be addressed through application of an algorithm (Table 67) which was adapted from Print (1992:89-90).

### TABLE 67 - An algorithm for competency needs assessment

| Step 1: Identify the interfaces at which the chiropractic professional functions. |
| Examples include patient:practitioner interface; health care system:practitioner interface etc (done through situational analysis of the profession and functional analysis workshops). |

| Step 2: Formulate competency domains, units and elements. |
| These broad domains may relate to the context(s) in which the practitioner functions, e.g. as a primary contact practitioner who requires adequate chiropractic manual technique (adjusting) skills for entry level practice. These statements represent positions which the developers or reviewers of competency-based professional standards believe are relevant to the chiropractic profession (conducted by functional analysis workshops). |

| Step 3: Rate broad-based competency domains and units and elements in the domains. |
| The domains, units and elements have priorities assigned to them by a group (e.g. a functional analysis workshop or wider group). Rating by individuals can be on a scale of 1-5 and then averaged amongst the group. |

| Step 4: Rank competency domains. |
| The average ratings of the domains and units and elements in each domain are now ranked in order to determine a priority of importance for the preferred competency domains. A ranked list of preferred competency domains now exists. |
Step 5: **Determine discrepancy factors.**
Domains and units and elements within domains are subjectively and/or objectively examined to determine any discrepancy between reality and the preferred competency state of practitioners. Where a discrepancy exists between what is preferred i.e. the ranked domains or units and elements within domains and what exists (the observed state of professional practice), a discrepancy factor may be determined, representing the difference between the preferred and the actual; and

Step 6: **Develop plans for implementation and evaluation.**
Competency domains and units and elements within domains that present high discrepancy factors and to which high priority is attributed will demand immediate attention by the educational institutions. On the basis of the competencies established, recommendations can be made for adjustment to both the undergraduate curriculum and postgraduate and continuing education courses.


### 4.2.5.2 Application of a needs assessment algorithm
It is suggested that in undertaking the needs analysis for a chiropractic curriculum, the algorithm used to determine, rate and rank competencies should ideally be applied to each of the following items or elements of curriculum need and intent:

- Student goals for the curriculum (discussed in 4.3.2 below).
- General goals of the chiropractic curriculum (discussed in 4.3.4.4 below).
- Course outcomes objectives for a chiropractic program in each domain of learning (discussed in 4.3.4.6 below).
- Competency-based professional standards (discussed in 4.3.4.7 below).
- Attributes of a chiropractor (discussed in 4.3.4.3 below).
- Roles and tasks of the chiropractor (discussed in 4.3.4.7, Table 80 below).
- Societal expectations for the chiropractic curriculum (4.2.3.1 above).
- Health problems relevant to chiropractic practice (discussed in 4.4.2.5 below).

### 4.2.5.3 Integration of elements of curriculum need and intent
In view of the large number of items which needs to be analysed, correlated and integrated, it is argued that there are several compelling reasons for the construction of grids or matrices to assist curriculum planners with this process:

a) The vast amount of information and number of skills which need to be mastered by students have to be selected from an even larger body of available knowledge, skills and values.
b) Escalating costs of higher education and the need for rationalisation necessitate efficiency and effectiveness in the implementation of a curriculum.

c) The necessity to be sensitive to and meet societal and professional demands for practitioners in national and local regions.

d) The availability of computer methods to organise and track information which makes it possible to deal readily with a range of inter-relating factors which can be sorted according to subjects, modules, units or topics offered in the curriculum.

It has also been shown (Warren Piper 1993:39) that concept mapping of curriculum content is essential to quality control.

It seems reasonable to suggest that a pro-forma in the form of a subject guide or, even better, a study guide should be completed for each unit of work. A unit of work would be comprised of material that forms a logical session, topic or module of approximately 5-10 hours of face-to-face, student:staff interaction or an equivalent period of time in case of self-directed learning modules.
4.3 THE IDENTIFICATION AND ANALYSIS OF THE INTENT OF A CHIROPRACTIC CURRICULUM

4.3.1 Introduction

4.3.1.1 Definition
Curriculum intent includes the aims, goals, objectives and competencies of the curriculum in relation to societal needs, the institutional mission and available resources.
The terms in use to indicate intent have not become standardized over the years (Heathcote, Kempa and Roberts 1991:42). Attempts are being made at standardising use of the terms aims, goals and objectives (Print 1992:93) and the ultimate yardstick for measuring the value of these statements is seen as their usefulness in enabling members of an organisation to identify their common purpose and to work harmoniously in its achievement (Warren Piper 1993:18).

4.3.1.2 Curriculum design questions

<table>
<thead>
<tr>
<th>TABLE 68 - Curriculum design questions about curriculum intent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mission</td>
</tr>
<tr>
<td>1.1 What is the institutional mission?</td>
</tr>
<tr>
<td>1.2 Which institutional strategic factors impact on this curriculum?</td>
</tr>
<tr>
<td>1.2 What is the departmental (unit) mission?</td>
</tr>
<tr>
<td>2. Aims</td>
</tr>
<tr>
<td>2.1 What are the generally phrased statements of what should be achieved by the curriculum in the long term?</td>
</tr>
<tr>
<td>2.2 What does society have to say about aims for the course via the government, the education system, the health care system, reports of major enquiries, etc?</td>
</tr>
<tr>
<td>3. Goals</td>
</tr>
<tr>
<td>3.1 What in precise terms, should be achieved by the curriculum in the medium to long term?</td>
</tr>
<tr>
<td>3.2 What do the education and health care systems and curriculum committee expect?</td>
</tr>
<tr>
<td>4. Objectives</td>
</tr>
<tr>
<td>4.1 What are the general objectives for the course stated in precise, technical, operational terms with key words?</td>
</tr>
<tr>
<td>4.2 What are the short term, specific, institutional objectives for subjects and units?</td>
</tr>
<tr>
<td>4.3 What are the behavioural objectives for subjects, units and learning sessions?</td>
</tr>
<tr>
<td>5. Competencies</td>
</tr>
<tr>
<td>5.1 Which attributes (combination of knowledge, skills and attitudes) should graduates possess?</td>
</tr>
<tr>
<td>5.2 Which performance indicators should be used to evaluate attainment of competencies?</td>
</tr>
<tr>
<td>5.3 Which criteria (courses) represent the standards against which performance can be judged?</td>
</tr>
</tbody>
</table>

4.3.1.3 **Psychological foundations of curriculum intent**

According to psychologists the goals individuals are pursuing create the framework within which they interpret and react to events (Dweck and Leggett 1988:256). Stark, Shaw and Lowther (1989:vi) suggest that institutions should obtain measures of student goals and relate them to other student characteristics and the curriculum so as to improve the educational process. They note, however, that goals are not fixed - they change as individuals develop different self-views and acquire new methods of self-management while an institution's mission determines which changes in goals to encourage, or discourage, among students. Learning is more effective if the objective of learning or performance, made possible by the learning, can be related to a pre-existing motivation, i.e. relating instruction on topics to student intent i.e.: practical interest areas (Gagné 1985:311). In fact, course and subject objectives should be so designed as to facilitate the establishment of positive mental patterns through achievement and competency motivation (Kindsvatter 1988:248). This close relationship between the psychology of motivational theory and curriculum intent is illustrated in Table 69.

<table>
<thead>
<tr>
<th>PRINCIPLE</th>
<th>LECTURER BEHAVIOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>The desire to achieve and experience success is essential to realistic goal setting</td>
<td>Students' motivations and goals to become doctors of chiropractic should be understood and the aims of the course should be clearly defined and explained to them</td>
</tr>
<tr>
<td>Impetus to commence a learning task is essential to initiating a learning sequence</td>
<td>Focus student attention on desired competencies to be developed as a doctor of chiropractic</td>
</tr>
<tr>
<td>Goals that are too hard or too easy to attain are neither motivating nor reinforcing when attained</td>
<td>The level of difficulty and sequencing of units in the chiropractic curriculum should always be based on year level integration and pre-requisite requirements and competencies</td>
</tr>
<tr>
<td>Setting and attaining goals should be seen in a holistic context</td>
<td>Short term goals should be shown to be related to long-term achievement e.g. explaining to 1st year students the relevance of basic medical sciences to the eventual chiropractic clinical practice. All components must be seen by the students as necessary to attainment of the degree</td>
</tr>
</tbody>
</table>

4.3.2 The Importance of Student Intent

Goals are what students hope to achieve and many educational outcomes are related to them, including academic satisfaction, use of appropriate learning strategies, effort exerted in coursework and ultimately, academic achievement (Stark, Shaw and Lowther 1989:vi). However, goals are not fixed; and an institution’s mission determines which changes in goals to encourage, or discourage, among students (Stark, Shaw and Lowther 1989:vi). The impact of student goal information on the curriculum is apparent from Table 70.

**TABLE 70 - How student goal information can be used in curriculum design and implementation**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>It facilitates teacher understanding of the diversity and intensity of student effort in a particular class.</td>
</tr>
<tr>
<td>2.</td>
<td>Through &quot;classroom research&quot; teachers can use student goal information to discuss how their goals for a particular class relate to that of their students.</td>
</tr>
<tr>
<td>3.</td>
<td>It facilitates the design of classes that employ teaching approaches appropriate for students' level of interest and expectation.</td>
</tr>
<tr>
<td>4.</td>
<td>Collecting and analysing student goals can enhance formal assessment processes by fostering and documenting goal changes among students.</td>
</tr>
<tr>
<td>5.</td>
<td>It allows for statistical adjustment of outcome expectations in relation to a specific academic discipline or classroom setting to account for goals of entering students.</td>
</tr>
<tr>
<td>6.</td>
<td>It strengthens counselling.</td>
</tr>
<tr>
<td>7.</td>
<td>It facilitates student recruitment.</td>
</tr>
<tr>
<td>8.</td>
<td>It facilitates retention of students.</td>
</tr>
<tr>
<td>9.</td>
<td>It facilitates administrative planning.</td>
</tr>
</tbody>
</table>

Based on information from: Stark, Shaw and Lowther. 1989:vi; 2-6

4.3.3 Institutional Intent in Relation to the Chiropractic Curriculum

Sanford (1969:8) sees individual development, which is the supreme goal of a university or college, as interrelated with the preservation and advancement of culture, and the maintenance and further development of technology, while the pursuit of truth and development and enjoyment of human intellectual powers with discourse is one of the chief goods to be found in a flourishing university (Wolff 1970:128; Morse 1989:92). Considerable re-examination of the goals, purposes and values of universities has been taking place in recent years (Allen 1988:1; Badley 1992:21) and will no doubt, over time, influence chiropractic education.

It is argued that the institutional intent must make provision for the chiropractic program so that it may find itself in an environment which provides the recognition, resources, nurturing and growth - i.e. the climate within which it can flourish. Concurrently, the intent of the chiropractic program in a university must be consonant with that of the institution.
4.3.4 The Intent of a Chiropractic Program

4.3.4.1 Expressions of intent

The intent of the RMIT chiropractic program is expressed in terms of sequential expressions of intent on a continuum between a generalised mission statement, statement of graduate attributes, basic educational objectives in the cognitive, psychomotor and affective domains and detailed clinical objectives and competencies which are discussed below.

4.3.4.2 Mission statement

The mission of The Chiropractic Unit of the Department of Chiropractic, Osteopathy and Complementary Medicine is 'to benefit society through the education of competent and knowledgeable chiropractors so that they may acquire the understanding and skills necessary to apply their knowledge as primary contact and primary health care practitioners and contribute effectively as members of the health care team. The Unit is committed to the advancement of the discipline of chiropractic through scholarship and research by fostering critical thinking and the use of the scientific method throughout its educational programs' (RMIT 1995:1).

4.3.4.3 Attributes of graduates

The broad educational aims are to produce graduates who have developed those attributes listed in Table 71.

| 2.  | An appreciation of the values inherent in the arts and sciences. |
| 3.  | An awareness and understanding of the relevant socio-economic-cultural environment. |
| 4.  | Informed, defensible opinions on matters of public concern. |
| 5.  | Communication skills. |
| 6.  | An appreciation of the value of free inquiry and discussion, and willingness to accept professional and community responsibility. |
| 7.  | A self-actuated interest in learning which they will maintain throughout their lives. |
| 8.  | The ability to use the skills of others in the practice of chiropractic. |


4.3.4.4 General goals

Goals are seen as outcomes of the overall program which tend to be long range in nature and as targets, somewhat removed from immediate classroom assessment (Warren Piper 1993:18) e.g. the example in Table 72.
TABLE 72 - General goals of a chiropractic program

1. To maintain a standard of excellence which will continue to identify the program as a leader amongst chiropractic programs.
2. To create new knowledge.
3. To sustain effective and efficient student learning experiences through the optimal organisation of knowledge, curriculum sequencing and teaching.
4. To produce competent chiropractic graduates who can provide an increasingly broad range of services relevant to the needs of society.
5. To recruit the most highly qualified student applicants with special emphasis on minority groups and disadvantaged applicants.
6. To promote and support a broad-based, high quality continuing education program.
7. To maintain a favourable climate for competitive recruitment of well qualified and experienced staff.
8. To provide comprehensive patient-oriented care.

Adapted mutatis mutandis to chiropractic from Rosser and Beaulieu 1984:686.

4.3.4.5 Vocational goals

The vocational goals of basic chiropractic education should be to produce graduates with the knowledge, skills and attitudes which provide an appropriate foundation to enable them to undertake competent general practice of chiropractic and engage in further education and research; they should be able to practice safely and effectively under supervision as fieldwork residents; their knowledge and skills should be firmly based on scientific principles; as self-directed learners, they should have an attitude favouring the further development of their knowledge and skills throughout their professional careers' (JEC 1995A:10). It is argued that it is reasonable to suggest that in order to meet the demands of a rapidly changing technocratic society and rapid information generation, emphasis should be placed on acquisition of chiropractic students' self-directedness as learners; an understanding of the principles underlying clinical science and practice; and on essential, important factual material with avoidance of rote memorisation of material which is not directly relevant or cannot fit within the time constraints of the experiential curriculum.
4.3.4.6 Outcomes objectives

Objectives, as expressions of intent, describe desired outcomes by indicating what the chiropractic graduate will be expected to be able to do. They form a sound basis for the evaluation of units and programs as well as the selection of appropriate content, instructional materials and methods (Davies 1976:114).

Chiropractic outcomes objectives can also be seen as statements which describe in general terms the competencies a learner is expected to have at the end of an educational program so as to perform the specified functions or tasks of a primary health care practitioner, and to solve problems connected with the neuromusculoskeletal system, particularly abnormal spinal and extremity joint function, i.e. outcomes objectives are taken to mean statements describing the expected results of learning experiences as they manifest themselves in the performance or behaviour of the learner (WHO 1977:6,7). Further refinement of these general objectives lead to the formulation of specific competencies, discussed below, which need to be validated through consensus research. Reasons why objectives in a sense 'drive' the experiential curriculum appear in Table 73.

<table>
<thead>
<tr>
<th>TABLE 73 - The purpose of determining educational objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits to society</td>
</tr>
<tr>
<td>1. Protection of consumers of health services</td>
</tr>
<tr>
<td>2. Systematic provision of health manpower</td>
</tr>
<tr>
<td>Benefits to educational programs</td>
</tr>
<tr>
<td>1. Evaluation of students</td>
</tr>
<tr>
<td>2. Evaluation of the program</td>
</tr>
<tr>
<td>3. Evaluation of teachers</td>
</tr>
<tr>
<td>4. Cost-effectiveness in the use of resources</td>
</tr>
<tr>
<td>Benefits to teachers</td>
</tr>
<tr>
<td>1. Self-appraisal</td>
</tr>
<tr>
<td>2. Planning</td>
</tr>
<tr>
<td>3. Student evaluation</td>
</tr>
<tr>
<td>Benefits to learners</td>
</tr>
<tr>
<td>1. Feedback</td>
</tr>
<tr>
<td>2. Guidance of learning</td>
</tr>
<tr>
<td>3. Self-assessment</td>
</tr>
</tbody>
</table>

Based on WHO 1977:29-34.
A suggested set of general outcome-objectives of a basic undergraduate chiropractic education appears in Tables 75, 76 and 77. These should ideally be read with reference to the attributes of chiropractic graduates (Table 71) and the general goals of a chiropractic program (Table 72). In a sense, statements in these tables represent different phases of the continuum for the development of curriculum intent mentioned above.

Intermediate objectives express in less general terms the competencies a chiropractor is expected to possess at the end of a certain stage of the educational process in order to perform certain required tasks or to continue his or her education and training (based on WHO 1977:7); and specific learning objectives are statements that describe the performance or behaviour of the learner expected to result from a specific unit of learning. Between, as well as within the different levels on the continuum of expressions of intent, all statements of educational objectives should be consistent with one another and all institutional objectives should be followed by appropriate intermediate and instructional objectives (WHO 1977:7).

a) Chiropractic objectives in the cognitive domain

Chiropractic educational objectives in the cognitive domain are best understood and developed within the framework provided via Bloom's taxonomy (1956) which had extraordinary world-wide impact and was soon followed by taxonomies for the affective and psychomotor domains (De Landsheere 1988:345). Bloom uses four basic principles in designing a taxonomy of educational objectives (Table 74).

<table>
<thead>
<tr>
<th>PRINCIPLE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Methodological principle</td>
<td>The major distinction should reflect the ways teachers state educational objectives</td>
</tr>
<tr>
<td>2. Psychological principle</td>
<td>The taxonomy should be consistent with our present understanding of psychological phenomenon</td>
</tr>
<tr>
<td>3. Logical principle</td>
<td>The taxonomy should be logically developed and internally consistent</td>
</tr>
<tr>
<td>4. Objective principle</td>
<td>The hierarchy of objectives does not correspond to our hierarchical values</td>
</tr>
</tbody>
</table>

Based on Bloom 1956.
The taxonomies of educational objectives have major value and implication in the systematic evaluation of program and course objectives covering the whole range of cognitive, affective and psychomotor processes involved in education and training by providing easily understandable guidelines when based on a classification (taxonomy) constructed according to one or more of the abovementioned explicit principles of Bloom (De Landsheere 1988:345). Analysis indicates that application of Bloom's principles and taxonomy (1956); Mager's guidelines (1962A; 1962B) and the *Criteria for the evaluation of learning objectives in the education of health personnel* (WHO 1977) are of great benefit when writing objectives during the design of an integrative chiropractic curriculum. Bloom's taxonomy of educational objectives in the cognitive domain include, from lowest to highest: knowledge, comprehension, application, analysis, synthesis and evaluation. These cognitive levels can be used as a guide in designing objectives so that learning experiences can be included for each to ensure maximum development and moulding of students, which, it is hypothesised, will promote their self-directedness and independence. Chiropractic educational objectives in the cognitive domain are identified in Table 75 below.

**TABLE 75** - The objectives of a basic chiropractic education - cognitive domain

<table>
<thead>
<tr>
<th>Upon completion of the course, graduates shall be expected to be able to demonstrate knowledge of:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The biological, behavioural and social sciences</td>
<td>The biological, behavioural and social sciences at a level not only adequate to provide a rational basis for chiropractic practice immediately following graduation, but also to assist them to adapt to the changes in practice and to assimilate the advances in knowledge which will occur over their working life.</td>
</tr>
<tr>
<td>2. Human growth and development</td>
<td>The structure, function and normal growth and development of the human body and mind at all stages of life, the interactions between body and mind, the factors which may disturb these and the disorders of structure and function which can result.</td>
</tr>
<tr>
<td>3. Management of neuromusculoskeletal disorders</td>
<td>The aetiology, natural history, prognosis and management of common neuromusculoskeletal disorders in children, adolescents, adults and the aged which have been demonstrated to respond to chiropractic care. The knowledge required to allow appropriate management includes knowledge of commonly used adjustive/manipulative techniques and ancillary modalities used in chiropractic practice.</td>
</tr>
<tr>
<td>4. Diagnosis &amp; Referral</td>
<td>The recognition and timely referral for joint or separate care of patients with conditions for which chiropractic treatment is inadequate or inappropriate or where it will delay urgently needed medical care.</td>
</tr>
<tr>
<td>5. Health education and rehabilitation</td>
<td>The principles of health education, disease prevention, amelioration of suffering and disability, rehabilitation, the maintenance of health and the minimisation of disability in old age.</td>
</tr>
<tr>
<td>6. Human relationships</td>
<td>Factors affecting human relationships, the psychological well-being of patients and their families and the interactions between humans and their social and physical environment.</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>7. Public and occupational health</td>
<td>The principles of public and occupational health should be covered in content whenever appropriate.</td>
</tr>
<tr>
<td>8. Health care provision</td>
<td>Systems of provision of health care with their advantages and limitations including methods of meeting the health care needs of disadvantaged groups within the community.</td>
</tr>
<tr>
<td>9. Health care costs</td>
<td>The costs associated with health care, and the principles of efficient and equitable allocation and use of finite resources.</td>
</tr>
<tr>
<td>10. Research</td>
<td>Scientific method as applied to biomedical, behavioural and sociological research.</td>
</tr>
<tr>
<td>11. Ethics</td>
<td>The ethical standards and legal responsibilities of the chiropractic profession.</td>
</tr>
<tr>
<td>12. Prevention</td>
<td>The importance of methods and techniques in preventative care by primary prevention of disorders of spinal origin by identifying the principles of spinal hygiene and secondary prevention.</td>
</tr>
</tbody>
</table>


**b) Chiropractic objectives in the psychomotor domain**

Chiropractic educational objectives in the psychomotor domain need to be placed in a suitable framework. A range of taxonomies in the psychomotor domain have been developed but not been given the attention they deserve (De Landsheere 1988:345).

While Harrow's taxonomy in the psychomotor domain dominates the field (De Landsheere 1988:345), Simpson's taxonomy appears much more suitable and directly applicable to the study and evaluation of chiropractic psychomotor skills within the framework of his six major hypothetical categories: perception, set, guided response, mechanism, complex overt response and adapting and originating (Simpson 1966:1).

The steps in executing chiropractic psychomotor skills are consonant with the categories in Simpson's taxonomy as shown by the analysis given under the assessment of student performance in 4.6.3.3 below.
### TABLE 76 - The objectives of a basic chiropractic education - psychomotor domain

Upon completion of the course, students shall be expected to be able to demonstrate:

<table>
<thead>
<tr>
<th>Objective</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Data collection</td>
<td>The ability to gather and record clinical information by taking an accurate, organised and problem-focused patient history, including psycho-social factors, using appropriate perspective, tact and judgement.</td>
</tr>
<tr>
<td>2. Patient assessment</td>
<td>The ability to perform an accurate physical and mental state examination.</td>
</tr>
<tr>
<td>3. Selection of procedures</td>
<td>The ability to apply judgement and perspective in choosing from the repertoire of clinical skills, those which it is appropriate and practical to apply in a given situation.</td>
</tr>
<tr>
<td>4. Clinical decision making</td>
<td>The ability to arrive at an appropriate diagnosis or differential diagnosis based on a concept of multifactorial etiology by approaching the diagnosis objectively and evaluating all available evidence; interpreting and integrating examination findings; arriving at a provisional diagnosis using differential diagnostic assessment; using clinical laboratory and x-ray procedures in assessment and diagnosis of disorders of spinal origin; and interpreting test results; using x-ray procedures with due regard for safety precautions; recognising concomitant conditions; establishing any inter-relationships and directing their proper referral; and by employing proper therapeutic trial.</td>
</tr>
<tr>
<td>5. Management planning</td>
<td>The ability to formulate a management plan, with rational and efficient use of investigational modalities, and to plan management in concert with the patient. The level of detail expected in relation to the management plan will vary depending on the commonness or importance of the condition(s) or disease process(es) from which the patient may be suffering.</td>
</tr>
<tr>
<td>6. Clinical judgement</td>
<td>The judgement in deciding on appropriate care by instituting the appropriate chiropractic management with treatment and/or referral to other health disciplines. This includes treatment of the disorder, the relief of discomfort and alleviation of environmental, causal and irritating factors where possible.</td>
</tr>
<tr>
<td>7. Treatment competence</td>
<td>The necessary competence in treatment by achieving the manual dexterity to accomplish manipulative and adjustive techniques; and acquiring competence in modalities of treatment.</td>
</tr>
<tr>
<td>8. Interpersonal relationship</td>
<td>Ability to establish satisfactory relationships with patients by developing patient cooperation and showing concern and consideration; and relieving anxiety, tension and discomfort.</td>
</tr>
<tr>
<td>9. Communication</td>
<td>The ability to communicate clearly, considerately and sensitively with patients, relatives, professional colleagues, other health professionals and the general public. This should include the ability to counsel sensitively and effectively and to provide information in a manner which ensures patients and families can be truly informed when consenting to any clinical procedure.</td>
</tr>
</tbody>
</table>
10. Emergency care
The ability to perform common manual and life-saving procedures such as caring for the unconscious patient and cardiopulmonary resuscitation.

11. Interpretive skills
The ability to interpret relevant literature in a critical and scientific manner.

12. Case study method
The ability to use the resources of a medical, chiropractic library to pursue independent inquiry relating to clinical problems.

13. Computer skills
The ability to use computers for learning, literature searches and other applications of use in chiropractic practice.

14. Change management
The ability to adapt to changes in relevant knowledge and practice and to incorporate such changes into their own practice.


c) **Chiropractic objectives in the affective domain**

Chiropractic educational objectives in the affective domain can be considered under the five categories of the affective domain developed by Krathwohl, Bloom, Masia et al (1964) which, from lowest to highest affective level include: receiving, responding, valuing, organising and characterisation. Objectives for a basic chiropractic education in this domain appear in Table 77.

**TABLE 77 - The objectives of a basic chiropractic education - affective domain**

Upon completion of the course, graduates shall be expected to be able to demonstrate behaviour which signify:

1. **Humanism**
Respect for every human being, with an appreciation of the diversity of human background and opportunities, and an unprejudiced attitude towards patients. There should be respect for and understanding of different cultural values and incorporation of that respect and understanding in all aspects of professional practice;

2. **Ethics**
An appreciation of the complexity of ethical issues and a reasonable personal approach to handling such ethical issues;

3. **Compassion**
A desire to ease pain and suffering;

4. **Personal Responsibility**
Willingness to accept responsibility for the patient's welfare by accepting responsibility for the chiropractic care of the patient; recognising personal professional capabilities and limitations; and relating effectively and knowledgeably to other health disciplines;

5. **Professional responsibility**
Acceptance of the responsibilities of a chiropractor in relation to the care of the patient; the profession of chiropractic; other health care disciplines and related community services; and for continuing self-education directed towards research and clinical practice;

6. **Communicativeness**
An awareness of the need to communicate clearly and fully with patients and their families, and to involve them fully in planning management;
7. Cost effectiveness

A desire to achieve the optimal patient care for the least cost, with an awareness of the need for cost-effectiveness to allow maximum benefit from the available resources;

8. Community responsibility

Consideration of the interests of the patient and the community as paramount, with these interests not subservient to their own pecuniary interest;

9. Teamwork

A desire to work effectively and as a team with other health care professionals;

10. Self-education

An appreciation of their responsibility to maintain their standards of practice at the highest possible level by continuing education throughout their professional careers;

11. Sharing responsibility

An appreciation of the need to recognise when a clinical problem exceeds their capacity to deal with it safely and efficiently and to refer the patient for help from others when this occurs;

12. Limitations

A realisation that it is not always in the interests of the patient or their family to do everything which is technologically possible to make a precise diagnosis or to attempt to modify the course of a problem.


### 4.3.4.7 Competency-based professional standards

The suggestion that competency-based professional standards should be attained in University courses elicited significant debate and resistance in higher education in recent times (Bowden and Masters 1993:iix). However, university education certainly does include training (especially in professional courses) and, to the extent that it involves training, it does produce outcomes which are measurable and a significant number of these would be amenable to measurement on the basis of competency (HEC 1992:71). Competency-based professional standards are now an integral part of chiropractic education (Kleynhans 1992A:98) and are linked to standards of practice guidelines (CAA 1995:1). It is argued that the establishment and documentation of professional competency-based standards for chiropractors serve the following practical, curriculum-related purposes:

a) It greatly facilitates curriculum development including the preparation of learning objectives which encompass and provide for the achievement of competency-based standards. They are particularly helpful in determining any curriculum deficiencies or superfluity and in balancing and placing emphasis on relevant sections.

b) The granting of accreditation to institutions and programs is based to a large extent on self-evaluation of the curriculum process and assessment of teaching-learning outcomes. For this process to be meaningful, it needs to be based on competency-based standards.
c) Competency-based standards for chiropractors are systematically reviewed to ensure they remain relevant to the profession and hence form a basis for curriculum update.

d) There are very real advantages to basing objectives on competencies (Table 78).

**TABLE 78 - Advantages of basing objectives on competencies**

1. Students will know what they will be expected to be able to do at the end of the course.
2. Lecturers will be working towards the course goals.
3. It is a superior (more reliable) method of ensuring that graduates would possess the necessary attributes to meet societal needs.
4. Establishment of competencies assists curriculum planners in determining content, methods, and assessment.
5. It assists with decisions on deletion of content and lessens the burden of assimilating a great deal of factual content, i.e. it prevents overcrowding of the curriculum (Blunt, 1976).
6. Student and staff knowledge of the objectives allow more valid and reliable evaluation techniques to be developed to assess whether students have acquired the essential competencies.

Based on data from: Beenhakker JC. 1987.

A competent chiropractor can be defined as a person who has the attributes necessary for practising chiropractic i.e. undertake the roles and tasks of a chiropractor to the appropriate standard. Professional attributes of a chiropractor, represent areas of knowledge, skills and attitudes including those in Table 79 and competencies relate to the roles and tasks of the chiropractor including those outlined in Table 80.

**TABLE 79 - Professional attributes of a chiropractor**

- knowledge (the recall of facts; information retrieval skills), also called cognitive skills;
- interpretive skills (e.g. relating to historical, examination and laboratory data);
- problem-solving skills (e.g. differential diagnostic skills); psychomotor skills (e.g. those required for diagnostic work and for patient care via manual treatment);
- interpersonal and communication skills, also called affective skills (e.g. skills required to accurately elicit and convey information and make a patient feel at ease);
- philosophical attitudes (e.g. a humanistic, caring attitude);
- perceptual skills (e.g. a keen sense of observation);

TABLE 80 - Roles and tasks of a chiropractor

- accepting the role of chiropractor (e.g. as a primary contact health care professional with the right to conduct a comprehensive diagnostic assessment);
- understanding the individual, the family and the community;
- practising disease prevention and health promotion;
- analysing and defining health problems;
- managing health problems (planning and implementation of chiropractic care);
- augmenting personal and professional knowledge;
- establishing appropriate conditions for patient or client care by creating a favourable practice milieu;
- ensuring patient safety in practice by using procedures such as x-rays and physical testing to avoid complications;
- managing a practice; and
- applying articular chiropractic manual techniques such as spinal manual adjustments, soft tissue technique etc.

Adapted from Kleynhans 1992A:100.

An excellent methodology for determining attributes of a practicing chiropractor is available from the work of Price et al (1971:229-237) based on the following algorithm a) determine attributes in the form of criteria, characteristics, basic factors and qualities important to practice, through input from a large number of practitioners; b) construct a list of these attributes; c) obtain ratings on a 5-point scale ranging from 'extreme importance' to 'no importance' from a very large representative sample of society including major groups drawn from various health personnel, general public, students, diverse socio-economic and ethnic groups; and d) rank the attributes.

An adequate sample of the attributes, roles and tasks need to be appropriately evaluated in the student, including competency-based assessment, to demonstrate a successful curriculum outcome.
4.4.1  Introduction

4.4.1.1  The role of content

Curriculum content consists of knowledge, skills and attitudes while knowledge includes facts, concepts and generalisations; skills and processes include items such as reading, writing, calculating, dancing, critical thinking, decision-making, communicating, etc; and values and attitudes include the beliefs about matters concerned with right and wrong, good and bad, beautiful and ugly (Hyman, 1973:4). The listing of content is a commonly used method of developing statements of objectives (Davies, 1976:114).

It is argued that in order to substantiate, through competency-based assessment, that the entry level professional competencies have been attained at the end of an undergraduate chiropractic curriculum, it is necessary to determine and describe content in relation to intent with particular reference to competent professional practice i.e. the competencies which must be demonstrated in terms of the tasks and roles of practitioners; in other words, their knowledge, skills and values relative to the diagnosis and management of health problems; disease prevention and health promotion. In the final analysis, therefore, the content should accommodate all the objectives for a basic chiropractic education referred to in Tables 67, 68 and 69. To ensure that this occurs it is suggested that knowledge, skills and values covered in the curriculum need to be expressed in terms of concepts which are vertically and horizontally integrated through concept mapping or the creation of a 'topic tree' referred to by: Chastonay, Guilbert, Rougemont (1991:405); Warren Piper (1993:21); Horn (1991:1) and Gjerde (1987:316). An approach towards clarifying content in the chiropractic curriculum should be based on a number of issues (Kleynhans 1991E:53; 1991F:59). These are discussed below. Designation of content as core or optional is a major task for which Harden and Davis (1995:125) provide excellent guidelines.
4.4.1.2 Curriculum design questions

The questions in Table 81 indicate the wide-ranging consideration which needs to be given to selection and organisation of content.

**TABLE 81 - Curriculum design questions about curriculum content**

1. **ELEMENTS OF CONTENT**

1.1 Knowledge
- Which subjects should be included?
- Which philosophical concepts should be included?
- Which chiropractic beliefs should be included and how do they relate to subjects and concepts?
- Which chiropractic principles should be included?
- Which educational objectives in the cognitive domain should be included?

1.2 Skills and processes
- Which objectives in the psychomotor domain should be converted to content in the form of subjects, problems and learning experiences?
- Which generic basic science research skills relevant to liberal education should be included?
- Which diagnostic assessment and therapeutic skills essential to chiropractic practice should be included?
- How many of each of the practical procedures should be included in the learning experiences?

1.3 Values as content
- Which objectives in the affective domain should be converted to content in the form of problems, subjects and learning experiences?
- How should communication skills, ethics, sociology, psychology, humanism and holism be integrated as content?

1.4 Competencies
- How can each of the competency-based professional standards be converted to expressions of content?

1.5 Health problems
- Which health problems should be considered, to what depth should they be covered, at which points in the curriculum should each appear or be repeated?
- How should health problems be prioritised for inclusion as content?

2. **ORGANISATION OF CONTENT**

2.1 What is the significance, validity, social relevance, utility and learnability of each item of content which is selected and what interest does it have for learners?

2.2 What is the range and depth of coverage of each item of content?

2.3 Which items of content should precede other items or be taught concurrently?

2.4 Which balances of content should be created in terms of basic medical and professional clinical sciences, and scientific and humanistic elements?

### 4.4.1.3 Research methods and techniques

<table>
<thead>
<tr>
<th>METHOD</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Brainstorming</td>
<td>Content is determined by generating phrases and words which represent knowledge and skills required within the broad field of the discipline. Each item is followed by a series of operational objectives for skills and competencies required to meet the needs stated. Competencies are stated as curriculum content objectives (Romaniuk and Romaniuk 1984:57-69).</td>
</tr>
<tr>
<td>2. Health Problem Analysis</td>
<td>Classification of common and important health problems according to the ICHPPC (International Classification of Health Problems in Primary Care) code number, indicating acuteness, preventability, relevant teaching department and rank ordering. It is based on epidemiological data and serves to (a) relate education more closely to community needs; (b) predict changes to societal needs; (c) meet program objectives and (d) avoid fragmentation and over-specialization at undergraduate level (Rosser and Beaulieu 1984:683-9).</td>
</tr>
<tr>
<td>3. The Delphi Technique</td>
<td>Relies on the judgement of an expert panel or 'wise men'. This method appears particularly relevant to the determination of clinical competencies desired in a graduate (Dunn et al 1985:15; Dunn and Hamilton 1986:207; Harden 1985:135; Sackman 1975:1).</td>
</tr>
<tr>
<td>4. Task Analysis</td>
<td>A descriptive &quot;pencil and paper method&quot; that could be applied to chiropractors in different settings including solo private practice, group practice, hospital and community health centre settings. It is complemented by a health problem analysis.</td>
</tr>
<tr>
<td>5. Critical Incident Survey Technique</td>
<td>It involves descriptive analysis of critical incidents occurring during the course of practice (Dunn &amp; Hamilton 1986:207). It has already been applied to the establishment of competency-based professional standards for chiropractors (Kleynhans 1993:10).</td>
</tr>
<tr>
<td>6. Behavioural Event</td>
<td>It involves identification of 15-20 practitioners who are regarded by their peers as 'star performers' and interviewing them in-depth to determine characteristics, perceptions of events, thoughts, feelings, etc.</td>
</tr>
<tr>
<td>7. Interviews with Recent Graduates</td>
<td>This method is used to identify the areas of practice in which they felt least confident. This can be followed up a year later with similar questions to discover whether there remained any professional uncertainties in terms of knowledge, skills and techniques.</td>
</tr>
<tr>
<td>8. Review of Recent Textbooks</td>
<td>A useful procedure in order to get an indication of current thinking and new approaches which influence the education needs of practitioners (Jayawickramarajah 1987:167; McLeod and Harden 1986:69).</td>
</tr>
<tr>
<td>9. Study of 'Heroes in Practice'</td>
<td>It is similar to the critical incident survey but refers to incidents, not individuals, being studied in order to ascertain whether any pattern can be determined relative to the setting in which the mistake took place, the surrounding details and consequences.</td>
</tr>
</tbody>
</table>
10. Subject-centred (or content knowledge) Approach
A classical approach aimed at identifying the content in terms of factual knowledge of relevance to a course.

11. Multifactorial Approach to Support Problem-based Learning
Content derived from resource materials (documents, laboratory materials, museum specimens, books, instructional packages, learning guides, audiovisual materials); health problems and organisational relationships.

Based on: Kleynhans 1991E and 1991F)

4.4.2 Elements of Content in a Chiropractic Curriculum

4.4.2.1 Knowledge as content consists of a number of elements including:

a) Subject content - The subjects in a standard chiropractic curriculum are listed in Table 2 (1.2.2.4 above) while subjects required by the statutory boards (JEC 1995A:22-34) are listed in Table 54 (4.1.3.1 i) above. Both form the basis for the selection of content for the Australian chiropractic curriculum. The Association of British Neurologists (1995:5) has prepared an excellent exposition on neurological content in a course which, it is argued, would apply to chiropractic.

b) Concepts of philosophy as content - It is argued that both the basic methods of philosophy (Table 13) and their application to the chiropractic belief system (Tables 14, 27 and 33) should be covered in the content of the chiropractic curriculum since they provide a sound philosophical foundation and relate strongly to the ideological, sociological and cultural setting in which chiropractors need to operate as discussed in 3.1.2, 3.1.5, 3.1.8 and 3.2.6.3 above. These concepts also relate closely to a number of the outcome-objectives of a basic chiropractic education outlined in Tables 67, 68 and 69.

c) Chiropractic beliefs, outlined in Table 15 and discussed immediately above have significant curriculum impact as can be seen from the relationship between the beliefs and related basic medical science and chiropractic clinical curriculum content (Table 83).
<table>
<thead>
<tr>
<th>BELIEF</th>
<th>SUBJECT</th>
<th>CONCEPT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Chiropractors accept that the individual has intrinsic value and there is worth inherent in human life</td>
<td>Principles:</td>
<td>Historical chiropractic&lt;br&gt;Philosophy - humanism&lt;br&gt;Ethics of practice: consent, beneficence, privacy</td>
</tr>
<tr>
<td>2. Chiropractic is a rational activity</td>
<td>Principles:</td>
<td>Historical chiropractic&lt;br&gt;Neurophysiological and biomechanical theories of chiropractic</td>
</tr>
<tr>
<td></td>
<td>Philosophy:</td>
<td>Humanism</td>
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<tr>
<td></td>
<td>Chiropractic practice:</td>
<td>Clinical decision-making processes; Disease prevention and health promotion</td>
</tr>
<tr>
<td></td>
<td>Basic Medical Sciences:</td>
<td>Anatomical, physiological and pathological substrates</td>
</tr>
<tr>
<td></td>
<td>Diagnosis:</td>
<td>Psychosocial interaction</td>
</tr>
<tr>
<td></td>
<td>Physiology:</td>
<td>Homeostasis</td>
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<td></td>
<td>Biomechanics:</td>
<td>Kinesiopathology</td>
</tr>
<tr>
<td>3. Chiropractic is logical and is based on a systematic clinical approach</td>
<td>Chiropractic practice:</td>
<td>Clinical decision-making processes (case study method and evidence-based decision making)</td>
</tr>
<tr>
<td></td>
<td>Diagnosis:</td>
<td>Physical and laboratory diagnosis; Diagnostic imaging interpretation;</td>
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<tr>
<td></td>
<td>Chiropractic skills:</td>
<td>Chiropractic and medical diagnostic skills; Chiropractic manual techniques; Chiropractic physiological therapeutics</td>
</tr>
<tr>
<td>4. Chiropractic is a reasonable and beneficial clinical pursuit</td>
<td>Principles:</td>
<td>Ethics, jurisprudence and practice management (health care economics)</td>
</tr>
<tr>
<td></td>
<td>Correlative chiropractic practice:</td>
<td>Etiology, mechanism, signs, symptoms, differential diagnosis, syndrome management and prognosis</td>
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<tr>
<td></td>
<td>Chiropractic is unique in the way that basic social and biological sciences are synthesised in functions which promote health</td>
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<td>------------------------------------------------------------------------------------------------------------------</td>
<td></td>
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<tr>
<td></td>
<td>Anatomy: Morphological basis of CMT*</td>
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<td></td>
<td>Physiology: Physiological and pathophysiological basis of CMT</td>
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<td></td>
<td>Biomechanics: Mechanical and pathomechanical basis of CMT</td>
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<td></td>
<td>Pathology: Indications and contraindications to CMT</td>
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<tr>
<td></td>
<td>Ethics, jurisprudence and practice management: Humanistic factors in clinical practice</td>
<td></td>
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<tr>
<td></td>
<td>Correlative chiropractic practice: Integration of factors into a taxonomy for clinical decision-making</td>
<td></td>
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<table>
<thead>
<tr>
<th></th>
<th>Chiropractic is a process with a central subjective purpose</th>
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<tbody>
<tr>
<td></td>
<td>Physiology &amp; biomechanics: Functional basis of CMT</td>
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<td></td>
<td>Pathomechanics and pathophysiology: Pathokinesiological basis of CMT</td>
</tr>
<tr>
<td></td>
<td>Psycho-social aspects of practice: Humanistic, cultural, ethnic and psychological principles in practice</td>
</tr>
<tr>
<td></td>
<td>Systematic CMT: Patient education to assume responsibility for their own health</td>
</tr>
<tr>
<td></td>
<td>Physiological therapeutics: Therapies adjunctive to CMT;</td>
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<tr>
<td></td>
<td>Orthopaedics: Diagnosis of problems;</td>
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<td></td>
<td>Neurology: Scope and limitations of chiropractic;</td>
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<tr>
<td></td>
<td>Diagnosis: Prevention of complications from CMT; Referral of relevant cases; and Limitations of CMT;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Chiropractic is a process with an inherent organisation or systems</th>
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<tbody>
<tr>
<td></td>
<td>Systematic CMT: Diversified CMT</td>
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<tr>
<td></td>
<td>Nimmo CMT</td>
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<td></td>
<td>Gonstead CMT</td>
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<td></td>
<td>Upper cervical specific CMT</td>
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<td></td>
<td>Correlative chiropractic clinical practice: Patterns of dysfunction (basic distortion pattern; Lovett-Illii classification etc); and</td>
</tr>
<tr>
<td></td>
<td>Taxonomy for clinical decision-making</td>
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<tr>
<td></td>
<td>Diagnosis: Screening diagnostic assessment</td>
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</tbody>
</table>

Based on analysis by the author of Table 14.
*CMT is Chiropractic Manual Technique*
d) **Chiropractic principles**, discussed in 3.1.3.3 (Tables 16-21) above, represent an extensive part of content subsumed in all subjects in the curriculum and should be selected according to content selection guidelines and mapped across all the years of the program to ensure adequate coverage, reinforcement and assessment.

e) **Educational objectives in the cognitive domain** are outlined in Table 75 and are most important in guiding the selection and organisation of knowledge content.

### 4.4.2.2 Skills and processes as content

Skills and processes as content are diverse and primarily of a clinical nature. They can be linked directly to the clinical outcome-objectives for a basic chiropractic education in the psychomotor domain in Table 76 above which are quantified in Table 84 below.

**TABLE 84 - Qualitative and quantitative standards for chiropractic clinical education**

Institutional clinics must establish mechanisms to attain the following standards:

<table>
<thead>
<tr>
<th>QUALITATIVE ASPECTS</th>
<th>QUANTITATIVE ASPECTS</th>
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<tbody>
<tr>
<td>◆ Assure quality care</td>
<td>◆ Perform at least 25 clinical examinations to include case history, physical and neuromusculo skeletal examinations, each leading to a diagnosis, diagnostic conclusion or clinical impression</td>
</tr>
<tr>
<td>◆ Develop a comprehensive patient's case history to include appropriate emphasis on all elements appropriate to the patient's entering complaint and health status</td>
<td>◆ Perform/interpret at least 25 area radiographic (diagnostic imaging) examinations with written reports of findings</td>
</tr>
<tr>
<td>◆ Develop objective data through conduct of a physical examination appropriate to the health status of the patient</td>
<td>◆ Interpret clinical laboratory tests appropriate for a chiropractic practice setting to include at least 25 urinalyses, 20 hematology procedures such as blood counts and 10 clinical chemistry, microbiology or immunology procedures or profiles on human blood and/or other body fluids</td>
</tr>
<tr>
<td>◆ Perform and/or order, and interpret appropriate imaging examinations</td>
<td>◆ Perform chiropractic adjustments and/or manipulations on at least 250 patient care encounters</td>
</tr>
<tr>
<td>◆ Perform and/or order and interpret appropriate clinical laboratory examinations</td>
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<tr>
<td>◆ Perform and/or order and interpret other relevant procedures indicated by the clinical status of the patient</td>
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<tr>
<td>◆ Integrate data in a manner that facilitates identification of the pathophysiologic mechanism(s) responsible for the patient's complaint(s) and diagnosis/clinical impression</td>
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<tr>
<td>◆ Refer patients when clinically indicated for consultation, continued study or other care</td>
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<tr>
<td>◆ Identify and initiate the appropriate health care regimen</td>
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</tr>
<tr>
<td>◆ Perform chiropractic adjustment and/or manipulations</td>
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</tbody>
</table>
Monitor patient's clinical status during and after completion of the health care regimen through follow-up and review appropriate to the patient's health status

Keep appropriate records of patients' evaluation and case management


4.4.2.3 **Values as content** include principles, concepts, facts and behaviours outlined in the chiropractic educational objectives in the affective domain (Table 77) which are covered in the study of ethics and communication and in clinical practicum where they form a very important part of content. It is argued that consideration of socio-cultural factors should play an important role in the chiropractic curricula for multi-cultural societies. The following studies have relevance (Bana et al 1990:483; Harrison et al 1996:35; Harrison 1997:212).

4.4.2.4 **Competencies as content** can be translated into discrete areas of study and learning experiences (Stone 1987:155). The benefits of basing objectives on competencies are illustrated in Table 78 (4.3.4.7) above. Stone (1987:155) has developed a very useful matrix of relationships between defined generic competencies and subject areas as well as a framework for the translation of competencies into content. Major headings for the framework are given below with examples from a chiropractic curriculum in square brackets for each heading:

- **Competency** [diagnosis] \(\Rightarrow\)
- **Dimensions** [psychomotor cognitive] \(\Rightarrow\)
- **Objectives** [to enable the student to take a history, perform a physical examination and arrive at a conclusion in terms of a) the patient's problems, b) the probable diagnosis and c) the prognosis] \(\Rightarrow\)
- **Competency tasks** [a) history taking; b) physical examination, c) formulating a problem list etc] \(\Rightarrow\)
- **Subject areas** [clinical practice]

It is argued that health problems in this context are common or important disorders which normally require health care for their resolution or amelioration, are potentially responsive to chiropractic care or, when not a chiropractic problem, may be seen by a chiropractor as the point of primary accession for patients to the health care system where early diagnosis and appropriate referral in this case could be life-saving. Health problems are discussed in 4.2.3.1 d) above and selection criteria for inclusion and emphasis of these problems in the curriculum appear in 4.4.3.1 below.

4.4.2.6 Human subject research experience is strongly advocated early in the medical curriculum as a natural vehicle for fostering independent learning, critical evaluation and communication skills and to confront issues of ethical and professional conduct (Harrison 1997:212).

4.4.3 The Selection of Content

It is crucial that a framework be used for the selection of content to avoid curriculum overload. Print (1992:111) suggests six criteria which curriculum developers require to facilitate the selection of contents: significance, validity, social relevance, utility, learnability and interest.

4.4.3.1 The significance of content is judged in terms of how essential or basic it is to the discipline or theme under study; thus, whether it is worthy of inclusion in a curriculum (Print 1992:111). In fact, 'if study were to be based on the number of carefully selected principles, concepts or ideas, facts would be learned to illustrate these and would be included only insofar as they contributed to an understanding of these. This would reduce the problem of learning the large bodies of facts which seems to be the bugbear of so many courses'... (Nichols and Nichols 1978:52). An interesting study on the identification of core curriculum in the Liverpool medical program places this concept in current context for medical education (Bligh 1995:383); as does the work of Harden and Davis (1995:125) and Leggat (1998:38).
Based on an analysis of data derived from Jayawickramarajah (1987:171) and Adams and Traina (1989:1), prioritisation criteria for the selection and emphasis of health disorders in the chiropractic curriculum are proposed, including the seriousness of the condition if not detected or poorly managed; frequency with which it is encountered in a 'typical' practice; importance in terms of preventability; importance to the community; importance to emphasising basic concepts in learning; importance in terms of evaluation and treatment; and importance in serving as a model for discussion of a group of conditions.

4.4.3.2 The validity of content in relation to objectives requires that content must reflect stated objectives (Print 1992:112) while it is argued that validity of clinical procedures, included as content, requires application of a test for which the following criteria are suggested:
- evidence in the literature which supports its relevance, efficacy and efficiency;
- historical use;
- safety;
- rationality in terms of known anatomy, biomechanics and physiology;
- and whether it is ethical and operationally definable.

4.4.3.3 The social relevance is concerned with moral values, ideals, social problems, controversial issues etc related to the social development of the individual (Print 1992:112). Since future chiropractors need to be accountable, responsible and humanistic, it appears reasonable to suggest that positive discrimination is essential in the selection of learning experiences designed to develop and enhance these and similar attributes through inclusion of ethics, jurisprudence, risk management, humanism, medical sociology, communication skills, epidemiology etc.

4.4.3.4 The utility of content is similar to significance and social relevance, but is more specific and applies to the usefulness of content in preparing students (Print 1992:112) for the real world of private practice through inclusion of subjects covering issues of principles and practice with a focus on safety.

4.4.3.5 The learnability of content is particularly relevant to curricula that have to meet the needs of large numbers of students where it is often difficult to take account of individual differences and hence aspects of content not learnable by some students (Print 1992:113). It is argued that content can be made more learnable through the design of highly structured, self-directed learning materials which may be used to supplement expository teaching and to promote individualisation learning and self-directedness.
4.4.3.6 *The interest of learners in content* bears a strong relationship to motivation (Print 1992:113), hence it is argued that it behooves staff to illustrate relevance and articulation through careful selection of content in subjects such as chemistry, microbiology and pathology which are essential building blocks but may be less interesting to students than the diagnostic and therapeutic subjects. Showing relationships between the basic medical and the chiropractic clinical sciences would tend to replace rote memorisation with greater understanding of concepts which need to be integrated. It is argued that all six criteria of content selection have an important influence on the design of an experiential chiropractic curriculum insofar as they promote the creation or simulation of a 'real world' context; minimise curriculum overload, show relevance; promote integration of content into the learner's cognitive framework and (therefore) decrease the necessity for rote learning.

4.4.4 The Architectonics of Content

Once content has been selected, criteria are applied to arrange the elements appropriately for learners. Termed the architectonics of content, it may be defined as those principles responsible for ordering content into systematic categories for the purpose of study (Phenix 1964:44; Zais 1976:328), the most important of which are **scope** and **sequence** (Print 1992:115); both of which have a strong basis in the psychology of content architectonics discussed in 4.4.6.1 and 4.4.6.2 below.

4.4.4.1 The **scope of content** refers not only to the range of content areas represented, but to the depth of treatment each area is accorded (Zais 1976:338). Print (1992:115-6) offers useful concepts about scope:

a) Because of time constraints, breadth of content is always bought at the expense of depth with the reverse also being applicable.

b) The relationship between core content and electives require careful consideration.

c) Integration of content is important in order to provide some sense of reality.

d) Content which may be deleted to avoid student overload should be (beneficially) considered.

It is also argued that the architectonics of the traditional and most of the current chiropractic curricula can be greatly improved upon if the selection and organisation of content.
4.4.4.2 *The sequence of content* is the order in which content is presented to learners over time (vertical integration) and as such represent manageable sections in varying arrangements (Print 1992:117). Principles/criteria for sequencing include: a) Simple to complex such as development of simple psychomotor skills (static palpation) which should precede more complex procedures (motion testing); b) Prerequisite learnings e.g. the study of spinal anatomy prior to spinal palpation.

Mastery of certain content should precede that of content which requires pre-requisite knowledge. Application of both principles are shown in each of the following examples of content sequences:

a) Learning about nutritional management:

General chemistry → Organic chemistry → Biochemistry → Physiology → Pathology → Laboratory pathology → Diagnosis → Nutritional management

b) Mastery of physical assessment:

Observation → Static palpation → Motion palpation → Physical assessment

c) Learning about therapeutic exercise:

Observation → Postural evaluation → Gait analysis → Muscle testing → Therapeutic exercise

d) Developing an understanding of pathokinesiology:


4.4.4.3 *The balancing of content* is seen as an extension of the process of determining scope and sequencing and is directly influenced by content selection. Chiropractic curriculum balance is in fact required by the statutory boards as outlined in Table 63 (4.2.3.1 i) above).

a) Scope (breadth and depth) of content can be balanced between a scientific and humanistic approach (*ideological balance*). Doran 1983:1832 suggests that ideally, the curriculum should produce graduates who can practise in a humane manner and still remain scientifically and technologically effective. The mission of chiropractic education is to promote simultaneously the philosophical elements, science and art of chiropractic and must therefore be prepared to always consider the balance between the often limited scientific
understanding of clinical practice and the necessity for both clinical intervention based on intuition and experience (the art of practice) and research validation of practice. Scientism should therefore be a topic for discussion under principles and chiropractic clinical scientists should proclaim the values of humane culture and human self-realization, otherwise there may not be a full appreciation of 'the societal needs for a balanced clinical approach in an age of science' (Doran 1983:1833).

b) **Sequence** needs to provide balance e.g. it is inappropriate to fill the early years of the chiropractic curriculum with basic medical sciences to the exclusion of clinical sciences since this will create serious concerns about the relevance and significance of content. Conversely, should students be given too many hours of clinical responsibility for which they do not have an adequate theoretical and practical skills base their learning could become frustrated, creating psychological problems relating to self-image and confidence and patient safety in the teaching clinic could be jeopardised.

### 4.4.5 Psychological Implications of Content Architectonics

#### 4.4.5.1 Psychology and the organisation of content

The content learned in institutions is for the most part a codified abstraction and formalisation of what others have discovered, while everyday learning is concerned with personally valued content, experienced first hand and much everyday learning springs from a felt need to learn what is functionally important at the time (Biggs 1988:127). Understanding of the psychological substrates of motivation is necessary to explain this concept. An adaptation of the concepts of Biggs (1989:22) suggests that a chiropractic practitioner examining a patient has an obvious need for specific information concerning anatomy, physiology, biomechanics, pathology, etc., while a student studying these subjects at second hand e.g.: as rote learning of codified knowledge, experiences no such need. An exception to this strategy is experiential learning in the special context of problem-based learning. Therefore, no matter how sincere a student's intentions and plans, codified knowledge does not often provide its own motivation for learning, except when driven by intrinsic motivation (Biggs 1989:22). It is also argued that rote memorisation does not, in any event, constitute good educational practice. Also, it has been suggested that problems of student motivation are more likely to result from the way that learning is organised than from a simple unwillingness of students to work harder; in
fact, delineating the aims enthusiastically at the beginning of a learning activity is one of the most effective ways of motivating students (du Plooy 1985:17).

These principles are applied in the design of the evidence-based clinical decision making system on which the outlines of major subjects are based. Content is designed in such a way that the extent of abstraction to which Biggs (1989:21) referred to is maximally reduced since all content in a subject or learning module is made functionally important to the task of managing patient problems and is highly motivating because it relates to the major student aim of doing the course. This approach also greatly reduces rote memorisation whilst facilitating maximal integration of all relevant components of the course, thereby facilitating transfer of learning from the classroom to the patient consultation room, clearly delineating the aims at the beginning of each learning activity which du Plooy (1985:17) suggests is highly motivating. ‘Psychological sequencing’ of content by using instructional processes in problem-based learning is advocated by Leggat (1998:39).

4.4.5.2 Architectonics of content

Once curriculum content has been selected it has to be placed within the context of the scope (horizontal integration) and sequence (vertical integration) of the overall curriculum (Print 1992:114-5; Zais 1976:338).

a) Sequencing - While subjects have traditionally been sequenced according to a logical or intuitive approach of the decision makers, principles which have a strong relationship to the psychological substrates of learning have become increasingly accepted as criteria for sequencing content, including:

i) simple to complex;
ii) pre-requisite learnings;
iii) chronology;
iv) whole to part learning;
v) increasing abstraction;
vi) spiral sequencing (Print 1992:115-6).
These principles are followed in the proposed integrative chiropractic curriculum design. The point of departure for the selection and organisation of content in the integrative chiropractic curriculum is competency in the knowledge, skills and values required for effective and efficient evidence-based clinical decision-making and the implementation of patient care to meet the needs of the community in which graduates will undertake their lifetime service to humanity within the context of a rapidly developing technocratic society characterised by an information explosion and constantly changing needs and demands for more responsible, accountable, competent and cost-effective health care service. Participant observation over two decades, however, resulted in the assumption that chiropractic students experience tremendous difficulty in integrating masses of highly relevant information during the five years of the chiropractic course and hence experience great difficulty in making the transition between classroom and clinical education and training. This is attributed to the fact that a traditional chiropractic curriculum is discipline-based; each discipline covers vast amounts of facts related to the entire human body which, while vertically integrated, most of the time tend to have little horizontal integration with other subjects.

b) **Integration** - While attempts at sequencing content in say anatomy, physiology and biochemistry through timetabling is intended to improve horizontal integration, the integrating activity is largely left up to the student who is so busy memorising facts about each of the disciplines in order to pass rigorous examinations that integration is often not achieved.

The conventional chiropractic curriculum includes discipline-based coverage of the basic medical sciences with little or no effective integration of content across disciplines in either the systemic or regional consideration of e.g. anatomy, physiology, pathology, diagnosis etc. In fact, the study of anatomy and biochemistry normally precedes that of physiology as building blocks while physiology precedes microbiology and pathology thereby decreasing opportunities to integrate knowledge and understanding of normal and abnormal structure and function and the ability to recognise same.
A similar problem exists with horizontal integration of the clinical sciences where much content is conveyed in separate subjects and units with a result that learners tend to not integrate necessary information and skills into an efficient system of practice. Problems with horizontal integration of content in the chiropractic sciences arise from:

i) Chiropractic diagnostic procedures tend to be fragmented into subjects/modules which develop discreet areas of skills without opportunities in the chiropractic skills laboratory for the integration of the different areas e.g. static palpation, motion palpation, postural assessment, instrumentation etc., which are all taught in a non-integrated manner. The fact that students are ultimately required to use all of these procedures in an integrated manner in the clinical setting does not ensure proper integration which, it is argued, would be greatly facilitated if these procedures were taught in an integrative manner from the beginning. Also, it makes little sense to have static palpation taught in isolation in the chiropractic laboratory from the palpation required for diagnostic assessment taught in physical diagnosis in the diagnostic sciences laboratory. It is argued that, instead, the skill of palpation applies anywhere in the body where palpation is required and it should therefore be taught in an integrative manner in all parts of the body where it applies.

ii) Chiropractic manual therapeutic techniques tend to be taught on a methods or systems basis e.g. 'diversified technique', 'Gonstead technique' and 'Nimmo soft tissue technique'. Even if 'diversified' and 'Gonstead techniques' for the same region (e.g. cervical spine) are taught in the same semester, participant observation over many years has shown that students still do not integrate the various techniques into a system of decision making which would allow them to pick the most suitable technique for any individual patients' biomechanical problem, let alone consider other factors which impinge on technique selection such as the size and body type of the patient and the practitioner. Neither is knowledge of the mechanical pathologies such as congenital anomalies or degenerative changes of the articulations of the region to be biomechanically adjusted brought into proper focus in the student's mind and they are instead
left to themselves to arrive at an understanding of the interplay of extremely
important clinical decision-making factors in the clinical situation.

iii) The current chiropractic curriculum does not properly identify a sufficient
number of the factors which play a role in the effective assessment and
chiropractic therapeutic management of common syndromes, signs and
symptoms with which patients present, let alone assist the student to integrate
a wide range of factors which must of necessity be integrated in order to
practice in an optimum fashion characterised by evidence-based decision
making which recognise the multi-factorial interplay in modern, scientific
chiropractic practice.

It is argued that each chiropractic management system, method and technique should
be subjected to descriptive analysis for the purpose of determining its potential
influence on the tissues, organs and systems of the body with a view to optimising the
process by which techniques are selected to facilitate the correction of human
dysfunction. In developing a model for chiropractic clinical decision-making the
following factors have been identified as playing an important role in chiropractic
management (Tables 51 and 52).

Identification of the key factors which influence chiropractic clinical decision-making
on a day-to-day basis demands a resolution, through curriculum design, of the
responsibility of educational institutions to prepare future graduates for practice.

c) **Organisation of an integrative, experiential chiropractic curriculum** that will
provide the learning experiences necessary to meet societal needs is based on two
philosophical assumptions:

i) Chiropractic is essentially a holistic health care discipline which recognises the
inherent capacity of the body as a total, functional unit to maintain or return to
homeostasis, particularly when bio-mechanical, chemical and mental
impairment to normal function is eliminated at a systemic or holistic level.

ii) In a biomechanical and neurological sense it is at the regional level that
decisions need to be made despite the fact that more than one region may be
involved when providing chiropractic patient care. It is therefore argued that it
is necessary that evidence-based clinical decision making involve both a
holistic (body in overview) and regional approach.
In the development of an integrative model for chiropractic education, therefore, it is suggested that a spiral curriculum be developed which commences in the first year with a subject called Chiropractic Patient Management in Overview which articulates, through concepts relating to human posture, to a study of Chiropractic Management of the Low Back followed by Chiropractic Management of the Lower Extremities. Knowledge of the clinical neurology of the low back and concepts relating to posture and gait allow for a sensible articulation between studies of the low back and the lower extremities. Subsequent study of Chiropractic Management of the Thorax builds on knowledge gained from the patient in overview and study of the Low Back, Pelvis and Abdomen and is followed by a study of the Chiropractic Management of the Head and Neck followed by the Chiropractic Management of the Upper Extremities which cannot be fully appreciated until both the neck and upper thorax have been properly studied.

It is argued that all major management concepts which a chiropractor needs to know, can be effectively introduced during the first two years of the course if the curriculum is based on the six subjects outlined above. To ensure that students do not loose sight of the holistic aspects of chiropractic patient management, the subject Chiropractic Patient Management 2 is then introduced to set the stage for the second phase of a spiral curriculum which then revisits each of the six regions in the same sequence to increase the depth of knowledge, skills and attitudes while the student becomes personally involved in hands-on patient care in years 4 and 5 with the spiral completing at the end of year 5. This design allows for the key graduate attributes and the basic objectives for chiropractic education in all three domains to be addressed in each of the subjects except for issues relating to the accounting, legal and contractual side of practice administration which would be offered as a separate subject.
4.4.5.3 **Psychological basis for the integration of content**

a) **Transfer of learning** is fundamental to the arrangement of the architectonics of the chiropractic curriculum. It is the phenomenon that knowledge, skills or abilities learned in one field and context may influence performance in another field and context (van Rensburg 1986:166). The primary purpose of educational experiences is to enable the individual to meet new situations more effectively and throughout life, intelligent persons 'profit from experience' in the sense that, as a result of experience, they are better prepared to meet situations of various degrees of relatedness and similarity (Mouly 1973:298). However, since transfer does not take place automatically, the teacher has a great responsibility in selecting the appropriate method (Vrey, 1990:216). Learning experiences should therefore be deliberately planned in sequence i.e. vertical integration, so that one serves as a stepping stone to the next. From the viewpoint of psychology of learning, transfer is a continuous and sequential process involving the gradual improvement of the cognitive structure - it is the increased availability of relevant, stable and clear subsumers to which new learning can be anchored which has resulted from the continuous process of previous meaningful learning (Mouly 1973:301). Ausubel (quoted by van Rensburg 1986:169) sees transfer as an intrinsic part of the overall learning process linked to the concept of subsumption which he sees as the key underlying the processes of acquisition, organisation, retention and transfer of meaningful verbal materials. A transfer situation occurs whenever the existing cognitive structure exerts an influence on a new cognitive function, irrespective of whether the learning concerned is receptive or problem-solving. Ineffective transfer occurs when there is an inability to master new tutorial matter (van Rensburg 1986:169; Mouly 1973:281;292).

The integrative chiropractic curriculum design promotes transfer by providing a continuous and sequential process for improvement of the cognitive structure in which a pattern of clear subsumers to which new learning can be anchored is repeated within an identical framework in each of all the major subjects and where that same pattern is in fact repeated even more frequently in the section dealing with the chiropractic clinical management plan for each major syndrome, sign and symptom that a chiropractor has to deal with i.e. the framework which includes reference to morphology, function, abnormal function, pathology, assessment options, therapeutic care options, humanistic factors etc are repeated during the management for each syndrome (including the chiropractic subluxation syndrome), signs and symptoms as a microcosm of the subject as a whole (e.g. a region of the body to be managed). It is argued
that there can be little doubt that evidence-based clinical decision-making in the clinical setting would be greatly enhanced as a result of a spiral curriculum through at least 12 subjects and potentially hundreds of syndromes, signs and symptoms which are all presented using the same structural framework. Furthermore the problem-solving approach recommended for this system of learning can be reasonably expected to improve mastery of the tutorial matter.

b) Positive transfer - when earlier learning or knowledge promotes or facilitates subsequent learning (van Rensburg 1986:167) e.g. the mastery of Greek and Latin root words in a unit on etymology prior to the study of anatomy and diagnosis which require the use of compound terms made up of these root words. The integrative chiropractic curriculum design promotes positive transfer by linking material in each domain of the clinical decision making taxonomy back to previous domains (e.g. patient assessment in the light of morphology, pathomorphology and pathology; or technique application in the light of somatotyping etc) and subsequently integrates all facets of learning in the subject during problem-based exercises involving real patient scenarios during the development of a management plan.

c) Negative transfer - mastery of certain subject matter is impeded through proactive or retroactive interference (van Rensburg 1986:167) e.g. the mastery of psychomotor skills in the study of manipulative therapy is impeded through the proactive imitation of techniques by students prior to systematic introduction to the procedures and practice in a controlled classroom situation. The integrative chiropractic curriculum design limits negative transfer through the presentation of content in highly structured learning packs and chiropractic laboratory practical manuals discussed in 4.5.5.5 below. Horizontal transfer is promoted merely by using the same clinical decision-making format for each of the major subjects in the course as well as for constructing the management plan for each syndrome, sign or symptom to be managed. It is therefore argued that the student’s clinical decision-making skills will progressively develop as the student studies the first three or four subjects after which considerable learning time ought to be saved through application of the basic system across subsequent subjects. Considerable additional lateral transfer and integration can be expected to occur during each phase of the spiral curriculum.
d) **Lateral or horizontal transfer** - individuals are able to perform a different but similar task of about the same level of complexity as the one they have learned (van Rensburg 1986:167,168) e.g. practical skills developed in organic chemistry readily transfer to somewhat different procedures in biochemistry and physiology.

e) **Vertical transfer** - as a consequence of established knowledge, individuals are able to understand and execute more advanced and complex tasks. The broader (more comprehensive) and more flexible (useful) the individual's established knowledge, the greater is the potential for transfer (van Rensburg 1986:169; Vrey 1990:305). While similar to sequential transfer, vertical transfer demands progressively more from the learner's cognitive abilities as more knowledge is transferred, since learners not only have to know, but 'must also understand, apply, evaluate and analyse the subject matter as well as identify its essential features' (van Rensburg 1986:170) e.g. mastery of palpatory skills form a good substrate to much more complex spinal manipulative skills which require a fine sense of touch.

Vertical transfer can be expected to be greatly facilitated in the proposed integrative chiropractic curriculum design during the two main phases of the spiral curriculum in each of the main subject areas e.g. between Chiropractic Management in Overview 1 and 2; and between Chiropractic Management of the Thorax 1 and 2, etc. Considerable vertical transfer can be expected to take place between Chiropractic Management in Overview 1 and each of the subjects on regional management during the first spiral across years 1 and 2 of the curriculum. The introduction to all the basic cognitive, psychomotor and affective skills and principles in the overview subject is subsequently reinforced when each of the regions is studied, thereby gradually improving the cognitive structure and increasing the availability of relevant, stable and clear subsumers to which new learning can be anchored and in this way making the learning very meaningful in the context described by Mouly (1973:301) and van Rensburg (1986:170).
Sequential transfer - Ausubel and Robinson (1971:142) suggest that lateral and sequential transfer are both essentially horizontal in that the learner stays within the same behavioural category. Sequential transfer requires continuity in the presentation of academic material during which learners must be helped to develop an appropriate system of subsumers so that successive units of subject matter will be optimally subsumed in their cognitive structure (van Rensburg 1986:169,170) e.g. the sequential arrangement of chemistry - biochemistry - physiology - diagnosis in the medical curriculum where subject matter from each subject is pre-requisite to the next. Certain aspects of the study of these sequentially arranged subjects, however, require vertical transfer, e.g. the study of syndromes such as mechanical low back pain which would, for the understanding of complex mechanisms, draw on increasingly more complex concepts from all the subjects. Sequential arrangement and correlation of clinical teaching material are two techniques used to promote transfer in teaching chiropractic sciences in a five-year professional course. Positive and vertical transfer results from the sequencing of concepts in the subject commencing with simple neurological and biomechanical models which at each year level, through horizontal transfer, correlate with and integrate information from concurrently taught basic sciences e.g. anatomy, physiology, pathology, diagnosis etc which become more complex and extensive in each successive year in order to produce a competent practitioner at the end of the course. Sequential transfer is promoted via the integrative chiropractic curriculum design by progressively building on the elements involved in the chiropractic clinical management plan using the evidence-based clinical decision-making taxonomy which progressively moves from understanding of structure to function, abnormal function, pathology, humanistic elements, patient assessment options, therapeutic care options etc, so that when all the elements are known the management plan can be readily designed. Students can gain considerable experience through tutorials in the classroom and self-directed learning involving the creation of clinical management plans when provided with real case scenarios. In the clinical setting, reality teaching provides the ultimate learning experiences which should ensure that curriculum intent is met in terms of the preparation of a competent practitioner who demonstrates the graduate attributes and attainment of the basic cognitive, psychomotor and affective objectives of a program designed to meet community needs for chiropractic service.
4.5.1 Introduction

4.5.1.1 What are learning experiences?

a) Learning experiences, opportunities or activities are defined as 'those activities offered to learners in the teaching-learning situation, designed to enable learners to achieve the stated objectives' (Print 1992:124) including all teaching-learning strategies used such as classroom and clinical interactions and self-directed learning. The design and organisation of learning experiences in a chiropractic curriculum therefore relate to how teachers facilitate learning within the student i.e. 'how the teacher impacts content and provides opportunities for learners to acquire that content' (Print 1992:124). Passive learning occurs when learners use their senses to absorb information and make some effort to remember that information (Bevis 1989:208) which is usually derived from expository teaching such as lectures, films, audio and videotapes and reading (Print 1992:125). Bevis (1989:208) says that the most frequently employed, passive learning methods are devised solely for the purpose of acquiring information and are efficient neither for maintaining learner attention nor for the use of the information and leads to frustration by creating a dichotomy between the input and operational aspects of learning since students who test well on informational aspects may or may not perform well in aspects of practice. Active learning, on the other hand, involves the learner through actual participation and investment in all phases of the learning process, thereby enabling learners to self-appropriate and self-experience learning in a setting where teachers simulate reality or participate with learners in the reality setting where they serve as resource persons by providing information input, guiding learners in processes and suggesting heuristic devices for widening experiences and testing processes (Bevis 1989:208).

b) Process teaching and learning teaches learners what to do with knowledge and occurs through processes which are selected by the teacher as an appropriate means for teaching specific content so students become skilled in the basic processes of using data for accomplishing their curriculum intent, thereby ensuring transfer of relevant knowledge to the clinical situation where it can be used in the professional setting (Bevis 1989:209). Bevis (1989:209) states that active learning demands teaching strategies which require learners to engage in processes (a purposive series of activities) that are deemed essential to the subject
under study. Information (input) necessary to the activities is provided through any method that seems appropriate (reading, lecturing, consulting, attending seminars) etc, but the information is always secondary to the process. It is argued that in the chiropractic curriculum development cycle, process teaching and learning is not only integrally related to the identification and organisation of content and to competency-based assessment but is also strongly influenced by all domains of the chiropractic curriculum design taxonomy, particularly by intent and by the psychological foundations.

c) **Teaching strategies, methods and techniques.** A number of terms are used to identify learning experiences facilitated through teaching. Techniques are perceived to be the basic elements of this process and refer to individual procedures employed to facilitate learning e.g.: reading, role-playing, seminars, computer-assisted learning, small group technique etc. A method is seen as involving more than one technique e.g. expository teaching; and a strategy includes more than one method and possibly a number of techniques. Heuristics are the tests, tools or devices for discovering some way of achieving a goal or solving a problem and are employed in all forms of process learning where they are a mechanism to an end, not an end in itself e.g. brainstorming is a heuristic device for generating a quantity of ideas about a given subject (Bevis 1989:210).

d) **Phases of learning** include: 'preparing to tackle the relevant material, acquiring the necessary information, relating it to previous knowledge, transforming it through establishing organizational frameworks within which to interpret it, and so developing personal understanding (MacFarlane 1992). Teaching functions which support these phases of learning include: orientating; motivating; clarifying; elaborating; consolidating and confirming (MacFarlane 1995:53). The role of teachers in experientially-based learning revolves around the detection, selection and use of feedback to facilitate change in behaviours during process teaching involving an experiential base for the process of learning which includes pre-structured, pre-planned episodes with reinforcements resulting in cognitive recognition of the input as an integral part of the teaching operation in order to strengthen retention and the ability to generalise the learned behaviours (based on interpretation of Bevis 1989:217).

e) **Generic change in teaching methods** should be anticipated as the result of a shift - from synchronous single-location learning support to asynchronous networked learning support; from passive learning to active learning; from static presentation to dynamic
presentation; from the use of real objects to the use of virtual objects; from impassive delivery to supportive delivery; a shift to multimedia; from unidirectional presentation to interactive presentation; and from broadcast delivery to personal delivery (MacFarlane 1995:2).

In this section it is proposed to demonstrate how an Integrative Clinical Curriculum Design (ICCD) supports the phases of learning as it moves towards increasing use of multimedia for curriculum implementation.

4.5.1.2 Research questions which can be asked are diverse and extensive. The more pertinent questions appear in Table 85.

<table>
<thead>
<tr>
<th>TABLE 85 - Curriculum design questions about teaching-learning strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Which strategies are already in use?</td>
</tr>
<tr>
<td>2. Does the course provide an integrated learning experience?</td>
</tr>
<tr>
<td>3. How much study time is needed?</td>
</tr>
<tr>
<td>4. What information should be given to students and what should they find by themselves?</td>
</tr>
<tr>
<td>5. Can all the aims be achieved in the time available?</td>
</tr>
<tr>
<td>6. Which teaching-learning resources are available?</td>
</tr>
<tr>
<td>7. To what extent are existing teaching-learning resources being used?</td>
</tr>
<tr>
<td>8. Which teaching-learning resources can be purchased from available funding?</td>
</tr>
<tr>
<td>9. In which study units/domains and to what extent should each teaching-learning strategy be used?</td>
</tr>
<tr>
<td>10. To what extent should various teaching-learning media be used (e.g. handouts, compilation of journal publications (readers), videos, self-directed learning packs)?</td>
</tr>
<tr>
<td>11. Which methods and techniques are most appropriate to each area of work?</td>
</tr>
<tr>
<td>12. What communications support is available within the institution?</td>
</tr>
<tr>
<td>13. What physical facilities (lecture theatres, laboratories, classrooms, special purpose facilities) are available within and external to the institution?</td>
</tr>
<tr>
<td>14. Which strategies respectively promote acquisition of knowledge, skills and values?</td>
</tr>
<tr>
<td>15. Does the choice of method or technique reflect a) the course aims and objectives; b) availability of facilities; c) staff experience?</td>
</tr>
<tr>
<td>16. Which teaching-learning strategies (e.g. lecture, tutorial etc), should be used to optimise learning in relation to resources available?</td>
</tr>
<tr>
<td>17. Which strategies best suit staff knowledge, skills and experience?</td>
</tr>
<tr>
<td>18. What staff development is needed to optimise student teaching and learning?</td>
</tr>
</tbody>
</table>

4.5.1.3 Analysis of teaching-learning strategies

An example of a framework for the analysis of teaching-learning strategies, methods and techniques is offered below. It is argued that such an analysis is ultimately necessary in order to determine which of the methods listed in 4.5.2 below are most appropriate to the teaching-learning task to be accomplished within the context of the available resources, the psychology of learning which is discussed in 4.5, type of content which is discussed in 4.5 and other factors which influence the implementation of learning.
TABLE 86 - Framework for the analysis of teaching-learning methods - example: expository teaching

<table>
<thead>
<tr>
<th>DESCRIPTION:</th>
<th>A teaching-learning method for transferring information.</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-L TECHNIQUES:</td>
<td>Lectures, demonstrations, set reading tasks and audio-visual presentations.</td>
</tr>
<tr>
<td>DEFINITION:</td>
<td>Expository teaching is the transmission of information in a single direction from source to learner.</td>
</tr>
<tr>
<td>APPLICATION:</td>
<td>Transfer of information from one source, the lecturer, to hundreds or thousands of learners.</td>
</tr>
<tr>
<td>HOW LEARNING IS TRANSMITTED</td>
<td></td>
</tr>
<tr>
<td>Mode</td>
<td>Face-to-face; over distance via print, radio and television.</td>
</tr>
<tr>
<td>Learner's Role</td>
<td>Passive receivers of information through observation and listening.</td>
</tr>
<tr>
<td>Teacher's Role</td>
<td>Dissemination of content; covering objectives.</td>
</tr>
<tr>
<td>PSYCHOLOGICAL IMPLICATIONS</td>
<td></td>
</tr>
<tr>
<td>Continuity</td>
<td>Vertical reiteration of information can be readily accomplished through planning.</td>
</tr>
<tr>
<td>Sequence</td>
<td>Simple-to-complex concepts can be readily arranged over time.</td>
</tr>
<tr>
<td>Integration</td>
<td>Passive learning leads to poor retention rates. Learners lack association with the material.</td>
</tr>
<tr>
<td>Feedback</td>
<td>Minimal, therefore accuracy of learning is in doubt.</td>
</tr>
<tr>
<td>Learner Appropriateness</td>
<td>Produces passive learning behaviour.</td>
</tr>
<tr>
<td>RESOURCE IMPLICATIONS</td>
<td></td>
</tr>
<tr>
<td>Effectiveness</td>
<td>A very financially effective means of transmitting knowledge. Several thousand students can be reached simultaneously or with repeat presentations.</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Resource use efficiency is very high.</td>
</tr>
<tr>
<td>Constraints</td>
<td>Cost of high technology delivery i.e. cable TV, satellite transmission; size of lecture theatre/room.</td>
</tr>
<tr>
<td>ADVANTAGES</td>
<td>A large amount of material can be covered in a short time, saving students hours of searching and reading. Excellent use can be made of expensive resources e.g. audio-visual, special demonstrations etc.</td>
</tr>
<tr>
<td>DISADVANTAGES</td>
<td>Ineffective in terms of learning; feedback almost nil. When transmission of knowledge is poor, learning suffers greatly.</td>
</tr>
</tbody>
</table>
4.5.2 Teaching-Learning Methods and Techniques in an Integrative Clinical Curriculum Design

4.5.2.1 Overview

It is not within the scope of this dissertation to undertake a detailed analysis of each of the strategies, methods and techniques used to implement learning within the framework shown in Table 86. However, an introduction to a range of strategies is provided in 4.5.2.2 below, while in 4.5.3 it is briefly discussed how learning is transmitted in an integrative curriculum. Teaching functions which support learning phases are mediated through teaching-learning strategies which, it is argued, have varying rates of success in serving the teaching functions which support each of the phases of learning and also vary in relation to usefulness in experiential learning and the degree of reality it provides. Cox (1982C:126) identifies four major factors in teaching and learning: what teaching sessions are expected to achieve, what students want and expect, what the subject matter requires and what the teacher feels capable of doing.

4.5.2.2 Application to experiential learning

The ICCD includes teaching-learning strategies which have been demonstrated to be particularly relevant to the ‘experiential curriculum’ and the meeting of chiropractic curriculum intent. The major strategies include inquiry learning through problem-solving and case study methods; individualisation learning through the use of highly structured learning packs and reality simulation teaching to promote transfer between classroom and laboratory; and reality teaching and reflective learning in the clinical practicum. An analysis in Table 87 indicates the usefulness of different strategies to experiential learning.
### TABLE 87 - Relevance of teaching-learning (T-L) strategies to experiential learning

<table>
<thead>
<tr>
<th>T-L METHODS AND TECHNIQUES</th>
<th>RELEVANCE TO EXPERIENTIAL LEARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td><strong>EXPOSITORY TEACHING</strong></td>
<td></td>
</tr>
<tr>
<td>Lectures</td>
<td>x</td>
</tr>
<tr>
<td>Demonstrations</td>
<td>x</td>
</tr>
<tr>
<td>Audio-visual presentations</td>
<td>x</td>
</tr>
<tr>
<td>Set reading tasks</td>
<td>x</td>
</tr>
<tr>
<td><strong>INTERACTIVE TEACHING</strong></td>
<td></td>
</tr>
<tr>
<td>Question-discussion technique</td>
<td>x</td>
</tr>
<tr>
<td>Computer assisted learning (except for ‘virtual reality’ programs)</td>
<td>x</td>
</tr>
<tr>
<td>Computer managed learning</td>
<td>x</td>
</tr>
<tr>
<td><strong>SMALL GROUP TEACHING</strong></td>
<td>x</td>
</tr>
<tr>
<td>Group discussions</td>
<td>x</td>
</tr>
<tr>
<td>Tutorials</td>
<td></td>
</tr>
<tr>
<td>Seminars</td>
<td></td>
</tr>
<tr>
<td>Buzz Groups</td>
<td>x</td>
</tr>
<tr>
<td><strong>INDIVIDUALISATION TEACHING</strong></td>
<td>x</td>
</tr>
<tr>
<td>Self-directed learning kits</td>
<td>x</td>
</tr>
<tr>
<td>Individual learning contract</td>
<td>x</td>
</tr>
<tr>
<td><strong>INQUIRY TEACHING</strong></td>
<td>x</td>
</tr>
<tr>
<td>Discovery Learning</td>
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<tr>
<td>Problem-solving</td>
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<td>Inductive learning</td>
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<tr>
<td>Scientific method</td>
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<td>Case study method</td>
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<td>Group investigation</td>
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<tr>
<td><strong>REALITY SIMULATION TEACHING</strong></td>
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<tr>
<td>Physical models</td>
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<td>Work models</td>
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<td>Simulations</td>
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<td>Role playing</td>
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<td>Patient management problems</td>
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<td><strong>REALITY TEACHING</strong></td>
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<td>Systematic</td>
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<td>Opportunistic</td>
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<td>Community-based</td>
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<tr>
<td><strong>INTEGRATIVE TEACHING-LEARNING</strong></td>
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<td>Problem-based learning</td>
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<td>Self-directed learning</td>
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<td>Evidence-based learning</td>
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<tr>
<td>Clinical experiential learning</td>
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<tr>
<td>Reflective learning</td>
<td>x</td>
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</tbody>
</table>

The framework is based on the work of Print (1992:124-140); Saylor, Alexander and Lewis (1981:271-294); Joyce and Weil (1986); Bevis (1989:183,208-221) and the author. Classification of the relevance of methods/techniques to experiential learning is by the author.
4.5.2.3  The reality continuum in Figure 15 is used to indicate the relative power of teaching-learning strategies with ‘learning by doing’ in a real situation being the most powerful way of acquiring information, skills and values (Print 1992:134) and integrate learning through reflection being the most powerful way of internalising and personally appropriating learning through experience. ‘While reality (in the chiropractic curriculum) may be an effective teacher it is rarely an efficient, systematic and thorough teacher’ (Print 1992:134) unless systematically designed (rather than opportunistic) clinical experiences are implemented within an evidence-based clinical decision-making framework.

FIGURE 15 - The reality continuum of teaching-learning strategies

Low reality  High reality
High teacher participation  Low teacher participation
Low learner involvement  High learner involvement

Expository  Interactive  Small group  Individualisation  Inquiry  Reality  Reality  Integrative
teaching  teaching  teaching  teaching  teaching  learning &  learning &
teaching  simulation  teaching  reflection

1  2  3  4  5  6  7  8

Based, with augment, on Print 1992:134.

4.5.3  How Learning is Transmitted in the Integrative Curriculum

4.5.3.1  Overview

Teaching-learning strategies in the chiropractic curriculum are those things that teachers do to facilitate learning and it is argued that these must be applied so that they meet the following criteria: a) be consistent with the conceptual framework of the integrative curriculum, especially the philosophical foundations and intent; b) be adaptable to the learners’ thinking processes or style i.e. the level of concreteness or abstractness; c) consider learners’ learning rates (adapted from Bevis 1989:208); d) target the desired graduate attributes; e) support the phases of learning; f) conform to the psychological foundations of learning; g) have regard to socio-cultural aspects of learning and; h) as a clinical program, be in the community interest.
4.5.3.2 Expository teaching

Table 86 above gives an analysis of expository teaching in summary form. Bennett (1982B:67), outlines the characteristics of the student as information processor and implications this has for teachers. Gibbs et al (1987:11) argues that, despite moves away from teacher-centred methods towards more independent student-centred learning, resource pressures will continue to require the use of large lecture classes and advice on planning and improving lectures continues to appear (Ewan 1982B:61). Instead of examining the behaviour of the lecturer in order to improve the limited efficiency of lectures, they suggest that attention should be focused on what students can do during lectures to improve their learning and suggest five techniques to improve student learning during lectures: improving student note-taking and attention by separating listening from recording and requiring the note-taking to be undertaken from memory; improving student learning through active review during the lecture; involving students in structured discussions even in very large classes by using “pyramiding”; checking on student learning by using “instant questionnaires”; and checking on student learning by asking them to summarise the three most important things about the lecture. The use of handouts is addressed by Bennett (1982C:151).

In the ICCD, the modified lecture method can be used to introduce self-directed learning, problem solving and case study method to large groups and still overcome the main problems experienced during lectures such as the poor and rapidly declining quality of student attention, poor note-taking; passive, reproductive mental set which lectures induce in students; the relative ineffectiveness of lectures when compared with almost any teaching or learning method in terms of developing learner understanding or the ability to apply knowledge; and poor feedback concerning student understanding of lecture content (Bligh 1974:23; Gibbs et al 1987:12). While Gibbs et al (1987:15) modify the way in which students take notes during a lecture, it is argued that essentially all the information proposed to be transmitted via lectures should be done in written or other forms and that any notes taken during lectures should be restricted to recording of special points or explanations which clarify learning and emphasise key points. In this context their suggestion should be supported that time be allowed after about 15 minutes of explanation or question and answer sessions so that students may spend five to ten minutes taking notes, recording diagrams etc.
In this way the lecture can be very powerful in influencing the way students pay attention and take notes during the lecture (Gibbs et al 1987:15); highlighting any inadequacies in notes or learning packs; and the need for specific follow-up work which can be supported by what Habeshaw, Gibbs and Habeshaw (1987) call “53 interesting ways of helping your students study”.

4.5.3.3 Interactive teaching can be extensively mediated via computer

A unified, integrated approach to the use of computers in the medical school curriculum is envisaged by Platt et al (1994:9) who suggests that the aim in computerising the medical school is to provide students with opportunities for independent learning, problem solving, communication and self-assessment which will form the basis for life-long learning and strengthening of the cognitive process by organising ideas according to deep rather than superficial criteria. He suggests that a well-managed electronic mail system allows the student to be in almost constant communication with the expert in the field, while allowing the researcher/teacher to apply at leisure. This theme is further developed by other authors (Atkins and O’Halloran 1995:149; Beadenkopf et al 1996:327). Ram et al (1997:51) found computer aided instruction using interactive multimedia concepts more effective for teaching cardiology than conventional lectures. A number of additional examples are provided below in 4.5.6.2(b), (c), (d) and 4.5.6.4(b), (c); and can be greatly expanded from the literature.

4.5.3.4 Small group instruction is a teaching method for generating free communication between the teacher and learners and among the learners themselves and enables learners to gain a great deal from their fellows (Walton 1973:2; Brown 1982A:45; 1982B:70; Crosby 1996:189). The facilitator’s content expertise alone does not determine the amount of teacher-directed behaviour in the group or the amount of the learners’ learning or satisfaction. Where small group instruction is used for problem-based learning, the focus built into the case and the extent of the facilitator’s training directly related to the content of the case are also significant variables relating to the learners learning, teachers’ behaviour and learners’ satisfaction (Davis et al 1994:663). Preston-Whyte et al (1996:135) developed an excellent instrument for student evaluation of tutors led, task-oriented small-group teaching. Since small group sessions allow active student interaction (i.e. ‘lived experience’), they encourage ‘deep’ rather than ‘surface’ learning (Biggs 1988:127; Entwistle et al 1992). It is therefore argued that investing adequate time in developing the focus of cases in the context of the aim and objectives of a topic, the important clinical points to bear in mind, collateral
reading required, questions to be answered etc in preparation for a large group "tutorial", merit comparison with resource intensive small group learning techniques. An example is large group problem-based learning (LGPBL) introduced by Barrows et al (1986:325); which is the application of the problem-based learning process, characteristically used with small groups of students, to an entire class and is a blend of the problem-based, self-directed learning approach and case method. They remark that the case method, probably best exemplified by the Harvard Business School (Christensen 1981; McNair 1954), features elements common to problem-based learning, but requires only one teacher for the entire class. One significant difference between small and large group teaching in these models is that the case method uses fully developed cases that have already been synthesised and organised for student analysis and discussion whereas characteristically, the physician must start with a patient complaint and subsequently has to build the facts into a synthesis of the case, using the clinical reasoning process as is done in the small group tutorial. However, they suggest that a blend of problem-based learning with a case method might solve the problem for medical education where, on the one hand, student achievement with a small group tutorial method has been shown to be two standard deviations above the mean achieved in conventional classroom teaching while, on the other hand, tutorial teaching is a luxury which in many cases requires too many teachers. It is interesting to note that the essential principles of LGPBL were already implemented by Cabot in 1906 and Canon in 1900 (Barrows et al 1986:325). Another resource-effective strategy is active, small group learning with a large group in a lecture theatre which has been tested for the teaching of clinical biochemistry by Schwartz (1989:81) and problem-based learning and student participation in a large class (Usherwood and Primhak 1996:341). Sessions are used to highlight a very small number of concepts and principles that the students may not have understood, to demonstrate the relevance of some of the material they have studied prior to the session; to give students the chance to apply some of what they have learnt and to provide practice at answering application-type questions. One to two weeks before the block begins students are given a study guide to the whole block listing for each session the objectives, the readings, the activities for the session in terms of long or short problems done individually or in groups, clinical presentations, interview with invited visitors etc. Student response on the whole has been favourable. Both the abovementioned strategies, which modify the small group tutorial approach, have shown promise during use in an integrative approach to chiropractic learning.
Use of tutor mediated small groups with the rest of the class as an audience was successfully used for problem-based learning in anatomy (Al-Jomard 1997:58) and both teacher-centred and student-centred small group formats appear to augment learning in comparison with lecture-based topics (Kolars et al 1997:53). A seminar developed by Nasmith and Daigle (1996:209) to teach health professionals how to use small groups in patient education provides effective small group leadership skills training and fundamentals of group dynamics which, it is argued, could be applied to the training of students to prepare them for the facilitation of learning in student-controlled syndicate groups i.e. autonomous, student-mediated interactive tutorials. This approach will be enhanced by implementing the twelve tips for effective small group teaching in the health professions developed by Steinert (1996:203). Detailed, excellent guidelines for the facilitation of learning in small groups are provided by Crosby (1996:189) and should be considered in the design of the abovementioned training programs as part of the ongoing search for methods of group tuition which are as effective as one-to-one tutoring referred to by Bloom (1984:4).

4.5.3.5 Inquiry teaching

Most of the techniques used for inquiry teaching-learning depend on critical thinking which can be defined in a variety of ways ranging from an enquiring attitude of mind to rigorous enquiry in terms of the methods of a discipline and is built upon sceptical attitudes and abilities of analysis, logical reasoning and sound judgement and should be applied while reading others’ work, while listening to lectures, formulating their own ideas and participating in scholarly interchanges (Furedy and Furedy 1983:3). Critical analysis entails careful, structured, judgement of a position or thesis while reflecting upon an item to be analysed and involves the definition and use of central concepts, with a focus on the purpose and approach of the author, the essence of the position or thesis and the implicit and explicit assumptions embodied in the argument; the methods of gathering and the use of empirical evidence and whether the conclusions seem justified by the evidence (Furedy and Furedy 1983:3). Of the various inquiry teaching strategies, problem-based learning (PBL) is probably best known. Neame (1981:94-5) describes how PBL is implemented in a totally integrated curriculum based entirely on clinical problems. "...the students are introduced to a sequence of patients through an appropriate medium (videotaped interviews, written hand-outs and so on)."
The students then discuss the material with the primary aim of defining what topics they need to study in order to understand and manage the problem, the presentation of selected items of 'trigger' materials leads the students to define essential learning which they need to undertake. ‘This learning will have components from every discipline which can contribute information relevant to this particular case; the sum of these contributions constitutes the ‘course' in each discipline’. According to Walton and Matthews (1989:555), conditions which facilitate PBL include: a) small group tutorial instruction; b) student-centred instruction; c) active learning; d) independent study; e) simulation; and f) focusing on relevant, high priority community-oriented issues. It is argued here that the integrative chiropractic clinical decision-making framework discussed in 4.1.8.2 e) Table 52, above, greatly facilitates PBL principles while PBL approaches greatly enhance delivery of the integrative chiropractic curriculum design.

4.5.3.6 Individualisation teaching-learning

Bevis (1989:188) says that students have unique life experiences that make their learning needs different. It is legitimate therefore to have student learning experiences, which are different for each student, provided that student homogeneity in a program is achieved through outcomes objectives (terminal criteria). These criteria must be consistent with the conceptual framework and internal structure of the learning activity but not necessarily through identical requirements for each learner. When staff and students are committed to individualised learning and are appropriately organised for it, retroactive integration (as an operational learning phenomenon) allows learners to progress through a curriculum through their own “natural” sequence that may differ from learner to learner. A study by Schmidt (1994:656) supports the notion that a minimum level of structure is required in order to profit from problem-based instruction. This structure can be internally provided, through prior knowledge available for understanding the new subjects, or offered by the environment in the form of cues of what is relevant and what should be the focus of the activities. If prior knowledge falls short or if the environment lacks structure, students will turn to their tutors for help and direction.
Bevis (1989:218) states that, paradoxically, structure enables freedom and independence and if a simulation experience is to be student-devised, the structure needs to be inherent in the objectives which must be clear and specific in the directions, limits and constraints and in the expected product. Providing no structure whatsoever is seen as a teacher cop-out that reduces learning, while providing too much structure is over control and places constraints on exploration and discovery, chokes independence and reduces learning. The balance is therefore as important as it is difficult to achieve. She suggests that whether explicit or implicit, every experientially-based learning activity must have the following components: objectives, pre-test to assess readiness or knowledge of the learners previous behaviours; directions of the operations necessary to attain the goals including options open to the learner; and criteria of success e.g. recognisable behaviours in the form of a post-test; and grading mechanisms. These criteria are met through the design guidelines for study guides in Table 88 below.

A great deal about individualisation learning can be derived from distance education technology (Kleynhans 1992B:55). Wedemeyer (1981:159) suggests a definition which applies equally to distance and on-campus learning: 'Independent study consists of various forms of teaching-learning arrangements in which teachers and learners carry out their essential tasks and responsibilities apart from one another, communicating in a variety of ways for the purpose of freeing internal learners from inappropriate class pacings or patterns; of providing external learners with opportunities to continue learning in their own environments, and of developing in all learners the capacity to carry on self-directed learning'. The main elements of distance learning which, it is argued, also apply to individualisation through self-directed learning by undergraduate 'residential' students include:

a) A carefully planned program which is backed up with advice and assistance and the influence of an educational organisation which distinguishes it from private study (Harden 1988A:140; Keegan 1980:33).

b) Teacher and learner are united and course content is transmitted via various technical media (Keegan 1980:33).


d) Learners usually work on their own but small groups may meet for didactic purposes (Harden 1988:140; Holmberg 1986:6; Keegan 1980:33).
e) Non-contiguous teaching occurs where two-way communication between tutor and student exists and communication takes place by means of print, audiostream, video, radio, telephone or computer. While study-guides and tutorial letters are produced in advance, there is an element of 'live' communication, the major functions of which are to give feedback and 'control progress'; motivate and evaluate students (Holmberg 1986; Dahllof 1986).

Harden (1988A:140) states that the development of material which allows teachers to guide students outside of lectures and tutorials requires clearly defined educational objectives, carefully structured and planned programs, identification of needs and individualisation of programs. The primary vehicle for transmitting learning is a study guide which forms the key component of highly structured learning packs which provide optimum guidance to learners. Consequential to descriptive analysis of the literature, an algorithm for the design of self-instructional packs was developed for use in constructing a number of modules for the chiropractic course at RMIT (Table 88).

**TABLE 88 - An algorithm for the development of a study guide**

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4</th>
<th>Step 5</th>
<th>Step 6</th>
<th>Step 7</th>
<th>Step 8</th>
<th>Step 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determine the Context of the Module</td>
<td>Define the Intent</td>
<td>Delineate the Content</td>
<td>Define the Learning Ambience</td>
<td>Select Implementation Techniques</td>
<td>Select Learner Assessment Methods and Techniques</td>
<td>Assess the Quality of the Study Guide</td>
<td>Outline Learning Management Guidelines</td>
<td>Establish and Implement an Evaluation System</td>
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*Constructed by the author 1993.*
Each step in the algorithm is briefly discussed.

**Step 1 Determine the Context of the Module** - this is done through a situational analysis which is the commencement point for the development of each module of self-instructional (self-directed learning) material, as it is for all curriculum development. It is a systematic, scientific examination conducted to devise a reliable, valid database, of all the elements, which influence curriculum decisions at the unit, subject, and overall curriculum level.

The purpose of a situational analysis in this context is: the diagnosis of curriculum needs i.e. to determine what learners in a module need; (Print, 1992:81); determination of the context into which the module is to be placed (Print, 1992:81); determination of the possibilities and limitations of a particular module relative to the various curriculum elements (Adey et al, 1991:11); to relate the module to the needs of society, a profession or group and to individual students; to facilitate modular planning, monitoring and review.

**Step 2 Define the Intent** - this includes clear delineation of the goals, aims, objectives and competencies of the module as illustrated in the outline of symbols above.

The delineation should clearly establish how the topic or module articulates with pre-requisite and subsequent topics or modules.

**Step 3 Delineate the Content** - the knowledge, skills and values to be transmitted via the module is done through symbols relating to content in the study guide which include: "FOR YOU TO DO", "ACTIVITY", "FOR YOU TO READ", etc.

**Step 4 Defining the Learning Ambience** - the learning climate to be created is crucial to optimisation of the learning process. It is determined partly through all steps in the algorithm, but particularly via items under a heading in the study guide: "POINTS TO BEAR IN MIND"; and additionally by the matters raised under Step 7 “QUALITY ASSURANCE” and Step 8 “LEARNING MANAGEMENT”. The learning ambience is positively influenced through introduction of the system and module; and through monitoring of progress - both via face-to-face large group tutorial sessions.

**Step 5 Select Implementation Techniques** - the range of techniques which can be used is potentially very extensive and includes all the different means by which knowledge, skills and values i.e. course content, can be conveyed to learners including all strategies in Table 87. The latest innovations include computer-based study guides (Harden and Smyth 1994:315). Examples pertinent to undergraduate chiropractic courses include: Face-to-face discussion to introduce modules, review progress and evaluate the method and techniques.
used in lectures or large group tutorials; print medium, e.g. printed material enhanced by a range of symbols and organised in innovative ways; textbooks; readers, etc.; case studies; audiotapes; videotapes and videotex; anatomical, diagnostic and other simulators; computer assisted learning (CAL) computer managed learning (CML), self-directed study groups such as 'leaderless' syndicate groups; home experiment kits, e.g. a scale and manual for nutrition experiments etc.

**Step 6 Select Learner Assessment Methods and Techniques** - competency-based assessment decisions need to be made on what formative and summative assessment should be used and should be clearly delineated.

**Step 7 Assess the Quality of the Study Guide** - quality assurance guidelines that define the characteristics of a good study guide are implemented in the design of learning materials.

**Step 8 Outline Learning Management Guidelines** - these are reflected in written form in the introduction to the study guide, which provides an overview of the self-instructional learning system and how the module operates. It is prepared once the decisions for the other steps have been made.

**Step 9 Establish and Implement an Evaluation System** - evaluation instruments should be established in view of the need to demonstrate accountability, responsibility and competency in education via outcomes assessment. Instruments include:

i) topic and subject evaluation forms to obtain student feedback on the performance of the learning strategy;

ii) student assessment instruments for formative and summative assessment, and a module evaluation questionnaire.

A series of excellent papers examine systems in the construction of study guides developed at the University of Dundee Centre for Medical Education (Harden and Smyth 1994:315; Smyth and Harden 1994:309; Smyth and Harden 1995:13) which has direct relevance to the development of learning packs for a chiropractic ICCD.

4.5.3.7 *Reality simulation teaching learning* can be conducted in many ways including patient-management problems (PMP's); standardised patients; and *simulation machines* such as for the teaching of auscultation discussed in 4.5.6.4 b) below:

a) **The patient management problem*** is an exercise which stimulates decisions a practitioner has to make in the diagnosis and treatment of a patient’s illness. It allows learners to work through the problem at their own pace, skimming more familiar material and
identifying areas where further reading would increase the depth of their knowledge. The program is in a form which is readily available to the learner who, in the course of completion of the package, will have reviewed the elements of history taking, physical examination, appropriate investigations, the development of a differential diagnosis at various stages of an illness, identification of therapeutic options and development of a management plan (Jones et al 1987:433; Marshall and Fabb 1981:1).

b) Standardised patients - the use of standardised patients is an innovative technique which is usually employed in the clinical years to teach and evaluate interviewing and physical examination skills and patient management (Ainsworth et al 1991:1390; Handfield-Jones et al 1993:3; Heard and Tank 1994:204). A standardised patient is a lay person trained in a particular clinical scenario or with a set of known physical findings (Barrows 1993:443). The use of standardised patients to bring the basic science experience in anatomy closer to clinical reality has been demonstrated by Heard and Tank (1994:203). It is argued that this methodology can be applied in the chiropractic skills laboratory for illustration of variations in anthropometry to develop skills in somatotyping; for the identification of topographical anatomy required for chiropractic diagnostic procedures and to correlate topographical and other anatomical structures with their radiographic appearance. This learning can be reinforced through clinical case studies. It is further argued that clinical skills of graduates will be dramatically improved if standardised patients in the diagnostic skills laboratory are studied concurrently with anatomy using prosections.

4.5.3.8 Reality teaching learning in the chiropractic curriculum relates to the clinical experiences gained by learners, particularly in chiropractic- and diagnostic skills classes and in the institutional outpatient clinic or in community-based clinics. Like most professional clinical training programs, chiropractic education involves a clinical experience requirement which takes about one year with all or most of it occurring concurrently with the last year of classroom work (Mootz and Cohen 1992:471). Clinical teaching, referred to here, is synonymous with the clinical practicum, internship, clerkship or clinic-based training in chiropractic institutions. Clinical teaching means 'the sum of all educational activities that go on in patient care settings and arise from the process of delivering care' (Guyatt and Nishikawa 1993:148). Clinical teaching represents a culmination of educational experiences upon which judgements can be made by patients receiving care and by clinicians, teachers and evaluators or assessors who use specific performance criteria for competency-based
assessment. Clinical teachers serve as role models for chiropractic students to integrate knowledge, and promote organisation and instruction with direct clinical decision-making as a major learning strategy. Clinical teachers help refine students’ learning abilities and develop effective problem-solving skills by presenting specific knowledge in meaningful organised patterns. Clinical learning strategies can be implemented by staff serving as clinicians, clinical supervisors, clinical instructors, role models or mentors. Longhurst (1994:53) says that ‘the mentorship experience is one that develops out of a fortuitous relationship that helps the learners, both student and mentor, define support and attain their professional aspiration’. He asserts that ‘it is clear that mentors cannot be assigned, but that mentorship relationships grow. Bergmann et al (1989:495) recommend that chiropractic staff practices should be developed in chiropractic teaching clinics to allow clinical staff to integrate their potential skills as teachers, clinicians and researchers. Staff should also serve as role models for learners from which mentor relationships can develop with an added benefit of a higher volume of patients and wider degree of diversity of patient complaints. Cordry and McDonald (1990:62) describe how a grand rounds program can be developed for chiropractic students. The main mode of reality clinical teaching is via clinician:learner interaction through direct instruction, role modelling, mentorship etc. The learners’ role is active participation in clinical experiences involving the observation or implementation of patient care involving the domains outlined in the clinical decision-making framework in 4.1.8.2 e) (Table 52) above. The teachers role is that of role model, mentor and facilitator of clinical experiential learning through conscious activity to promote pattern recognition which promotes retention, and critical thinking which involves the ability to evaluate and process multiple pieces of potentially contradictory information. This is targeted to the end result of reaching a supportable conclusion (Mootz and Cohen 1992:474). Problem solving and other skills are applied for the purposes of identifying a patient’s problem and selecting an appropriate approach to care and management. The process is then followed through to resolution while repetition and practice lead to proficiency in psychomotor skills and promotes confidence, which is often lacking in the beginner (Mootz and Cohen 1992:475). Coulehan (1991:5) describes analysis of the treatment act as a way of studying the clinical art of chiropractic. McLeod and Harden (1985:173) identify features of an effective clinical teacher as role model to include ‘group instructional skills, attitudes to patients, applied problem solving, student-centred instructional strategies, humanistic orientation, subject expertise and a
challenging approach'. They stress the importance of establishing teaching session guidelines, stressing that overall planning of clinical educational experiences for students should no longer be left to teaching with patients who happen to be available (opportunistic clinical teaching). Rather, within the constraints of a busy clinical service, the teaching coordinator should be able to organise structured experiences which will allow students to be exposed to as broad a spectrum of patient personalities and problems as possible. This necessitates preparation for each teaching session. They illustrate how clinical teaching can be improved by identifying commonly observed faults in trainee-patient interviews. Sarkin et al (1997:95) list twelve "tips" to improve the success of clinical learning during clerkship, mainly by improving learning climate while Cox (1982B:110) developed a protocol for teaching physical examination skills. Tai-Pong (1997:62) shows that clinical learning during medical clerkship produces long-term positive effects on graduates' attitudes towards the discipline of general practice.

Quinby et al (1997:129) say that medical students receive a beneficial learning experience by being involved in the care of the underserved. Tracy and Graves (1996:119) describe a successful innovative, experiential teaching unit to allow students to learn directly from people with disabilities about their health, educational and social needs. Participant observation of an RMIT chiropractic clinic for street people organised in conjunction with a church group reached the same conclusions. Models for mentoring medical students and the implications for their well-being are presented by Calkins and Epstein (1994:253).

4.5.3.9 Reflection

Learning from experience is strongly influenced through reflection (Cross 1993:293; Day 1993:83; Routledge et al 1997:122; Shepard and Jensen 1990:566). Reflection is a metacognitive function that deals critically with a previous activity or thought process and involves amongst other things, "thinking about thinking", and people may think about what they are doing as they do it which is called "reflection-in-action" (Hewson 1991:227). Reflection-in-action (Schön 1987:25; Molander 1993:165) occurs when reflection is part of ongoing action (Dall’Alba and Sandberg 1996:411) and it is agreed that, along with knowing-in-action, these two aspects of competent practice (Schön 1983:vii) are crucial to experiential learning in the ICCD. Methods of implementation of reflection-in-action include a diary (Ashbury et al 1993:196; Walker 1989:41), i.e. a Professional Development Diary (Watson and McManus 1992:1) and the use of research-based theory and technique (Schön 1991:1).
Glesne and Peshkin (1992) suggest that the act of writing promotes meaning and the development of a 'professional self'. According to Cross (1993:293) experiential learning places reflection within a four stage cycle which involves:

a) identifying and describing a relevant experience;

b) analysing and evaluating one's personal response to the event by reflecting on it;

c) then either formulating a new or confirming an existing working hypothesis on how to respond to similar situations in future; and

d) converting theory into action in response to new experiences.

Figure 16 indicates the 4 stages. Cross (1993:293) further suggests that for any experience to have lasting meaning, it must be followed at some appropriate distance by a period of reflection and that near involvement is not enough. In this context, meaning in relation to experience relates to learning which enables the individual to extend and grow personally and professionally as well as simply acquiring specific knowledge and skills. Reflective practice is promoted by experiential learning exercises such as the instructions to students to describe a learning activity or experience that occurred during a period of clinical observation as set out in Figure 17 (Cross 1993:295).
FIGURE 16 - Stages in an experiential learning cycle.

From: Cross 1993:295

FIGURE 17 - Instructions to students in carrying out an experiential learning exercise

Complete this exercise at the end of the five-day clinical observation period. Write your responses to Activities 1-3 in the boxes provided.

1. Describe a learning activity or experience that occurred during your period of clinical observation and which made a particular impression on you.
2. Reflect on how the experience has affected or changed you. Think not only in terms of knowledge or skills but also of personal development. In other words, what PROCESS lies behind what you have come to know about yourself, both professionally and personally as a result of the experience?
3. Formulate an ACTION THEORY from the outcome of your reflections. In other words describe precisely WHAT it is you have learned as a result of the process.

From: Cross 1993:296
4.5.4 Advantages and Disadvantages of Selected Learning Experiences in an Integrative Clinical Curriculum Design

4.5.4.1 Overview
Because of the limitations of space, only selected teaching-learning strategies are briefly discussed below despite the presence of a rich body of knowledge and research on each of these.

4.5.4.2 Advantages of implementing certain learning experiences

a) Advantages of enquiry teaching-learning - It is argued that problem-centred learning strategies applied to the chiropractic curriculum are particularly useful in the clinical components of the course where these can be applied in the context of systematic, integrative design strategies within an evidence-based decision-making framework. The Chiropractic Unit (RMIT 1995) applies a problem-centred strategy to a range of subject areas.

Problem solving exercises are used to integrate knowledge and develop clinical decision-making skills based on interaction with data from actual cases, depicting a systematically organised range of health problems from a group most commonly seen in practice.

A case-study method is applied during all five years of the curriculum to:

i) facilitate introduction of a hypothetico-deductive method of reasoning based on scientific, evidence-based decision making;

ii) integrate concepts from the various discipline areas taught during a semester, thereby facilitating horizontal integration;

iii) draw on information from previous semesters to facilitate vertical integration.

Systematic design strategies are applied by identifying concepts, competencies and health problems which should be covered at different course levels and then picking outpatient clinic cases most appropriate to the learning experiences for which learners are prepared at that stage.

Student-centred teaching is facilitated and motivation is increased in studying areas normally covered through rote learning and psychomotor skill drills by providing students with brief case studies e.g. when learning orthopaedic and neurological tests.
Case studies which demonstrate different structural and functional problems and linked to a systematic classification system, are used to develop problem-solving skills in clinical decision-making about selection of the most appropriate manual, therapeutic techniques for the types of cases graduates will encounter in the community.

Systematic coverage of professional competencies that graduates are expected to have also integrate problem-centred and competency-centred designs. The most accurate way to describe this design is an Integrative Clinical Curriculum Design, which incorporates multiple design strategies, viz: problem-based, integrative, etc, design strategies. Support for part of this concept can be inferred from statements by Neame (1981:94) who says that by using clinical problems as the basis for studying medicine, the relevance and importance of all material presented is at once clear to the students. This is because it is the very material which the students, through their own analysis, recognise as necessary in order to understand and manage the problem. He also states that immediate use and application of the knowledge reinforces and consolidates the learning process.

According to Walton and Matthews 1989:555), outcomes of problem-based learning (PBL) include: enhanced functional knowledge; development of the skills and motivation required for a capacity for continued learning; and the development of the skills of self-assessment. Albanese and Mitchell (1993:52-56), conducted a meta-analysis of the publications on PBL in English-language international literature from 1972 to 1992. Their findings suggest that, compared with conventional instruction, PBL is more nurturing and enjoyable; PBL graduates perform as well, and sometimes better, on clinical examinations and staff evaluations than students taking more traditional programs; and that staff tend to enjoy teaching using PBL. Schmidt (1983:16) says that a problem-based curriculum may provide better opportunities for learning to solve medical problems and that the available theoretical views and empirical evidence suggest that PBL, in the least, be considered a useful addition to conventional instructional methods. It can perhaps be used as an alternative approach. Harden, Sowden and Dunn (1984:5) contrast PBL and information gathering approaches and suggest that the following factors support a move towards PBL: PBL develops clinical problem solving skills; PBL promotes the development of integration of a learner’s body of knowledge; PBL has greater general educational advantages in relation to feedback, motivation, etc; PBL helps solve the problem of irrelevance in the overcrowded
curriculum. Problem solving is an efficient way for students to develop knowledge and reasoning skills simultaneously (Barrows and Tamblyn 1986:1-18).

b) **Advantages of expository teaching** - Harden, Sowden and Dunn (1984:5) suggest that the following factors support a more traditional or 'information gathering' approach:

i) understanding the fundamentals and vocabulary of each discipline is important; it favours the development of a logical progression of concepts in a discipline;

ii) resources are more readily available for the information gathering approach;

iii) teacher expertise is better developed for the traditional approach; and

iv) students may feel more secure with the traditional approach.

c) **Advantages of individualisation teaching-learning** include:

i) learners complete tasks appropriate to their ability level but do meet minimum requirements; individualisation has the advantage of meeting student needs more appropriately by allowing them to progress at their own pace;

ii) the focus of responsibility for learning changes from the teacher to the learner; considerable learning is undertaken independently of others;

iii) learning is powerful where individualisation is perceived as the personal resolution of interesting problems (Harden 1988A:140; Holmbes 1986:4; Print 1992:128). A survey of the literature suggests that the design of self-instructional material is increasingly being promoted as part of campus-based teaching in medicine. Wide-ranging learning resources are used including human, print, audio-visual and electronic media and various facilities and equipment. Based on the work in medicine by Ewan (1982:1), in general education by Rowntree (1986:1) and in chiropractic by Kleynhans (1992B:55), it is argued that the learning modules required for innovative, self-directed, problem-based learning in chiropractic can be based profitably on the design used for distance education packs. 'There are many advantages in promoting active student involvement in learning, both in the initiation and direction of that learning, by comparison with traditional passive (e.g. lecture) learning situations' (Neame 1981:94). Collective feedback in response to learners' assignments from self-directed learning is an excellent, time saving device which has been used in the chiropractic program at RMIT. It is also reported on by Mistry (1982:804) for case analyses and diagnosis reports in laboratory medicine where staff give a collective feedback on student performance based on 20-25 randomly selected and graded reports. This form of grading is believed to encourage all students to do their very best every time a case is presented. With individualisation
teaching-learning industrialisation of education occurs with the application of organisational principles; objectivity of teaching behaviours; mass production of materials with concentration, centralisation, automation, mechanisation and division of labour (Holmberg 1986:4; Keegan 1980:33). Large-scale systems are used to develop courses for thousands of students by teams or groups of experts in particular fields (Adey et al 1991; Harden, 1988A:141). Dahllöf (1986:1) sees the benefits of the large-scale model as development of excellent materials in form and contents, probably by a team; high commitment by staff, high visibility and high enrolments.

Small-scale systems involve an approach where the author of the study material is often the teacher offering the course. The small-scale system can also operate within the large-scale system e.g. a teacher developing a module within an organisation such as a large University or consortium, which caters for many students and offers a range of courses (Adey et al 1991). Dahllöf (1986:2) sees the benefits of a small-scale model as direct and good student contact; rapid clarification; high student participation and satisfaction; high pass rates; rapid change to materials; etc.

\[d\] Advantages of using case studies - The use of case studies in medicine has a long history of at least one century (Cannon 1900:563; Cabot 1906:1). A study of instruction in laboratory medicine is used as an example to show the following advantages:

i) students become aware of the problem solving nature of medical work;

ii) they gain insight as to how and why medicine is practiced in a particular way;

iii) they develop reasoning and decision-making skills in solving medical problems and become exposed to patients' real problems early in their education (Mistry 1982:804). The major goal of teaching laboratory pathology in chiropractic programs is to convey to students the basic concepts and facts that chiropractors should know to effectively use the clinical laboratory as a diagnostic tool. To achieve this outcome, it is argued that the instructional objectives in the integrative chiropractic curriculum should be designed so as to enable learners to analyse and interpret properly the pathophysiology reflected in abnormal results. They should also be able to correlate these results with other clinical manifestations, to select appropriate screening or diagnostic tests in the diagnosis and follow-up of health problems and to recognise the laboratory's role with respect to other health services in total patient care (based on Mistry 1982:804).
4.5.4.3 Disadvantages of an integrative clinical curriculum design

a) Disadvantages of problem-based learning - According to Albanese and Mitchell (1993:52-56), PBL students in a few instances scored lower on basic sciences examinations and viewed themselves as less well prepared in the basic sciences than were their conventionally trained counterparts. PBL graduates tended to engage in backward reasoning rather than the forward reasoning experts engage in. It is argued that this problem can be overcome in the integrative curriculum by integrating structured work in the basic sciences both in self-directed learning packs and practical/tutorial sessions.

b) Disadvantages of individualisation learning - The process of student-directed learning is often difficult early in the first year of the curriculum because it represents a stark contrast to the previous teacher-centred, "spoon-fed" educational system to which most students have been exposed (Adkison and Volpe 1994:128).

c) Disadvantages of clinical teaching - Hewson and Jensen (1990:518) say that the clinic presents many constraints on teaching including time constraints, because patients are usually unwilling to spend a long time in the clinic. There are also financial constraints where clinics are self-supporting and it is necessary for practitioners to see as many patients as possible, which result in logistical problems relating to the scheduling of patients in time and space. Hence, under these circumstances it is often difficult to coordinate good teaching with good patient care. If teaching clinics can be made to be financially self-supporting or are supported through grants then clinical teaching would be one of the most resource effective learning strategies. However, it has to be accepted that the cost for clinical teachers is high.

d) A disadvantage of computer-aided instruction which is seen as the primary barrier to its introduction may be the widespread use of other self-instructional tools that are effective and less expensive to develop and maintain (Painter 1994:143), e.g. the use of readily available print media in contrast with the high setting-up costs of placing material on the "web".

e) Disadvantages of the modified lecture method - Gibbs, Habeshaw and Habeshaw (1987:19) say that as a consequence of modification of the lecture method as described in 4.5.3.2 above, the only problems teachers appear to encounter are the conservatism of students who are used to a wholly passive role. Feelings of panic can develop when the students activities involved in the methods generate a lot of noise and a sense of loss of control. However, anxieties about loss of control dissipate after control has been successfully
regained a few times, especially if students are broken in gently and the purpose of activities are properly explained. While these methods are unlikely to suit all teachers or all situations, 53 alternatives have been found to modify the lecture method (Gibbs, Habeshaw and Habeshaw 1984; 1987:11).

f) A disadvantage of self-learning techniques is that when students are unfamiliar with this approach they tend to adopt a surface, reproductive approach to learning, i.e. effective, meaningful learning will not be achieved no matter how much private study the student may undertake (Tan 1990:89).

It is argued that the few disadvantages of the teaching-learning strategies proposed for an integrative chiropractic curriculum design are far outweighed by the tremendous advantages which are gained through the intelligent application, in line with the psychological foundations of learning, of strategies which promote evidence-based clinical decision-making within an integrative framework.

4.5.5 Psychological Foundations of Teaching-Learning Strategies

4.5.5.1 Principles which support experiential learning

Basic assumptions about teaching-learning strategies are outlined in Table 89 with expansion on major points below.

TABLE 89 - Psychological principles and assumptions about teaching-learning strategies

<table>
<thead>
<tr>
<th>PRINCIPLES</th>
<th>ASSUMPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUTONOMOUS LEARNING</td>
<td>1. Autonomous learning should be related to the overall curriculum context and presented as a holistic view.</td>
</tr>
<tr>
<td>CLARITY OF OUTCOMES</td>
<td>2. The clearer and more realistic and relevant the statement of the desired outcomes, the more effective the learning. If you cannot see the target clearly, the chances of hitting it are not good.</td>
</tr>
<tr>
<td>INVOLVEMENT</td>
<td>3. We learn what we practice.</td>
</tr>
<tr>
<td>TRANSFER</td>
<td>4. We need to transfer knowledge to new situations. If a newly learned term is to be widely transferred and become enriched with association, many applications must be noted and practised.</td>
</tr>
</tbody>
</table>
Learning is increased by knowledge of results. Delayed approval or disapproval is not highly motivating.

There is a motivation factor in all learning. Nothing motivates like success. If success is the best motivation for learning, then we must artfully arrange sequences of instruction for maximal success.

We learn best what is meaningful.

Most people never reach their potential. Low correlation between mental ability tests and creativity is not uncommon.


A review of the psychological principles of meaningful verbal learning and the cognitive substrates that support it, is vital to the implementation of an experiential chiropractic learning program. In fact, it is the *raison d'etre* for the introduction of the integrative chiropractic curriculum design strategy outlined in 4.1.8.2 (d-g) (particularly 4.1.8.3) and further explicated in terms of the psychological basis for the organisation of content discussed in 4.4.5.1 and the integration of content through transfer of learning in 4.4.5.3. In this section the psychological foundations of the chiropractic curriculum are addressed in relation to teaching-learning strategies with a strong focus on learner motivation for autonomous and self-directed, yet structured and guided, learning. A descriptive analysis of the literature below demonstrates that meaningful learning is a human activity, which is dependent on a mosaic of interrelated factors that include higher functions unique to human beings. Ausubel (1963:26) and Vrey (1990:282) relate that meaningful learning is dependent on an integration of anthropological (phenomenological), psychological and andragogical factors and that the cognitive structure, by providing subsumers and anchorage points for new information, undergoes growth during the process of meaningful learning which is also strongly influenced by motivation. Beyond basic biological drives or existence needs, motivation is a uniquely human phenomenon. The phenomenological approach to motivation points towards the overriding urge towards self-actualisation or towards bringing the perceived-self in consonance with the perceived adequate-self as a driving force behind meaningful learning. Transfer is influenced by both motivation and the cognitive structure which, with the benefit of meaningful learning experience, becomes extensively supplied with subsumers. Therefore, approaches that view learning as a human activity are particularly important in empirical and
experiential education. Appropriation of learning can only result when that which is appropriated has meaning. Meaning can never be anything more than a personal phenomenological product that emerges when potentially meaningful ideas are integrated within an individually unique cognitive structure (Ausubel 1963:26; Vrey 1990:282). The ICCD strongly supports the development of a cognitive structure rich in subsumers and lends meaning to the learning by relating it directly to the career appropriateness of learners in a conceptually motivating and holistic way.

4.5.5.2 Autonomous learning

It is important to educate future chiropractors as self-directed, life-long learners so that they may be able to deal with vast amounts of new information. To achieve this outcome, it is necessary that autonomous learning be related to the overall curriculum context and presented as a holistic view both in respect of the curriculum and of the individual learner, i.e. presented as a holistic process (Boud 1981:25).

Knowles (1981:8) suggests that for the drastic transition to occur to autonomous learning, teachers in higher education throughout the world need:

a) to know that there is a respectable research-based rationale for autonomous learning;

b) to know that its benefits have been successfully demonstrated in practice;

c) to have specific guidelines and techniques for implementing it.

Boud (1981:ii) says that many terms have been used to describe approaches to developing student autonomy in higher education: independent study, self-directed learning, student-initiated learning and project orientation are a few. Some of these have been used to refer to particular practices or to specific contexts and have special connotations for some people. He suggests that we are now beginning to perceive that the purpose of education is learning and we are beginning to realise that frequently teaching interferes with learning (Boud 1981:11).

Tough (1971, 1979) has demonstrated in his Adult's Learning Projects that when adults undertake to learn on their own. They tend to follow a sequence of steps, move at a pace, make use of a variety of resources, exhibit a style, and assess their learning in ways that are uniquely their own. If teachers want to facilitate student learning they will need to follow the flow of this natural process rather than impose teacher-made sequences on them. In discussing student autonomy, the focus is therefore not on teaching methods per se, but on strategies for fostering learning within the context of particular courses by various methods. It is argued that the integrative chiropractic curriculum design greatly facilitates autonomous
learning through the holistic process. This is achieved by using the ICCD clinical decision-making framework (in 4.1.8.2 d-g) and self-directed learning methodology discussed in 4.5.3.6 above, which can be implemented by using one or more of the following strategies identified by Boud (1981:12) as promoting autonomy:

i) the use of learning contracts in which students prepare a formal plan for their learning and its evaluation which is validated by a staff member;

ii) one-to-one learning in which students work in pairs to facilitate each other's learning;

iii) student planned courses in which students work on their own and in groups to initiate their own projects and put them into practice;

iv) peer support systems in which newly arrived students are assisted in problems of personal and academic adjustment by students with longer experience of the institution;

v) collaborative assessment in which staff and students cooperate in establishing criteria for student assessment and make judgements on the basis of these.

4.5.5.3 Motivation

How to motivate students to succeed with learning is explained well in the literature, particularly by authors on adult and autonomous learning (Boud 1981:12; Knowles 1981:95,31). The author (Kleynhans 1991:6.4.7) proposed application of the work of Knowles, Tough and others to chiropractic. Ways in which to enhance teaching and learning through motivation of students include the following strategies which are implemented in the ICCD:

a) **By seeing motivation as a state of unresolved need or desire** existing within the learner. Since adults are motivated to learn as they experience their own individual needs and interests that learning will satisfy, these are considered appropriate starting points for organising adult learning activities (Knowles 1988:31,116). Tough (1978:250) says that adults are motivated to begin learning-projects by anticipating several desired outcomes and immediate benefits to result for them personally such as satisfying a curiosity, enjoying the content itself, enjoying practising a skill or the activity of learning. Long term benefits include producing something, imparting knowledge and skills to others, increased pleasure and self-esteem gained. The ICCD is perceived to be highly motivating since it reinforces in learners a holistic concept of science-based clinical intervention where more and more ‘pieces’ of the chiropractic clinical management program or ‘puzzle’ are sequentially added.
Students thereby progressively increase their clinical competence and unresolved need to become fully competent or qualified for registration.

b) Conceptualisation - students have a conscious or subconscious 'mental blueprint' of the kind of persons they are and once they 'lock in' on a perception of what they are unable to do, it is difficult to shake them from this belief, particularly if the perception has had time to establish itself into a firm belief (Hamacheck 1979:270-5). The study materials should therefore provide strategies, as do self-directed learning materials in the ICCD, for enhancing self-concept and achievement to increase motivation. Success experiences with different degrees of difficulty should be made available in the form of tasks, quizzes etc in order to allow students at both ends of an ability continuum to experience success (Hamacheck 1979:270-5).

c) Opportunities for achievement - McClelland, quoted by Gagné (1985:306) says that opportunities for achievement are created through a clear definition of individual goals; perception of self-improvement; increasing assumption of responsibility for one's performance and a supportive social environment.

d) Incentives which result from reinforcement e.g. rewards for learning of intellectual skills, the ability to function independently and become self-directed learners lead to the establishment of a position of self-esteem (Gagné 1985:306). Behr (quoted by du Plooy 1985:17) says that present success and the expectation of success have a desirable effect on the motivation of students by raising of the student's level of aspiration - in general, the greater the success the higher is the level of aspiration and achievement.

e) Relate learning to pre-existing motivation. Learning is more effective if the objective of learning or the performance made possible by the learning can be related to a pre-existing motivation (Gagné 1985:245) e.g. relating topics in self-directed learning to practical interest areas such as patient management.

f) Provide guidance on study methods. Advice to students on how to study and how to successfully complete a self-directed study module (discussed in 4.5.3.6 above), promotes motivation through the promotion of proper planning, organisation and development of good study habits. Motivation can be gained by varying the instructional approach, i.e. the variety and flexibility can be used as a means of maintaining student attention and increasing achievement (Kindsvatter 1988:58). For example, the concurrent use in the ICCD of self-
directed learning packs, practical/tutorial sessions and clinical teaching, all keyed in to the same clinical decision-making framework.

4.5.5.4 **Meaningful learning**

a) **Overview.** For the purpose of designing instruction, Gagné (1985:245) considers five categories: intellectual skills, cognitive strategies, verbal information, attitudes and motor skills. He states that the specific operations constituting the learning events or processes are different for each of the five categories of learning outcomes. The inter-relationship of factors is explicated below.

b) **Verbal learning.** Verbal learning proceeds with written or spoken language and involves linguistic symbols to name and describe the concepts (Vrey 1990:245,257). It involves either receptive or exploratory learning, which can be meaningful as opposed to mechanical (van Rensburg 1986:144). For learning to be meaningful it involves significance attribution and the attainment of insight (Vrey 1990:245,257).

c) **Rote learning.** Rote or mechanical learning results from simple arbitrary association as in the memorisation of e.g. nonsense syllables or other verbal material without insight and integration (Mouly, 1973:281). However, rote learning is inevitable if learning material lacks logical meaningfulness and if the learner's cognitive structure is lacking in relevant subsumers or if subsumers are not recognised as such or if the learner does not choose to understand (Mouly 1973:282).

d) **When verbal learning becomes meaningful.** Meaning is a phenomenological outcome of a learning process in which potential meaning inherent in the external world becomes converted into an individualised content of consciousness (Ausubel 1963:35). Verbal learning becomes meaningful in the following situations:

i) when observable data relating to a problem are structured and therefore perceived, with insight and the problem is solved through a meaningful method of problem solving (Vrey 1990:247). It is argued that the clinical decision-making framework in the ICCD provides such a structure which is applied during problem solving exercises involving case studies;
ii) when logical, meaningful new material associated with relevant anchorage points (subsumers) in the learner's cognitive structure can be meaningfully integrated with relevant, existing knowledge (van Rensburg 1986:144,145; Vrey 1990:249). i.e. materials are potentially meaningful to the extent that they can be related to existing ideas in the learner's cognitive background (Ausubel 1963:26) or, subsumed under the learner's existing cognitive structure (Mouly 1973:281). It is suggested that the ICCD provides an excellent framework to develop a range of subsumers i.e. the factors important in clinical decision-making;

iii) when meaning is attributed to verbal learning which is integrated through harnessing a learner's cognitive processes to the extent that knowledge is reproduced in their own words as is required in exercises associated with self-directed learning;

iv) concepts are formed when one discovers inductively the distinguishing characteristics of the members of the group or category to which the concept refers (i.e. conceptual learning) (Vrey 1990:251) such as classification of concepts to fit the ICCD framework;

v) when a composite idea such as those expressed in sentences is coded or decoded to form structures (e.g. maps, drawings) that can be visualised (propositional learning) (Vrey 1990:252,254). In the ICCD extensive use is made of anatomical pictures, techniques, diagrams, laboratory reports, x-rays, etc;

vi) when discovery learning involves analysis and synthesis during which verbal material is rearranged, reorganised or restructured. It represents a distinct type of learning in problem-solving and creativity which intersects all forms of learning (Vrey 1990:256) as in the numerous opportunities provided through case studies;

vii) when students are confronted with problems that are genuine to them in terms of their needs and experiences, i.e. a real problem is more than an idea to be manipulated (Vrey 1990:256) as in the health problems relating to future practice;

viii) when students are encouraged to express themselves in ways that are new to them and to try methods that deviate from the tried-and-trusted, so that their originality can find expression in unusual answers - which may be 'astonishingly useful' (Vrey 1990:256,257). This is creative learning in which creativity is directly related to problem-solving and requires a combination of realistic thought and imagination. Further discussion occurs in 4.5.6 below on the application of teaching-learning strategies.
e) **How meaningful verbal learning is related to cognitive development** is of great importance to mastery learning in an ICCD. It is argued that the psychological foundations of meaningful learning stated below strongly support the approach being taken in the ICCD through the use of a decision-making framework which integrates all major domains of discipline-based factors.

i) it is enhanced through experience, related to cognitive development that promotes insight and significance attribution. (Vrey 1990:247,248);

ii) existing cognitive structure refers to an individual's organization, stability and clarity of knowledge in a particular subject-matter field at any given time (Ausubel 1963:26). Meaning therefore does not lie in the symbol that represents it i.e. the material to be learned. Rather it is in the individual where it must be found in a personal frame of reference and reconciled with or assimilated into concepts and images already present in an existing functional cognitive structure where relevant anchoring ideas may be available (Ausubel 1963:26);

iii) to allow integration of new material into the cognitive structure, a meaningful learning set and potentially meaningful material is required. A learning set allows the incorporation of substantive (as opposed to verbatim) aspects of new concepts, information or situations to relevant components of existing cognitive structure in various ways that make possible the incorporation of derivative, correlative, supportive, qualifying or representational relationships. In case of rote learning the material is related to cognitive structure but not in a substantive manner permitting incorporation of one of the relationships stated above (Ausubel 1963:22);

iv) potentially meaningful material must be non-arbitrarily relatable to relevant concepts in the cognitive structure and it must be relatable to the *particular* cognitive structure of a particular learner. The latter is seen as a characteristic of the learner rather than the material *per se*. The cognitive structure of the particular learner must include the requisite intellectual capacities, ideational content and experiential background i.e. appropriate anchorage points for the new material. Potential meaningfulness of learning material therefore varies with factors such as age, intelligence, occupation, cultural membership etc. and allows differential between meaningful learning and rote learning of the material. Rotely learnt materials are discreet, isolated entities relatable to the cognitive structure only in an arbitrary, verbatim fashion without the establishment of the correlative, supportive and other relationships
mentioned above. Such material is vulnerable to forgetting and has a much shorter retention span (Ausubel 1963:23;24);

v) cognitive structure is the most significant independent variable that facilitates, inhibits or limits the learner's capacity for requiring more new knowledge in the same field. It is regarded as the major factor influencing the learning and retention of meaningful new material in the same field (Ausubel 1963:26). In fact, if the cognitive structure is unstable, ambiguous, disorganized or chaotically organised, it inhibits learning and retention. Through the process of obliterative subsumption, it contributes to and helps account for the ordinary forgetting of knowledge. New learning and retention is facilitated by strengthening relevant aspects of cognitive structure in ways that retard the rate of the obliterative process (Ausubel 1963:26).

4.5.5.5 Electronics communications in teaching-learning strategies

Tinkler et al (1994:13) say that those seeking to optimise the application of electronics communications to education have been attracted to cognitive psychology. They see this as offering more credible theories about learning and the learner (than behaviourism) and has led to a gradual move towards constructivism which implies that we each construct our own reality or world picture. This comes about through the processing by the brain of sensory input, the reality being dependent upon both the range and the quality of the sensory input. They point out that educational institutions have begun to team together cognitive theorists, subject experts, instructional designers and technologists to develop new programs making use of the new technologies for delivery, based on constructivism. They indicate that multisensory learning increases concept formation (Tinkler et al 1994:14). Balbin and Sacks-Davis (1997:9) discuss electronic teaching and learning environment.

Assumptions about the future are made by MacFarlane (1995:60) who says that:

a) 'the technology of learning-support environments will have been developed and will have become widely deployed in the forms both of computer-based systems providing interactively developed knowledge of a wide range of microworlds and in the form of networking giving easy and flexible access to tutors and fellow learners;
b) 'widespread networking will exist, with multimedia capability;
c) 'all higher educational institutions will have powerful local distributed computing systems connected to a national academic network;
d) 'powerful multimedia authoring systems will be widely available, which will have a high degree of standardization or reciprocal compatibility and transference, and these will be in widespread, routine use; and
e) 'all participants in higher education - staff, students, and those pursuing off-campus continuing professional training - will routinely use desktop and portable computers with multimedia and networking capability'.

Inglis (1996:73) discusses the use of a multimedia computer game *Myst* as an analogous simulation of clinical problem solving. Janssen et al (1996:237) describe several useful multimedia software programs for medical education and propose a system for converting a set of class notes into a multimedia lecture presentation which would be most appropriate to learning in the ICCD. Vardaxis (1997:19) has developed a computerised pathology program 'The virtual pathology department', primarily for use by chiropractic students at RMIT University, but with direct application also in medical education. Jamison (1989:10) presents an excellent report on the use of computerised simulators at RMIT. Prognostication about future implications of information technology for the medical curriculum is made by Faughnan and Elson (1998:766) and Grisby and Sanders (1998:123).

4.5.5.6 Psychological foundations of special relevance to problem-based learning

a) **Integration** - According to Schmidt (1983:15), instructional methods should stimulate students by activating relevant prior knowledge, providing a learning setting as similar as possible to the setting in which the acquired knowledge is to be used (encoding specificity), and by giving students opportunities to elaborate on their knowledge. Willems (1981:5-21) suggests that written problems will activate relevant prior knowledge only if they have the following features:

i) they should consist of a neutral description of an event or a set of phenomena that are in need of explanation in terms of underlying processes, principles or mechanisms;

ii) they actually do have to lead to problem-solving activity;

iii) problems have to be formulated as concretely as possible;

iv) problems should have a degree of complexity adapted to students' prior knowledge.
b) **Learner appropriateness** - According to Barrows (1985:17,39) and Neame (1981:96-7), problems used should have a close resemblance to problems that students will come across in later professional life. Such problems should be those:

i) that have the greatest frequency in the usual practice setting;

ii) that represent life-threatening or urgent situations;

iii) that have a potentially serious outcome, in terms of morbidity or mortality;

iv) in which intervention (preventive or therapeutic) can make a significant difference in prognosis;

v) those that are most often poorly handled by practitioners in the community.

The principles outlined in a) and b) above are guidelines used in the proposition of ICCD learning packs.

Norman (1988:279) says that expert problem-solving in medicine is dependent on a wealth of prior specific experiences which can be used in routine solution of problems by pattern recognition processes and elaborated conceptual knowledge applicable to the occasional problematic situation. He also suggests, on the basis of empirical evidence, that there is a convergence of evidence from a variety of fields of inquiry that expertise is characterised, not by the possession of any superior general strategies, but by the availability of an extensive organized body of specialized knowledge. He points out that recent research has emphasised that the characterisation of expert knowledge simply as organised networks of scientific rules and concepts ignores the central role of experiential knowledge in expert performance.

c) **Clinical decision-making** - Neame (1982:143,144) describes advantages of the use of relevant information 'triggers', simulating the real clinical situation applied as a technique to develop clinical reasoning and promote transfer as part of PBL:

i) the relevance and significance of the material is clear to the students at the time of study and since a 'study unit' relates to a practical problem it increases enthusiasm and motivation to study it;

ii) students are actively involved and have a success experience from solving progressively more difficult cases, promoting vertical transfer;

iii) immediate application of the material studied promotes internalisation; the study methods promote a 'life-long' learning approach; probably most important is the fact that this approach does not promote rote learning but promotes clarity, stability and organisation in the learner's cognitive structure;
iv) problem-based learning causes the principles and structure of the subject matter to become readily apparent, thereby promoting retention and transfer. In fact, Barrington et al (1997:104) found that students enthusiastically received learning focused on real patients and their problems rather than clinico-pathological issues in isolation.

According to Jones (1997:140) many terms have been used to describe the cognitive processes involved in clinical decision making. Originally the idea was that of forming hypotheses and accepting or rejecting them through patient assessment (Barrows and Bennett 1972:273). This was subsequently further developed by Bordage and Zacks (1984:406) and Grant and Marsden (1987:92) who looked at structure of knowledge in memory, by Schmidt et al (1990:611) who claimed this knowledge was held in relevant illness categories and subsequently by Bordage, Grant and Marsden (1990:413) who based a diagnostic thinking inventory on the concepts of structure of knowledge in memory and flexibility of thinking.

This latter approach is consonant with the ICCD system of chiropractic decision making by using a highly structured framework. The diagnostic thinking inventory developed by Bordage, Grant and Marsden (1990:413) for medical practitioners was shown to be a reliable and valid instrument for measuring diagnostic ability of physiotherapists working in an outpatient department (Jones 1997:133) and appears to merit greatly an application in the chiropractic ICCD.

4.5.5.7 Psychological foundations of individualisation teaching

a) Student independence - Holmberg (1986:68) says that it should not be assumed that students have the capacity to work independently. Rather, special attention should be given to designing programs to promote and support autonomy. He discusses some interesting research findings from the German FernUniversitat on ways to promote student independence including:

i) setting problem-solving capacity as the main goal of the teaching;
ii) basing examinations on problem-solving exercises;
iii) promoting critical thinking;
iv) providing the ability of students to pace their study according to personal circumstances and wishes;
v) allowing students to commence study and submit assignments whenever it suits them; supporting student independence in research activity;
vi) staying in regular contact and approach students to maintain interest and promote successful progress;

vii) making counselling and tuition services available at times suitable to the students. Individualisation in the ICCD is provided via highly structured individualised learning kits, or unstructured or independent learning involving learning contents. Unstructured individualisation is invariably highly personalised, problem-oriented and very effective (Print 1992:131-2).

b) Learner appropriateness

The types of students best suited to individualised learning include:

i) self-directed, intrinsically motivated students who experience vocational and intellectual needs and interests that learning will satisfy (readiness to learn);

ii) those who have a rich life experience as the basis for their learning (Knowles 1988:30,116);

iii) highly motivated students with high self-esteem;

iv) good academic abilities and intellectual interests (Anwyl et al 1987:168-171);

v) students with an "addiction" to higher education (enjoyment from studying);

vi) achievement-oriented and assertive persons (Anwyl et al 1987:167; Holmberg; 1986:68);

vii) adult students who are hardworking, self-directing, determined, questioning and unwilling to accept second best (Ortmeier 1982:31).

4.5.5.8 Psychological foundations of clinical reality teaching-learning

a) Overview - 'A chiropractic intern’s learning ability, motivation, perceived relevance of the learning situation at hand and effective feedback by the instructor are four major factors that determine the success of a clinical teaching encounter' (Mootz and Cohen 1992:472).

b) Learning Ability - The learning ability in the clinical situation is influenced by the learners’ level of knowledge, their application of learning strategies and critical thinking ability. However, in clinical programs, students and staff are typically more concerned with the end product such as the learners administering chiropractic adjustments, playing the role of physician and demonstrating some perceived degree of expertise rather than with the process of problem solving (Mootz and Cohen 1992:471).
c) **Organisation of learning** - Brandsford et al (1986:1078) argues that presenting specific knowledge in meaningful, organised patterns facilitates the development of effective problem solving skills. Sauter and Spurgin (1990:169), have divided areas of chiropractic competence into seven sequential phases of patient care to be observed and evaluated in the teaching clinic, including:

i) Patient processing (appointment, initiation of a file, attire etc).

ii) Patient interview; physical examination.

iii) Laboratory tests and procedures.

iv) Diagnosis, treatment plan and report of findings.

v) Treatment procedures.

vi) Case follow-up and review - a pattern of sequential interaction which is believed to benefit patients, students and clinicians by defining the requisites of chiropractic health care, by guiding the improvement in the quality of performance and by assisting in curriculum development.

Specific requirements which elaborate on each of the abovementioned domains relate to cognitive, psychomotor, affective and communication skills development which are further discussed in relation to assessment in 4.6.7 below.

d) **Intrinsic motivation for clinical learning** - This arises from learners striving to attain favourable clinical outcomes for their patients and clients (i.e. patient-centred therapeutic goals). Wollstadt et al (1982) suggests that keeping the purpose of each clinical teaching encounter in mind (i.e. the patients' best interest) allows learners to see first hand the need for competency and to strive toward that end. Reality simulation teaching is seen as strongly motivating to students because of its experiential nature and contribution to developing competence in what will become their life-long, professional career. In fact, learning is increased when students are actively involved rather than passive onlookers (Barrand 1982A:108; Hilgard and Bower 1966:562) and principles the students themselves discover are understood more clearly, retained longer and used more effectively (Barrand 1982A:108). Descriptive analysis of the literature in 4.5.6.2 below, suggests a dramatic increase in simulated reality teaching in chiropractic as a result of the development of excellent physical and computer models especially for teaching-learning in anatomy, physiology, pathology and the diagnostic sciences. Motivation in clinical teaching is very high since the attainment of patient-centred therapeutic goals (or clinical outcomes) provides
a natural motivator for teaching of clinical competence (Mootz and Cohen 1992:472). They also suggest that curiosity is an important, if neglected, source of intrinsic motivation stimulated through role modelling behaviour leading to learners’ own investigations.

e) Feedback - Hilgard and Bower (1966:562) say that learning is increased when students receive immediate feedback about their performance. In clinical context, feedback should occur when the clinical event is fresh and relevant in the student’s mind and a simple assignment to review a particular disorder or clinical finding relevant to a current case can work well (Mootz and Cohen 1992:472). Clinical teachers should allow time for students to think through an answer since students learn to avoid answering questions when they know that the clinician will do it for them (Mootz and Cohen 1992:472). Feedback is crucial to clinical learning and should occur when the clinical event is fresh and relevant in the student’s mind (Mootz and Cohen 1992:472). McLeod and Harden (1985:187-8) say that observation of a learner in action in the clinical setting is of little use if the information obtained does not get back to where it does the most good - the trainees. It is absolutely critical that they be offered insight into what they did and how they performed so that they may recognise the discrepancy between intended and actual behaviour - a most suitable impetus for change. They suggest that the learners be asked to assess their own performance, followed by the assessor’s highlighting areas where it is felt the learner performed well to inspire confidence and reinforce good habits and make their learner more receptive to subsequent negatives. The assessor should then outline areas which need improvement using descriptive rather than evaluative language. Finally, the learners response to the points raised should be requested and plans discussed for learners to modify their performance in the future, also clinical teachers can provide reinforcement by demonstrating relevance of concepts and procedures in subsequent clinical situations.

f) Relevance - This is easier to achieve in the clinical setting than in the classroom. It is argued that the clarity and implications of clinical concepts produce better attention and transfer of knowledge than print-based information or simulated practice in the classroom.

g) Continuity of learning - This is provided through successive cases that need to be managed or for which the management is observed. As suggested by McLeod and Harden (1985:187), it is essential that rather than providing opportunistic patient exposure, as much planing as possible should go into designing the clinical practicum to allow students to see as many types of health problems (which for chiropractic are discussed in 4.4.2.5). Sequence is
important insofar as the complexity of cases, which the learner has to personally provide care for is concerned. It may assist the building of confidence if less complicated cases are handled initially;

h) **Integration** - In clinical teaching integration is very high and can be readily reinforced through identification of key factors relating to a case and requiring the learner to search the literature for information relating to all the domains of decision making identified in the integrative chiropractic clinical decision-making framework discussed above;

j) **Appropriateness of learning** - The Integrative Clinical Curriculum Design adds greatly to the effectiveness of experiential learning in the clinical situation which is seen as the most effective, most valid learning strategy as well as the most valid and reliable place for assessment of competence.

It is argued that the psychological foundations of learning which apply to the organisation and implementation of teaching-learning strategies strongly support the introduction of an ICCD. This is particularly because of it's focus on the development of a highly structured cognitive framework rich in subsumers which will facilitate future evidence-based clinical decision making, critical thinking, reflective practice and life-long learning.

k) **Learner's approaches to studying** - Stiernborg and Bandaranayake (1996:229) distinguish between: i) a 'surface approach driven by the intention to fulfil course requirements or by anxiety rooted in concern about the examination which results in 'regurgitation of words and phrases'; and ii) a deep approach where 'students see the task as interesting and entailing personal involvement'. 'They start the learning by attempting to unravel the meaning of the task and try to integrate the new facts and ideas with their previous knowledge' which produces 'a deeper understanding of the learning task'. It is suggested that the ICCD promotes a deep approach to learning, which can be assured by the way in which Study Guides are constructed and assessment’s conducted.
4.5.6 The Application of Certain Teaching-Learning Strategies in an Integrative Chiropractic Curriculum

4.5.6.1 Overview

Experience and research indicate that a variety of methods are important for effective teaching-learning and therefore all programs and teachers should have an effective repertoire of teaching-learning strategies (Print 1992:126). In fact, all university teachers have a professional responsibility to:

i) Teach their subjects in such a way that all students have an equal opportunity to learn and demonstrate that learning in accordance with the aims of the subject.

ii) To vary their teaching practices in relation to the context in which particular components of the course are offered (e.g. clinical teaching, skills training).

iii) To have regard for the students and their particular concerns, backgrounds, aptitudes and the level and standards of a program (AVCC 1993:2). Furthermore, creativity in medical education should be encouraged in terms of using innovative techniques in clinical teaching (Handfield-Jones et al 1993:3). These principles are supported by the following comments derived from Brady (1983:112): not all students learn equally well through the same strategies; certain methods are more applicable to particular situations; and no single method is superior, particularly in terms of student performance, to another in all situations. It is argued that these and the abovementioned guidelines provided by the Australian Vice-Chancellors Committee (AVCC 1993) can be met through the application of Wheeler’s “principles of learning” (Wheeler 1967:130), “for which there is probably more agreement amongst educators than there is about learning theories” (Print 1992:135) to the ICCD. Key principles enunciated by Wheeler are identified through key words in bold print below where application of the principles is shown in the ICCD.

a) Learning in the ICCD is an active process in which the learner is involved, not only in the practical and tutorial sessions but throughout the curriculum through the use of self-directed study packs including study guides. These promote autonomous yet active involvement, promote understanding of what is being learned, directly related to individual goals, values and motives for doing the course.
b) There is frequent repetition of response within the clinical, decision-making framework of the major concepts to be mastered and enhancement of these in the development of clinical skills.

c) The study guides, tutorials and practical classes provide immediate reinforcement which promotes learning through cognitive feedback and the early development of the cognitive framework which is promoted because of the similar structure of successive subjects within the curriculum.

d) It is possible to introduce a wide range of experiences, which will promote both generalisation and discrimination. How this can be accomplished is identified in 4.5.6.2-4.5.6.3 below for each of the major discipline areas in the course.

e) Learners' perceptions about what constitutes good clinical practice can be developed in a deliberate, systematic manner and while allowing for individual variations, can develop practitioner behaviour, which is congruent with societal needs and professional advancement in the community interest.

f) While other types of learning take place simultaneously with the designed outcomes on which a unit of work might focus, it is argued that the overall framework used in the ICCD facilitates the attainment of key components of curriculum intent.

4.5.6.2 Teaching-learning in the cognitive domain

a) One of the main vehicles for implementation of learning in the ICCD is individualisation learning consisting of study guides which guide learners on the depth and breadth of required learning in each component of the course. There is a focus on important clinical points to bear in mind, reference to a reader, practical manual, case studies and clinical practicum and provide opportunities for further investigation. Self-assessment is keyed into readers, laboratory manuals and multi-media learning materials. Within this vehicle, a clinical decision-making framework forms the basis for evidence-based clinical learning supported by problem-solving, scientific method and case study method to facilitate enquiry learning. Individualisation learning is further supported through problem-based learning linked to reality simulation teaching including the use of physical models, work models, simulations, role playing and patient management problems to facilitate integration and development of practical skills. Clinical reality teaching which is systematic rather than opportunistic and community-based rather than restricted patient-base finally provides the
milieu in which course-based learning can be completed and life-long, self-directed learning can subsequently follow. Descriptive analysis of the literature indicates research support for the use of a range of strategies to promote learning in the cognitive domain, some of which also include significant learning in the psychomotor and some learning in the affective domain. Interesting examples include:

b) Strategies for teaching-learning in physiology - Student-directed learning in physiology can be encouraged through the use of problem-based assignments, workbooks, clinical case studies and computer based learning exercises (Whitaker 1994:197). The relevance of a physiology course can be greatly enhanced if clinicians are involved through the design of simple clinical case studies to help students integrate and apply their knowledge of basic physiology to relevant clinical problems. Whitaker has used tutorials assigned to self-directed learning, often in association with computer based problem-solving exercises and interactive tutorials. She believes that the approaches they are using and developing in the physiology course will help students at that stage to begin already to develop the skills they will need to practice medicine. A study by Villani (1996:43) of chiropractic students at RMIT confirms that increasing student learning responsibility and control improves motivation for learning physiology and results in better performance.

c) Strategies for teaching-learning in anatomy - A series of innovative strategies have been developed to facilitate learning in microanatomy (histology). All of these have direct application in the chiropractic ICCD. Clarke et al (1994:213) suggest that experience with teaching and assessing microanatomy using closed circuit TV (CCTV), self-directed learning based upon workbook activities and clinical problem solving indicate that teaching and examination by CCTV is a successful innovation. It makes efficient use of staff resources where the traditional techniques for teaching histology by using individual microscopes and slides are clearly impractical.

to the integrated study of histopathology, anatomy and physiology in which medical students are taught the skills that enable them to create computer-based multimedia tutorials.

Packer (1994:97) describes a computer-based pictorial anatomy and museum catalogue that is used for the chiropractic course at RMIT. It consists of a computer bank of images which provide a core around which purpose-specific teaching modules can be developed with the following advantages:

i) exact reproduction of each anatomical specimen in the museum;

ii) colour images of each prospected specimen which can be readily modified or labelled for particular purposes to match the level of presentation of anatomy to suit particular course requirements;

iii) allow once for enlargement of specific areas for more detailed labelling and study e.g. brain specimens;

iv) reproducibility with no copyright problems. It can also serve as a dissection guide, an alternative information source for flexible pacing and opportunities for repetition and as a basis for interactive learning.

Serial stereo-schemata is an innovative instructive aid in anatomy which prioritises the elucidation of the broad anatomic relationships and blends four key elements: schematic conversion, 3-dimensional illustration, holistic representations and serial sequences which is of particular benefit to teaching anatomy of the central nervous system (Sircar 1994:207).

Computer-assisted instruction in teaching human gross anatomy involving computer lessons designed to be very flexible in terms of the selection of material presented and made extensive use of colour graphics to explain the anatomy. Results suggest that computer-assisted instruction can play a central role in efforts to provide a human anatomy curriculum that best serves the educational needs of anatomy students (Walsh and Bohn 1990:499).

Problem-based learning in anatomy using a tutor as facilitator, a small discussion group, and the rest of the class as an audience was implemented with an appreciable degree of student acceptance and better appreciation of the relevance of anatomy (Al-Jomard 1997:58).
d) **Teaching of pathology** - laboratory pathology can be effectively learned through a problem-solving approach where illustrative case studies are used in lectures, laboratory sessions and small group discussions to teach clinical interpretation and practical application of laboratory testing. This is especially valuable if laboratory sessions that deal with various aspects of clinical pathology are conducted with active student participation (Kumar and Fox 1988:899). It is expected that the use of computer technology, especially in the study of self-instructional materials during unscheduled time, will further enhance the teaching strategy. Impressive computer-based aids to the teaching of pathology have been developed at the University of New South Wales (Hawkins et al 1997:45) and at RMIT University in Melbourne for the chiropractic program (Vardaxis 1997:19).

e) **Teaching genetics** - A PBL curriculum is well suited for the dissemination of current and continually changing genetic information because the common interests of biochemists, microbiologists and developmental biologists contribute to the ready integration of genetics (Adkison and Volpe 1994:131; Szeberényi et al 1996:213). Of particular relevance to chiropractors are the genetic relationships of conditions such as osteoporosis, rheumatoid arthritis, systemic lupus erythematosis etc.
f) Teaching-learning of clinical epidemiology - The science of medical decision-making is fundamental to evidence-based teaching, learning and practice and an appropriate course in clinical epidemiology and health services delivery has been shown to have major impact and long lasting effect (Chessare et al 1996:223). In this context, the relevance of student attitude to biostatistics is stressed by Siziya and Matchaba-Hove (1995:89).

4.5.6.3 Teaching-learning in the affective domain

At the heart of meeting chiropractic educational objectives in the affective domain is the teaching of chiropractic as a human experience for the purpose of creating humanistic chiropractors. A humanistic physician has been defined as one who understands patients as people and considers their psychological and social features in their assessments and care, who are compassionate and ethically sensitive and who communicate compassion and sensitivity warmly and effectively to patients (adapted from Branch et al 1991:482). Understanding of the whole patient can be gained through patient interviews and group discussions of key concepts which are the cornerstone of clinical education early in the course. The small group process in which students and staff work together is a major vehicle for learning since the group process shapes the attitudes of learners toward patients and toward clinical care (adapted from Branch 1991:487). As a result, learners appear to know themselves better, to be more purposeful and perhaps, to enjoy themselves more. Branch et al (1991:482) say that no medical school had developed a required course that solely addressed the patient-doctor relationship and that began in and extended beyond the first year. By placing the humanistic domain within the chiropractic clinical decision-making framework, it is argued that the Integrative Clinical Curriculum Design caters very well for the teaching of clinical skills in the affective domain, especially since self-directed learning packs are linked to tutorials and reality teaching in the clinical setting to reinforce concepts and develop desired behaviours. While there is a considerable body of opinion amongst clinical teachers that the most appropriate way to teach medical ethics is through the example of the teacher via an ‘apprentice’ or ‘osmosis’ system (Boyd 1989:1), Elstein and Harris (1990:533) recommend a combination of lectures, discussion and particularly, critical reflection where lecturers make students aware of the full range of the dilemmas which face them in the day-to-day care of patients and their intuitive responses to these. Critical reflection prepares students for a subsequent debate, a week later, where they may test their arguments against the criticism of their peers in a public forum. Critical reflection is seen to play a major role in
the teaching of professional ethics (Elstein and Harris 1990:534) and attitudes generally. Experiential learning through reflection is discussed in depth in 4.5.3.9 above. Harrison et al (1996:35) report on innovative approaches in communication skills training and Harrison (1997:212) recommends incorporation of human subject research experience early in the medical curriculum. Birgegard et al (1996:51) comment on an excellent instrument used for evaluation of student communication skills in clinical practice. Other references to promotion of learning in the affective domain appear in 4.5.3.8 above.

Irvine (1988:189) has defined what we would want students to learn in terms of professional behaviour and has set criteria for the assessment, which is discussed in 4.6.5 below. She suggests that desirable behaviour can be encouraged to develop:

a) By exploring values which should be clearly defined in terms of the values and beliefs on which the curriculum goals are built.

b) By teachers facilitating constructive debate about these so that students become experienced in the process of clarification of value issues.

c) By more sharing of information at appropriate points in the curriculum and by pointing out that interpretation of facts is coloured by beliefs and beliefs are the result of the way we interpret our experience and fit it into our existing conceptual frameworks.

d) By providing practice in the use of desirable behaviours e.g. trigger films, role playing, experiential exercises and learning “games” to discuss responses and emotions and to illustrate interpersonal communication skills.

e) By providing practical experiences such as field visits in which the student becomes a participant observer.

f) By teachers providing opportunities for students to reflect on and discuss their experiences which is facilitated through skilful development of the student learning group and of a colleague relationship between teacher and student, which can provide necessary affective support for students when they take responsibility for patient care for the first time. She says that the behaviour, which the teacher models will be a strong influence on the learning that takes place in this context. Tai-Pong (1997:62) shows that medical clerkship produced long-term positive effects on graduates’ attributes towards general practice. This could suggest that a major influence on attitudes is created during chiropractic clinical practicum. Gill and Adshead (1996:61) say that training in cultural issues has been identified as essential by practising doctors and Pendleton et al (1984) have shown that a successful
consultation depends on the doctor understanding the patient's health beliefs and norms of behaviour. Gill and Adshead (1996:62) developed an innovative module for teaching cultural aspects of health as a vital part of communication, which extends well beyond the focus on particular diseases and is directly applicable to the ICCD. Supplementary to this is the capacity to understand roles, which, it is argued, are fundamental to good communication (Cox and Corr 1996:343).

Skills in the affective domain are particularly important when good, bad and sad news needs to be conveyed and Harden (1996:275) gives twelve tips on teaching and learning about bad news while Fallowfield (1996:27) discusses communication in relation to good, bad and sad news. Both studies are of direct relevance to the ICCD.

4.5.6.4 The teaching-learning of complex professional practice skills

Professional practice cannot be reduced to a series of separate cognitive, psychomotor and affective skills, which can be taught in isolation. The myriad of tasks to be performed which are central to practice generally involve learning in all three domains hence it is advantageous to use a combination of teaching-learning strategies concurrently in an integrative fashion as indicated below. Tan (1990:89) suggests that in order to achieve meaningful learning from practical work, it may be necessary to set students very specific tasks to do both before and after the laboratory session. During their first year at university, students need to be provided with specific, structured, well sequenced, active teaching/learning experiences stressing skills, concepts and the integration of theory with experimentation. They can then gradually learn to function independently and acquire the skills necessary for them to achieve the learning objectives. To achieve this, the curriculum and teaching-learning strategies must be tailored to both the background and educational needs of students (Tan 1990:89). Bevis (1989:217) supports this by stating that the role of teachers in experientially-based learning revolves around the detection, selection and use of feedback to facilitate change in behaviours during process teaching. This involves an experiential base for process learning and includes pre-structured, pre-planned episodes with reinforcements resulting in cognitive recognition of the input, as an integral part of the teaching operation, in order to strengthen retention and the ability to generalise the learned behaviours.
A comparison of computer-assisted instruction (CAI) and small-group teaching (seminars) of cardiac auscultation to medical students indicated that CAI is at least as effective as seminars (Mangione et al 1991:389). They identify several clinical reasons to promote CAI for teaching cardiac auscultation:

i) Declining interest in bedside diagnostic skills like cardiac auscultation.

ii) Cost effectiveness, the possibility of inexpensive serial observations.

iii) The therapeutic value of the physical contact between doctor and patient.

iv) The satisfaction of making a diagnosis using only one's own physical senses.

A proposed chiropractor simulator as a teaching-learning strategy, adapted from "the surgeon simulator" described by Reznick et al (1990:63) and Winckel et al (1995:167) is seen as having great potential for the teaching-learning of complex practice skills. It would consist of a seminar in a chiropractically equipped consultation room and would be linked to a case presentation method. The simulator learning technique would include a wide range of chiropractic clinical skills based on knowledge, psychomotor skills and attitudes relating to the integrative, chiropractic clinical decision-making framework. In preparation for a teaching seminar a chiropractic clinician would prepare a scenario and gather necessary teaching materials and choose an appropriate site for the simulation. Excellent methodologies for scenario or case discussion preparation exist (Craig and Kopala 1995:161; Atkins and O'Halloran 1995:149; Nasmith et al 1995:419). An applicable, well thought-out protocol for teaching interviewing skills has been developed by Barrand (1982B:114) and should be applied. The first half of the seminar would see the clinician becoming the patient and simulate a health problem or employ a simulated patient which could be a student trained as a standardised patient, while learners would take the role of a practitioner. After the scenario the clinician teacher would review in detail the performance of each student with an emphasis on formative evaluation. Points of importance relating to any of the range of factors in the clinical decision making framework would be reviewed and management plans and simulated demonstration of skills critically analysed. The chiropractor simulator method would have the benefits of learning in a situation with a high degree of fidelity to the real situation and at the same time will be satisfying critical educational objectives of clinical teaching. The learner, when faced with a patient with a particular health problem, will be able to manage the case through evidence-based decision making. More important than ensuring that a student can recite a differential diagnosis, choose the correct answer from a list of multiple choices or be
able to list important features of a health problem is that they are able, when faced with a patient with a particular problem, to do an appropriate history and assessment, arrive at a diagnosis and institute a plan of management or refer as appropriate. Davies (1996) at RMIT uses such a method. It is argued that a chiropractic simulator method would allow for continuous and immediate feedback, for learners to communicate findings to patients in lay terms and lessen the financial and logistic problems of using actors to simulate patients. It would assist in maintaining the high fidelity of using human scenarios and therefore would have great potential in teaching chiropractic students on a day-to-day basis. An innovative approach to a Simulated Learning Environment (SLE), which appears positively applicable to the chiropractic simulator is promoted by O'Neill and McCall (1997:141; 1996:121), who refer to open access provision to SLE which gives students control over their own learning suitable for individual styles and paces (Ramsden 1992:1). The SLE in a clinical setting can be seen as analogous to a situation where practice would normally occur. It would be equipped with ceiling mounted cameras and microphones to allow performances to be observed, recorded and played back allowing students to assess their own performance in conjunction with objective evaluation received from staff or peers. Simulated patients are added to consolidate student learning and to supply vital information about students’ performances (Harmon and Vannatta 1995:31; Van Der Vleuten et al 1990; Wong et al 1996:111). The strategy would be further enhanced through the addition of an early mentoring system to explore students’ work in a realistic community setting such as demonstrated by Quinby and Papp (1995:47). Also with family case studies such as described by Salleh (1995:63) and through experience sharing by using group psycho-therapeutic techniques in clinical training (Runia 1995:399). Use of a ‘morning report’ where computerised data is used for students and at least one clinician to exchange information on recently evaluated patients (Recht et al 1995:327) and role playing as a clinical teaching procedure (Barrand 1982C:122). This approach in medical education is strongly supported by Singer (1988:804) and Stillman et al (1983:941). It is argued that, with minor modification, this strategy has application in the chiropractic skills laboratory and teaching clinic for the ‘routine’ teaching of a range of patient assessment skills and manual therapeutic simulations.
It can also be argued that the advantages which are persuasive for the use of an integrative clinical curriculum design for chiropractic in the teaching-learning of complex professional skills include:

a) It provides a way of selecting only essential content from the masses of data being generated by knowledge explosion in the basic, clinical and chiropractic sciences.

b) Teaching-learning is based on a logical, precise, cognitive process that is easily applied to simulated and actual chiropractic clinical problems of the kind which will be encountered in community-based practice.

c) The approach responds to the concerns of students for immediate relevance and usefulness, thereby providing motivation, interest and reinforcement.

d) This approach uses teaching personnel and classroom time in a most efficient and effective way (inspired by Bevis 1989:210).

Through the use of a variety of teaching-learning strategies an equal opportunity is created for most if not all students to learn and demonstrate that learning in accordance with the aims of the subjects. The teaching practices vary in relation to the context in which particular components of a course are offered (e.g. clinical teaching, skills training); the particular concerns of students; their backgrounds, aptitudes and the level and standards for the program are taken into account in designing self-directed study guides.

Individualisation teaching in the ICCD is mediated by the use of self-directed learning packs implemented through large group tutorials to introduce the system and provide guidance along the way. While voluntary, small group interaction of learners is highly recommended and encouraged, it is not an integral part of the learning system. Self-instructional material, which is highly structured and very effective can be developed for all areas of chiropractic education. Self-instructional learning systems present a highly scientific approach to teaching and learning which, through continuing evaluation of the system, provide opportunities for refinement and improvement; and effective assessment and evaluation instruments can be developed for a system of self-instruction in all aspects of the chiropractic curriculum.
Reality simulation teaching is seen as strongly motivating to students because of its experiential nature and contribution to developing competence in what will become their life-long, professional career. Descriptive analysis of the literature suggests a dramatic increase in simulated reality teaching in chiropractic as a result of the development of excellent physical and computer models especially for teaching-learning in anatomy, physiology, pathology and the diagnostic sciences.
4.6 A CLARIFICATION OF THE EVALUATION OF STUDENT PERFORMANCE IN A CHIROPRACTIC CURRICULUM

4.6.1 Introduction

Assessment in medical education has a long history, starting with a publication by the famous Sir William Osler in the first edition of the Lancet (1913:1).

4.6.1.1 Assessment, measurement and evaluation

In present context, professionals are individuals who use technical or specialised knowledge and skill in service of the public welfare. The importance of evaluating their competence as professionals is to receive assurance that the service which is delivered by them are effective and safe (McGaghie 1994:59). Gonczi et al (1993:12) suggest that performance assessment is a process with a focus on data gathering, using a variety of instruments and strategies. Data is collected by means of systematic observation for the purpose of making specific decisions about an individual, not a program or product reflecting a group's activity.

Assessment involves the interpretation of measurement data (Print 1992:145) following an analysis of results and a comparison with the performance of others (i.e. norm-referenced assessment) or comparison with a set standard e.g. a criterion or objective (i.e. criterion-referenced assessment). Competency-based assessment is against set criteria, therefore it is criterion-referenced assessment (Gonczi et al 1993:51).

Measurement data interpreted during assessment refers to any numerical description, grading on a scale or other means of quantifying the outcome or performance of the measurement. In assessment, measurement is a way of coding or combining the results of judgements, using either marks or categories (e.g. pass/fail) (Gonczi et al, 1993:52; Print 1992:144).

The information gained from measurement is interpreted to reach an assessment. Examiners to make value judgement interpret assessment results. This constitutes an evaluation which is always expressed as written comments.

Formative evaluation is regular testing of progress on competence throughout a course. It is directed towards determining the degree of mastery, resulting in competence, which is demonstrated in the performance of professional tasks against pre-established criteria, identified as performance indicators, at a defined standard. Assessing chiropractic students should help them focus their learning during the course, identify individual strengths and weaknesses, provide an opportunity for improvement, highlight deficiencies in the content or
delivery of the course and ultimately protect the public against incompetent graduates (based on Print 1992:154-6). To do all this the assessment system must contain a large and properly managed formative element.

**Summative assessment** is applied at the end of a learning experience e.g. self-directed or other education and training or at the end of a course to qualify as a practitioner which may be the point of entry into a profession. It is a general assessment of the overall degree to which outcomes have been attained over a period of time and normally represent major examinations such as competency-based assessment at the end of a semester or year or assessment for professional registration. The summative assessment must be criterion-referenced; and there must be adequate feedback between staff and students to ensure that all potential gains are obtained from the assessment system (Print 1992:154-6).

4.6.1.2 **Competence** is not something that is directly observed, it is inferred from performance and competency-based assessment. In common with other types of assessment it involves inference that is subject to error, hence in all cases, it is important to gather the kind of evidence that will make the inference safe (Gonczi et al, 1993:11). Assessment can be thought of as occurring whenever one person, in some kind of interaction, directly or indirectly, with another, is conscious of obtaining and interpreting information about the knowledge and understanding or abilities of that person (Rowntree 1987:4). Competency-based assessment is the process of judging competence against pre-established performance standards, following the gathering of sufficient evidence to enable a judgement to be made through inference from performance of a sufficient number of varied activities to make the inference safe (Gonczi et al, 1993:11). To ensure that the inference is safe, it is argued that the competencies on which the clinical evaluation is based should be carefully identified and weighted. Excellent techniques for this purpose have been developed by Aston-McCrimmon and Hamel (1983:77; 1986:954; Sanford et al (1993:369) and Heymann and Roberson (1984:166) while problems with non-response bias to this type of survey is discussed by (Hovland et al 1980:270).

A competent practitioner has the attributes (knowledge, skills, attitudes, abilities) necessary for performance (carrying out of the multitude of tasks required) to the appropriate standards (performance criteria against which competence can be assessed and validated) (Adapted from Gonczi, Hager, Athanasou, 1993:7). It is therefore argued that such competencies should have clearly defined performance indicators to assist assessors and that the indicators
should be linked to standards of practice guidelines (Holey 1993:379; Kleynhans 1992A:98; 1993:1). Furthermore, clinical competence is a complex phenomenon which almost always requires the practitioner to use a combination of attributes simultaneously and to adapt their practices to different contexts. No single assessment technique has been found which can evaluate overall clinical competence and in fact, the use of planned combinations of techniques, heavily based on performance assessment, has increasingly become the norm both in the United States and Australia (Gonczi et al, 1993). Also, performance assessment as an approach to human performance evaluation is the process of gathering data by systematic observation for making decisions about an individual (Berk 1986:1 quoted by Gonczi et al 1993:12) which has been increasingly studied and developed in recent decades. In the chiropractic curriculum, performance assessment is linked to the clinical situation. The basic philosophy behind competency-based assessment of professional skills is well guided by an aphorism by Sir William Osler: "to study the phenomena of disease without books is to sail an uncharted sea, while to study books without patients is not to go to sea at all" (Bennett and Bennett 1950:76). In this context, Reznick et al (1992:487) argue that we need to observe learners interacting with patients to assess their clinical skills and that the closer an assessment simulates the eventual task, the more valuable it will be.

4.6.1.3 Assessment of student performance in an integrative clinical curriculum design is seen as a major phase of curriculum development both in a cyclical and a process model. In fact, evaluation is the driving force behind the curriculum and determines the real curriculum objectives i.e. what students "really" learn (Kowlowitz et al 1991:347) and the quickest way to change student learning is to change the assessment system (Elton and Laurillard 1979:87). Katz and Snow (1980:13) say that performance assessment of a health worker measures the ability of the individual to carry out a specific task and focuses on their total behaviour - knowledge, attitude and practices acquired during training as well as their organisation and integration in practice. It is argued that to have both meaning and relevance, evaluation of student performance must:

a) be linked directly to curriculum intent;

b) be based on the content most relevant to future practice;

c) be correlated with learning experiences transmitted through teaching-learning strategies;

d) contribute to a positive learning climate;
e) have in-built quality assurance guidelines;

f) be subject to change based on self-evaluation of the student evaluation strategies; and

g) ultimately serve as evidence during accreditation reviews that a major outcome indicator of curriculum success i.e. competent practitioners, has been attained.

A very important benefit of assessment is the direct relationship that appears to exist between assessment and learning strategies. Cox (1990:540) observes that the examination focus influences the structure of learning e.g. reliance on formal examinations tends to encourage rote learning, recognition and recall. Therefore, a focus during assessments on those attributes most important to graduate outcomes e.g. problem solving, practice skills etc., can be argued to foster learning in those domains (Gonczi et al 1993:45).

4.6.1.4 Curriculum design questions

A series of questions to assist curriculum developers is presented in Table 90.

<table>
<thead>
<tr>
<th>TABLE 90 - Curriculum design questions about the assessment of student performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Can all the aims be assessed?</td>
</tr>
<tr>
<td>2. Should all the aims be assessed?</td>
</tr>
<tr>
<td>3. To what extent, where and when should diagnostic, formative and summative assessment be used?</td>
</tr>
<tr>
<td>4. Where and to what extent should self-assessment be used?</td>
</tr>
<tr>
<td>5. Which elements of learning can be assessed (e.g. information, problem solving, skills, attitudes and habits)?</td>
</tr>
<tr>
<td>6. What types of tests can be used?</td>
</tr>
<tr>
<td>7. Which systematic observation techniques can be used (e.g. work samples, direct observation, checklists and rating scales, multitstation objective structured examinations, anecdotal records)?</td>
</tr>
<tr>
<td>8. For which elements of assessment should interviews, self-reports, questionnaires and sociograms be used?</td>
</tr>
<tr>
<td>9. How should student assessment relate to program evaluation?</td>
</tr>
<tr>
<td>10. What is the reliability, validity and fidelity of each type of assessment?</td>
</tr>
<tr>
<td>11. Which factors may interfere with assessment of student performance areas?</td>
</tr>
<tr>
<td>12. Which assessment techniques and methods are most appropriate to each of the aims and objectives?</td>
</tr>
<tr>
<td>13. Which facilities and materials are available for assessment?</td>
</tr>
<tr>
<td>14. Who are available to participate in assessments (e.g. external and internal examiners; patients; models)?</td>
</tr>
<tr>
<td>15. Which skills and what experience do the examiners have?</td>
</tr>
<tr>
<td>16. In which areas of the curriculum should norm- and criterion- referenced assessment be used?</td>
</tr>
<tr>
<td>17. How does student assessment relate to curriculum evaluation (e.g. how does student failure relate to curriculum deficiency)?</td>
</tr>
</tbody>
</table>

4.6.1.5 The selection of assessment methods and techniques

According to Athanasou and Hawke (1992) in Gonczi et al (1993:43) general issues which need to be considered in selecting the methods of assessment that will best suit a profession include:

a) the amount of evidence required needs to be specified (e.g. repetitions and the context of the performance);

b) the adoption of particular methods of assessment may mean that some people are not treated equally (therefore, a sufficient range of methods should be used);

c) the assessment process will take time to establish credibility;

d) cost estimates are not straightforward (each of the competency-assessment methods has particular associated costs); and

e) measures may be required to detect any anomalies in assessment outcomes (e.g.: accuracy of different assessments, relationship between judgements and performance on real patients in the clinical workplace).

Important criteria with respect to the quality of competency-based assessments focus on the feasibility, reliability, validity, fidelity and control of bias in relation to the methods of assessment selected. Feasibility issues relate to the utility and practicability of using certain assessment methods and techniques including acceptability, scoring, cost issues, security, administration and learning implications. 'In reliability, we search for the consistency or stability of the measure over time and over situations' (Friedman and Mennin 1991:390). The reliability of competency-based assessment is optimised to a reasonable level: a) if multiple assessments of competencies are undertaken; when objectivity in grading performance is facilitated through aids such as marking guides, rating scales and checklists; b) when the amount of evidence collected in a competency-based assessment is sufficient to ensure judgment of consistent performance to the standard required across a range of situations and through repeated performance or by drawing on a number of different sources of evidence; and c) when there is internal consistency and test-re-test reliability of the assessment methods used and when the forms and components of the assessment is continually evaluated and improved over time including the evaluation of individual items, sub-tests or components within the competency-based assessment and the evaluation of the reliability and validity of the overall assessment decision (Gonczi et al 1993:45). 'In establishing validity, we try to design an appropriate and accurate test of a target behaviour that needs to be measured'
(Friedman and Mennin 1991:390). Assessment specifications which determine the basic framework within which assessment takes place are determined by answering three main questions: a) what evidence is needed?; b) how much evidence is needed?; and c) which methods will provide quality evidence? (Black 1993:9). Specifications include items such as: a) weighting of content according to performance areas (behaviours); b) domains in which assessment should take place and major range indicators for competencies in each domain; c) assessment methods and techniques used; d) chiropractic clinical content according to health care conditions; e) content in the exam based on diagnostic and therapeutic techniques; and f) content included in specific assessment methods e.g. in the objective, structured clinical examination (or OSCE), the written assessment etc (Fabb and Marshall 1983:22-26). Factors which influence the inference of competence are related directly to the selection of assessment methods which determine the quality and quantity of evidence which is gathered in order to scientifically support the inference of competence. That is, assessment methods are selected on the basis of the evidence required to infer competence including the characteristics of evidence—quantity, quality, validity of evidence and indices used, and on the basis of the practical considerations and operational factors needed in producing such evidence i.e. the efficiency of obtaining evidence needed to infer competence (Black 1993:5; McGaghie 1994:59; Gonczi et al 1993:54). Harden (1979:65) gives an excellent overview of student assessment.

4.6.2 Psychological Foundations of Student Assessment

4.6.2.1 Overview

It is argued that the psychological foundations of student assessment should be considered in two, broad perspectives. These are one, the factors which influence students and student learning and two, those which influence the assessors, particularly in relation to issues of bias and other factors which influence the validity of the assessment. Bandaranayaka (1978:597) indicated that assessors' physical and mental condition and environmental conditions affects scoring of essays. Lowry (1993A:54) suggests that assessing medical students should help them focus their learning during the course, identify individual strengths and weaknesses, provide an opportunity for improvement, highlight deficiencies in the content or delivery of the course and ultimately protect the public against incompetent graduates. It is argued that to attain this outcome the assessment system must contain a large and properly managed
formative element and the summative assessment must be criterion rather than norm-referenced. Also, there must be adequate feedback between staff and students to ensure that all potential gains are obtained from the assessment system. Lepper (quoted by Kindsvatter 1988:42) has shown that students' motivation to accomplish a task tends to be diminished if they feel they are being overly controlled i.e. too closely monitored.

4.6.2.2 The relationship between motivational theory and assessment is shown in Table 91.

<table>
<thead>
<tr>
<th>PRINCIPLE</th>
<th>LECTURER BEHAVIOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback of pleasing results provides motivation via incentive</td>
<td>Assimilation of lecture material ought to be tested regularly. Evaluation of test results should be conveyed to students as swiftly as possible and ought to be interpreted in the context of both short and long-term goals</td>
</tr>
<tr>
<td>Self-esteem is enhanced by success experience and promotes high motivation</td>
<td>Competence and mastery should be recognised and reinforced by praise e.g.: when giving an excellent adjustment or making a brilliant diagnostic deduction</td>
</tr>
<tr>
<td>Maintenance and enhancement of the 'perceived-self' is the central factor in learning events and the motive behind all behaviour</td>
<td>Temporary failure should be seen by both student and lecturer as an occasion for a fresh attempt to overcome difficulties</td>
</tr>
<tr>
<td>Feelings of success with current learning heighten motivation for subsequent tasks, and feelings of failure lower motivation for subsequent tasks</td>
<td>Tasks and quizzes with different degrees of difficulty should be made available in both cognitive and psychomotor skills areas, so all students experience success in some aspects</td>
</tr>
<tr>
<td>Shift the emphasis from rote learning of facts to the development of learning skills and deeper understanding of of underlying principles</td>
<td>Change assessment strategies to place more emphasis on an &quot;open book&quot; approach to assessments by means of essays, assignments and practical projects supplemented by multiple choice question papers and objective, structured clinical examinations, short answers and essays</td>
</tr>
</tbody>
</table>

4.6.2.3 Influences on assessors

When planning assessment, the assessor must be aware of various influences on the assessment process which could affect the quality of the system. Where applicable, assessment should be unobtrusive, questioning and probing, but should not interfere with normal practice activity. All assessors can be influenced by a number of factors and it is helpful to be aware of the most common influences so that they can be avoided (Fletcher 1991:64-66; Lenburg 1979:249). A sense of direction is important since unplanned assessment will result in inaccurate judgements; thus assessors should always be clear about what evidence they are looking for in any assessment situation which requires them to be familiar with and to understand the specified standards (Fletcher 1991:64-66). Potential problems that can interfere with the quality of evidence include:

a) an illusion of validity, which can readily occur since it is very easy to observe someone or to review written evidence and conclude that 'this is good'. However, the issue at hand is not whether or not an individual does 'good work', the issue is whether the evidence currently being assessed provides valid proof that the required standards are being met (Bandaranayaka 1978:595; Fletcher 1991:65). Evidence can be of high quality, but have nothing whatsoever to do with the particular area of competence, which is being assessed (Fletcher 1991:65). Friedman and Mennin (1991:394) suggest that validation studies are needed to reconfirm what constitutes a minimally competent performance for different test users e.g. how standards are set using expert judgement and how agreement is achieved among judges and how subjective judgement should be controlled. Trustworthy evaluation of professional competence also requires attention to the social conditions where such individuals work and to evaluation technology (McGaghie 1994:59).

b) stereotyping is never useful in an assessment situation. The concern as an assessor is to collect and evaluate relevant evidence of actual performance and this has nothing to do with categorizing people (Fletcher 1991:65).
c) **halo and horns effects** are a very common source of inaccurate judgement due to preconceived ideas about a person's performance. These ideas may be based on the fact that the assessor actually likes the person concerned (they have a halo), or that they don't like them (they have horns) - or that they usually do good or excellent work. The reverse works as well: maybe they do or don't like the assessor! None of these considerations should affect judgement during assessment and the concern should always be the actual evidence presented (Fletcher 1991:65; Gonczi et al 1993:58).

d) **the Hawthorn effect** relates to the fact that people act differently when they know they are being assessed. Ideally, competency-based assessment is *continuous* and should therefore be carried out under normal working conditions on an everyday basis and the assessment should be unobtrusive (Fletcher 1991:65).

e) **contrast effects** are about the fact that competency-based assessment is *individualised* assessment, concerned with individual performance, not a comparison or contrast with how other people perform. Assessors should therefore be careful to avoid comparing and contrasting candidates in the group for which they are responsible (Fletcher 1991:65).

f) **other psychological responses of evaluators** are discussed in detail by Lenberg (1979:240-259) to show how validity may be affected by issues such as anxiety, guilt feelings, confusing teaching with assessment, fatigue, anger, etc. Some factors have also been identified by Bandaranayaka (1978:595-597).

g) **potential assessor-based errors** identified by Gonczi et al (1993:58) which have psychological implications include 'marking down the middle' i.e. the tendency to judge performance as being in the middle of a rating scale. **Faulty calibration** which relates to rating of early candidates too high or too low, **failing to observe** due to lack of expertise in picking up even non-verbal cues, and **failing to record** because inexperienced assessors believe they will be able to recall better than they actually can.
4.6.3 The Assessment of Student Performance in the Domains of Learning

4.6.3.1 Overview
The taxonomies of educational objectives in the various domains have been enthusiastically received by teachers, educationalists and test developers because they offer easily understandable guidelines for systematic evaluation (De Landsheere 1988:345) covering the whole range of cognitive, psychomotor and affective processes. Expansion of this concept follows below.

4.6.3.2 The assessment of student performance in the cognitive domain
Categories in Bloom's taxonomy of educational objectives in the cognitive domain (Table 92 below) can be used as criteria to create a framework for the assessment of student performance. However, in the ICCD these categories would almost invariably be used in conjunction with criteria from the other two domains in the assessment of complete professional practice. It is argued, however, that unless assessors apply the basic curriculum elements such as Bloom's taxonomy, the assessments designed may be lacking in comprehensiveness and the attainment of all major objectives may not be adequately measured. The descriptions for each of the cognitive levels can be used as a guide in designing assessments so that learning experiences in the curriculum for each level can be adequately assessed to ensure maximum development and moulding of students within the time constraints of the course. It is hypothesised that this approach will promote self-directedness and independence in learners because it will provide an additional framework for use as a tool in learning. The basic chiropractic educational objectives in the cognitive domain, identified in Table 75 above, should be classified, ideally, according to Bloom's taxonomy, and correlated with relevant assessment strategies. Miller et al (1991:481) took an innovative step by adapting Bloom's taxonomy in the cognitive domain mutatis mutandis to objectives in medical education. Further adaptation of their work to chiropractic appears in Table 92.
TABLE 92 - Application of Bloom’s taxonomy of educational objectives in the cognitive domain to competency-based assessment in chiropractic

COGNITIVE LEVELS (from lowest to highest)

1. Knowledge - the recall of specifics or related facts. This process emphasises the psychological processes of remembering. It includes knowledge dealing with specific facts, trends, classifications and theories as well as procedures employed in a specific subject field. Knowing the major risks for a patient with a particular illness would be an example of this level.

2. Comprehension - this represents the lowest level of understanding. Comprehension involves making use of an idea without necessarily relating it to other material or realising its full implication. Examples are interpreting the meaning of a graph or predicting the continuing spread of a contagious disease.

3. Application - the use of abstractions or principles to solve problems. These may be in the form of generalisations or theories that must be remembered and applied. Examples include applying scientific terms discussed in a paper to other situations, or solving health problems using scientific knowledge.

4. Analysis - the breaking down of complex information into simpler parts to understand how they are related or organised. Analysis is intended to clarify and provide an understanding of the interactions between elements. An example would be relating a patient’s previous symptoms to a current medical condition.

5. Synthesis - the process of combining concepts to constitute a new whole. This includes creating completely new products such as writing a composition or developing a differential diagnosis for a patient.

6. Evaluation - making value judgements based on some given criteria or standard. Comparing two different medical procedures regarding patient prognosis is an example of this level.

Based on Bloom 1956 and Miller et al 1991:481.

A multi-dimensional evaluation system for the basic medical sciences (McLeod et al 1996:19) is an excellent example of how the abovementioned principles can be put into practice.

4.6.3.3 The assessment of student performance in the psychomotor domain

Skills tests are of particular relevance to the validation of the professional competency of chiropractors because of the 'hands-on' nature of their assessment and patient care procedures. A number of taxonomies of educational objectives in the psychomotor domain (Harrow 1973; DeLandsheere 1988:345) were reviewed. As a result of participant observation of the assessment of psychomotor skills in the chiropractic curriculum, particularly chiropractic manual technique (CMT), it is suggested that assessment of objectives in the psychomotor domain can be most effectively based on Simpson’s taxonomy.
<table>
<thead>
<tr>
<th>PSYCHOMOTOR LEVELS</th>
<th>DESCRIPTION OF BEHAVIOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PERCEPTION</td>
<td>The process of becoming aware of objects, qualities or relations by way of the sense organs</td>
</tr>
<tr>
<td>1.1 Sensory stimulation</td>
<td>Impingement of a stimulus upon one or more of the sense organs (auditory, visual, tactile, taste, smell, kinesthetic)</td>
</tr>
<tr>
<td>1.2 Cue-selection</td>
<td>Deciding to what cues one must respond in order to satisfy the particular requirements of task performance</td>
</tr>
<tr>
<td>1.3 Translation</td>
<td>Relation of perception of action in performing a motor act. This is the mental process of determining the meaning of the cues received for action</td>
</tr>
<tr>
<td>2. SET</td>
<td>Preparatory adjustment of readiness for a particular kind of action or experience</td>
</tr>
<tr>
<td>2.1 Mental set</td>
<td>Readiness, in the mental sense, to perform a certain motor act</td>
</tr>
<tr>
<td>2.2 Physical set</td>
<td>Readiness in the sense of having made the anatomical adjustments necessary for a motor act to be performed</td>
</tr>
<tr>
<td>2.3 Emotional set</td>
<td>Readiness in terms of attitudes favourable to the motor act's taking place</td>
</tr>
<tr>
<td>3. GUIDED RESPONSE</td>
<td>Overt behavioural act of an individual under the guidance of the instructor (imitation, trial and error)</td>
</tr>
<tr>
<td>4. MECHANISM</td>
<td>Learned response has become habitual</td>
</tr>
<tr>
<td>5. COMPLEX OVERT RESPONSE</td>
<td>The individual can perform a motor act that is considered complex because of the movement pattern required. A high degree of skill has been attained. The act can be carried out smoothly and efficiently</td>
</tr>
<tr>
<td>5.1 Resolution of uncertainty</td>
<td>The act is performed without hesitation and with confidence</td>
</tr>
<tr>
<td>5.2 Automatic performance</td>
<td>The individual can perform a finely coordinated motor skill with a great deal of ease and muscle control</td>
</tr>
<tr>
<td>6. ADAPTING AND ORIGINATING</td>
<td>The individual might originate new patterns of actions in solving a specific problem</td>
</tr>
</tbody>
</table>

Based on: Simpson EJ. 1966; and De Landsheere V. 1988.

The steps in executing chiropractic psychomotor skills are consonant with the categories in Simpson's taxonomy as shown by the following analysis where the different 'categories' and sub-categories identified by Simpson appear in bold.
a) **Perception** relates strongly to the use of palpatory examination of patients using both static and motion palpation which depend primarily on **sensory stimulation** of receptors in the practitioner's fingers. Through repeated exercise over many years of practical work in chiropractic psychomotor skills laboratories, **cues** are developed such as the characteristic "end-feel" of joints and "blockage" in the movement of joints which are **translated** by the examiner into diagnosis of aberrant biomechanical function.

b) When developing in students the skills in delivery of chiropractic manual techniques, a key factor is operant conditioning in terms of readiness to execute a manual adjustment to spinal joints. This is identical to the "set", as Simpson calls it, which depends on mental, physical and emotional factors. The **mental set** is based on knowledge of the principles of chiropractic technique. The **physical set** on conditioned psychomotor responses to the situation at hand i.e.: the physical relationship between student and patient and the type of corrective chiropractic adjustment to be made and the **emotional set** is related to the realisation that the student is about to intervene physically with the body of another human being.

c) The **guided response** involves an integration of the cognitive, psychomotor and affective aspects of the chiropractor as human being. This is probably the most difficult phase of the education and training of a chiropractor and is dependent on repetitive practice under the guidance and with the role modelling of chiropractic teachers who are simulated by students during a phase of trial and error while practising the procedures. Practice over a period of years contribute to development of the emotional set when the point is reached where a technique has to be applied to a live patient without much room for trial and error.

d) The **mechanism** described by Simpson is readily recognised in the learned psychomotor responses which have become habitual in a fourth year student who has developed chiropractic skills to a level adequate to have earned the privilege of practicing in a teaching clinic.
e) **Complex overt response** is the result of considerable education, training and experience gained during the period of clinical practicum work in a chiropractic teaching clinic. It results in competence in chiropractic manual skills characterised by confidence (*acting without hesitation*) and an **automatic performance**, which subsumes speed, accuracy, efficacy and effectiveness. When a high degree of skill has been attained and the act of chiropractic manual techniques can be carried out smoothly in a finely coordinated way, it contributes to the aesthetics of chiropractic practice recognised in final year students.

f) **Adapting and originating** chiropractic manual techniques is part of the curriculum intent and is essential to the effective and competent practice of chiropractic. Since not all patients are alike and since changes to normal structure takes place in the presence of certain pathologies, techniques have to be adapted to suit specific individuals. This can only be done by an experienced practitioner who has a sound foundation in both the **cognitive** and **psychomotor** skills domains in addition to a well developed **affective** component making it possible to competently deal with patients in pain.

Techniques to assess learner performance in this domain are discussed primarily in 4.6.7 and to a lesser extent in 4.6.4 and 4.6.5 below.

### 4.6.3.4 The assessment of learner performance in the affective domain

Criteria for assessment of behaviour in the affective domain have been identified by Irvine (1988:189) including qualities such as:

a) Respect for other people; awareness of learners' own personality traits, beliefs and value systems; respect for human life, not only in the physical sense but in a psychological and social sense.

b) Respect for themselves and their own needs.

c) The ability to solve problems and make decisions in a systematic, humanitarian way, with regard to the patient as a whole person and with regard for the expertise of others in the health team;

d) A positive attitude to life-long learning.

e) A commitment to the profession they are part of and a willingness to enable it to change to meet changing needs in society.
Simulation exercises can be used for both training and assessment, e.g. a trigger film of an interview with an angry patient; role playing a conversation with a patient in great pain; experiential exercises and learning "games" to illustrate inter-personal communication skills (Irvine 1988:191).

Fabb and Marshall (1983:24) suggest that affective attitudes and skills should be measured in relationship to all components of a clinical problem and not just to an appended psychosocial problem. The attitudes to be measured should include: a) tolerance of ambiguity and uncertainty; b) appropriate risk-taking behaviour; c) acceptance of responsibility; d) self-assessment; e) acceptance of responsibilities of a professional.

Assessment of attitudes and professional behaviour does not require teachers to develop and use a specialised assessment technology but does require that teachers clarify their goals in the affective area. Teachers must then define them as specifically as possible in terms of tendencies to behave in certain contexts and incorporate opportunities to assess their tendencies in the course of routine clinical learning and examinations (Irvine 1988:192).

Assessment of habitual performance can be conducted in almost every clinical training interaction using rating scales that are completed by an observer. It is argued that when constructing rating scales, affective behaviours relating to all 5 levels identified by Krathwohl, Bloom and Masia (Krathwohl et al 1964) should be considered (Table 94).

TABLE 94 - Educational objectives in the affective domain

<table>
<thead>
<tr>
<th>AFFECTIVE LEVELS</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. RECEIVING</td>
<td>Sensitivity to the existence of certain phenomena</td>
</tr>
<tr>
<td>2. RESPONDING</td>
<td>Active attention to phenomena, reflecting interest but not commitment</td>
</tr>
<tr>
<td>3. VALUING</td>
<td>Perception of worth or value in phenomena</td>
</tr>
<tr>
<td>4. ORGANISATION</td>
<td>Arrangement of values into an organised system</td>
</tr>
<tr>
<td>5. CHARACTERISATION</td>
<td>The development and internalisation of the organisation level to the extent of representing a philosophy of life</td>
</tr>
</tbody>
</table>

From: Krathwohl, Bloom and Masia (1964).
Fabb and Marshall (1983:25) classify the interpersonal skills to be observed in the doctor-patient interview as below. The affective levels, from Kratwohl, Bloom and Masia’s classification, indicated in brackets are based on the perceptions of the author:

**Initiation:** salutation;  
acceptance and concern;  
listening  

**Maintenance:** ease of interviewer;  
ease of patient;  
reasonable control of interview;  
appropriate tempo  

**Termination:** clarifies issues;  
provides appropriate reassurance;  
delineates follow-up;  
ensures that the patient understands

Different authors have described similar performance areas that can be used to provide a conceptual framework for competency-based assessment of objectives in the affective domain, which apply to complex clinical practice:

- Nyquist (1991A:6): professional attitudes, habits and interpersonal skills  
- Fabb and Marshall (1983:8,11,24): appropriate attitudes, interpersonal and communication skills  
- Burg, Lloyd and Templeton (1982:60): attitudes, work habits and interpersonal skills  
- Sauter and Spurgin (1990:170): affective development i.e. interpersonal skills/professional demeanour, professional activities, patient care empathy; and communication skills, i.e. oral communication and writing skills.

It is argued that assessment of chiropractic objectives in the affective domain in an ICCD will be greatly enhanced through detailed analysis of chiropractors’ performance tasks, their correlation with affective levels in Krathwohl, Bloom and Masia’s taxonomy (Kratwohl et al 1964) and the selection of relevant techniques to assess each.
4.6.3.5 Assessment of student performance in complex professional practice

How competence is conceived will make a big difference to the assessment process used. If professional competence is thought of as the capacity to successfully perform a series of discrete observable tasks, then assessment will likely consist of an observer simply ticking off a checklist of the discrete tasks. However, reducing an occupation to a series of discrete observable tasks provides a trivial and superficial representation of the occupation. If professional competence is thought of simply as possession of a series of desirable attributes including knowledge of appropriate sorts, skills and abilities such as problem solving, analysis, communication, pattern recognition, and attitudes of appropriate kinds, then it follows that assessment will be seen in terms of a strategy to assess each of these separate attributes (Gonczi et al 1993:13; Heywood et al 1992:16); and the most appropriate instruments selected (Levine 1978:33).

The integration concept of competence assessment is based on knowledge, abilities, skills and attitudes displayed in the context of a carefully chosen set of realistic professional tasks, which are of an appropriate level of generality. This integrated approach avoids the problem of a myriad of tasks by selecting key tasks or elements that are central to the practice of the profession. Following this, the main attributes required for the competent performance of these key tasks or elements are then identified and used as a basis for assessment (Gonczi et al 1993:13).

It is argued that, traditionally, the emphasis in chiropractic and medical education has been on acquiring a body of essential facts on each topic, but now more attention is given to the skills and attitudes thought to be important in a "good doctor". It is argued that a range of methods is needed to assess the range of clinical skills. As an example, the multiple choice question paper is an excellent, cheap, reliable, and reproducible way of testing factual knowledge but tells us almost nothing about clinical skills (Fabb and Marshall 1983:50). The objective structured clinical examination is expensive, administratively cumbersome, and lacks high reliability but is an excellent way of assessing practical skills (Reznick et al 1992:487). Even complex processes like skill at self-directed learning can be tested e.g. the McMaster University "Triple Jump Exercise" (Chapman et al 1993:225). However, important guideposts to clinical assessment are medical information processing skills (Joorabchi 1989:331) which, it is argued, need to be considered in all clinical assessment.
Work-based assessments are the most direct and realistic tests of competence (Black 1993:4). They are a particularly useful method of assessment in areas such as the chiropractic profession where students can undergo formative assessment in the clinical situation by their supervisors. Because clinic-based assessment can take place over an extended period of time, it can yield valuable insight into the overall performance, functioning and competence of a soon-to-be entry level chiropractor. The candidate can be observed undertaking a wide variety of real tasks and much more reliable judgements about professional competence are possible than with assessments conducted in a summative fashion using more artificial methods and techniques (Black 1993:4). The relative advantages and disadvantages of assessment methods and techniques are analysed below, including:

- Observational Techniques
- Oral Techniques
- Self-assessment
- Student Work
- Written Assessment

4.6.4 Observational Techniques for the Assessment of Performance in Complex Professional Practice

4.6.4.1 Overview
Assessment of performance in clinical practice is a complex task (Newble 1978:637; 1982:225) and may address some or all of four levels of complexity of task: pre-requisite knowledge; partial, prescribed tasks; patients with problems; and performance in practice. Each focuses on different abilities and the later levels subsume the earlier abilities (Cox 1990:543). A range of observational techniques are discussed below.

4.6.4.2 Direct observation of patient care
Cox (1982H:241; 1990:543) says that task performance in professional practice draws on integration of working knowledge, practical skills and responsible behaviour and suggests that clinical assessment should move towards multiple, performance-based assessments on real world tasks in natural settings. He points out that while scores across tasks may show little correlation and would not be expected to, they reveal a profile of strengths and weaknesses which diagnose what needs to be learnt. In a chiropractic context, the 'real world
tasks in a natural setting' include community interaction, health care system interaction, professional interaction, staff and financial management, management of practice environment, patient assessment, diagnostic decision making, planning of patient care, implementation of patient care, disease prevention and health promotion (Kleynhans 1993:14-17). Cox (1990:540) argues that although the clinical process can be divided into parts, which are sufficiently simplified and specified to enable a form of measurement of each, it does not follow that measuring all the separate parts is equivalent to measuring the whole, integrated performance. He says that clinicians observably do not work systematically through a sequence of routines, but search for clues to fit explanations that spring to their mind as the clinical picture develops. Also, that clinical activity moves flexibly backwards and forwards with overlapping processes from listening to questioning and back, in examining and probing and asking more questions and in advising, discussing and negotiating. He sees the process as responding opportunistically to clinical evidence as it becomes available, adapting to the emotional state of the patient and responding to the emotional transaction implicit in every consultation. It is also noted that sophisticated protocols have been prepared (Nyquist 1991D:1; 1991E:1; 1991F:1), for practice-oriented evaluation of students, even in specialty areas such as paediatrics (Nuutinen et al 1997:200). These very convincing arguments further support the notions discussed in 4.6.3.5 above that direct observation of patient care in the clinical workplace, on a formative rather than summative basis, is the most appropriate strategy for the assessment of learner performance. In this context, it has been suggested that measurements are most appropriately recorded using a rating scale for assessment of a specific performance or range of performances (Nyquist 1991B:4). An analysis of this method appears in Table 95.
TABLE 95 - Analysis of direct observation of clinical practice as an assessment strategy

Uses: to collect data about performance of technical skills, interpersonal skills, clinical skills and patient related attitudes; to gather information about clinical problem-solving capabilities (2).

Strengths

High face validity (2)
High level of fidelity
Focuses on products and/or processes (1)
Can provide high level of integrated assessment (1)
Allows assessment of attitudinal and interpersonal skills (1)
Allows assessment of practical and technical skills (1)
Offers realistic evidence of competence (1)
Allows supervisor evaluation of problem solving (1)
Focuses on relevant performance criteria (1)
Gives indirect evidence of knowledge/understanding (1)
Permits complex assessments (1)
Ease of construction of instruments (2)
Ease of administration and scoring (2)
Excellent potential for feedback to learners (2)

Weaknesses

Potential unreliability of ratings (2)
Lack of standardisation (2)
Amount of staff time needed for implementation (2)
Circumstances of observation may be too specific (1)
May require lengthy and costly assessments for reliability (1)


Nyquist (1991B:4) says that reliability of ratings can be improved by using multiple raters and multiple assessments and averaging the results for each learner; training the raters and providing them with a standard against which to compare their ratings; and including specific behaviours. It is argued that non-participant observation of client-health worker interactions (Weerakoon and Fernando 1990:311) could also be considered as a strategy to improve the reliability of ratings as can the use of videotapes of the complete medical interview and physical examination (Edelstein & Ruder 1990:155).

4.6.4.3 Direct observation of clinical performance in simulated patient care situations has all of the uses and strengths of direct observation in actual care situations (Fabb 1982:237; Holzman 1982:160). It also has the benefit of standardisation of the assessment procedure i.e. every learner can be assessed on the same patient workups (Nyquist 1991B:4). Analysis of this method is provided in Table 96.
### TABLE 96 - Advantages of simulation techniques used for the assessment of performance of complex professional practice

#### Strengths

- It is a very powerful assessment technique (3)
- Low to moderate level of fidelity (1)
- Can provide high level of integrated assessment (1)
- Assesses data gathering, hypothesis creation and problem solving (1)
- Allows assessment of attitudinal and interpersonal skills (1)
- Allows assessment of practical and technical skills (1)
- Provides indirect evidence of knowledge/understanding (1)
- Permits complex assessments (1,10)
- Gives opportunity to observe specific elements of competence (1)
- Provides realistic simulation of activities (1,10)
- Most direct method for assessment of whether program is delivered as planned and of program quality separate from outcomes
- Ease of administration and scoring
- High validity for assessment of clinical skills, technical skills and interpersonal skills of learners
- Content and face validity high (2,7), concurrent validity moderate (2)
- Clarity of feedback to learners and program personnel
- Can be used to assess changes in learner performance or practice-related behaviour, particularly in situations where use of real situations is not feasible (10)
- Standardisation of the assessment procedure, i.e. every participant can be assessed on the same patient workups
- Can include "patient" feedback about interactional behaviours
- If ‘patients’ used as evaluators requires less professional time than observation in actual settings
- The use of multiple standardised patients to simulate the same cases show little or no effect on reliabilities of total, checklist and written scores (5)
- Wide applicability, ease of development, ease of administration
- Provides a structured and standardised means to assess clinical and interpersonal skills of participants
- Can provide reliable estimate of performance if sufficient number of stations are used
- Most direct method for gathering data prior to, during, or after completion of a program related to the current status of the target institution. Can gather data in some instances related to impact on target audiences such as patients
- Effect of transmission of information among candidates on the day of the examination are minimal (6)
- Methods of measuring clinical competence using standardised patients are enjoying increasing popularity (8,9)

#### Weaknesses

- The potential for unreliability and bias in measurement (4)
- Requires careful preparation and testing of the rating instruments (4)
- Cost for training and paying standardised patients (3)
- Due to reliance on memory and the high degree of judgement involved it is much more susceptible to rating errors and rating biases (4)
- Items must be written and raters trained to avoid problems with ambiguity of items (3)
- Raters must be trained to assess only those items where they have sufficient information to judge performance
- Initial case development is costly in terms of staff time (3)
- Standardisation patients need to be trained and paid for each performance
- Logistics of testing large numbers of students can be very complicated
- Requires considerable professional expertise in deciding what to observe
- Requires time and training of observers (4)
- Requires careful preparation and testing of the recording instruments (4)
- May not be able to assess all areas of interest and may violate propriety standards

Strategies suggested to improve assessment of clinical skills with standardised patients include:

a) clinical cases can be simulated by using computers with programs designed to provide all of the information required to make a diagnosis and initiate a treatment plan. The cases are uncued, in simulated time, and require sound clinical judgement for management. The system is used as computer-based examination (CBX) which is envisioned as complementary to other testing formats. It offers the ability to create a patient-care environment that permits observation of a physician's judgements about patient care but is not yet an ideal tool for assessing history taking, physical manipulations or performance in psychosocial domains (Volle 1990:47) or interacting with live humans;

b) van der Vleuten and Swanson (1990:58) recommend that standardised patient (SP)-based tests can be improved by focusing on assessment of history taking, physical examination and communication skills with separately administered written tests used to measure diagnostic and management skills. They also recommended adoption of a mastery-testing framework for score interpretation, development of improved procedures for setting pass/fail standards and the use of generalisability theory in analysing and reporting results of psychometric studies. Their recommendations are strongly supported by Miller (1990:77).

Although written examinations can quite adequately assess knowledge, clinical performance-based examinations (CPXs) are increasingly emphasised because they allow for more direct measurement of both clinical skills and the application of clinical knowledge in the care of patients (Shirar et al 1992:510).

4.6.4.4 Direct observation of simplified practice (psychomotor skills practical) relates to assessment of student performance at increasing levels of psychomotor behaviour in Simpson's taxonomy. This is achieved through direct observation and rating of clinical performance in simulated patient care situations such as psychomotor skills classes during each semester of the course, and assessment of habitual performance through the use of rating scales e.g. during formative and summative assessment of clinical skills on actual patients; and during multi-station clinical examinations (OSCE's). Corley (1983:168) discusses the difficulties with assessment of professional competence in the psychomotor domain through the use of formal examinations because of troublesome logistics problems relating to real and standardised patients and the difficulty with assessment of such simple skills as the use of an
ophthalmoscope. An assessment instrument on which he reports, evaluates learners on: the logical sequence of the examination; the thoroughness of the examination; the length of time to complete the task; the consideration shown to the patient; and an accurate description (not a probable diagnosis) of the patient’s abnormal physical findings. An analysis of strategies to assess psychomotor skills is given in Table 97.

**TABLE 97 - Analysis of the strategies used to assess psychomotor skills**

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Validity</th>
<th>Reliability</th>
<th>Requirements</th>
<th>Acceptance</th>
<th>Teaching Potential</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate level of fidelity, Focuses on products and/or processes, Can provide moderate level of integrated assessment, Provides opportunity to observe specific elements of competence, Assesses interpersonal and problem solving skills, High correlation with written exams, Allows assessment of practical and technical skills, Provides indirect evidence of knowledge/understanding, Provides realistic simulation of activities, Increases reliability and validity of overall data collection</td>
<td>Specific skill may not permit inference of overall competence, Skills may not permit generalisation to varied circumstances, May require lengthy and costly assessments for adequate reliability, Requires additional cost outlay, time commitment and other resources</td>
<td>Content validity high, face validity high, especially if real patients are used.</td>
<td>Moderate to high depending upon the quality of the assessors' checklist, Permits the assessor to identify clearly deficiencies of performance</td>
<td>Adequately equipped examining room</td>
<td>Student response is favourable to enthusiastic</td>
<td>High if immediate feedback is provided and students are permitted to re-examine for missed physical abnormalities or to again set up for techniques not properly demonstrated</td>
<td>Difficult to program standardised patients (simulators) in other than neurologic and orthopaedic disabilities</td>
</tr>
</tbody>
</table>

4.6.4.5 *The assessment of habitual performance using rating scales*

is analysed in Table 98 below.

**TABLE 98 - Analysis of the assessment of habitual performance using rating scales**

<table>
<thead>
<tr>
<th>Uses:</th>
<th>To assess habitual performance of learners in almost every clinical training interaction.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strengths:</td>
<td>Low cost</td>
</tr>
<tr>
<td></td>
<td>Wide applicability in relation to the assessment setting and categories of competence that can be assessed</td>
</tr>
<tr>
<td></td>
<td>Can be used to record observations of: knowledge, interpersonal skills, clinical skills, technical skills, problem solving and professional habits and attitudes</td>
</tr>
<tr>
<td></td>
<td>Information can be collected over time</td>
</tr>
<tr>
<td>Weaknesses:</td>
<td>Susceptibility to a number of rating errors and rating biases because of the reliance on memory and high degree of judgement involved.</td>
</tr>
</tbody>
</table>

From: Nyquist 1991B:4-5.

Rating errors and rating biases can be minimised by using between 7 and 11 rating points instead of the customary 3-5 and by using multiple raters and pooling the ratings (Nyquist 1991A:4).

4.6.4.6 *The multi-station clinical assessment* is also called the objective structured clinical examination or OSCE (Nyquist 1991B:5). The OSCE was introduced by Harden et al (1975:447) and initially developed by Harden and Gleeson (1979:39). Kachur et al (1990:225) say that the objective structured clinical examination (OSCE) is an educational technique that consists of creating a variety of standardised clinical situations (stations) through which trainees rotate. In each situation, they have to perform a specific, usually time-limited, task (e.g. a neck examination, an interview with a simulated patient who complains of chest pain, the interpretation of an x-ray or a written quiz etc. Each performance is evaluated using station-specific rating forms that contain criteria for successful accomplishment of the task. A large amount of additional evaluation data can be obtained from OSCE's if assessors are encouraged to enhance rating forms with written comments since such comments usually concern trainee performance and can also provide feedback on organisational issues relevant for OSCE developers (Kachur et al 1990:229).
There is a general consensus of opinion that OSCE constitutes a definite improvement on the traditional examinations and this type of examination has now been used for several years as in-course assessment or forms an integral part of the final examinations (Cuscheri et al, 1979; Abdulbasit A-Latif. 1992:179-180). Studies by Kowlowitz et al (1991:345); Petrusa et al (1991:86); Sethurmen (1993:367); Ainsworth et al (1994:67) show that both students and assessors (who were staff and/or postgraduate students and/or fellows) showed overwhelming acceptance and support of the OSCE when introduced in traditional medical schools. In fact, major reasons appear to be that the examination is structured and is a mechanism for both teaching and evaluation (Cater et al 1991:253). Reznick et al (1992:487) state that the OSCE has emerged as the state-of-the-art method of testing clinical skills. They say that it has the major advantage of observation of actual performance, and that the use of standardised patients has enabled this examination to simulate real world conditions with a high degree of fidelity.

However, there is no single most appropriate method of assessment, which can adequately test all the desired components of clinical competence. Although OSCE has been shown as a powerful tool in testing a large variety of skills, other methods such as orals, multiple choice questions (MCQ's) (Anderson 1983:1) (Bandaranayake & Cox 1988:206; Harden 1979:1; Lennox 1974:1) and clinicals have also been found to be favourite. Advantages of OSCE over other forms of assessment procedures have been well recognised and one of particular value is the provision of feedback by providing the students with the marked checklists during or after the examination (Black & Harden, 1986). Another is to provide students with their profiles which expresses ability across a range of qualities and skills. Weaknesses of the OSCE are that it is costly to run, labour intensive to establish and it requires a dedicated and knowledgeable team to implement. Generally, a lengthy examination of six hours or more is required to achieve high levels of reliability (Reznick et al 1992:491).

Examples of improvements to the original OSCE include:

a) McGaghie et al (1994:59) designed, developed, pilot tested and used a set of four checklists for evaluating selected features of the clinical musculoskeletal examination, and prepared observational raters to use the checklists in the context of an OSCE. They show that systematic checklist development and the rate of training are important steps toward production of reliable data about medical student clinical performance. It was also found that using skilled raters who received hands-on training contributes to data quality;
b) Ainsworth et al (1994:67) combined standard testing techniques with custom-designed response forms, extended menu questions, testing equipment and scoring programs to improve the information provided by clinical performance testing incorporating standardised patients and OSCE. They found that these features are easily adapted and offer maximum flexibility, while using staff time and resources more efficiently. That is they found that the use of computer-based scoring programs and optical scan technology allows staff to spend more time on student observation, feedback and problem development;

c) Jamison (1992:265) developed a modified, fixed response OSCE for assessing competence in diagnostic decision making of chiropractic students at RMIT. She argues that replacement of standardised patients by models, slides and sound simulators provide a less expensive forum for realistically assessing competence in diagnostic decision making in a clinically pertinent milieu. Replacement of station examiners and/or open questions by closed item responses which are marked in a multiple choice question format, further reduce costs although severely restricting the capacity of the OSCE to assess problem solving. Newble (1988:175) provides a practical guide on how to plan and run structured clinical examinations;

d) Results from a study by Petrusa et al (1991:86) support the feasibility of implementing standardised OSCEs that would provide important data on the performance of graduates and on the adequacy of clinical education from different medical schools. The development of Part IV of the US National Board of Chiropractic Examiners, which is based on OSCE assessment, provides the opportunity to standardise OSCE assessment across chiropractic institutions and to compare learners’ performance across chiropractic institutions (NBCE 1996:1);

e) the OSCE has been adapted for use in psychiatry (Famuyiwa 1991:45);

f) senior medical students have been used as simulated patients (Feickert et al 1992:167).

In conclusion, the objective structured clinical examination and the traditional clinical examination correlate very well in assessing undergraduate medical students. Students have also indicated their preference for the MCQ's and orals. It is suggested that several of these methods of assessment should be used in combination to complement each other and provide a broad-based assessment of student performance (Abdulbasit A-Latif. 1992:182-183). However, despite strong support for the OSCE, the very valid comments by Cox (1990:542), in which he stresses the limitations of OSCE must be heeded: 'the OSCE, in a
misunderstanding of professional expertise, attempts to measure obedience to the rigidity of the teacher's early structuring and sequences. In effect, the examination focus becomes the structure, not the learner and on the structure which, we hope, the learner adapts to each situation'. Cox (1988:25) stresses that the unit of study is a human being with an illness to be translated into a diagnosis and management plan, which requires extremely complex behaviour built on an immense body of biomedical knowledge which cannot be summarised into boxes to be ticked.

The application of methods and techniques to the domains of the chiropractic ICCD is further discussed in 4.6.9 below.

4.6.5 Oral Techniques for the Assessment of Performance in Complex Professional Practice

4.6.5.1 Overview

It is argued that oral assessment has been and can be expected to continue to be used extensively (Cox 1982G:229; 1982H:241). Nyquist (1991B:4) says that traditional interview-format oral examinations were once used almost universally in the medical specialties and sub-specialties where it was felt that they could be used to assess something beyond knowledge such as problem-solving or inter-personal skills. She states that research has not supported this claim, although reasonable reliability has been demonstrated with structured, standardised orals using hand-picked examiners, in typical settings the inter-grader reliability is poor. There is also poor content sampling as a result of the small number of items included and the cost of appropriate administration is generally prohibitive especially if a large number of learners is assessed.

It appears that more innovative use of oral testing such as the Structured Oral Self-directed Learning Evaluation (SOSLE) show promise and deserves special mention, as does the Triple Jump Exercise (TJE), the Written Treatment Planning Simulation (WTPS), the Formal Oral Examination (Clinical Oral), while brief comments are made on the Viva.

4.6.5.2 The structured oral self-directed learning evaluation (SOSLE) is the only oral test to be analysed in detail in this dissertation so as to serve as an example of an analysis approach (Table 99).
TABLE 99 - Analysis of the structured oral self-directed learning evaluation (SOSLE)

**Description:**
SOSLE is an oral examination that evaluates students' problem solving ability, self-directed learning skills, knowledge level and self-assessment ability. It consists of three parts conducted over a 24 hour period including.
- a) Problem definition and learning issue generation (20 minutes)
- b) Information search and study (24 hours)
- c) Final problem formulation, management strategies and self-evaluation process (30 minutes).

It is a revised version of the Triple Jump Exercise (TJE) devised in 1975 for undergraduate medical students at McMaster University.

**Uses:**
To evaluate clinical reasoning skills in relation to problem solving ability, self-directed learning skills, knowledge level and self-assessment ability.

**Strengths:**
- Excellent inter-rater reliability.
- The range of skills tested (*)
- The reality simulation of the test (*)
- Results support its usefulness in assessing important process-oriented skills such as problem-solving and self-assessment abilities
- It provides a method to evaluate process-oriented skills in the academic setting
- Once a bank of problems has been developed the only preparation time involved is the assessor's workshop and student scheduling.

The evaluation time is incorporated into the exercise and is completed at the time of the exercise.
The feedback to the students on their performance is immediate and the results are available to administration simultaneously.
Student feedback indicates that a considerable amount of individual learning occurs as the student goes through the exercise. The SOSLE may therefore be more valuable as a formative than a summative evaluation tool.

**Weaknesses:**
- Validity testing shows variable correlations between written tests and tutorial marks, suggesting that the SOSLE may measure different aspects of clinical competence.
- The timetabling to construct SOSLE is quite extensive in order to ensure the best possible reliability.

Based on analysis of a study by Chapman et al 1993:223. *Comments by the author.*

4.6.5.3 *The triple jump exercise (TJE)* was designed to measure a student's problem solving ability, self-directed learning skills, knowledge and self-assessment ability. The examiner can discover the students' knowledge in relation to clinical problems and can evaluate the students' problem-solving approach and logic. It also allows the examiner to observe how the student handles new knowledge and formulates the information into a management or treatment plan (Chapman et al 1993:225; Callin and Ciliska 1983:41; Painvin et al 1979:1). Because of its similarity to SOSLE, the TJE is not further discussed here.
4.6.5.4 The written treatment planning simulation (WTPS) was introduced by Schofield (1981:1). This technique is similar to the Triple Jump Exercise in its objectives, but different in terms of the procedures (Chapman et al 1993:226). The procedure involves tape recording verbal protocols in order to identify the learners' thought processes and planning strategies (Butcher and Schofield 1984:70). It has been suggested that the WTPS could be used in order to establish the concurrent validity of the SOSLE (Chapman et al 1993:231).

4.6.5.5 The formal oral examination is designed as an oral patient management problem involving a complex medical, psychological and social situation and requires approximately 25 minutes to administer using a case that represents a common condition seen in family practice (Fabb and Marshall 1983:125). Content validity is achieved by having the examination developed by experienced practitioners; case material is chosen so that total management of the patient situation would be necessary and to force examinees to decide when they are out of their depth in a particular area of practice. Topic selection and test development is via consensus of a committee. Test development is carefully undertaken to ensure currency of reports, x-rays etc used. It is updated from time to time including instructions to candidates, case card, instructions to examiners, script for examiners and a videotape of two candidates with accompanying critique and completed standardised scores which have been verified by a committee as being at the appropriate level. Guidelines for test preparation, scoring procedure and procedures to assure uniform presentation are all carefully worked out. The formal oral has advantages over the written patient simulation exercise, such as patient management problems, in that examinees must create the options rather than have them presented, which enables the examiner to introduce varying degrees of simulation to assist as necessary. (The above details are based on the publication by Fabb and Marshall 1983:125-146).

4.6.5.6 The viva voce examination is a time-honoured test in medical examinations which varies in quality depending on the examiners' understanding and interaction during this form of assessment (Fabb and Marshall 1983:165). The viva voce may lack validity and reliability unless it is purposefully structured and its development based on the determination of specific goals. These include the behaviours it is expected to measure and the weightings each is to be given; the preparation of standardised questions and problems which will test such behaviour; and the administration of the questions and problems in an agreed upon
sequence with the candidate’s responses being recorded and the rating of the candidate on a standardised form by at least two examiners (Fabb and Marshall 1983:165).

4.6.6 Self-Assessment of Performance in Complex Professional Practice

4.6.6.1 Overview

Student self-assessment is the involvement of students in establishing standards and/or criteria to apply to their work and their making judgements about the extent to which they have met these criteria and standards (Boud 1988:193). Although self-testing in some sense is a technique for assessment in which students test themselves by checking their own answers it amounts to more than this since it involves students taking responsibility for monitoring their own learning. This is achieved by establishing appropriate criteria for their learning, making judgements about its nature and extent and by developing the ability to become independent learners who do not need a teacher or examiner in order to check their own progress (Boud 1988:193). While self-assessment may in some circumstances be used to supplement or replace teacher assessment, it is primarily used to assist students to be more effective learners. It can be incorporated into courses of any kind at any level. The particular approaches which can be adopted vary greatly depending on the type of course, the nature of the subject, the degree of sophistication of students in working independently and on the particular reason for introducing self-assessment into the course (Heron 1988:193). However, it is in the early stages of any course or of any year that students should ideally encounter the concept of self-assessment if it is to be taken seriously and applied effectively (Heron 1988:196).

4.6.6.2 Reflective reports which are discussed in detail in 4.5.3.8 and Figure 13 above.

4.6.6.3 The GOSCE

A group objective structured clinical examination (GOSCE) is conducted for groups, is similar in nature to the OSCE but with obvious limitation of items. It is excellent for radiologic assessment or other visual materials on which students would write notes to be subsequently marked by themselves, peers or staff. Self-assessment and learning through GOSCE has been suggested by Biran (1991:478-479) who has identified its advantages as economy, mutual support and opportunity to examine social skills. The perceived disadvantage of using a GOSCE for self-assessment is lack of individual assessment. Other
potential uses are formative assessment, end-of-course assessment, exploring interpersonal relationships and its use as teaching method for short courses.

4.6.6.4 **Attitude inventories** are self-report tools designed to assess the attitudes of a group of subjects toward a particular subject, group, institution, or institutional practice. It is used to assess changes in attitudes among learners. Strengths include that these tools are inexpensive and relatively easy to develop, administer and score. Weaknesses include their questionable or unknown reliability and validity based on the assumption that participants have both the ability and the desire to answer items honestly (Nyquist 1991A:2).

4.6.6.5 **Questionnaires and interviews as self-reporting survey techniques**

<table>
<thead>
<tr>
<th>TABLE 100 - Analysis of self-reporting survey techniques as an assessment strategy (Questionnaires and interviews)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Advantages</strong></td>
</tr>
<tr>
<td>Convenience of self-administration</td>
</tr>
<tr>
<td>Relative low cost</td>
</tr>
<tr>
<td>Ease of scoring</td>
</tr>
<tr>
<td>Possibility of questioning in-depth</td>
</tr>
<tr>
<td>Flexibility in administration</td>
</tr>
<tr>
<td>No requirement for literacy</td>
</tr>
<tr>
<td>Generally superior for questioning in sensitive areas</td>
</tr>
<tr>
<td><strong>Disadvantages</strong></td>
</tr>
<tr>
<td>Inability to question in-depth</td>
</tr>
<tr>
<td>Risk of low returns</td>
</tr>
<tr>
<td>Inability to assure that questions are understood and answered as intended</td>
</tr>
<tr>
<td>Participants must both have the information asked for and be willing to provide it accurately and honestly</td>
</tr>
<tr>
<td>Relative high cost, especially if interviewers must be recruited and trained</td>
</tr>
<tr>
<td>Large time commitment needed for administration and scoring</td>
</tr>
</tbody>
</table>

4.6.7 **The Assessment of Student Work**

4.6.7.1 **Overview - The assessment of student work samples** can provide valuable information on student performance and learning in complex clinical practice. Included are assessment of a learners: clinical diary (or log diary); review of a scientific article; writing of a scientific article; written assignments; narrative case reports; written case presentation; referral letters to other health practitioners on cases they have seen etc.
4.6.7.2 The clinical diary (log) is well established and is a useful addition to other tests of competence in general practice. Its validity and reliability depend on the care with which it is produced, the standardisation of its presentation and the monitoring of the standards of the assessors (Fabb and Marshall 1983:167).

4.6.7.3 Assignments can be of great benefit in testing the capacity of learners to do independent work involving the synthesis and integration of clinical data.

4.6.7.4 Review of charts, records and documents

<table>
<thead>
<tr>
<th>Uses</th>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>To assess clinical problem solving as reflected in the written record of the care provided (2)</td>
<td>Actual practice behaviour can be assessed (2)</td>
<td>Difficulty in selecting a set of factors to examine records across a variety of health problems (2)</td>
</tr>
<tr>
<td>To gather data about a variety of clinical skills and professional habits (2)</td>
<td>The sequence of care over an extended period of time can be assessed (2)</td>
<td>Clinical records may not reflect what was actually done (2)</td>
</tr>
<tr>
<td></td>
<td>Established criteria can be used to assess behaviour (2)</td>
<td>Different methods of recording are hard to compare (2)</td>
</tr>
<tr>
<td></td>
<td>Multiple samples of care in each category can be assessed to assure reliability of ratings (2)</td>
<td>A single record may reflect care decisions of several clinicians (2)</td>
</tr>
<tr>
<td></td>
<td>Unobtrusive (1)</td>
<td>Careful review using established criteria can be time consuming (2)</td>
</tr>
<tr>
<td></td>
<td>Generally high reliability (1)</td>
<td>Records can be incomplete or inaccurate (1)</td>
</tr>
<tr>
<td></td>
<td>Reviewing can be done when convenient (1)</td>
<td>Criteria should be developed in advance (1)</td>
</tr>
<tr>
<td></td>
<td>Easier to use multiple reviewers than with direct observation because scheduling is easier (1)</td>
<td>Reviewers should be trained (1)</td>
</tr>
<tr>
<td></td>
<td>Instrument revision does not necessitate locating new behaviour samples (1)</td>
<td>Many questions cannot be answered from documents only (1)</td>
</tr>
<tr>
<td></td>
<td>Generally more reliable than questionnaire or interview data on issues of recorded fact (1)</td>
<td>Records can be incomplete or inaccurate (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Can be more time consuming than use of questionnaires or interviews to gather some information (1)</td>
</tr>
</tbody>
</table>

4.6.8 Written Assessment of Performance in Complex Professional Practice

4.6.8.1 Overview

Written assessment, particularly in the form of an essay, has a very long history in educational assessment. Concerns about the subjective and inconsistent marking of essay-type questions (Cox 1982D:197; Cox and Ewen 1985:195; Cox 1988:144; Ebel 1974:77; Feletti 1988:147; Feletti & Engel 1982:203; McLeod & Snell 1996:23) has led to a variety of fixed-response examinations such as multiple choice questions (MCQs) (Cox 1982E:211; 1982F:215). The recognition that education aims for more than acquisition of knowledge (tested through essay) has produced attempts to measure skills and attitudes. An attempt to test the application of knowledge, rather than the presence of knowledge, has led to many new methods such as patient management problems (PMPs) (Hunt 1982:219) and computer-based examinations (CBX). In the context of this dissertation, only a brief overview of the strengths and weaknesses of written assessment strategies are provided and brief discussion on the 'newer' strategies such as PMPs and computer-based assessment. Participant observation suggests that written assessment is still the most extensively used form of assessment in chiropractic education and include the following methods and techniques: subjective written assessments include the essay, modified essay, prepared essay, open book essay, patient management problems and computer-based written assessment. Objective written assessments include true and false questions and multiple choice questions of various types. The advantages/strengths and disadvantages/weaknesses of written assessment strategies are briefly outlined in Table 92 while the differences between objective and subjective written assessments and oral assessment strategies appear in Table 102.
TABLE 102 - Analysis of written assessment strategies

**ADVANTAGES**
- Focuses on knowledge, comprehension, problem solving
- Assesses performance across a range of circumstances
- Provides evidence to demonstrate transferability
- Elicits extra evidence to demonstrate understanding
- Supplements other assessment methods
- Content validity can be high
- Relatively high reliability
- Convenience of administration and scoring
- Ease of construction
- Low cost
- Modified essay questions (MEQ) and clinical-type orals show some promise for assessing problem-solving
- It provides a closer estimate of real problem solving than the objective test
- Patient management problems (PMP's) are excellent teaching tools

**DISADVANTAGES**
- Few workplace performances are amenable to assessment by written examination.
- It is difficult to assess values and attitudes through written assessment
- Cannot assess interpersonal performance
- Cannot assess psychomotor skills
- Cannot assess technical performance directly
- Does not fully measure problem-solving skills
- Limited applicability for measurement of problem solving; when used for both pre-course and post-course assessment, participants can fake low performance on the pre-test, also possibility of test/treatment interactions
- Generally low reliability of scoring for traditional essay and oral
- Generally poor content sampling because of the small number of items
- Expensive in terms of faculty time for administration of oral examinations and for scoring of essay examinations
- Paper PMP's do not appear to assess anything different from clinically oriented MCQ's
- High initial cost outlay and need for much technical expertise for computerised PMP's, branching PMP's difficult to score


A comparison of written and oral assessment techniques appears in Table 103.
<table>
<thead>
<tr>
<th>AREAS OF DIFFERENCE</th>
<th>OBJECTIVE</th>
<th>ESSAY</th>
<th>ORAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What the examinee is doing when taking the test.</td>
<td>Reading and thinking Favours fluent readers if speeded</td>
<td>Thinking and writing Favours fluent writers</td>
<td>Thinking and thinking Favours fluent speakers</td>
</tr>
<tr>
<td>2. Process involved for examinee</td>
<td>Choosing among alternatives provided</td>
<td>Plan out answer and on paper</td>
<td>Express answer with little planning in own words orally</td>
</tr>
<tr>
<td>3. Number of test items</td>
<td>Large number of specific items</td>
<td>Small number of more general items</td>
<td>Varies</td>
</tr>
<tr>
<td>4. Where examiner time is spent</td>
<td>Primarily in test preparation</td>
<td>Primarily in test scoring</td>
<td>Primarily in test administration</td>
</tr>
<tr>
<td>5. Typical level of objectivity and reliability</td>
<td>Moderate to excellent</td>
<td>Poor to moderate</td>
<td>Poor to moderate</td>
</tr>
<tr>
<td>6. Most common errors resulting in a poor test</td>
<td>Poor content sampling Items not clearly related to objectives</td>
<td>Poor content sampling Lack of clarity of questions Rater errors Rater bias</td>
<td>Poor content sampling Examiner prompting Rater errors Rater bias</td>
</tr>
<tr>
<td>7. When to consider use of each type</td>
<td>When highly reliable scores are needed When group is large When broad coverage of content is needed</td>
<td>When encouraging development of writing skills When group is small When testing is formative</td>
<td>When encouraging development of skill in oral expression When testing is formative</td>
</tr>
</tbody>
</table>

4.6.8.2 Patient management problems (PMPs)

PMPs are exercises that simulate the decisions a practitioner has to make in the diagnosis and treatment of a patient’s illness. By imitating a real situation, PMPs allow learners to practice, assess or be evaluated on an aspect of clinical competence, without the use of patients (Harden 1986:2). The patient management problem (PMP) commences with a statement of the presenting symptom of the patient and a description of the setting and facilities available so that, from this point, the problem can be developed in either linear or branching format (Fabb and Marshall 1983:70). PMPs develop in stages, each stage corresponding to a stage in patient management e.g. (1) information is provided about the patient and the problem; (2) some action is required of the respondent; (3) feedback is provided to this action; (4) the PMP ends (Harden 1986:2). Media used to present the PMP include print, audiotapes, slides, film strip, microfiche, overhead projector transparencies, videotape, film (sound and silent), computers, models and simulated patients, for which the advantages and disadvantages are discussed in detail by Harden (1986:8-12). Excellent guidelines on the construction of PMPs are provided (Marshall and Fabb 1981:1-20; Marshall 1988:170). They also point out that some years ago it was reported that 80% of the questions in medical examinations in the USA required only recall of isolated medical facts. It was found also that 15% required some interpretative skill and less than 5% required the use of a problem-solving skill while affective behaviour was hardly tested at all. The PMP was developed in response to this anomaly as one of the simulation tests to assess clinical problem-solving skill that resembles the clinical situation.

4.6.8.3 Computer-based assessment

The use of computers in the assessment process is extensively discussed in the literature. They have particular relevance to PMPs, Computer Managed Learning (CML) where they are often used for assessment; to support observation of simulated practice; and as stations in an OSCE.

4.6.8.4 Reflective assessment

The protocol for a portfolio and diary-based reflective method of assessment linked to reflective, experiential learning exercises discussed in 4.5.3.9 above has been implemented and evaluated by Routledge et al (1997:122). It is of particular importance to competency-based assessment of performance in the affective domain with an ICCD. It is also consonant with Rowntree’s (1987) statement that assessment should reflect the students’ qualities and
achievements which are actively rewarded by the system i.e. ‘they should focus on these abilities which are important in the field of practice’ (Routledge 1997:122). It can be argued, however, that reflective assessment actually touches the phenomenological basis of learning through ‘lived experience’ which gives meaning to the work of the professional as discussed in 1.1.2 and 4.1.4.3 above.

4.6.9 Specifications for the Assessment of Learner Performance in a Chiropractic Curriculum

4.6.9.1 Overview
The purpose of designing specifications for the assessment of learner performance in the chiropractic curriculum are to ensure coverage of all major objectives and competencies which need to be demonstrated during each semester or year of the course and prior to course completion. These specifications are designed to satisfy societal and statutory requirements for safety, effectiveness and efficiency in chiropractic health care. It is argued that it is necessary that a sufficient range of procedures be employed to assess the wide range of cognitive, psychomotor and affective skills needing to be attained. Also, in order to provide sufficient, reliable, valid measurements from which competence can be inferred at a reliable level, specifications are needed to link various curriculum elements, particularly the content within the ICCD framework, to the assessment strategies.

An example of a set of specifications for an assessment system appears in Table 104. Examples of how specifications are further broken down are given in Tables 105-110.

TABLE 104 - An indicative list of specifications for a competency-based assessment system in chiropractic

| 1. | Weighting of content according to performance areas (behaviours) (Table 105) |
| 2. | Weighting of content according to domains and major range indicators (Table 106) |
| 3. | Weighting of content according to assessment methods and techniques (Table 107) |
| 4. | Weighting of content according to diagnostic techniques (Table 108) |
| 5. | Weighting of content according to therapeutic techniques (Table 109) |
| 6. | Weighting of content in the written assessment (Table 110) |
| 7. | Priority allocation of chiropractic clinical content according to health care conditions |
| 8. | Weighting of content in the objective, structured clinical examination (OSCE) |
### Table 105 - An example of the weighting of content according to performance areas (behaviours)

<table>
<thead>
<tr>
<th>PERFORMANCE AREA</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>COGNITIVE BEHAVIOUR</td>
<td>[50%]</td>
</tr>
<tr>
<td>Knowledge/Information</td>
<td>15%</td>
</tr>
<tr>
<td>Clinical Interpretive Skills</td>
<td>15%</td>
</tr>
<tr>
<td>Clinical Problem Solving Skills</td>
<td>20%</td>
</tr>
<tr>
<td>AFFECTIVE BEHAVIOUR</td>
<td>[10%]</td>
</tr>
<tr>
<td>Interpersonal Skills</td>
<td>5%</td>
</tr>
<tr>
<td>Professional Attitudes &amp; Habits</td>
<td>5%</td>
</tr>
<tr>
<td>PSYCHOMOTOR SKILLS</td>
<td>[40%]</td>
</tr>
<tr>
<td>Diagnostic</td>
<td>20%</td>
</tr>
<tr>
<td>Therapeutic</td>
<td>20%</td>
</tr>
</tbody>
</table>

**TOTAL WEIGHTING** 100%

### Table 106 - An example of the weighting of content according to domains and major range indicators for chiropractic

<table>
<thead>
<tr>
<th>CLASSIFICATION</th>
<th>% WEIGHTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMUNITY DOMAIN</td>
<td>5%</td>
</tr>
<tr>
<td>Community awareness</td>
<td></td>
</tr>
<tr>
<td>Health care system</td>
<td></td>
</tr>
<tr>
<td>PROFESSIONALISM</td>
<td>5%</td>
</tr>
<tr>
<td>Professional interface</td>
<td></td>
</tr>
<tr>
<td>PROFESSIONAL MANAGEMENT</td>
<td>5%</td>
</tr>
<tr>
<td>Staff and financial management</td>
<td></td>
</tr>
<tr>
<td>Practice environment</td>
<td></td>
</tr>
<tr>
<td>PATIENT PRACTITIONER INTERACTION [85%]</td>
<td></td>
</tr>
<tr>
<td>Relationships &amp; pregnancy problems</td>
<td>5%</td>
</tr>
<tr>
<td>Neonate</td>
<td>5%</td>
</tr>
<tr>
<td>Infant</td>
<td>5%</td>
</tr>
<tr>
<td>Preschool child</td>
<td>5%</td>
</tr>
<tr>
<td>School child</td>
<td>5%</td>
</tr>
<tr>
<td>Adolescent</td>
<td>15%</td>
</tr>
<tr>
<td>Young adult</td>
<td>15%</td>
</tr>
<tr>
<td>Middle-age person</td>
<td>15%</td>
</tr>
<tr>
<td>Old-age person</td>
<td>15%</td>
</tr>
</tbody>
</table>

**TOTAL WEIGHTING** 100%
### TABLE 107 - An example of the weighting of assessment according to assessment methods and techniques

<table>
<thead>
<tr>
<th>METHOD/TECHNIQUE</th>
<th>% WEIGHTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical records review</td>
<td>5%</td>
</tr>
<tr>
<td>Clinical observation/simulated</td>
<td>12%</td>
</tr>
<tr>
<td>patients</td>
<td></td>
</tr>
<tr>
<td>Rating scale</td>
<td>5%</td>
</tr>
<tr>
<td>Objective structural clinical exam</td>
<td>5%</td>
</tr>
<tr>
<td>Formal oral examination</td>
<td>13%</td>
</tr>
<tr>
<td>Viva voce</td>
<td>21%</td>
</tr>
<tr>
<td>Patient Management Problem (PMP)</td>
<td>13%</td>
</tr>
<tr>
<td>Written essay</td>
<td>10%</td>
</tr>
<tr>
<td>Modified essay</td>
<td>9%</td>
</tr>
<tr>
<td>Objective assessment</td>
<td>7%</td>
</tr>
<tr>
<td><strong>TOTAL WEIGHTING</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

### TABLE 108 - An example of the weighting of content according to diagnostic technique

<table>
<thead>
<tr>
<th>DIAGNOSTIC TECHNIQUE</th>
<th>% WEIGHTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>History</td>
<td>30</td>
</tr>
<tr>
<td>Postural analysis</td>
<td>8</td>
</tr>
<tr>
<td>Radiology</td>
<td>10</td>
</tr>
<tr>
<td>Palpation</td>
<td>16</td>
</tr>
<tr>
<td>Orthopaedics</td>
<td>12</td>
</tr>
<tr>
<td>Neurology</td>
<td>12</td>
</tr>
<tr>
<td>Other examination</td>
<td>10</td>
</tr>
<tr>
<td>Laboratory pathology</td>
<td>2</td>
</tr>
<tr>
<td>Functional assessment</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL WEIGHTING</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
### TABLE 109 - An example of the weighting of content according to therapeutic techniques

<table>
<thead>
<tr>
<th>THERAPEUTIC TECHNIQUE</th>
<th>PRIORITY</th>
<th>% WEIGHTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spinal Manipulation</td>
<td>1</td>
<td>50%</td>
</tr>
<tr>
<td>Exercise</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Soft Tissue Technique</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td>Extremity Technique</td>
<td>4</td>
<td>10%</td>
</tr>
<tr>
<td>Therapies Adjunctive to Manipulative Therapy</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td>Nutrition</td>
<td>6</td>
<td>2%</td>
</tr>
<tr>
<td>Psychological Counselling</td>
<td>7</td>
<td>2%</td>
</tr>
<tr>
<td>Advice</td>
<td>8</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

### TABLE 110 - An example of the weighting of content in the written assessment

<table>
<thead>
<tr>
<th>DOMAINS OF PERFORMANCE</th>
<th>% WEIGHTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Community Interaction</td>
<td>5</td>
</tr>
<tr>
<td>2. Health Care System Interaction</td>
<td>5</td>
</tr>
<tr>
<td>3. Professional Interaction</td>
<td>10</td>
</tr>
<tr>
<td>4. Staff and Financial Management</td>
<td>5</td>
</tr>
<tr>
<td>5. Management of Practice Environment</td>
<td>10</td>
</tr>
<tr>
<td>6. Patient Assessment</td>
<td>15</td>
</tr>
<tr>
<td>7. Diagnostic Decision Making</td>
<td>20</td>
</tr>
<tr>
<td>8. Planning of Patient Care</td>
<td>20</td>
</tr>
<tr>
<td>9. Implementation of Patient Care</td>
<td>5</td>
</tr>
<tr>
<td>10. Disease Prevention and Health Promotion</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>
Specifications, which will assist assessors, can also be designed to indicate:

a) How measurement instruments relate to performance in the domains in a chiropractic clinical decision-making framework (Table 111).

b) The matching of performance areas in each domain of learning to methods and techniques of assessment.

c) The matching of performance areas in each domain of learning to the domains in the chiropractic decision-making framework.

In Table 111, ‘capability’ and ‘performance’ refer to knowledge which people know how or when to use and are contrasted with a narrower understanding of the word knowledge, which applies to the term “performance evidence”, where information is merely recalled (Eraut 1992:15).
TABLE 111 - The types of evidence provided during the assessment of chiropractic clinical practice

<table>
<thead>
<tr>
<th>ASSESSMENT METHOD/TECHNIQUE</th>
<th>P</th>
<th>PC</th>
<th>C</th>
<th>CP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OBSERVATIONAL TECHNIQUES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct observation (normal practise)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indirect observation (video recording)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct observation (simulated patients)</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Direct observation (simplified practice)</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Habitual performance rating scales</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-station clinical assessment</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>ORAL TECHNIQUES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triple jump exercise</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structured oral self-directed learning evaluation</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Written treatment planning simulation</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal oral</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viva voce</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SELF ASSESSMENT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reflection reports</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group objective structured clinical examination</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude inventories</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Questionnaire and interviews</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>STUDENT WORK</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical diary</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical reports/documents</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Assignments</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charts/records/documents</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>WRITTEN ASSESSMENT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Objective written (multiple choice question) (True and false questions)</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Subjective written (essay) (modified essay) (patient management problems) (computer-based assessment)</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

**KEY:**
- **P** = Performance evidence
- **PC** = Mainly performance evidence, but also capability, depending on context
- **C** = Capability evidence
- **CP** = Mainly capability evidence, but also performance depending on context
Summary

In Chapter 4:

Design Strategies

1. An analysis of the literature shows how a number of design strategies have relevance to the mosaic of an overall chiropractic curriculum design capable of providing learning experiences which would result in the appropriation of the lived experience necessary for safe, effective primary contact practice of chiropractic. It is argued that while curriculum design strategies have particular relevance to the way in which teaching-learning is organised and implemented, it either links with or reaches into all other aspects of the curriculum such as the foundations, paradigms, intent, content, and application.

2. The psychological foundations of teaching-learning and a humanistic curriculum paradigm appear to have particular relevance to curriculum outcome in terms of self-directedness and competency of practitioners.

3. A range of contradistinctive curriculum design strategies could be identified and analysed and an integrative chiropractic curriculum design could be developed around a framework which facilitates evidence-based clinical decision-making and promotes the development of a strong cognitive framework with extensive subsumers which are reinforced throughout many subjects over five years.

4. The design and development of an integrative, evidence-based, experiential chiropractic curriculum has been clarified and named an Integrative Clinical Curriculum Design (ICCD).

Situational Analysis

5. The Integrative Clinical Curriculum Design (ICCD) for chiropractic places strong emphasis on problem-based learning within a cognitive framework which promotes meaningful, mastery learning and long term retention through the development of a set of subsumers which is repeatedly reinforced in most subjects of the course and also in the study of a large number of health problems which students will encounter in future practice.
6. The contextual framework of a chiropractic curriculum, linked to the curriculum foundations, could be clarified on the basis of situational analyses of the chiropractic profession and of an institutional curriculum.

7. It could be shown how a needs assessment algorithm can be applied to elements of the chiropractic curriculum.

8. Needs assessment is inextricably linked to the situational analysis that draws heavily on information from the curriculum foundations and culminates in clarifying the context in which the curriculum is placed.

9. A key feature of needs assessment is the identification of the elements which will define both intent and content of the curriculum while both intent and content will dictate which teaching-learning strategies are appropriate to the implementation of the curriculum.

**Intent**

10. A descriptive analysis of the literature indicates that the intent of the chiropractic curriculum can be identified, analysed and integrated as a domain within a taxonomy for the design of the chiropractic curriculum.

11. The intent of the chiropractic curriculum could be identified including the institutional mission, the curriculum aims, goals and objectives and the professional competencies and attributes of graduates. A rationale could be provided for basing objectives on the competencies, attributes, roles and tasks for which the curriculum should prepare a chiropractor which, in turn, strongly influence selection of content, teaching-learning strategies and competency-based assessment.

12. Since identification of intent is based on a situational analysis and needs assessment, which are strongly influenced by the curriculum foundations and the paradigms and design strategies which are most appropriate, they can serve to clarify the content required, and contribute to the understanding of a teaching-learning climate conducive to successful implementation of the curriculum and to student assessment which is used to determine achievement of competency in relation to the quality standards set.

13. Ultimately, the success of the curriculum design and its implementation is evaluated both internally and by external accrediting bodies to determine the attainment of success, measured in relation to the intent of the curriculum. As such, the intent *drives* and is intimately related to all other aspects of the curriculum.
14. The role, elements and organisation of content in a chiropractic curriculum could be identified and analysed and an innovative approach is introduced to promote the development of an effective cognitive framework through the horizontal and vertical integration of content in a way which facilitates evidence-based clinical decision-making.

Content

15. The selection of content from a vast amount of knowledge, skills and attitudes requires application of sophisticated methods and techniques to determine both the quantity and quality of content to be included in the curriculum and is facilitated through concept mapping.

16. Content includes subject content, concepts of philosophy, chiropractic beliefs, principles and educational objectives in the cognitive domain; skills and processes, basic chiropractic educational objectives in the psychomotor domain, basic educational objectives in the affective domain; competencies and health problems.

17. The content selection process has regard for the significance, validity, social relevance, utility, learnability and interest of content to learners.

18. The organisation or architectonics of content relate to both scope and sequence and is strongly influenced through the psychology of learning which relate to horizontal and vertical integration through various types of transfer of learning.

Learning Experiences

19. Teaching-learning strategies to promote experiential and self-directed learning in the chiropractic curriculum, including relevant psychological principles and assumptions, could be identified and analysed.

20. A framework for analysis of teaching-learning methods has been developed and teaching methods are classified for relevance to experiential learning.

21. Individualisation, experiential, problem-based learning strategies could be identified with a strong focus on the development and maintenance of highly structured self-directed learning packs which are linked to practical and tutorial sessions which emphasise reality-simulation, reality and reflective learning.
22. A range of teaching-learning strategies are available for the implementation of the chiropractic curriculum. Each can be analysed using a pro-forma which facilitates comparison of the different strategies with a particular focus on their applicability to reality teaching which is seen as fundamental to the identification of those strategies which are most appropriate for an experiential, competency-based curriculum. While the benefit of expository and other teaching methods are recognised and appreciated, strong emphasis is placed on those methods and techniques which are most suitable for experiential learning including exploratory learning such as problem-based learning, individualisation teaching, simulated reality and reality teaching.

23. It is argued that considerable benefit can be derived from the introduction of an innovative, integrative approach to teaching-learning in the proposed chiropractic curriculum. The organisation and implementation of learning experiences in the ICCD, while depending heavily on application of many of the principles of PBL depends on individualisation learning rather than syndicate groups (as is the case with PBL). The implementation of the curriculum may be seen as more descriptive in terms of detailed, structured guidance provided to learners and also because of the requirement for structured practical classes, particularly for clinical skills development.

24. There is a very strong body of knowledge supporting the concepts and implementation of PBL which is applied in a modified manner, potentially with tremendous cost savings, by developing learning packs, based on distance education technology and large group tutorials instead of syndicate groups for implementation.

Assessment of Student Performance

25. Concepts about competency-based assessment, including motivational theory, could be identified and clarified in the context of assessment of chiropractic student performance in each of the cognitive, psychomotor and affective domains, with a special focus on the assessment of performance in complex professional practice. Recommendations are made for the use of Simpson's taxonomy in the psychomotor domain, as a framework for chiropractic skills assessment.

26. Guiding principles could be identified for the selection of methods and techniques suitable to the assessment of chiropractic, competency-based professional standards.
27. The strengths and weaknesses (advantages and disadvantages) and differences among the various assessment methods and techniques could be identified and analysed.

28. The suitability of competency-based assessment methods and techniques to assess the major performance areas of chiropractic practice could be analysed.

29. Through consensus workshops a set of specifications for assessment could be agreed upon.

30. The assessment techniques and methods, which are most suitable to the intent, particularly to the specific competencies in chiropractic, could be identified and categorised in relation to assessment strategies available.
CHAPTER 5

A CLARIFICATION OF THE APPLICATION OF A CHIROPRACTIC CURRICULUM

Curriculum application is the implementation of a new curriculum or the vivification of an existing curriculum, characterised by the creation of a learning climate, the establishment and maintenance of a quality assurance process, monitoring through self-evaluation and external accreditation and modification through change management.

PRÉCIS 5: Chapter 5 relates to the learning climate, quality assurance, self-evaluation, external accreditation and management of change.

OUTLINE:

Chapter 5 considers:

5.1 A clarification of the learning climate of a chiropractic curriculum
5.2 A clarification of the quality management of a chiropractic program
5.3 A clarification of the management of change in a chiropractic curriculum.
5.1 A CLARIFICATION OF THE LEARNING CLIMATE OF A CHIROPRACTIC CURRICULUM

5.1.1 Introduction

5.1.1.1 What is learning climate?

The term 'learning climate' or 'learning environment' is one which almost defies definition, since it encompasses everything going on in the life of a student while they study (HEC 1992:28). It also relates to ambience, ethos, tone, atmosphere and environmental press, used more or less synonymously to take account of the overall crucial features of an educational environment (Genn and Harden 1986:111). In a good learning climate 'there should be an orderly atmosphere, sufficient security, adequate maintenance, positive staff morale, good student attitudes and effective means of communication' (Victorian State Board of Education. 1986:15,16). However, the climate of an educational environment, like the concept itself, is rather intangible, unreal and insubstantial, yet climate, in its effects, is pervasive, substantial and very real and influential. The establishing of this climate is almost certainly the most important single task of the medical teacher (Genn and Harden 1986:112).

Banning (1980:208) and Jacoby (1989:34) say that: campus ecology is concerned with the interactions between students and the educational environment. They use Crookston's definition to explain campus ecology as 'the systematic coordination and integration of the total campus environment - the organization, the structures, the space, the functions, the people, and the relationships of each to all others and to the whole - toward growth and development as a democratic community'.

5.1.1.2 Design of a client-centred climate

Where the campus is viewed as the client and therefore the target for intervention, design can be approached through seven steps (Table 112).
TABLE 112 - Steps in the design of a campus environment

1. Designers, in conjunction with community members, select educational values.
2. Values are then translated into specific goals.
3. Environments are designed that contain mechanisms to reach the stated goals.
4. Environments are fitted to students.
5. Students' perceptions of the environments are measured.
6. Students' behaviour resulting from environmental perceptions is monitored.
7. Data on the environmental design's successes and failures, as indicated by students' perceptions and behaviour, are fed back to the designers so they can continue to learn about student-environment fit and design better environments.


A good learning climate is provided if the student is seen as client, as at RMIT University which seeks to 'provide a total quality service designed to assist and support students in an environment conducive to student learning' (Warren Piper 1993:67). This agrees with the notion that 'care must be exercised in how we teach, about the environment in which teaching takes place, and about how we assess learning' (Smith 1989:64-65). Of particular relevance to chiropractic is the view that medical education environments are rather different in kind from typical academic environments of universities and foster scholarly or intellectual activities to the extent to which it encourages friendliness, cooperation and supportiveness (Genn and Harden 1986:111, 116). In fact, the concept of climate or ambience is of direct relevance to chiropractic educators in relation to their understanding of the nature and improvement of quality of the educational experience that students gain in chiropractic programs, constituent departments, classrooms, clinics and other settings.

5.1.1.3 How data on learning climate can be used - data obtainable on climate has wide application as seen in Table 113.

TABLE 113 - How data on the teaching climate can be used

1. To answer the question: "What is it like to be a student in this classroom or chiropractic program?"
2. To determine discrepancy between students' perception of climate and the chiropractic institutional/departmental/unit objectives (Adapted from Genn and Harden 1986)
3. To assist academic staff in planning climate in the classrooms, clinics, preceptorships, self-directed learning materials and other locations of teaching-learning
4. To determine any difference between the explicit objectives and the implicit press (stress) of the environment (Pace and Stern 1958; Archer and Lamin 1985:210; Shirom 1986:667)
5. To use considerations of climate based on educational, psychological, philosophical and other criteria as bases of judgements about how "good" or "bad" the environment is (Genn and Harden 1986)
6. To compare student anticipations of the climate at entry level with the real or actual climate experienced by students after inhabiting the new environment for a sufficient period to report their perceptions of it (Stern 1961)

7. To compare students' perceptions of an actual environment's climate to students' perceptions of the ideal environment which they would have wished to have inhabited (Genn 1975)

8. To conduct research on the existing climate:
   a) To determine the nature of the learning climate in a particular educational environment (Moos 1976; 1979)
   b) To detect and describe differences in climate among educational environments being studied (Moos 1976; 1979)
   c) To use climate as a dependent variable in terms of its predictions and antecedents (Genn and Harden 1986)
   d) To determine the input of learning climate on student performance (De Young 1977)
   e) To determine "ideal" and "actual" discrepancies in environmental climate as a basis for curriculum change in implementation or other domains (De Young 1977)
   f) To determine the concerns of students (Bradley, McLachlan and Sparks 1990)

9. To gauge the health of a chiropractic program in relation to the climate of the learning environment.

5.1.1.4 Curriculum design questions - a summary appears in Table 114.

TABLE 114 - Curriculum design questions about learning climate

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Can a setting be provided for a chiropractic learning process?</td>
</tr>
<tr>
<td>2</td>
<td>How are chiropractic students viewed?</td>
</tr>
<tr>
<td>3</td>
<td>Which chiropractic role models should be provided?</td>
</tr>
<tr>
<td>4</td>
<td>Which chiropractic student behaviours should be rewarded?</td>
</tr>
<tr>
<td>5</td>
<td>How can support and encouragement be provided while guiding chiropractic students?</td>
</tr>
<tr>
<td>6</td>
<td>How can cooperation be promoted among chiropractic students?</td>
</tr>
<tr>
<td>7</td>
<td>How can the environment be influenced to encourage scholasticism, propriety, social awareness, cooperation and competition among chiropractic students?</td>
</tr>
<tr>
<td>8</td>
<td>Which instruments can be used to measure ambience in a chiropractic program?</td>
</tr>
</tbody>
</table>

5.1.1.5 Research methods and techniques to determine learning climate

According to Genn and Harden (1986:112) 'the actual assessment of the climate of an educational environment is a matter of objectifying or operationalising the climate concept, in the form of measuring instruments'. Tools for the successful, quality measurement of the climate of higher education environments have been designed (Pace and Stern 1958; Pace 1969; Genn 1972:81; Genn 1981; Genn 1984:227). A summary appears in Table 115.
## TABLE 115 - Research methods and techniques for the measurement of learning climate

<table>
<thead>
<tr>
<th>METHOD/TECHNIQUE</th>
<th>DATA COLLECTED/COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematic Observation**</td>
<td>Impression of school climate</td>
</tr>
<tr>
<td>Psychosocial environment interviews/observation**</td>
<td>Aggregated views on teaching climate</td>
</tr>
<tr>
<td>Interviews**</td>
<td>Student, teacher and other stakeholder attitudes</td>
</tr>
<tr>
<td>Pace &amp; Stern's College Characteristics Index (CCI) (Pace &amp; Stern 1958; Stern 1970)*</td>
<td>Data on 30 psychological need dimensions or scales within students and the parallel environmental climate or press along the same dimensions including e.g. needs for achievement, affiliation, aggression, nurturance etc</td>
</tr>
<tr>
<td>Organisational Climate Index (OCI) [Stern &amp; Steinholf (1970)] (The OCI is an exact counterpart of the CCI above)*</td>
<td>For use in any institutional environment to collect data on climate dimensions</td>
</tr>
<tr>
<td>College and University Environmental Scales (CUES) (Pace 1969)*</td>
<td>Factor analysis of CCI items. Simpler and more effective than CCI. Uses 5 scales (scholarship; practicality; community; awareness and propriety) consisting of 30 items per scale. Can be used to measure climate in institutions, departments, classrooms</td>
</tr>
<tr>
<td>Thistlethwaite's Inventory of College Characteristics (ICCD) (1962)* and Pace's College Characteristics Analysis (CCA) (1964)*</td>
<td>Separate data on staff and student press is obtained in each case</td>
</tr>
<tr>
<td>Learning Environment Inventory (LEI) (Fraser et al 1982)*</td>
<td>Staff press is attributable to teacher characteristics and behaviours; student press is attributable to student characteristics and behaviour</td>
</tr>
<tr>
<td>Classroom Environmental Scales (CES) (Moos and Trickett 1974; Moos 1979)*</td>
<td>Scales for: Cohesiveness</td>
</tr>
<tr>
<td>College and University Classroom Environment Inventory (CUCEI)* (Treasguist and Dennis 1984) - basically derived from the LEI and CES above</td>
<td>Used for secondary and tertiary education</td>
</tr>
<tr>
<td>Medical School Environmental Index (MSEI) (Hutchins 1961). Based on Thistlethwaite's Inventory of College Characteristics (ICCD)*</td>
<td>Each scale has seven items</td>
</tr>
<tr>
<td></td>
<td>It has good psychometric quality and can be scored in a brief time</td>
</tr>
<tr>
<td></td>
<td>The climate or press of the medical school (both staff and student press) is related to the tendency of students to go into research, teaching and clinical practice respectively</td>
</tr>
</tbody>
</table>

*Based on details from Genn and Harden 1986:111-124; ** adapted from Print 1992:87.
5.1.2 The Psychological Foundations of a Learning Climate

5.1.2.1 Overview

It is argued that in psychological terms, learning climate or ambience refers to the stimuli that emerge from the social interactions throughout a group and relate to characteristics of people and procedures. It has been argued that 'the most important construct underlying the effect of each aspect of a positive learning climate is the student's motivation (Kindsvatter 1988:41-45). In this context, 'it is essential to see that there is a connection between the human development of students as individuals and teachers as persons - with a concept and knowledge of a subject and a belief in the value of teaching it'. Also important is a connection between the development of students and the direction in which society can go. With the help of such insights teachers can begin to operate from a different level of responsibility and with clearer foresight (Niblett 1969:256). Smith, Stanley and Shores (1957:429) stress the primacy of the teacher's role by stating that curriculum improvement will only take place as the professional competence of teachers improve. The competence of teachers will be improved only as they become involved personally in the problems of curriculum revision and interact directly with other teachers to reach a consensus on basic principles, goals and plans - this, of course, directly affects the learning climate. Smith, Stanley and Shores (1957:429) also suggest that the belief or disbelief of a teacher in his/her students is capable of enhancing on the one hand, or dissolving on the other, their confidence in themselves and their stature in their own eyes. Niblett (1969:255) says that university teachers need to be human beings, much alive, if they are to be able to communicate more than a narrow range of their learning since a wrong or inadequate self-concept means a wrong calculation both of the outward and inward kinds of environment necessary for continued development.

A strong relationship exists between motivation and learning climate as shown in Table 116.
TABLE 116 - Application of the principles of motivational theory to learning climate

<table>
<thead>
<tr>
<th>PRINCIPLE</th>
<th>LECTURER BEHAVIOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provision of emotional security satisfies the need for safety and affiliation.</td>
<td>Lecturers must unreservedly accept students as they are with a view to helping them become what they can and ought to be. Avoid procedures which create high stress.</td>
</tr>
<tr>
<td>Emulating a role model facilitates acquisition of motivating behaviour e.g.: self-reliance, persistence, success, attitude, etc.</td>
<td>Lecturers should consciously provide real life and symbolic models of exemplary intellectuals, self-directed life-long learners, sound clinicians and compassionate, humanistic practitioners.</td>
</tr>
<tr>
<td>Communication ought to be meaningful, arouse intellectual curiosity and ought to involve students actively and personally.</td>
<td>Lecturers should delineate aims at the beginning of a lecture, set a stimulating climate and vary the instructional approach.</td>
</tr>
<tr>
<td>Motivation is destroyed through the fatigue which accompanies boredom</td>
<td>Lecturers should relate learning to pre-existing motivation, vary the instructional approach with variety, flexibility and by arousing intellectual curiosity to maintain student attention.</td>
</tr>
</tbody>
</table>


5.1.2.2 Psychosocial factors are responsible for a major role in the creation of the learning climate in the context of an experiential chiropractic curriculum, which promotes autonomous learning and leads to the appropriation of lived experience. In fact, Barker (1968) writes about concepts and methods of studying ecological psychology, i.e. the environment of human behaviour. The views of several authors are reviewed below:

a) Acquisition of autonomous learning strategies - It is argued that this process should be commenced in the first semester of an ICCD through the introduction of an integrative clinical decision-making framework, self-directed learning principles and exercises. This is because all learning, involves the whole person, not just the intellect since what is to be learned is not seen separately from the motives and desires of students. Postponement of the opportunity to exercise such personal responsibility for a learning activity would tend to discourage the development of the capacity to do so (Boud 1981:12). It is also argued that the effects of implementation of an electronic teaching and learning environment will need to receive increasing attention in future. Work in this respect has already commenced at RMIT (Balbin and Sacks-Davis 1997:9; Vardaxis 1997:19).
b) Acquisition of a personal identity as a chiropractic learner depends on freedom, which is facilitated through individualisation learning described in 4.5.3.6 above. Such freedom is among the most valuable gifts which universities and other institutions of higher education can ever offer their students to develop identities of their own which are more inclusive and differentiated than those permitted by custom or fashion for public expression in their society (Niblett 1969:250). In fact, the development of a personal identity can be promoted through the application of human development theory, principles, and concepts. In an educational setting these may be used to identify the forms of development to which the institution is willing and able to commit its resources in the form of selected strategies designed intentionally to change students' knowledge, behaviour, attitudes, beliefs or values (Creamer 1984:3; Jacoby 1989:29-30). The institution would lead individuals toward greater development, present them with strong challenges, appraise accurately their ability to cope with these challenges, and offer them support when they become overwhelming (Sanford 1986:46; Jacoby 1989:31). The ICCD allows teachers to do this in a structured, regulated fashion. From a psychosocial viewpoint, chiropractic educators should be aware of what age their students are, what decisions, concerns and needs are likely to be uppermost in their minds, and what skills and attitudes they need to make those decisions and to cope with their various developmental tasks (Widick, Knefelkamp and Parker 1980; Jacoby 1989:32) and to make them competent for practice. Psycho-social student support through conditions which give freedom to their students involves an acknowledgment by universities of parts of human experience which usually go unrecognised (Niblett 1969:250).

'Person-environment' psychology offers a range of useful theoretical perspectives based on conceptualised student behaviour and development as functions of the person and of the actual perceived environments (Jacoby 1989:33). Table 117 gives an analysis of the major perspectives.
TABLE 117 - Perspectives on person-environment interaction in relation to student development

<table>
<thead>
<tr>
<th>INTERACTIONAL PERSPECTIVE</th>
<th>PROPOONENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Development is a result of interaction between the person and the environment</td>
<td>Holland 1973</td>
</tr>
<tr>
<td>2. Individual personal characteristics are the primary determinant of behaviour and is the link of the person-to-environment situation</td>
<td>Stern 1970</td>
</tr>
<tr>
<td>3. The context or situation is the determining variable in student development</td>
<td>Roe 1957</td>
</tr>
<tr>
<td>4. An individual's behaviour varies from one environment to another</td>
<td>Barker 1968</td>
</tr>
<tr>
<td>5. A good &quot;fit&quot; between persons (their needs, goals, expectations and attitudes) and the environment (its demands, supports and the characteristics of the persons who inhabit it) have a positive impact on the individual</td>
<td>Moos 1976/1979</td>
</tr>
<tr>
<td>6. Congruence between person and environment promotes satisfaction, productivity, achievement and growth; incongruence creates stress and dissatisfaction and inhibits growth and performance</td>
<td>Walsh and Betz 1985</td>
</tr>
</tbody>
</table>

Based on analysis of information from Jacoby 1989:33-4.

**c) Integration into the learning environment** - A synthesis of various stage models developed by Brundage and MacKeracher (1980) can be applied directly to specific courses and learning projects (Boud 1981:31-2) such as the chiropractic curriculum. The relationship of the learner with the self and others in the learning environment is depicted in Table 118.

TABLE 118 - Stages of integration into the learning environment

Entry stage: This stage is triggered when learners enter a situation which has a high degree of novelty, uncertainty, or lack of familiarity, which involves them in personal stress or in which they perceive a threat to themselves.

Reactive stage: Learners move out of the entry stage and into the reactive stage when they develop a sense of themselves as being individuals who are capable of acting independently within the situation or when they perceive the environment as having become unreliable and unsupportive.

Pro-active stage: When learners feel confident about themselves as accepted members of the group or actors within the situation, they move on to discover and eventually accept the individuality of others involved.

Integrative stage: When learners can distinguish between individual others, they move on to integrate the perspective of others with their own.

From: Brundage and MacKeracher (1980); Boud (1981).
It is argued that the integrative chiropractic curriculum (ICCD) greatly assists the integration of students into the chiropractic learning environment. In contrast to subject-based teaching with the major, initial impact for students being contact with a range of separate non-integrated basic medical and other sciences which, during the initial part of the course, tend to seem to students to have little relevance to their desire to become chiropractors, the ICCD has a focus on student-learning with emphasis on integration of basic medical and chiropractic sciences as part of a clinical paradigm with reinforcement of the chiropractic relevance in each subject on the management of each region.

5.1.3 **Teacher-Mediated Climate**

5.1.3.1 *Promotion of self-confidence and autonomy*

Responsibility for climate is an important role of teachers. The belief or disbelief of teachers in their students is capable of enhancing on the one hand, or dissolving on the other, their confidence in themselves and their stature in their own eyes (Niblett 1969:255). Some teachers 'exhibit great sensitivity, skill and humanity in dialogue, both intellectual and personal, with their students (Heron 1981:61) which serve to provide an excellent learning climate. Boud (1981:12) says that if a skill is as important as that of autonomy in learning, then it is the responsibility of teachers in higher education to do something about creating the conditions in which it can flourish. The role of the teacher as facilitator in setting the learning climate is eloquently covered by Rogers (1969:164-6; quoted by Boud 1981:36). He says that teachers have much to do with setting the initial mood of the group or class experience. Teachers help to elicit and clarify the purposes of the individuals in the class, they rely upon the desire of each student to implement those purposes which have meaning for them, as the motivational force behind significant learning. Teachers make easily available the widest possible range of resources for learning and regard themselves as a flexible resource to be utilised and function as facilitators of learning (Rogers 1969:164-6; Boud 1981:36-37). Roger's overriding contribution is an insistence that what is important in developing student autonomy and in enabling students to take responsibility for their own learning is not any technique or teaching methodology. It is an attitude by teachers towards students of acceptance and understanding of their views, desires and frame of reference, and the relationships between teachers and students which develop as a result of this acceptance (Boud 1981:37; Kirschenbaum 1979:202). The views that teachers hold about how students
are motivated affect their methods of instruction and how they are themselves judged as persons by the students. If teachers treat students as irresponsible, they will 'probably' behave that way and if they are treated as mature and responsible, they will (hopefully) behave that way (McGregor in Beard and Hartley, 1986:50-51).

It is argued that the ICCD promotes student autonomy through teaching-learning strategies such as structured learning packs including study guides which, by the way they are designed, can create a motivating, interesting and exciting learning experience which promotes self-directed learning, autonomy and self-confidence. Teachers who are trained in the implementation of this learning system, including the way in which assessments are done, can reasonably be expected to display attributes translated into behaviours which would:

a) enhance student self-confidence;

b) enable them to develop responsibility not only for their own learning but also for the patients to whom they will in future provide chiropractic health care and who also need to be encouraged to take responsibility for their own health.

5.1.4 Social Aspects of Learning Climate

5.1.4.1 Holistic view of the campus environment

At its best, the campus is expected to bring together the views and experiences of all its points of view and create something greater than the sum. It is also expected to offer the prospect that personal values will be clarified and the channels of our common life will be deepened and renewed (Boyer and Hechinger 1981:56; Morse SW 1989:v). Chiropractic programs located in a large multi-disciplinary institution provide students with a rich multi-disciplinary and multi-cultural milieu, which it is reasonably assumed, contribute to their personal and professional developments and integration into society.

5.1.4.2 Integration of women and minority groups

Smith (1989:19) says that to achieve full integration of women, multi-cultural or other minority groups concerns not only the number of students but also:

a) the treatment they receive from staff;

b) attitudes on campus;

c) the curricula they follow;

d) harassment;
e) the absence of role models;
f) limited opportunities for leadership;
g) approaches to learning.

He quotes Rutter et al (1979) as saying that schools with a good climate can offset the usual disadvantages associated with poor or minority social backgrounds of students since social relations in schools are formed largely around the relations of teaching and assessment. In a multi-cultural setting, the challenge therefore is to try to define values in which people can share but at the same time allow for important differences to be acknowledged and even nourished (Smith 1989:33). Participant observation indicates that the number of women in the RMIT chiropractic course increased from 15% to 50% in the last 15 years and that the number of students from minority groups increased by some 10-13%. However, since chiropractic has for many years been a male-dominated profession, it has been difficult to attract the women chiropractic staff necessary to serve as role models to women who now comprise half of the number of chiropractic students in many institutions.

5.1.4.3 Moral education

The morally educative function of climate is explained by Niblett (1969:3) who says that a university is still seen by many as not only having a mentally educative function for individuals by bringing them more clarity of thought as well as building sounder bases of judgement within them. It also has a morally educative function causing them to be more tolerant, more open to listen to the evidence, more balanced, freer to reason and be reasonable and finally, to be sounder as well as more informed in their views and convictions. It is argued that the emphasis on humanistic factors as a domain within the ICCD taxonomy for chiropractic clinical decision-making not only introduces but repeatedly reinforces in different contexts the paradigms, concepts and practices. These relate not only to professional ethics but to philosophy, psycho-social and cultural aspects of health care, the student’s personal life, the teaching clinics and the wider community.
5.1.4.4 Mattering

Mattering is defined as the feeling that others depend on us, are interested in us, are concerned with our fate, or experience us as an ego-extension (Rosenberg and McCullough 1981:165; Jacoby 1989:36). A "mattering scale" has been developed for use in determining whether policies, practices, and classroom activities in higher education are geared toward making adult students feel that they matter (Schlossberg, Lynch and Chickering 1989; Jacoby 1989:37). Participant observation suggests that mattering is of crucial importance to the creation of an environmental climate favourable to the development of caring, compassionate and competent chiropractors.

5.1.4.5 Service and citizenship are important concepts in the moulding of students for future life that Morse (1989) discusses in detail.

5.1.4.6 Clinical education provides a social milieu for learning which is quite unique, different from that for non-clinical courses and characterised by interaction not just with fellow students but with patients, clinical support staff and clinicians. This is achieved in a setting which cannot tolerate the frivolity and abandonment of youth but which has a focus on attitudes of responsibility, empathy, caring, compassion, clinical concern, safety and accuracy. These are often accompanied by a deep sense of doubt about personal capacity and lack of self-confidence in translating classroom, individualised and reality simulation learning into reality practice. Mootz and Cohen (1992:473) say that, in the clinical setting, it is important that the teacher provide constructive feedback to help remedy deficiencies as well as reinforce and compliment students for good work since reinforcement goes a long way to facilitating growth and positive feelings in the teacher-student relationship'. They also recommend that clinical teachers avoid saying or doing anything that could be perceived as humiliating an intern in front of a patient. If a given situation calls for immediate clinician intervention, the guidance can be provided simply and the student can be asked to stop by the clinician's office after the conclusion of the visit'. It is argued that the ICCD will promote integration and a better "fit" between persons and the environment in the clinical milieu because of the better preparation through the integrative, clinical decision-making framework which considers all the relevant variables and reinforce them over several years and many subjects. In the humanistic domain of the ICCD taxonomy, the psychological, socio-cultural and philosophical factors relevant to practice are considered. This is done at least three times for management in overview and twice for application to each region e.g. as in the
psychology relevant to low back pain or the socio-cultural factors important to the management of culturally and socially sensitive regions of the human body. Finally, 'if the teaching environment encourages active and relevant learning, the students will initiate their own “investigations” thereby serving as an important, intrinsic motivator (Mootz and Cohen 1992:472). Beach and McCormick (1990:91) have found that the environment of the teaching clinic should be warm, considerate of the needs of students, staff, patients and their carers and should allow ample time for discussion and independent learning. A rich clinical environment which will promote learning would be one with a focus on the wisdom of Sir William Osler (1859-1919) who said: “look at the cases not from the standpoint of textbooks and monographs, but as so many stepping-stones in the progress of your individual development of the art”. Finally, key factors in the establishment of the chiropractic clinical teaching environment by the clinical teacher, adapted mutatis mutandis from Xue et al (1993:219), include that the teacher:

a) provides a valuable teaching experience;
b) serves as a role model;
c) provides sufficient clinical exposure;
d) shows respect for the learner as a person and a valuable member of the team;
e) discusses the learners’ patients in adequate depth;
f) stimulates the learner to do additional reading;
g) teaches the learner to be more analytical;
h) improves the learners’ history taking and physical diagnosis;
i) provides guidance to appropriate journals;
j) teaches at the side of the patient in the treatment room; discusses the learners’ clinical skills;
k) utilises the learners’ talents sufficiently;
l) is well prepared for each clinical session; m) provides excellent feedback.

In addition to the points made by Xue above, Sarkin et al (1997:95) outline twelve tips which, it is argued, are applicable also to chiropractors, to create a more humane environment and introduce learning experiences during the clinical clerkship.
5.2.1 Introduction

5.2.1.1 Quality management, in the context of this study, relates to the determination of how the appropriation of lived experience can be most effectively managed. The concept can be explained through several terms used by Warren Piper (1993:7):

a) quality assurance is the total of those mechanisms and procedures adopted to assure a given quality or the continued improvement of quality and it embodies the planning, defining, encouraging, assessing and control of quality;

b) quality management is the design and maintenance of quality assurance mechanisms and taking responsibility for the same;

c) quality control relates to management procedures for evaluating and guaranteeing standards;

d) quality planning is the development and adoption of policies on issues of quality e.g. the statement of definitions, goals, standards and strategies in relation to quality.

It can be argued that successful institutions manage the quality of their operation well and can therefore be used as models for the study of quality management in higher education. Five major quality-related themes emerge from a variety of studies looking at successful institutions. Smith (1989:iv-v) says that these institutions:

a) focus on students' success and provide the tools for success;

b) have programs for enhanced articulation of programs;

c) energy and resources to creating an accepting environment that nourishes and encourages success;

d) have access to good information that focuses on the institution and students;

e) include leaders among academic staff and administration who provide strong direction for these efforts.

Student-focused approaches to the creation of high quality institutions recognise that a high-quality institution is one that:

a) facilitates maximum growth among its students and academic staff;

b) can document that growth through appropriate assessment procedures;
c) knows about its students and has a method for gathering and disseminating this information;
d) makes appropriate adjustments in programs or policies when the student data indicate that change or improvement is needed (Astin 1985:77; Jacoby 1989:37).

Institutional quality in this context is equated not with physical facilities or staff credentials but rather with a continuing process of critical self-examination that focuses on the institution's contribution to students' intellectual and personal development (Keller 1983:132; Jacoby 1989:41). The quality delivery process in medical training is evaluated as a framework for quality improvement initiatives by McCrea (1996:300) which, it is argued, also has relevance to chiropractic.

5.2.1.2 Stakeholders in the quality assurance of a chiropractic curriculum include those who take responsibility for or benefit from a quality program. In the chiropractic curriculum, those who are able to most directly influence decisions relating to quality include the academic, administrative and clinical staff. It is argued that ultimately, however, all stakeholder groups are involved in the quality assurance of the program including the patients of students or graduates who may reject them as incompetent or praise them for their skill. Also the students who, through comments which should be taken seriously by staff and administrators, can significantly influence decisions about quality.

5.2.1.3 The benefits of a total quality management (TQM) system outlined below are extensive and provide a convincing rationale for its introduction and maintenance.

<table>
<thead>
<tr>
<th>TABLE 119 - Benefits of total quality management (TQM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Better involvement of staff in the improvement of their own working environment, and hence the institution's ability to be responsible and accountable for the services it provides to chiropractic patients and students.</td>
</tr>
<tr>
<td>b) Better orientation of the institution to its customers, i.e. where priorities are changed from generating policies and rules to generating opportunities to learn about patient and student expectations and requirements.</td>
</tr>
<tr>
<td>c) Improved 'cycle time', that is, the time required to complete a process, by eliminating redundancies.</td>
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<tr>
<td>d) A change in institutional climate, which will be perceived as an improvement in morale or a more general change in mindset.</td>
</tr>
<tr>
<td>e) Less over-reliance on intuition and tradition in favour of decisions based on fact, even though the decisions may be both slower and tougher.</td>
</tr>
<tr>
<td>f) A breaking down of inter-departmental divisions and of the traditional divisions between administration, student and academic affairs. This is perceived to be a result of the teamwork orientation of TQM.</td>
</tr>
<tr>
<td>g) Development of a common language to solve problems.</td>
</tr>
</tbody>
</table>
h) A better sense of 'what we are about' and more goal-directedness.

i) Reduced re-work and scrap.

j) Cost savings.

Adapted from: Warren Piper 1993:88,89

5.2.1.4 Basic activities and pre-requisites of TQM

Warren Piper (1993:31) identifies three basic activities in quality management: setting goals and standards, evaluating practice and improving practice. He considers the marks of good quality management to be that these three basic activities are undertaken deliberately and systematically:

a) That all stakeholders are involved in all three basic activities in respect of the tasks and decisions for which they are responsible.

b) That evaluation involves the systematic collection and interpretation of data.

c) That everybody sees the evidence upon which the quality of their work is assessed, rather than relying solely on the judgement of a superior.

He stresses that while these are simple principles, they are not always easy to apply in practice and need to be considered in conjunction with three pre-requisite activities:

a) Mapping what has to be managed.

b) Establishing quality assessment procedures.

c) Setting criteria against which to judge performance (Warren Piper 1993:31-2).

Warren Piper’s model, including the three pre-requisite and three basic activities are used as a framework for a quality management program in an ICCD and are discussed in turn.

In order to validate the self-evaluation process of quality assurance, the questions in Table 120 may be fruitfully addressed.
5.2.1.5 Curriculum questions

TABLE 120 - Curriculum design questions about the quality management, evaluation and accreditation of a chiropractic program

| ACTIVITIES PRE-REQUISITE TO QUALITY MANAGEMENT* |
|---|---|
| 1. | What should be included in a map of what has to be managed? |
| 2. | Which procedures should be established for encouraging and assessing quality? |
| 3. | Which criteria should be set against which to judge performance? |

| BASIC QUALITY MANAGEMENT ACTIVITIES* |
|---|---|
| 1. | Which goals and standards should be set for the program? |
| 2. | How will practice be evaluated against standards? |
| 3. | How will practice be improved? |

| EVALUATION OF QUALITY MANAGEMENT PRACTICES** |
|---|---|
| 1. | What is evaluation of the quality management of a chiropractic curriculum? |
| 2. | What are the self-evaluation practices expected in a chiropractic curriculum? |

| ACCREDITATION** |
|---|---|
| 1. | What are the elements of an accreditation system? |
| 2. | What are the characteristics of a good accreditation system? |
| 3. | Which accreditation framework and what documentation is required for accreditation? |

*Based on concepts from Warren Piper 1993 which are posed as curriculum design questions. ** By the author.

5.2.2 Activities Pre-requisite to Quality Management

5.2.2.1 A map of what has to be managed in a chiropractic curriculum

Maps of what has to be managed are probably best represented in terms of quality frameworks relevant to the chiropractic curriculum which have been developed in Australia by the JEC (1995B:29). The JEC bases its approach in part on that of the Scottish Higher Education Funding Council (SHEFC 1993:QA/2), by The Australasian Council on Chiropractic Education Limited (ACCE 1997:1) and by RMIT University (1997B:13) for internal course quality audit purposes. An excellent map for planning and conducting program evaluation is presented by Rotem and Bandaranayake (1983:127). A compilation of items in the frameworks appear in Table 121.
TABLE 121 - Items to be managed which are included in quality frameworks relevant to the chiropractic curriculum

<table>
<thead>
<tr>
<th>Category</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curriculum Intent (aims and objectives)</td>
<td>- consistency with mission</td>
</tr>
<tr>
<td></td>
<td>- consistency with societal needs</td>
</tr>
<tr>
<td></td>
<td>- currency</td>
</tr>
<tr>
<td>Curriculum Design and Review</td>
<td>- appropriateness to needs</td>
</tr>
<tr>
<td></td>
<td>- recognition of prior learning</td>
</tr>
<tr>
<td></td>
<td>- liaison with profession/end users</td>
</tr>
<tr>
<td></td>
<td>- student input</td>
</tr>
<tr>
<td>Teaching-Learning Environment Conducive to Learning</td>
<td>- academic, physical and social aspects</td>
</tr>
<tr>
<td></td>
<td>- research</td>
</tr>
<tr>
<td></td>
<td>- specialist facilities for experiential learning</td>
</tr>
<tr>
<td></td>
<td>- staff and ancillary facilities</td>
</tr>
<tr>
<td>Staff Resources</td>
<td>- staffing establishment</td>
</tr>
<tr>
<td></td>
<td>- staffing profile</td>
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<tr>
<td></td>
<td>- administrative and library support staff</td>
</tr>
<tr>
<td></td>
<td>- staff development</td>
</tr>
<tr>
<td></td>
<td>- qualifications in higher education</td>
</tr>
<tr>
<td>Learning Resources</td>
<td>- equipment, materials, information technology</td>
</tr>
<tr>
<td></td>
<td>- library, audiovisual, computer, etc</td>
</tr>
<tr>
<td>Course Organisation</td>
<td>- vertical and horizontal integration</td>
</tr>
<tr>
<td></td>
<td>- timetabling</td>
</tr>
<tr>
<td></td>
<td>- coordination of teaching-learning</td>
</tr>
<tr>
<td></td>
<td>- coordination of assessment</td>
</tr>
<tr>
<td></td>
<td>- feedback</td>
</tr>
<tr>
<td>Teaching-learning Practice</td>
<td>- based on intent</td>
</tr>
</tbody>
</table>

5.2.2.2 The establishing of quality assessment procedures for a chiropractic curriculum

a) Process management - It is argued that the establishing of quality assessment procedures for a chiropractic curriculum is dependent on process management where a process is a series of activities performed to achieve a specific outcome (IBM 1993:35). The University of Wisconsin at Madison, School of Business, developed knowledge, methodology and implementation procedures for TQM as a system of management with emphasis in four areas: daily management, strategic and policy management, cross functional management and new product and service development (IBM 1993:32). It is argued that this framework is most appropriate for the establishment of quality assessment procedures for the ICCD. The framework consists of:

i) daily management which includes cycle-time reduction techniques, bottleneck analysis and constraint theory, incremental and breakthrough improvement planning, fool-proofing techniques etc (IBM 1993:32);

ii) strategic and policy management which includes adaptive policy deployment, benchmarking and measures of progress, customer-focused missions and visions, critical process identification etc (IBM 1993:32);

iii) cross-functional management which includes characteristics of horizontal functions, advanced system structures for large organisations, effects of cross-functional management, examples and classification methods for horizontal functions (IBM 1993:32);

iv) new product and service development which includes reliability deployment, construction and analysis of quality, analysing customer behaviour and use analysis, process management for new product development etc (IBM 1993:32).

b) Application of a TQM model - In line with the model proposed by Warren Piper (1993:31-2) in 5.2.1.4 above, a province of management (i.e. competency-based assessment) was selected from a chiropractic curriculum management map and serves as an example of how this elegant model performs (Table 122).
TABLE 122- Principles of quality management in relation to a province of the chiropractic curriculum - competency-based assessment

DESCRIPTION

This section outlines a quality management framework for the competency-based assessment of learners.

AIM

To develop and monitor guidelines for competency-based assessment of learners.

GOALS

a) To establish a process and framework within which assessment can be conducted.
b) To set and approve standards for assessment.

ACTION PLAN

1. A map of what has to be managed

   a) Training of assessors (staff and external assessors)
   b) Selection and registration of assessors
   c) Updating of handbooks and guides
   d) Evaluation of assessor, student and other stakeholder feedback
   e) Management of change resulting from action on feedback
   f) Assessing candidates
   g) Recording and transmitting results
   h) Providing feedback to candidates
   i) Development and testing of assessment methods to improve their capacity to assess existing competency standards and adapt them to changed standards
   j) Communication with stakeholders

2. Procedures for encouraging and assessing quality

   a) Training program for assessors and other personnel involved with the system, using an "Assessors' Guide"
   b) Use of student and assessor evaluations and feedback from all other stakeholders
   c) Liaison with Registration Boards, Health Service Commissioners and other groups to determine whether needs are met
3. Criteria against which to judge performance

- Established benchmarks e.g.:
  - Appoint recognised and trained experts as assessors
  - More than one assessor is used for each assessment decision
  - More than one assessment method is used for each assessment decision
  - Thorough sampling of performance is undertaken particularly in the clinical workplace
- Assessment specifications
- Results of field tests
- Comparison with students' results for previous years
- Algorithms for the design of assessments
- Performance indicators (see Table 124)

PROCEDURES

1. Setting goals and standards

   Regular review and update of:
   - A statement of intent including a mission with vision and value statements; aims, goals, objectives, graduate attributes, competencies including the management of specified health problems
   - A competency-based professional standards document which provides performance indicators for clinical practice
   - Guidelines for standards of practice and range indicators to provide benchmarking
   - Assessment specifications
   - Handbooks and publications to guide the competency-based assessment system
   - An Assessors' Guide for the training of external assessors and staff
   - Student guidelines relating to competency-based assessment for formative and summative assessment
   - Performance indicators for the administration of assessments (see Table 124)

2. Evaluating practice against standards

   Regularly administer instruments to evaluate the system:
   - Assessor's questionnaire
   - Student questionnaire
   - Communicate with stakeholders who can supply information on perceived outcomes e.g. Registration Boards, Health Service Commissioners, Third Party Payer Organisations, etc

3. Improving practice

   Hold regular stakeholder meetings to review handbooks, processes and procedures and discuss results of 2a) and 2b) above
   - Maintain a quality log and enter actions needed and completed
1. Review overall aims, goals, action plan and standards
   a) Once established, a review is conducted once every two years at a stakeholder meeting.
   b) All relevant persons are advised of the outcome.
   c) An updated version of the statement of intent; a competency-based professional standards document and guidelines for practice standards and range indicators is distributed to all relevant students and staff within two months of the review at the beginning of a new academic year.
   d) Updated assessment specifications are distributed to all relevant students and staff.
   e) Updated handbooks on competency-based assessment and an assessors guide is distributed to each external and internal assessor.
   f) Updated student guidelines for competency-based assessment are distributed to students and staff.

2. Collect and analyse data from student evaluations and external sources
   a) Data from evaluations is obtained annually, analysed and the results considered by stakeholder teams.

3. Improving practice
   a) Stakeholder meetings are held following each major assessment to analyse data and reach conclusions and recommendations for major reviews.
   b) Entries are made in a quality log within one month from each time data becomes available or is considered by a consultative or advisory committee.


5.2.2.3 Criteria against which to judge the performance of a chiropractic curriculum

a) Criteria against which to judge the process of implementation and performance of an ICCD include the following generalisable ways, identified by Warren Piper (1993:102-3) of judging how well the organisation is managing each of the provinces of activity identified in the quality framework discussed in 5.2.2.1 above:

i) comprehensiveness should apply across all provinces to ensure a complete approach to quality management of the assessment system;
ii) **communication** of the system with an emphasis on promoting useful and comprehensible management data and encouragement of the right and responsibility of people at all points in a process to identify and report a defect in the system, which requires immediate attention. Such communication requires that the policy and procedures on quality assurance are clearly described and widely comprehended within the assessment system;

iii) **cogency** refers to planning which reflects the notion of assuring and improving quality throughout the system;

iv) **coherence** relates to the extent to which the intent, policies and procedures of successive levels of responsibility nest into one another in a leader-led approach to quality management;

v) **consonance** deals with the fundamental principle that the structures, procedures and methods employed within the system actually have the intended result;

vi) **consistency** is promoted if the system's policies and intent remains sufficiently stable over time to permit the evaluation of procedures;

vii) **consequence** makes it possible for anyone to act, without fear, to improve things throughout the system, consistent with ensuring that judgements of quality and recommendations for improvement are acted upon.

b) **Criteria against which to judge outcomes** as a measure of the performance of a chiropractic ICCD appear in the documentation of accrediting bodies which evaluate the RMIT chiropractic course (ACCE 1997; JEC 1995A&B; RMIT 1997B).

### 5.2.3 Basic Quality Management Activities

**5.2.3.1 The setting of goals and standards for the quality management of a chiropractic curriculum**

It is argued that performance indicators, guidelines and benchmarks are a way of expressing goals and standards for the basic quality management of the ICCD while guidelines for processes of curriculum implementation can be used to establish quality standards. Analysis of the literature abounds with examples of guidelines for the design and implementation of the curriculum. In fact, it was possible to construct performance indicators and guidelines for self-evaluation, with validation from the literature of all aspects of the curriculum design.
taxonomy in Table 10. An example relating to certain aspects of the evaluation of learner assessment is given to illustrate this point (Table 123).

**TABLE 123 - Performance indicators for the self-evaluation of competency-based assessment in relation to the curriculum intent of a chiropractic curriculum**

- The course objectives refer to the need for lifelong (continuous) self-assessment (2).
- Each course objective contains the necessary elements (e.g. performance standard, behavioural criteria) to permit the construction of an appropriate procedure for measuring the learner's success in achieving the objective (2).
- Invigilators and assessors are trained and competent in preparing and supervising assessments.
- Assessors check the facilities and set-ups before the assessments commence to ensure that everything is ready as per the prescribed assessment criteria.
- The test instructions are read or presented to the learners in clear and concise language.
- Individuals are allocated a reference number in order to maintain confidentiality and to avoid bias or discrimination (3).
- Assessors accept that learners are likely to be nervous and ill-at-ease when assessment takes place.
- Time is set aside to calm learners' fear of assessment.
- Before assessments commence learners are briefed about the assessment format, conditions and operation.
- The importance of carefully reading the assessment instructions is stressed during the learner's briefing.
- Candidates for practical assessment are made to understand what is to be done and what is required in order to ensure the test results will be valid.
- Invigilators and assessors know they must not intervene when learners are making errors on practical assessment.
- Skills tests cover those skills needed by the profession and by learners and are the same for all learners.
- Skills tests are tried out and 'proved' before offering them for general use. The first trial is carried out by assessors and clinical staff from several sectors of the program and pilot groups are formed to try out the test.
- The reliability and consistency of key requirements of test performance are deemed dependable in relation to comparison of one group of similar candidates with another i.e. tests would yield broadly similar results.
- The assessors establish rapport with the learners and encouraging remarks are made like: "we want you to feel that you are being fairly treated"; "no-one is out to fail you"; "there are no trick questions"; "if in doubt, we are here to...etc".

Based on: (1) Walklin 199; (2) WHO 1977; (3).
5.2.3.2 How practice can be improved in the quality management of a chiropractic curriculum

A critical part of implementing total quality management involves process management i.e. identifying critical processes and working to ensure that they are effective, efficient, under control and adaptable (IBM 1993:25). In adapting a model for a new teaching strategy developed by the University of Maryland (IBM 1993:50) to the ICCD it is argued that improvement in the practice of quality management in an ICCD will result if total quality (TQ) features are built into the teaching-learning methodology. The University of Maryland model includes:

a) Student involvement in the design of courses.
b) Team teaching involving staff, practising professionals and students.
c) Cognisance of real-time data and feedback.
d) Cross-functional student project teams.
e) Module-based subjects from which students and members of the profession can make need-based selection decisions.
f) The design of organisational projects and the evaluation of processes and outcome accomplishments made by members of the profession as future employers, by the students and by the teaching staff.

Models have been developed by Hansen (1993:12) and are used for the planning and implementation of total quality improvement (TQI). The investigative cycle is based on the ‘PLAN-DO-CHECK-ACT CYCLE’ of Shewart/Deming (Deming 1986:passim; Hansen 1993:11) which can be broken down as follows: a) PLAN - define the question, plan the analysis; b) DO - carry out the analysis; c) CHECK - assess the results, reformulate the analysis; and d) ACT - proceed with the analysis, check the results and report the results.
5.2.4 Evaluation of the Quality Management Practices of a Chiropractic Curriculum

5.2.4.1 What is evaluation in relation to a chiropractic curriculum?

Evaluation is concerned with making judgements about things in terms of their value or worth in terms of behaviour, objects or processes and to be effective such judgements must be based on appropriate and relevant data (Print 1992:141). In education it is inexcusable to make fanciful evaluations, even if based on the so-called ‘intuitive reaction’ of experienced assessors or evaluators because an abundance of data exists upon which judgements can be based about students, teachers, the curriculum, the institution and its products and processes (Print 1992:141-2). The benefits of ongoing evaluation are indisputable. However, the success and usefulness of evaluation results in clinical education is clearly associated with the willingness to adopt a critical attitude and to analyse the existing situation, opportunities to discuss, availability of a plan of action and continuous collection of evaluative data (Wolffhagen et al 1997:99). Evaluation in the context of a chiropractic program occurs in several ways:

a) Evaluation of students - A clarification of the evaluation of student performance in a chiropractic curriculum is discussed in 4.6 above. In fact, all the basic concepts of assessment, measurement and evaluation of student performance apply equally to the evaluation of staff, the curriculum, the unit/team responsible for it’s implementation, the relevant departments and the institution.

b) Internal evaluation of the curriculum is evaluation within an institution. In a University, internal evaluation takes place at several levels:

i) by the responsible department and the course team in which case it constitutes a process of self-assessment which is inextricably linked to quality assurance or total quality management (TQM);

ii) internal evaluation by a multidisciplinary institution of it’s courses done at institutional level to ensure that courses meet quality assurance guidelines and may therefore be reaccredited. This is discussed further in 5.2.5 below.
c) **External evaluation** of an institution or the department in an institution responsible for a program (e.g. an undergraduate chiropractic course) are conducted for the purpose of:

i) a **departmental review** to which external experts/consultants are appointed;

ii) **external accreditation** by a professional accrediting agency (e.g. a council on chiropractic education);

iii) **regional accreditation** of a chiropractic institution in the United States of America where, besides professional accreditation, external institutional accreditation by an agency such as the Western Association of Schools and Colleges (WASC 1990:1) is a measure of institutional credibility, status and viability.

5.2.4.2 What are the self-evaluation practices expected in a chiropractic curriculum?

The expectations for the self-evaluation of quality assurance processes used by programs, which should guide all institutions and their self-evaluation teams, can be determined through descriptive analysis of documents from accrediting organisations and the Universities as described in 5.2.2.3 b) above.

a) **Self-assessment** - Assessment of evidence underlying assertions of institutional strengths and weaknesses is a theme in all comprehensive self-studies. Institutions are expected to make a review and analysis of data collection efforts and the use of data throughout the institution as an overarching theme of the self-study process.

b) **Data collection** - A census should be conducted of the types of data being collected or able to be collected by an institution to monitor its chiropractic program. It is argued that there should be a decision to focus assessment efforts on selected aspects of the curriculum, examples of which include the following issues addressed in the literature:

- Self-assessment identification of needs and teaching ("SAINT") (De Saintonge 1996:65).
- Case study of a department of medicine’s educational retreat (Guyatt and Nishikawa 1993:147).
- Administrative structure for academic function (Hamilton 1995:365).
- Guidelines for bringing total quality improvement into the classroom (Hansen 1993:1).
- Tutor/teacher expertise research (Schmidt 1994:656).
- Outcomes, measurements in the assessment of educational program effectiveness (Kassebaum 1990:293).
- Staff evaluation of departmental chairpersons (Ross 1990:1).
- Validity studies:
  • standardised patient examination (Rutala et al 1992:561; Stillman et al 1992:557)
- Assessing curriculum implementation (e.g. Taunton 1984:217 (overall program); Vernon 1994:91 (problem-based learning in behavioural science courses); El-Hazmi and Tekian 1986:55 (overall medical curriculum).
- Graduates’ evaluation of teachers (Finucane and Rolfe 1996:57).
- Approach to the evaluation of academic quality of North American schools of chiropractic medicine (Gemmell 1992:23).
- Curriculum improvement through continuous evaluation (Friedman and Mennin 1991:390).
- Comparison of conventional and problem-based curricula during curriculum change process (Coles 1985:308).
c) **Self-assessment system** - Institutions should establish their own working definitions of assessment i.e. assessment techniques can and should be used to inform major policy issues within an institution and institutions should establish their own framework for quality assurance of which an example appears in 5.2.2.1 above.

d) **Staff and student involvement** - Institutional staff and students are to be directly involved in assessment efforts. Staff and student involvement is essential in establishing institutional assessment goals and in determining what questions should be answered and how data should be used (WASC 1990:3,9).

e) **Testing of self-assessment models** - Model assessment efforts may be emphasised to promote institutional expertise and commitment by requiring the 'initiation of several model assessment efforts in different parts of the institution and then disseminating the results and analysis of such models throughout the institution'.

f) **Improvement of self-assessment plans** - Develop or improve institutional plans or sets of plans for assessment. All institutions are expected to develop institutional assessment plans to include: i) What will be the goals of assessment throughout the institution? ii) What methods will be used? iii) How will staff and others be involved? iv) How will the effectiveness of the assessment program itself be evaluated? v) A formal plan or set of plans will serve to focus institutional efforts and provide a basis for evaluation by the institution as well as future accrediting teams (ACCE 1997:2; CCE (US) 1997.ix; JEC 1995A:1; WASC 1990:4).

g) **Improvement of self-assessment techniques** - Improve assessment techniques for program reviews. As with the education program, the program review must consider evidence of program effectiveness, i.e. actual student learning outcomes.

h) **Outcomes assessment** - Incorporate assessment data in periodic evaluations of the effectiveness of the educational program. Evaluations must include evidence of the outcomes of the educational program. An example is the study by Blumberg and Deveau (1995:205).

i) **Assessment of ambience** - Assessment of the 'co-curriculum program' of the institution. The use of assessment techniques in determining the quality of student experience at an institution, e.g. for women, different ethnic groups, majority students, returning adult students etc.
366

j) Curriculum evaluation by students - A number of studies provide excellent methodologies applicable to student evaluation of the ICCD. Excellent examples are Snadden and Yaphe (1996:31) who developed a protocol for evaluation by students of attachments in general practice at the University of Dundee; and Blumberg et al (1994:96) and Bolger and Staines (1985:382) who assessed academic problems encountered by medical students.

5.2.5 The Accreditation of a Chiropractic Curriculum

5.2.5.1 Overview

Accreditation and the term accredited means to be officially recognised; generally accepted, orthodox; having guaranteed quality (Brown 1993:15). Accreditation provides certification that the standards of a course are appropriate to the award to which it leads and that the course and the methods adopted in delivering it are likely to achieve the purpose for which the course was or will be introduced. 'Historically, the quality of an institution of higher education has been established through accreditation, either of its individual programs or of the university as a whole' (WASC 1990:1). Within the accreditation framework, qualities considered an attribute that can be measured by such inputs include the number of books in the library, the size of the budget, the number of staff members holding a Ph.D. etc. More recently, comprehensive accreditation programs are being implemented in which quality is judged by the inspection of outputs. Frequently this is done by measuring graduation and attrition rates or by standardised tests (IBM 1993:27). Accreditation powers in relation to tertiary award courses in Australia have been granted by State/Territory and Commonwealth governments to higher education institutions, empowered by their various acts of establishment to accredit/approve their own courses (RATE 1991:5). Where institutions of higher education are empowered to accredit their own courses, course development and approval takes place within the framework of the institution’s strategic plan and its educational profile. Generally this operates on the basis of peer review through a hierarchy of committees and standing committees (faculty board/academic board/university council) with responsibilities for academic standards, course objectives, teaching/learning resources, admissions criteria, cross-faculty implications and the requirements of relevant professional bodies or employer groups. Some institutions are utilising course advisory committees comprising a range of interested parties including practitioners, employers, community representatives and academic staff from other institutions, which enable ongoing review of
content and relevance. This partnership model functions as a more efficient alternative to the periodic scrutiny of courses solely by professional bodies and promotes inter-institutional communication helpful to the maintenance of national standards (RATE 1991:5).

5.2.5.2 Accreditation guidelines for first professional degrees

Australian government guidelines define a first professional degree as the qualification required for entry to the profession via registration. The bachelor degree is the initial award in professions such as health and education, architecture, engineering, law, business and in the areas of the arts and the sciences. Courses at this award level provide students with a systematic and coherent introduction to a body of knowledge, the underlying principles and concepts and the associated problem-solving techniques. Students are expected to develop the academic skills and attitudes needed to comprehend and evaluate new information, concepts and evidence from a range of sources. This is necessary so that after completion of a degree, they can continue to review, consolidate, extend and apply the knowledge, using the techniques gained in their undergraduate studies. A bachelor degree course usually includes the provision of major studies in which significant literature is available, course content is taken to a significant depth and knowledge is progressively developed to a high level which provides a basis for postgraduate study (RATE 1991:13).

The accreditation of medical courses is a very sophisticated process conducted in a scientific manner with clearly defined criteria and processes as evidenced by the literature (Hamilton and Vanderwerdt 1990:541; Smith 1991:743; Australian Medical Council 1992:1). Similarly, designed processes pertain to chiropractic professional course accreditation.

5.2.5.3 Professional accreditation of chiropractic education

Professional accrediting bodies and statutory boards which undertake accreditation of chiropractic programs and institutions include:

a) Councils on chiropractic education such as the Australasian Council on Chiropractic Education (ACCE), the U.S. Council on Chiropractic Education (USCCE), the Canadian Council on Chiropractic Education (CCCE), and the European Council on Chiropractic Education (ECCE).
b) **The professional registration boards.** In Australia the two largest boards, the Chiropractors and Osteopaths Registration Board of New South Wales and the Chiropractors and Osteopaths Registration Board of Victoria in 1994 established The Joint Education Committee of Participating Australasian Chiropractors and Osteopaths Registration Boards (JEC 1995A:2); in South Africa the professional statutory council for chiropractic has powers in terms of the relevant Act to accredit higher education programs. While relevant universities and colleges have their own processes, procedures and standards for internal accreditation of their chiropractic programs (in the same way that they do for other courses within the institution), and while in the last decade there has been considerable pressure by government for institutions to focus on outcomes assessment and quality assurance in teaching and management (Billing 1988:65; Gibson 1988:128; Kleynhans 1994:1), it is argued that external professional accreditation is the only way in which the chiropractic registration boards and the chiropractic profession can be satisfied that statutory requirements for education are met. This may be the reason why institutional accreditation of teaching programs is supplemented in the case of professions such as engineering, medicine and chiropractic by professional accreditation.

According to the Western Association of Schools and Colleges (a regional accrediting association in the U.S.A.), the overarching statement on assessment relating to accreditation relates to the concept that ‘the institution has developed the means for evaluating how well, and in what ways, it is accomplishing its purposes as the basis for broad-based continuous planning and evaluation’ (WASC 1990:1). The Commission of Accreditation of the U.S. Council on Chiropractic Education (US CCE) has as its mission to provide evaluative guidance to chiropractic institutions on issues of institutional effectiveness and program quality. Through the accreditation process, it assesses institutional mission and goals, programs, inputs, resources, outcomes and planning. Accreditation is granted through peer review and by a decision of the Commission on Accreditation, based upon an evaluation relative to the institutions' compliance with the standards (US CCE 1997).
5.2.5.4 Stakeholders in evaluation and accreditation

There are at least six groups to which the evaluation and accreditation of chiropractic teaching institutions and specific programs is of great importance including:

a) **Chiropractic patients and the community** which have a requirement for professional responsibility, accountability and competence that has been repeatedly stated by various sectors of the public and by government. The Australian government, through the National Office of Overseas Skills Recognition has in recent years spent significant amounts of money to support professional research on the establishment of competency-based professional standards and in developing competency-based assessment strategies for entry level practitioners in many professions including chiropractic (Kleynhans 1992A:98; 1993:1).

b) **Professional registration boards** which have statutory responsibility to ensure minimum levels of quality and effectiveness of professional care.

c) **Students** who spend a significant period of time and money in gaining qualifications, having made a life-long commitment to the professional discipline, enrol in a program in good faith in terms of its quality.

d) **The universities and other educational institutions** which are involved in the provision of education and training programs and are required to meet minimum levels of program quality and effectiveness; and to continuously self-assess and improve their programs.

e) **The chiropractic profession** which is concerned with advancement of the discipline, the quality of entrants to the profession and the provision of qualified professionals for research, education and practice of the discipline (Kleynhans 1992A:98; Kleynhans 1994:1; JEC 1995A:5).

f) **The accrediting bodies** which have to reach a determination about the quality of a program by validating the institution’s self-assessment.
5.2.5.5 The elements of an accreditation system

Descriptive analysis of the literature indicates that all accreditation systems share a range of elements, but the way in which these are developed vary across a range of organisations (ACCE 1997; AOA 1990; CCE (US) 1991, 1997; ECCE 1996; NZQA 1995A,B,C; SCHEFC 1993; WASC 1990:1). It is argued that an assessment system needs to be carefully established since problems with processes and procedures have the potential to result in litigation. It is therefore necessary that the system is demonstrably viable in terms of resources in both professional and administrative personnel and that it's assessments are valid, reliable and fair. The main elements of a chiropractic educational accreditation system which ensure it’s success include the personnel, documentation and efficient communication, each of which is discussed below.

The personnel required for the accreditation system includes several groups:

a) A group to set and continuously review accreditation standards such as the council of each of the chiropractic accrediting bodies or the academic board or senate of a university and various sub-boards or committees which deal with educational standards.

b) A group to review institutional program documentation and inspection reports such as a commission on accreditation of a chiropractic accrediting body or a department, faculty or school board, a courses committee, academic board or senate of a higher education institution. Normally, several committees will review such documentation in a university.

c) An inspection or validation team which typically consists of experts in the disciplines to be evaluated who are appointed to validate information on program strengths and weaknesses and other data supplied in institutional self-evaluation documentation. In the Australian higher education system, persons would spend a day or less to conduct this task while the councils on chiropractic education in the U.S., Canada and Australia spend several days to conduct an in-depth inspection.

d) A body which reviews inspection team or validation reports such as a Commission on Accreditation of a chiropractic accreditation body and relevant committees in a higher education institution.
The documentation required for an accreditation system includes:

a) **A standards document** - a term found across the accreditation systems of a range of professions. It consists of a detailed outline of what is expected in terms of procedures and measures used to evaluate instructional programs both by the institutions and by accreditation inspection committees. The supporting documentation necessary for the conduct of such evaluation include guidelines for self-assessment; desirable outcomes of educational programs; student service and learning environment; institutional viability etc.

b) An administrative handbook or manual of operations for the conduct of the accreditation process.

c) **Training manuals** which are required for members of accreditation inspection teams or review committees who conduct on-site institutional visits; and for members of groups who have to review reports and make recommendations. Training workshops for new evaluators, continuing evaluators and team chairpersons should be provided with an emphasis on the evaluation of institutional self-assessment documentation and evidence of institutional quality.

5.2.5.6 **The accreditation process**

Efficient communication of the spirit and intent of accreditation is vital to the evaluation process. The accrediting body should therefore clearly communicate its expectations that self-assessment techniques be used by all institutions to build a "culture of evidence" while respecting institutional autonomy in determining the form and scope of institutional self-assessment. There should be a clear indication that assessment will not be used punitively as a way of challenging institutional credibility. Nor should data be used to compare institutions to one another. The spirit of assessment is to connect better evidence to the accrediting process so that the dual purposes of accreditation -- accountability and improvement -- can be fulfilled more effectively (WASC 1990:2).
### Evaluation of an accreditation system

**TABLE 124 - Characteristics of a 'good' accreditation system**

- Clearly defined criteria or standards for evaluation.
- Clearly defined policies, processes and procedures.
- Trained and informed personnel at a standards setting group; implementation group; inspection teams.
- Up-to-date documentation: standards; handbook/operating manual; training manuals.
- Institutional involvement in establishing standards, policies, processes and procedures.
- An outcomes assessment approach which links student performance on competency-based assessment to institutional accreditation.
- An efficient and effective secretariat.
- Adequate funding including the cost of inspections.
- Reciprocal relationships with similar organisations.
- Due regard for confidentiality.
- Emphasis on objectivity, validity, reliability and fidelity.

Based on analysis of: CCE (US) 1997; The Western Association of Schools and Colleges 1990; Bureau of Professional Education, AOA, 1990; JEC 1995; ACCE 1997; SCHEFC 1993.)
5.3 A CLARIFICATION OF THE MANAGEMENT OF CHANGE IN A CHIROPRACTIC CURRICULUM

5.3.1 Introduction

5.3.1.1 Curriculum change

Change can be thought of as the deliberative and collaborative process to solve a problem or to plan and attain an improved state of functioning (Bennis et al 1969:1; Print 1992:179). It is argued that the planned management of curriculum change necessary to alter a conventional curriculum to an experiential, integrative chiropractic curriculum is an integral component of the curriculum design. Curriculum vivification, discussed in 2.3.2 above is argued to be the creative element of curriculum change management and is the translation of the curriculum framework into the functional forms of a dynamic, growing, assimilating, innovating curriculum (Bevis 1989:178). The impact of change is very significant as indicated by the 1913 statement by Osler (1913:1): "naturally conservative, we are bewildered by the rapidity of a forced prognosis and change...we have outrun an education system framed in simpler days for simpler conditions". Fry et al (1997:108) see curriculum change in all health care professions as a consequence of changes in knowledge, culture, professional practice and individual needs. While supporting the notions of Fry et al (1997:108), it is argued that curriculum change in chiropractic is also a consequence of an information explosion and hence the necessity to work smarter rather than harder. Furthermore, there is a strong argument that information which is not useful (or used) is useless. Coupled with this is the fact that much of the chiropractic curriculum is an imitation of the medical curriculum. However, chiropractors, by virtue of the fact that they practice manual rather than chemical medicine, do not have the same needs as medical practitioners in areas such as histopathology, microbiology, treatment of infectious disorders etc. Change is also, particularly, necessary because of the problem with lack of integration of basic science and clinical knowledge into clinical decision-making. Other reasons for change are included in 1.2.2 above.
5.3.1.2 **Innovation**

Shumaker (1977:78) says that unlike an unanticipated or chance change, innovation is a planned and deliberate change. Collingwood (1979:8) adds that while change takes place through innovation which implies change in the present situation, successful innovation is usually charged by the durability and extent of the change. Also, innovation has a number of attributes, which are important according to the perception of these by stakeholders. Attributes such as relative advantage, compatibility, complexity etc therefore influence the time taken for the widespread acceptance of innovation and are the measure of its success. Attributes are more easily influenced than either the environment in which change is to be implemented or the characteristics of the stakeholders (Collingwood 1979:8). Of overriding importance, however, appears to be the statement by Chin and Benne (1969:33) that an innovation does not stand or fall on its own merit alone, but also on how the innovator deals with the human element inherent in the setting.

5.3.1.3 **The environment for change** relates to relatively visible, specific conditions such as the resources available to support the innovation, the level of understanding of the innovation, the organisational structure which would either impede or facilitate acceptance, physical requirements (such as classroom and clinical accommodation necessary to implement innovation etc). Non-specific conditions relating to social and cultural norms which are influenced by inherent instability in the environment to accommodate change and energy for innovation which can be provided through money, moral pressure, competition, commitment and support from higher levels in the organisation (Collingwood 1979:10). "The analytical processes for determining the capabilities required by the newly qualified professional and the principles embedded in the questions related to faculty (staff) organisation, educational implementation, assessment of capability and evaluation of outcome, should be capable of adaptation to any program of professional education" (Neufeld 1984:267). The notion of "ripeness for change" has been proposed by Miles (1964:644-5) signifying a state where cumulative changes and perception of need in the environment build up to such a level that only small effort is required to overcome resistance to change. Therefore, specific conditions that will facilitate acceptance or non-specific conditions, which will predispose the environment to change should be identified by the planners and instigators of innovation (Collingwood 1979:9).
5.3.1.4 Curriculum questions

TABLE 125 - Curriculum design questions about the change process of a chiropractic curriculum

THE PLANNING OF CHANGE

Forces of Change
Which generic forces of curriculum change should curriculum developers and all other participants in the curriculum, be aware of in addressing the what, how, when and so what of learning and teaching?

Extent and Speed of Change
What should be the nature of change in terms of speed, scale, degree (thoroughness), continuity (profoundness) and direction of the planned change?

Sources of Curriculum Change
Which of the following sources of curriculum change are to be consulted and how should information be obtained?
- direct and indirect effects of changes in society?
- direct and indirect effects of changes in the educational system?
- direct and indirect effects of changes in the profession?
- perceived concerns, dissatisfaction or needs about the curriculum which require change?
- which needs or problems have stakeholders accepted?

Innovation and Change Strategies
Which elements of the curriculum change process should be used?
Which factors should be explored because they have significant impact on adoption of the innovation(s) proposed to this curriculum in terms of:
- access to information?
- alternative innovations?
- institutional, staff and departmental support?
- funding availability?
- role of change agents, e.g. profession, staff, students?
- community and government pressure?

THE IMPLEMENTATION OF CHANGE

Application of the Attributes of Change
How does the relative advantage, compatibility, complexity, triability, observability and status of the innovation influence the change process?

Communication and the Implementation of Change
How should it be demonstrated to stakeholders through workshops, seminars and other forms of communication that an innovation is of inherent value to them and is a logical solution to their problems?

Which group techniques such as staff meetings, group decision making, group workshops, training groups, working parties, action research sessions, consultants working with staff and other methods should be used to convince stakeholders that the change should be introduced?

Which political-administrative change procedures, if any, have to be used to reward staff and which sanctions are to be avoided in introducing change?

Evaluation
How will the change process be evaluated?

Based on analysis of concepts derived from Skilbeck 1976; Print 1992; Duncan 1979; Collingwood 1979; Rotem and Bandaranayaka 1981; Grant and Gail 1989).
5.3.1.5 The importance of change and its relationship to quality management is evident from the following quotes: President William Kirwan, University of Maryland - College Park says: “I am convinced that universities must fundamentally alter their educational strategy and institutional infrastructure in order to meet the challenges of the global marketplace in the twenty-first century”. Initiatives which he proposes are “designed to achieve a profound change in the culture of the institution, and in the educational product we deliver to our customers” (IBM 1993:46).

Judy Olian (IBM 1993:47), principal investigator of an IBM-TQM project says: “We recognise that the universities of the year 2000 that will be successful will look substantially different from the universities of the 1980s and early ‘90s. If we want to be among those that are successful, we have to change. We have to change in relatively dramatic ways, and in that sense we view TQM as a process of cultural transformation.”

5.3.2 Psychosocial and Philosophical Foundations of Change

5.3.2.1 Overview

An innovation does not stand or fall on its own merit alone, but also on how the innovator deals with the human element inherent in the setting (Chin and Benne 19:33). Influence of the change process on stakeholders could be significant and the political and psychosocial factors which influence each person or group should be identified e.g. the ultimate responsibility of a statutory body, a curriculum committee, a department head etc. Actual control of the curriculum, and the promotion of opportunities for “lived experience” in practice rests wherever the teaching and learning are actually occurring, i.e. with the teachers and learners who, as central players, have to be convinced of the value of the change (Grant and Gail 1989:253; Duncan 1979:272,275). In fact, the teacher is the more important member of the teacher-student partnership in this case and must therefore be convinced of the value of the change. The teacher must understand it, must feel ownership of it, be committed to it, have the skills to implement it and must be supported by supervisors in such efforts (Grant and Gail 1989:253). Duncan (1979:275) shares this view...”a curriculum, to be effective, must meet not only the needs of the students but must give the teaching staff the opportunity to teach in a way that gives them satisfaction”.
5.3.2.2 The learners' views, understanding and commitment are, of course, also extremely important (Duncan 1979:275). In fact, according to Grant and Gail (1989:253) the original learning-by-objects models whereby teachers defined a set of learning objectives and teaching methods to go with them failed, because the system did not take the learners' views into account. Ausubel et al (1968) say "the most important single factor influencing learning is what the learner already knows. Ascertain this and teach accordingly". This seminal statement undergirds the psychology of learning emphasised in 4.5.5.1 above. It also supports the notion expressed by Grant and Gail (1989:254) that personal development of learners and teachers should be an ever present, valued and necessary corollary linked with the present move towards standard setting, performance indicators, quality assurance and best practice concepts. In this humanistic approach, there is a recognition of individuals' capacity to change, to support that change and perceive it in a social and institutional sense - a consideration which should be brought into any system for the management of change (Grant and Gail 1989:254; Gale and Grant 1997:239). Lowry (1993:322) adds to this concept by suggesting that, ultimately, the strongest driving force for change must be the students and recent graduates. They must be empowered to demand excellence in the courses that they attend and realise that their education is not a favour to them but a means of preparing them to be the sort of doctors that we want in the future.

5.3.2.3 Change as political process has many elements vital in formulating a strategy which should take into account the special nature of the undertaking, the underlying social/professional structure, the degree of autonomy of the stakeholders, the distribution of power and the extent of local control (Grant and Gail 1989:253). Implementation of a planned, rational change strategy therefore should address questions of control, ownership, leadership, power, gain and loss etc.

5.3.2.4 Psycho-social decision variables in the management of change according to Grant and Gail (1989:254); Gale and Grant (1997:239) include:

a) The dimension of gain and loss which generally refers to self esteem, security, satisfaction etc of teaching staff. This can be influenced by a profound change and should be considered carefully during the change implementation process.
b) Ownership which is a crucial factor that plays a major role in the manner in which the change process is conducted, necessitating that proper methodologies such as action research, team building seminars etc are used in order to work through relevant change issues to ensure success. Grant and Gail (1989:255) refer to "Lindquist's definition of ownership: the degree to which persons or groups whose support is necessary to implementation feel that planned changes are their solutions to their problems in pursuit of their goals".

c) Leadership which can be exercised by almost anyone in the introduction of change.

d) Power or the latent presence of force which is restricted to a few people (Grant and Gail 1989:255) who should use great discretion in applying it to force change through coercion.

5.3.2.5 Receptivity to change

Rotem and Bandaranayaka (1981:598-9) and Gale and Grant (1997:239) identify a number of propositions relating to teachers' receptivity to change. Each of these is considered below in relation to the introduction of an Integrative Clinical Curriculum Design (ICCD) for the chiropractic program at RMIT.

a) A need to change is experienced by teachers when they are dissatisfied with what they are doing at present (Rotem and Bandaranayaka 1981:598). Dissatisfaction with excessive workloads because of funding constraints for the chiropractic program should make teachers in the program receptive to change in the teaching learning strategies applied since these have the potential of saving time, once fully developed.

b) Dissatisfaction with present practice can result from becoming aware of new ways to achieve desirable results (Rotem and Bandaranayaka 1981:598). It is reasonably expected that this will be the case with the ICCD if appropriately explained.

c) Discrepancies in performance that are not deemed to be important are easily ignored (Rotem and Bandaranayaka 1981:598). It is argued that explanation of the benefits of the ICCD, which uses evidence-based, clinical decision-making framework specifically for chiropractic, would illustrate major discrepancies in performance between the potential of the ICCD and the existing program, thereby gaining the attention and interest of teachers in the course.
d) **Imposition by others** (people in authority) of an innovative educational practice can be expected to cause teachers to do as little as necessary to pacify such demands without changing the principle (Rotem and Bandaranayaka 1981:598). In the case of the ICCD the change is so dramatic as to necessitate a new teamwork approach because of fundamental change to the delivery approach. Substantial change to the fundamental principles of curriculum implementation has to be applied by the teachers.

e) **Disbelief** on the part of teachers who want to improve (or are expected to change) a particular aspect of their performance, but do not believe that it can be done, will most likely result in them lowering their level of expectation rather than change their performance (Rotem and Bandaranayaka 1981:598). Because the ICCD dramatically changes the way in which the chiropractic curriculum is currently delivered at RMIT, it is argued that teachers would tend to set new expectations, which would improve performance.

f) **Uncertainties and setbacks** in the process of implementation may still cause teachers to fail in improving their situation even when they have a notion of how to go about change (Rotem and Bandaranayaka 1981:598). Since the ICCD utilises highly structured learning materials which are delivered through a clearly defined system, much of which is prepared by a curriculum materials development team, staff will be able to participate both in the development and delivery of the curriculum. Staff perform as part of a team and hence have fewer personal uncertainties and setbacks in that context. It is suggested (IBM 1993:1) that most individuals understand that change is inevitable - "the only constant is change". "They realise that today's environment is dominated by shifting relationships, dynamic technologies and aggressive competition. They understand the need to stay current and develop increased flexibility and responsiveness. It isn't a matter of like or dislike; instead, it is a matter of reducing uncertainty by effectively managing change. Two conditions are necessary to reduce uncertainty and facilitate change: one is motivation, the other means. Individuals must realise that their current position or way of operating is untenable in the long run. They must believe - not just be told - that their ability to thrive in a dynamic environment depends on their identifying new and better approaches to their work and they must develop the tools or means to effect change."
5.3.3 The Planning of Curriculum Change

5.3.3.1 Overview

The planning of innovation is a management process, which will facilitate widespread acceptance of the innovation through rational study of the factors involved in their interactions. The main factors which affect the planning process include:

a) The language used to describe the goals and processes of planning.

b) The data on which decisions are made.

c) The planning methods themselves which are subject to the following errors which can distort the planning process: a viewpoint conditioned by a particular technique or political decision; oversimplification; failure to consult; biases; and remoteness of the planners from the action point of the plan (Collingwood 1979:12).

In this section, the language, goals and processes of planning are addressed including a checklist of factors, which facilitate the change process and classifies key concepts.

5.3.3.2 Checklist for the management of curriculum change

A study by Lazarus and Harden (1985:333) on the implementation of the objective structured clinical examination (OSCE) in 20 departments in six medical schools found that four major groups of factors are important in managing change: a) the attributes of the innovation itself; b) the environment in which the innovation is to be implemented; c) the potential user of the innovation; and d) the method of disseminating the innovation. They produced an excellent checklist of factors that facilitate the change process (Table 126).
| 1. Attributes of the innovation | Brought about by need (5)  
Relevance (4)  
Compatibility (1,4)  
Adaptability (4)  
Advantageousness (1,4)  
Simplicity (1,4)  
Available resources (4)  
Triability (1,3,4)  
Observability (1,4)  
Supported by data (5) |
|-----------------------------|-----------------------------|
| 2. The environment | Active openness (1,4)  
Freedom to innovate (1,4)  
Information linkage (4)  
Leadership (3,4)  
Power (3,4)  
Managing the human element (6) |
|-----------------------------|-----------------------------|
| 3. The potential user | Participation (4)  
Social network (1,4)  
Informal personal contact (1,4)  
Reference group identification (1,4)  
Ownership of innovation (2,3,4)  
Opinion leader (1,4) |
|-----------------------------|-----------------------------|
| 4. Method of dissemination | Resources available (2,3,4)  
Workshops and seminars (4)  
Lectures (4)  
Hands-on experience (4)  
Informal discussions (3,4)  
Committees (2,4)  
User participation (2,3,4) |
|-----------------------------|-----------------------------|
| 5. Stages of implementation | Identification of the target group(s) (5)  
Identification of potential users (5)  
Definition of roles and role clarity (5)  
Analysis of needs of target group(s) (5)  
Role, modelling and information dissemination (5)  
Development of reinforcers (5) |

Synthesised from factors identified in this case study and from factors reported in the literature: The numbers behind items in the checklist indicate other authors who have also commented on these factors: 1. Collingwood (1979); 2. Duncan (1979); 3. Grant and Gail (1989); 4. Lazarus and Harden (1985); 5. Meleis and Burton (1981); 6. Chin and Benne (1969); Gale and Grant 1997:239.

Lazarus and Harden (1985:340) say that the need for medical teachers to understand the process of change and to be aware of the factors which facilitate the process, has become an overwhelming priority.
5.3.3.3 *Primary areas of intervention* which should be considered during the planning of a change implementation program should, according to Rotem and Bandaranayake (1981:603) focus on:

a) Helping teachers identify targets and opportunities for improvement.

b) Upgrading the significance (importance) attributed to teaching e.g. linking a requirement for satisfactory evidence concerning teaching to tenure or promotion considerations.

5.3.3.4 *Extent and speed of change*

The rate of change is influenced by the prevailing attitudes, experiences and values within the potential users, therefore, those responsible for promoting innovation must take account of their heightened awareness of change compared with those just starting to consider the innovation (Collingwood 1979:10). Based on analysis and comparison of the conventional chiropractic curriculum (Table 57) and the proposed ICCD (Table 56) which is structured according to the clinical decision making framework outlined in Table 52 above, it is argued that change could conceivably be introduced at three levels. These are the first year of the program, and in a modified manner at third and at fifth year levels.

5.3.3.5 *Factors that impact on the adoption of change* include all the attributes of innovation (Collingwood 1979:8; Lazarus and Harden 1985:336) discussed in 5.3.3.2 above. It is argued that all of these should be employed to plan and implement change of the magnitude represented in a five year, double bachelor degree program with very high contact hours.

5.3.4 **The Data on Which Change Decisions are Based**

5.3.4.1 **Overview**

The data on which change decisions are based include: a) the views of the stakeholders; b) details of the present and proposed curriculum.
The view of the stakeholders is an important source of curriculum change which is covered in detail as part of the ongoing self-evaluation process discussed in 5.2.6.2 above. A case study of RMIT suggests that:

a) Students have raised issues such as lack of integration of material, repetition and overlap, lack of perceived relevance, poor delivery in certain sectors, excessive demand and severe overload, often in areas considered not to be of core importance and resulting in the neglect of core study areas. Other areas identified include lack of "philosophy" in the course, particularly to allow material in the later years of the program to be adequately integrated in terms of a chiropractic and wellness paradigm, apprehension about performing in the clinical practice situation because of feelings of insecurity, lack of confidence, and apprehension about working on real live patients.

b) The staff have concerns about excessive workloads, inadequate time for research and scholarly work, increasing demands by the University which seeks to move towards the notion of "working smarter, not harder", and introducing innovative teaching-learning strategies.

c) Members of the profession serving on the Course Advisory Committee in Chiropractic wish to be assured that the recently developed competency-based professional standards for chiropractic (Kleynhans 1993:1) and standards of practice guidelines (CAA 1995:1) are implemented in the curriculum. Extra-curricular influences have been said to play an important part in medical curricular change (Duncan 1979:275).

The present and proposed curriculum models for the chiropractic program at RMIT are outlined in Tables 57 and 56 respectively. Of the subjects in the course, the clinical component is taught by the Department whilst the basic sciences (anatomy, biochemistry, biology, biological chemistry, microbiology, pathology, physiology) are taught by discipline-based service departments, mainly from the Faculty of Biomedical and Health Sciences. To implement the ICCD it would be entirely feasible to develop highly structured learning packs which make reference to all content necessary to implement the evidence-based, clinical decision-making framework (i.e., functional morphology, physiology and pathophysiology, pathology etc). Learners would be provided with a holistic approach which would allow them to integrate knowledge, skills and attitudes from all those areas in subjects titled e.g. patient management in overview, chiropractic management of the low back etc. The
delivery of content in the basic sciences would be left primarily to the service teaching
departments, albeit with much greater awareness of the context in which their teaching would
need to occur. The way in which integration in the ICCD is to take place is seen as a very
strong feature of this design, which overcomes problems that, for some 20 years, have been
recognised as major barriers to the introduction of a truly integrative, problem-based
curriculum in a faculty with a discipline-based approach. It effects several service
departments within the University, each with strong territorial boundaries and research areas
and which provide service teaching to several courses other than chiropractic. While several
new medical schools have based their courses almost entirely on problem-based learning - the
most well known being McMaster in Canada, Maastricht in the Netherlands and Newcastle in
Australia (Lowry 1992D:1483; Leggat 1997:93) such a change was precluded at RMIT
because of the abovementioned arguments. Instead, it is proposed to request service teaching
departments to divide large subjects such as anatomy and physiology into much smaller units,
which would allow the concurrent teaching of relevant components of these subjects as part
of large, regional subjects.

5.3.5 The Adoption of Change

5.3.5.1 Overview

It is suggested by Rogers and Shoemaker (1971:101) that the process of accepting or rejecting
an innovation consists of four stages:

i) knowledge, i.e. the user is exposed to the innovation;

ii) persuasion during which a favourable or unfavourable attitude is formed towards the
innovation;

iii) decision, i.e. the user engages in activities which lead to a decision to adopt or reject
innovation;

iv) confirmation during which the user seeks reinforcement for the decision taken.

During the decision process the planner of innovation should follow “pump priming”
strategies to secure adoption of the innovation through the use of strategies such as financial
rewards, provision of support staff, relief from other duties, dissemination of information and
encouragement (Collingwood 1979:10). It is also important to use “opinion leaders” in
disseminating the innovation within the group to encourage their colleagues to adopt the
change (Rogers and Shoemaker 1971:181).
5.3.5.2 Knowledge of the innovation can be based on the attributes of the innovation, which according to Collingwood (1979:9) are more easily influenced than either the environment or the characteristics of the stakeholders. Discussion follows on six attributes in the context of introducing an ICCD. These attributes include:

a) Relative advantage which is the most important attribute of any innovation and relates to the worthwhile benefits which it can provide to the potential user (Collingwood 1979:9). It is argued that the advantage of using the new ICCD to overcome problems with integration will assist acceptance by stakeholders and facilitate change management.

b) Compatibility relates to the capacity of the innovation to blend with the normal ways of doing things; and its harmony with existing values, experiences and needs of stakeholders in order to reduce the perception of threat (Collingwood 1979:9). The ICCD is compatible with recent developments in the chiropractic curriculum at RMIT including the introduction of highly structured learning packs to facilitate conventional lecture/tutorial modes of delivery and the inclusion of problem-based learning exercises. Placing the learning packs in a new, integrative framework which allows staff to retain their personal intellectual property as sections within extensive readers established according to the framework is expected to promote compatibility and harmony. Students who have had difficulty with the integration of content and who have become used to learning with assistance from structured learning packs can reasonably be expected to adapt to the new innovation with support provided via tutorials which include problem-based learning exercises. Assuming that it will be demonstrated through competency-based assessment that the ICCD leads to effective chiropractic practitioners, the profession and society should find the innovation acceptable.

c) Complexity relates to the ease with which the innovation is comprehended. The more complex an innovation and the greater the retraining required by staff and students will inevitably influence the time duration required for its acceptance (Collingwood 1979:9). Because of:

i) the simplicity yet completeness of the ICCD;

ii) the fact that it is directly related to the management of those health problems most often seen by chiropractors; and

iii) because the framework is repeated for various regions and for the consideration of individual health problems.
It is argued that the inherent nature of ICCD will promote its acceptance on the grounds of simplicity and ease of comprehension.

d) **Triability** relates to the potential for progressive or piecemeal introduction of an innovation which is more likely to be accepted on this basis than an all-or-nothing approach i.e. the use of "temporary systems" aid the introduction of educational innovation by allowing adaptation through the local situation (Collingwood 1979:9; Miles 1964:484). The focus of the ICCD is on clinical decision-making which must of necessity subsume all factors in the framework. It has the capacity to be introduced as a small subject which "pulls everything together" during any one semester or which can be progressively enlarged to include all of the work during any semester within segmental, regionally-based subjects based on the framework. In fact, the progressive expansion of the content within the framework for a region of the body until it eventually includes all content necessary for that part of the course will assist the progressive movement from a more conventional to an innovative approach to learning.

e) **Observability** relates to the visible effects of innovation which, if more apparent, will promote more rapid, widespread acceptance (Collingwood 1979:9). The ICCD framework and delivery system includes readers, student guides, study guides, laboratory manuals, case study manuals and teachers’ manuals. These are all linked to the same framework which provides excellent visible effects of the innovation such as:

i) The comprehensiveness of the content covered.

ii) The ease with which it has been integrated into a decision-making framework.

iii) The evidence-based approach to clinical learning.

iv) The applicability to the clinical situation with emphasis on common health problems and the identification of all major concepts needing to be covered in the curriculum.

These factors tend to indicate to the teachers that this is a useful innovation. Because of the ease with which students can access large masses of content and assimilate it within the framework it is argued that they would readily accept the system provided that tutorials and practicals delivered in an interesting and supportive manner are available to support their studies.
f) **Status** relates to the perceptions of the stakeholders about the prestige and special regard in which an innovation is likely to be held by non-stakeholders and which will recognise their contribution or attainment as of special quality or value. The ICCD is an innovative curriculum design which very clearly breaks with the conventional subject-centred, teacher-centred design. It incorporates innovative processes such as problem-based learning, highly structured learning packs, evidence-based decision making, integration of content and other factors which bring the chiropractic curriculum in line with other innovative tracks in medical and chiropractic education. It is therefore reasonable to argue that it should enhance the status of the stakeholders who participate in its implementation.

5.3.5.3 **Persuasion to innovate**

Singer (1981:162) says that poor communications, which are blamed for a lack of specific performance several levels down in an organisation, is not so much in the communication in the generally accepted sense of the word. Rather it is a failure to ensure that there is a meeting of minds where the recipient interprets the communication in the same sense as the communicator. To accomplish this task, he sees that a major responsibility for any manager is to help subordinates to learn. This is accomplished by using skills of persuasion which require that they should develop the ability:

a) to listen well;
b) to question "why" "how" "when" to provoke thought;
c) clarity through phrases such as "what you seem to be saying is..." 
d) to remain silent at appropriate junctures so that thinking can take place.

The four skills are used to provoke thought and understanding on the part of a team. Consultation is also stressed by Gale and Grant (1997:239).

5.3.5.4 **The decision to adopt change**

Factors which impact on the decision to adopt change are numerous and need to be identified at the planning stage to allow strategies to be developed which will overcome potential problems before they arise. Relevant considerations include:

a) **Lack of clarity about the innovation** can lead to a misunderstanding of the concept of integration (Gross et al 1971:1). This can be overcome by establishing stakeholder workshops as described in Table 4 in 2.1.3 above.
b) **Lack of teachers’ capabilities to carry out the innovation**, i.e. ignorance of the ways in which an integrated program could be implemented and a lack of a comprehensive view of the subject matter that is required for teaching in an integrated program (Gross et al 1971:1). This can be overcome by providing staff with completed or almost completed examples of learning packs which indicate how material would be ‘packaged’ within the clinical decision making framework. This should include photocopies of relevant readings from textbooks, which should be included with printed material to provide a full conceptual view of the system to be formed.

c) **Lack of tools, equipment and physical resources** which are required to implement the program (Gross et al 1971:1) could create immediate resistance to the concept and therefore jeopardise its introduction. It is therefore necessary to make certain that a clear indication is given that the ICCD can be implemented using the same resources as for the conventional curriculum. This feature represents a major difference between the problem-based curriculum and the ICCD which makes the latter much more adaptable to existing conditions in orthodox programs.

d) **Unfavourable organisational conditions** prior to and during the introduction of the innovation e.g. the existence of a traditional departmental structure with rigid boundaries (Gross et al 1971:passim). The ICCD model allows the departmental structure to be retained with subject-based service teaching in small blocks being offered concurrently with the chiropractic major. During the first two years of the program there will be an emphasis on anatomy; biophysics; biological chemistry; physiology and biological sciences. During the third and fourth years, microbiology, pathology and diagnostic sciences are to be taught concurrently, in an integrated manner with the chiropractic major.

e) **Innovations that are divorced from “real life” situations** would not be in great demand (Rotem and Bandaranawake 1981:601). Since a number of staff in the Department have already experimented with self-directed learning packs, including well-developed study guides using the pro forma outlined in 4.5.3.6, Table 88 above, it is argued that there is already a strong body of opinion that this innovation is workable.
f) **Lack of incentives** for excellence in teaching (Rotem and Bandaranawake 1981:601) and innovation, may also create a barrier to introduction of the ICCD. It is argued that this problem can be overcome because of a strong drive over the last two years by the University for the introduction of innovative teaching-learning strategies and the possibility of receiving development grants for curriculum restructuring to implement and evaluate such a program.

g) **Relative inability of the consumers to understand** and apply the products of educational research (Rotem and Bandaranawake 1981:601) may result from a situation where few of the relevant teachers have been trained as teachers. This problem does not exist at RMIT where a very large proportion of the staff have completed diploma or certificate level courses in education and are expected to be stimulated by ICCD as an innovative concept.

5.3.5.5 **The evaluation of change**

Barrington *et al* (1997:104) provide a valuable case study on the evaluation of change from traditional case-studies to patient-based, problem-based learning which identifies an approach applicable to the evaluation of curriculum change to an ICCD.
Summary

In Chapter 5:

Learning Climate

1. The learning climate of a chiropractic curriculum is unique, yet the background data, research methodologies, psychological and social foundations of other learning environments apply equally to the explication of the clinical learning setting. It is, however, more complex and perhaps closer to the reality of future professional practice than is the learning climate for students in many other disciplines.

2. 'Learning climate' could be described in detail to reflect the views of various authors. The steps in the design of a campus environment could be identified as well as how data on the teaching climate can be used. Curriculum design questions could be formulated and a wide range of research methods and techniques to determine learning climate identified.

3. Principles of motivational theory could be applied to the theory of learning climate. Psycho-social factors responsible for creation of the learning climate could be discussed in the light of the implementation of the ICCD, including how it promotes acquisition of autonomous learning strategies and a personal identity and influences person-environment interaction and integration into the learning environment.

4. Teacher-mediated climate is explored in the light of promotion of student self-confidence and it is shown how the ICCD's structured learning packs promote student autonomy.

5. The relevance of the social aspects of learning climate to chiropractic education and the ICCD is discussed in the light of a holistic view of the campus environment where chiropractic programs in a large multi-disciplinary institution provide a rich multi-cultural milieu. Major progress has been made with integration of women and minority groups. It is shown how the ICCD promotes moral education and how mattering is important to the ICCD.

6. The unique social climate of the chiropractic clinical education setting is characterised by constructive feedback, role modelling, guidance etc which, it is argued, is facilitated through the ICCD approach.
7. The ICCD is perceived to facilitate student integration into the complex clinical environment because of its focus on humanistic factors and integration of all clinical decision-making factors into a holistic paradigm simulating the reality of future practice.

Quality Management

8. The quality management program for a chiropractic curriculum has extensive, demonstrable benefits and can itself be subjected to self-evaluation using a basic framework of seven factors including comprehensiveness, communication, cogency, consistency, etc.

9. There is abundant evidence in the literature to validate that external accreditation of the chiropractic curriculum is an extensive, well-designed, comprehensive process which involves at least five groups of stakeholders. It shares basic concepts among various accrediting agencies principles and procedures with other professional and regional accrediting agencies, it takes place within a well-defined accreditation framework and requires extensive documentation for the validation of the institutional self-evaluation.

10. A quality management program for a chiropractic curriculum has extensive, demonstrable benefits and can itself be subjected to self-evaluation using a basic framework of seven factors e.g. comprehensiveness, communication, cogency, consistence etc.

11. There is abundant evidence in the literature to validate that external accreditation of the chiropractic curriculum is an extensive, well-designed, comprehensive process which involves at least five groups of stakeholders. It shares basic concepts among various accrediting agencies principles and procedures with other professional and regional accrediting agencies, it takes place within a well-defined accreditation framework and requires extensive documentation for the validation of the institutional self-evaluation.

Management of Change

12. The management of change in a chiropractic curriculum could be clarified through identification of a range of factors which impact on the introduction of a chiropractic ICCD.
13. An extensive checklist of factors, which facilitate the change process could be synthesized from factors identified in this case study and previously reported in the literature.

14. It is shown how change decisions about the introduction of a chiropractic ICCD are influenced by: the views of the stakeholders; comparison of present and proposed curriculum models; knowledge of the innovation, compatibility, triability, observability and status of the proposed change; and receptivity to change.

15. The decision to adopt change is impacted upon by a number of factors.

16. It could be demonstrated how factors can be controlled in relation to the adoption of a chiropractic ICCD.
THE IMPLICATIONS OF THE STUDY

The implications of the study are expressed in terms of: a summary which outlines the background, the problem and the investigation; an outline of the findings; a list of recommendations and the implications of each recommendation made for chiropractic practice and for the education and training of chiropractors; comments on future research; and a final synthesis of the study.

PRÉCIS 6: Chapter 6 relates to the implications of the study: the summary, findings, recommendations, implications of the recommendations, future research and a synthesis.

OUTLINE:

Chapter 6 considers:

6.1 Summary
6.2 Findings
6.3 Recommendations and implications of the recommendations
6.4 Future research
6.5 Synthesis
6.1 SUMMARY

6.1.1 Background

The point of departure for this study concerned a number of problems with the chiropractic curriculum perceived through participant observation over some three decades and further confirmed through inference from descriptive analysis of the literature.

The educational issue addressed in this dissertation concerned the attainment of competence in complex chiropractic clinical practice. In the process of attaining this competence demanded by society, some learners experience difficulty with assimilation, critical thinking and clinical hypothesis formulation in that: a) learners depend on too few factors when making clinical decisions and instituting patient management, thereby affecting the effectiveness, efficiency and hence the quality and even the safety of patient care; b) learners do not adequately integrate content acquired through rote learning which appears to be characteristic of conventional teaching methods where knowledge, skills and values are acquired in separate ‘building blocks’ taught in isolation (e.g. anatomy of the whole body taught in isolation from physiology of the whole body, pathology of the whole body etc). This results in minimal integration across discipline boundaries or in relation to systems and especially the regions of the body (which is crucial in manual medicine, such as chiropractic); c) the context in which learners receive information in the case of conventional lectures is far removed from the reality of a live patient with regional and systemic problems involving factors and processes relating to at least eight domains of chiropractic clinical decision-making which require problem-solving skills. There is strong evidence that these three, major problems with the conventional approach to medical and chiropractic education significantly impair students’ conceptualisation of how the vast amount of chiropractic curriculum content: i) fits into reality practice; ii) impairs transfer of learning (vertical, horizontal and lateral).

The significance or implications of the knowledge, skills and attitudes which need to be mastered is often lost on the learners.

This study set out to find a way of overcoming these perceived problems with the chiropractic curriculum by identifying a fundamental, philosophical precept to guide curriculum development.
6.1.2 The Problem

The problem addressed in this dissertation arose from the search for a fundamental philosophical precept which can guide chiropractic curriculum design so as to overcome many of the problems currently experienced. It is expected that such will provide a guide to curriculum developers and reviewers in their important task of designing a curriculum which meets societal needs and requirements. The focus for the study is the living, experiencing, thinking human being and the point of departure is the phenomenological observation by Kierkegaard that only what is learned through experience, i.e. personally appropriated, is truly known. The problem addressed in this dissertation is therefore subsumed in the question: is there support for the hypothesis that Kierkegaard’s phenomenology about education as “lived experience which needs to be personally appropriated by learners” is relevant to the design of a chiropractic curriculum?

6.1.3 The Investigation

This study was conducted on the basis of participant observation which led to the identification of the research problem and basic thrust of the investigation; descriptive analysis of the literature which was the main method used; and a partial situational analysis and case study of the RMIT University program which was done to define, in broad terms, the context of a contemporary chiropractic curriculum design with a focus on its needs and intent.

The descriptive analysis of the literature was found to be most informative and rewarding. Throughout the investigation there was an attempt to use frameworks for the analysis of data which resulted in the creation of a large number of tables which are intended to provide, at a glance, an overview of a relevant classification which indicates the relationships among major concepts.

Curriculum design questions and sub-questions were used as a rough guide for the investigation. However, it was found early in the study that the area of investigation is so vast that justice could not be done except to a few of the major concepts. In a number of instances, therefore, such as the clarification of teaching-learning methods, the analysis of provinces of quality management, competency-based assessment etc, only examples could be provided.

As a consequence, many recommendations for future investigation have resulted.
6.2 FINDINGS

The findings of this investigation are based on analysis of what has been revealed about the research problem through clarification of each of the research sub-questions, and about how well each of the objectives have been met and what has been ultimately revealed about the research question. The findings of each of the sub-questions will be addressed in turn.

6.2.1 A Framework and Process for an Experience-based Chiropractic Curriculum

Sub-question 1 is addressed in Chapter 2: can a framework and process be identified in terms of which an experience-based chiropractic curriculum can be defined, designed and modelled for students?

It has been found that:

a) The curriculum represents a unique area of investigation which is clearly evident from the fact that a considerable body of knowledge could be identified in publications on the topic. A large number of authors who have formulated definitions of curriculum, developed algorithms for curriculum design, identified ways of curriculum vivification; developed and graphically depicted models and processes for curriculum design. Based on this finding, the curriculum process could be clarified and a definition and model for the chiropractic curriculum could be respectively formulated and designed.

b) The steps in curriculum development can be identified and structured which is evident from the work of a large number of investigators who have arrived at basically similar steps. It is also shown that additional steps should augment the traditional steps in curriculum development, i.e.:

i) To provide for the selection of a curriculum team, since analysis of the literature provides evidence that the views which curriculum developers bring to the process of curriculum design impact directly on the outcome.

ii) To arrive at a definition for the curriculum being designed so as to produce a template for its development.
iii) To outline an algorithm for curriculum design in order to lend order to the process as a map of what needs to be undertaken. With the appropriation of lived experience as focus for autonomous learning, it became apparent during the investigation that the curriculum must be designed with great care and in a systematised manner.

iv) To develop or adapt a model for curriculum design at the outset in order to clarify how the process will be approached. Because lived experience involves the whole person (i.e. it is appropriated in a holistic manner by a learner) it was determined that a systematised approach, which is also holistic, is essential to curriculum design, both for a new program and whenever a review (revitalization or vivification) is undertaken.

v) To maintain the curriculum in optimum health, therefore it is necessary to follow the effects of any change throughout all domains. This is based on the observation that change to any element in any domain of a taxonomy for the design of a chiropractic curriculum will impact to a greater or lesser extent on all other domains.

vi) To consider the philosophical, socio-cultural and psychological foundations relating to the professional discipline before proceeding to the determination of the context of the curriculum. Great care has to be taken to ensure a strong emphasis on the humanistic foundations of philosophy, psychology and sociology - the anthropoeic basis which must be thoroughly explored each time a chiropractic curriculum is designed or reviewed. This is necessary to ensure that the most comprehensive and meaningful lived experiences are planned for each day of the course. For this reason, many of the curriculum design activities address foundational issues.

c) A taxonomy or classification system can be developed to facilitate the design of a chiropractic curriculum. While holistic in its approach, the taxonomy which was designed can systematically deal with a wide range of curriculum elements classified in domains, categories and classes, each of which retain a focus on the appropriation of lived experience. Classification is facilitated through the use of a framework into which can be placed all known factors which impact on the lived experience that is proposed to be gained by learners. This dissertation offers a taxonomy for curriculum design based on domains, which represent areas of investigation, decision-making and implementation, including: i) curriculum process; ii) curriculum organisation; iii) curriculum development; iv) curriculum application. It is demonstrated how each curriculum domain contains categories and classes of elements, which need to be addressed as part of the mosaic of a holistic approach.
The identification of elements included in the taxonomy is based on the work of a large number of researchers, which further confirms that the curriculum represents a unique area of investigation.

As a result of developing this taxonomy, an algorithm for curriculum design, monitoring and vivification could be developed. During analysis and classification of each domain of the taxonomy, it was found that emphasis on the appropriation of lived experience by learners provides a focus and direction to curriculum decision-making. As a result, the issues, methods and techniques which focus on the experiential, or on the laying of foundations for the appropriation of lived experience, receive greater coverage in this dissertation than those which do not directly serve to promote this purpose. In fact, the thrust towards creating meaningful, lived experiences by the learner influences and permeates all aspects of the curriculum. It includes:

- The selection of curriculum developers, who share this philosophical approach to curriculum design.
- The selection of a curriculum model which best serves this purpose.
- The proportional balancing of paradigms in the creation of a complex eclectic paradigm which serves this basic philosophical approach.
- The careful analysis of the foundations and intent of the discipline or course to determine which experiences should be created when the curriculum is implemented.
- Selection and arrangement of content.
- Implementation of teaching-learning strategies with an emphasis on the experiential and avoidance of unnecessary rote memorisation and 'regurgitation of buckets-full of facts' which soon become outdated and forgotten. These teaching-learning strategies include: i) inquiry teaching including discovery learning, problem solving and case study method; ii) individualisation teaching including self-directed learning and individual learning contracts; iii) reality simulation; iv) teaching which includes the use of models and patient management problems; v) reality teaching in clinical practice facilities in preference to exposition teaching such as lectures and unguided reading tasks.
- Student assessment with a focus on competence, appropriated through lived experience, which is characterised by professional attributes relating to the roles and tasks, including problem-solving and the intellectual activity necessary for the practice of chiropractic.

- Creation of a learning ambience within which planned, lived experiences can flourish and clinical community service can be provided for the benefit of both patients and learners.

- Implementation of quality management procedures which have major impact on the learning environment within which experience takes place and determines the efficiency and effectiveness of the program.

- Establishment of evaluation processes which focus on outcomes, i.e. on what has been achieved in terms of the appropriation of lived experience by learners and the accomplishment of the program as a whole.

- The internal institutional and external professional accreditation of chiropractic education.

Certain domains need to be holistically approached by having reference to all other domains in the taxonomy e.g. the domains on curriculum evaluation and quality assurance must each have regard for all the other domains and the inter-relationship between all domains need to be carefully observed when considering each domain.

d) **An extensive list of curriculum design questions could be formulated to** guide curriculum developers. These questions could be linked to the objective of appropriation of lived experience, could be classified in terms of each of the domains and key questions could be formulated in an overview.

e) **A definition for the chiropractic curriculum** could be formulated on the basis of what the investigation revealed about each of the domains in the curriculum design taxonomy and the expected curriculum outcomes expressed in terms of competent graduates.

f) **A model for the design of a chiropractic curriculum** could be depicted graphically. While subsuming concepts from the designs by Wheeler, Nicholls, Skilbeck and Bevis, it is strongly related to the integrative (eclectic) model of curriculum design by Print. It seeks to expand Print's work through the addition of an establishment process phase, which includes an algorithm and by including an algorithm for the curriculum presage during the organisation phase. It also provides an expanded application phase.
6.2.2 The Influence of Foundations and Paradigms on the Appropriation of Lived Experience by Learners

Sub-question 2 is addressed in Chapter 3: what does a study of the foundations and paradigms of the chiropractic curriculum indicate about the appropriation of lived experience by learners?

It has been found that:

a) There is evidence of a significant body of knowledge relating to the philosophical, sociological and psychological foundations of the chiropractic curriculum which exert a strong influence on the appropriation of lived experience in learners by clarifying which concepts need to be included in the curriculum.

b) The concepts identified ultimately influence the planning of learning experiences in tutorial and practical sessions, in study guides, case study manuals and clinical practicum experiences designed to develop in learners the attributes identified in the curriculum intent. An analysis of the philosophical, sociological and psychological foundations of the chiropractic curriculum provides evidence that this process leads the investigator to the formulation of conceptions, orientations or paradigms. These recognise the unique qualities and needs of the chiropractic discipline and as such leads to a decision about which design approaches are most suitable.

c) The ability to develop paradigms confirms the scientific nature of curriculum development and provides a framework, which can assist future curriculum taskforces in generating new knowledge about the chiropractic curriculum as research subject. Concepts from both the curriculum foundations and paradigms subsequently influence decisions on curriculum design - the approach to be taken to facilitate learning in each part-discipline - whether it is based on information-gathering, problem-solving or an integrative approach.

d) The philosophical foundations of chiropractic have reference to ontology, epistemology, axiology, holism, logic and humanism. It is demonstrated that there are extremes of science and of dogma in the philosophical approaches to chiropractic. Both chiropractic research and the chiropractic curriculum require not only the traditional, reductionistic scientific method but also qualitative approaches such as phenomenology and hermeneutics as a philosophical basis for a humanistic approach. It is clearly demonstrated through descriptive analysis of the literature that the philosophical views in terms of which knowledge and experience is
organised, very strongly influence the way future practitioners will approach and respond to their patients' problems and needs. The curriculum developers must therefore be intimately aware of and include in the curriculum adequate coverage of concepts relating to chiropractic science, human service, subjectivity, interactive activity and the multi-dimensionality of chiropractic as primary contact healthcare discipline, facilitated through a study of the chiropractic belief system and scientific principles.

e) The character of a culture could be explicated as a result of a descriptive analysis of the literature and the sociological and cultural foundations of the chiropractic curriculum. These could be addressed in terms of the groups which control the chiropractic educational system, how they exercise their control and how ideology influences groups who exert such control. The influence of resource allocation on the design of a chiropractic curriculum could be explicated and important influences identified. The influence of the social structure on the curriculum could be identified and explicated at various levels. The ideologies which impact on academic and other issues about the curriculum and the part that belief systems play in clarifying the role of chiropractors and their place in the health care community could be shown. It could also be shown how the social practices relating to the chiropractic profession influence curriculum content, implementation and assessment. It could be shown how control over the curriculum is exerted by: i) external accrediting agencies (The Australasian Council on Chiropractic Education Limited and the Joint Education Committee of Participating Australasian Chiropractors and Osteopaths Registration Boards); ii) internal groups including a student:staff consultative committee, curriculum review committee, curriculum development committee, course advisory committee and stakeholder taskforce groups. The socio-cultural implications of resource allocation for the implementation of teaching-learning strategies indicate significant impact on the standards of a curriculum. In analysing the structural setting of the chiropractic curriculum it could be demonstrated how the chiropractic profession, the higher education system, and cultural values, attitudes and beliefs ultimately influence the teaching-learning milieu. The reason for the existence of health care professionals, their goals, contribution to society, and responsibilities could be explicated to show that identification, understanding and unification of the philosophical, cultural and practical elements, common to most chiropractors, serve as a source of power which will help chiropractic in society to develop a sense of identity, security and confidence. The sociological and cultural rationale for first professional chiropractic courses could be
explained in terms of the provision of liberal education, contribution to the health sciences, primary contact status of chiropractors, implications for curriculum change; interdisciplinary implications for service teaching, statutory and international requirements placed on the curriculum. The societal expectations of the chiropractic curriculum could be related to its philosophical foundations, showing how relevant branches of philosophy need to support teaching-learning in relation to: i) community-based, prevention-oriented primary care; ii) humanistic care; iii) scientifically and technologically effective care. This should be done in relation to the understanding of practitioner:patient interactions, problem solving, diagnostic and therapeutic skills and the ethical behaviour of practitioners.

I) A study of the psychological foundations of the chiropractic curriculum confirms that a wide intellectual framework is necessary for the integration of future life experiences into the rich fabric of a self-actualising human being. Such a liberal education must provide experiences which, while not measurable as competencies per se, contribute to such characteristics of the educated professional as: i) self-directedness in the acquisition of further knowledge, skills and values as part of life's experience; ii) a thirst and love of knowledge which is wider than required to meet the immediate needs of a discipline; iii) an approach to thinking, investigation and practice which will make life's experience a joy. It should enhance fulfilment in the context of being simultaneously an educated person and health care professional with the propensity to assist patients in a humanistic and clinically effective way. In clarifying the psychological foundations of the chiropractic curriculum in detail, it could be demonstrated how psychology influences all phases of curriculum design and impacts to some extent on all domains and most categories of the taxonomy for the design of an experiential curriculum. Curriculum design questions about the psychological foundations could be constructed for all domains in the taxonomy and evidence from the literature could be provided to validate how psychology influences all stages of the curriculum development process including: i) interactions of the curriculum team during the initial curriculum phase, the philosophical, sociocultural foundations and curriculum paradigms during the curriculum organisation phase; ii) the curriculum design strategies; iii) the determination of context and needs, intent, content, learning experiences and competency-based student assessment during the curriculum development phase; iv) the learning climate, quality assurance process, management of change, self-evaluation and external accreditation during the curriculum application phase. Motivation, as the driving force behind all behaviour, could be explicated
on the basis of Maslow and Elderfer's theories. Psychology as curriculum foundation could be shown to have such far-reaching influences on the design of the chiropractic curriculum that detailed discussion and clarification was included in each section of the dissertation where each of the categories and domains of the curriculum are considered.

g) A number of paradigms for the design of the chiropractic curriculum could be identified via analysis of relevant literature and could then be analysed and clarified by using a framework which outlines the implications that each has for the facilitation of learning about chiropractic. Understanding of the abovementioned components of the curriculum presage subsequently allows investigators to apply curriculum design forces which, in turn, further elucidates the curriculum design. This is achieved by using the major, discipline-based constructs identified from the foundations, 'disciplining and classifying' each according to paradigms and by reviewing designs which will most appropriately facilitate learning. Subsequent application of the design forces, (vertical and horizontal integration) allows investigators to form a global view of the delivery system or model of the curriculum required.

Analysis of the major paradigms for curriculum design in relation to the curriculum foundations, disciplines and subjects in the curriculum, demonstrates that all paradigms are relevant to the chiropractic curriculum including the academic rationalist, competency-based, evidence-based, humanistic, professional reconstructionist, social reconstructionist, technological and patient-focused paradigms. Since they all influence the conceptual framework of the chiropractic curriculum it was concluded that, finally, an eclectic paradigm which subsumes characteristics from all the other paradigms, should be used to integrate the characteristics desired in an integrative, chiropractic, clinical curriculum framework. This eclectic paradigm subsequently influenced other elements of the curriculum design.

Based on the evidence, it is reasonable to conclude that the appropriation of lived experience is facilitated through experiential learning.

While the performance of competencies would be a reasonable measure of how effectively curriculum intent has been met, analysis of the paradigms strongly suggest that curriculum developers must guard against a superficial, technological approach to what should be an in-depth, liberal, professional education at clinician scientist-level rather than a vocational approach. With a focus on the 'appropriation of lived experience' through experiential autonomous learning, the curriculum design process is given special meaning and specific
direction - in fact, decision-making about inclusion of elements and processes is greatly facilitated.

6.2.3 The Design and Development of an Experience-based Chiropractic Curriculum

Sub-question 3 is explored in Chapter 4: *how does the concept of appropriation of lived experience relate to the design and development of a chiropractic curriculum?*

There is evidence to suggest that:

a) *A number of curriculum design strategies*, both innovative and traditional, could be identified from a range of publications and could be applied to the design of various elements of the curriculum including intent, content, teaching-learning methods and techniques, student assessment, the learning environment and program evaluation. The significance of adopting innovative design strategies could be clearly demonstrated including the benefits of student centred, problem-based, integrated, community-based, electives, systematic and competency-based approaches in contrast to traditional designs which are seen as no longer appropriate for the design of a modern medical/chiropractic curriculum. In particular, it could be clearly demonstrated how the assumptions about andragogics, as compared to pedagogics, suited the chiropractic curriculum and how competency-based education is much more desirable than the traditional content/time-based education in relation to meeting the curriculum intent and implementing the instructional process and student assessment. It could be demonstrated how these design strategies could be applied in the development of an integrative chiropractic curriculum design which has as it’s point of departure the context in which future practice by graduates is to take place, including: i) the health problems they would need to be able to manage; ii) the principles of disease prevention and health promotion they would have to implement; iii) the graduate attributes in terms of humanism and other characteristics which they would be expected to display; iv) the content of the curriculum which is influenced by the intent and placed within the framework based on a taxonomy for clinical decision-making in future practice which emphasises critical thinking and hypothesis formulation; v) teaching-learning strategies which identify and implement learning experiences necessary to meeting the intent and is closely related to problem-solving in real-life clinical learning situations; vi) the implementation of competency-based
assessment strategies for the assessment of professional entry-level chiropractors as a major outcome of the curriculum. It is a major strength of this dissertation that such a clinical decision-making taxonomy, based on every day chiropractic practice, could be constructed and subsequently tested against a descriptive analysis of the literature which validated the assumption that there is support for the implementation of such a design. Also, that it is demonstrably a major departure from conventional chiropractic teaching-learning strategies and has the potential to revolutionise the facilitation of learning in a chiropractic program.

b) The contextual framework of a chiropractic curriculum and particularly that at RMIT University could be clarified by showing relationships between the curriculum foundations and intra- and extra-institutional factors, which influence the chiropractic curriculum. Situational analysis methodology developed by Skilbeck and refined by others could be effectively applied to the design of the chiropractic curriculum and the needs analysis of the chiropractic profession. The uniqueness of the chiropractic curriculum is apparent from an analysis of the extra-institutional factors which influence curriculum content i.e. societal demands; educational system requirements; professional profile, needs and requirements; and teaching support systems and technology. The application of situational analysis to a specific institution and program was clearly illustrated through a review of intra-institutional factors, which influence curriculum context, including student attributes, staff strengths and weaknesses, institutional and departmental ethos, material resources, and perceived problems. It is also evident that a needs analysis can be very effectively conducted for the chiropractic curriculum by determining which goals can be stated and what rating should be given to each goal. It would be beneficial to then determine how ratings influence the ranking of goal statements and how the discrepancies, which exist between desired goals and existing practice, determine the requirements of curriculum vivification. Finally, the crucial role that the determination of the curriculum context plays in the development of a chiropractic curriculum is clear from the way in which it influences the intent, content, learning experiences, assessment etc.

c) The intent of the chiropractic curriculum can be identified on the basis of a descriptive analysis of the literature and can be analysed and integrated as a domain within a curriculum design. It is demonstrated how motivational theory applies to the determination of curriculum intent, which includes a statement of the mission, aims, goals, objectives and competencies to be attained. It is demonstrated how student goal information can be used in curriculum design
and implementation and how the general and vocational goals influence the intent. Basic educational objectives in the cognitive, psychomotor and affective domains could be extensively outlined. The advantages of basing objectives on competencies could be clearly demonstrated. The intent drives and is intimately related to all other aspects of the curriculum. It is evident from a study of the curriculum intent that only through the appropriation of lived experience, which is translated into competence, can the intent ultimately be met.

d) The content of a chiropractic curriculum, which leads to the appropriation of lived experience, could be identified, analysed and arranged architectonically in structural and functional relationships to promote appropriation of lived experience. The role of content could be clearly identified and the importance of concept mapping explicated. Eleven research methods and techniques to determine curriculum content could be clarified. The elements of content in a chiropractic curriculum could be identified as: i) subject content; ii) concepts of philosophy as content; iii) chiropractic beliefs related to specific subjects and discipline areas; iv) chiropractic principles; v) educational objectives in each of the domains of learning; vi) competencies; vii) health promotion and disease prevention principles and health problems which could all be expressed as content. It was found that criteria for the selection of content include significance, validity, social relevance, utility, learnability and the interest of learners. The architectonics of content could be explicated in terms of the scope, sequence and balancing of content. Extensive support could be identified in the literature for the role of psychology in the organisation of content in relation to the transfer of learning including positive, negative, lateral (horizontal), vertical and sequential transfer. In summary, it is clearly shown how transfer influences the implementation of the development of an effective cognitive framework rich in subsumers as found with the Integrative Clinical Curriculum Design.

e) The design and organisation of learning experiences that lead to the appropriation of lived experience could be clarified in great detail. Learning experiences, opportunities and activities could be defined in relation to the process of establishing teaching-learning strategies, methods and techniques, the phases of learning and the generic change in teaching methods. A framework could be developed for the analysis of teaching-learning strategies including: i) definition; application; ii) how learning is transmitted in terms of mode; iii) the learners’ and teachers’ roles; iv) psychological implications which cover a range of principles
of learning; v) resource implications; vi) advantages, disadvantages and rating levels for both experiential learning and reality teaching level. The relevance of teaching-learning strategies to experiential learning and therefore the appropriation of lived experience of a very large range of teaching-learning strategies could be rated as high, moderate and low as a result of impressions gained from descriptive analysis of the literature and participant observation. A reality continuum of teaching-learning strategies from low reality to high reality could be developed and a comprehensive range of teaching-learning methods and techniques could be classified along a continuum starting with expository teaching at the one extreme and integrative learning and reflection at the other. A detailed, validated account could be given of how learning can be transmitted in an integrative clinical curriculum design including the role of expository teaching, interactive teaching mediated by computer, small group instruction, enquiry teaching, individualisation teaching-learning, reality simulation teaching-learning, reality teaching and reflection. The advantages and disadvantages of selected learning experiences in an integrative clinical curriculum design could be identified, analysed in detail, tested against current literature and evaluated in terms of advantages and disadvantages in relation to reality learning and therefore the appropriation of lived-experience. Particular attention was given to enquiry teaching-learning including: problem solving, case study method and individualisation teaching-learning. It was demonstrated how an algorithm for the preparation of a study guide could be used. An extensive analysis of the psychological foundations of teaching-learning strategies clarified principles, which support experiential learning and therefore the appropriation of lived experience.

g) The evaluation of student performance in a competency-based chiropractic curriculum could be clarified as the driving force behind the curriculum, which determines what students “really” learn. Basic terms used in assessment could be clarified with particular emphasis given to the assessment of competence in complex clinical skills and the importance of formative assessment in the clinical setting as chiropractic workplace. The psychological bases of assessment could be extensively analysed with the purpose of ensuring validity, reliability and fidelity. Clarification of competency-based assessment in all three domains of learning adds to chiropractic teaching-learning strategies, particularly a proposed assessment approach for psychomotor skills based on Simpson’s taxonomy of learning in the psychomotor domain. Assessment of performance in complex chiropractic professional practice could be elucidated in terms of observational, oral, written and self-assessment
strategies and the assessment of student work. A system was developed for the determination of specifications for the assessment of learner performance in a chiropractic curriculum. A grid could be created to show how measurement instruments might be applied in relation to the domains of the chiropractic clinical decision-making framework of an integrative clinical curriculum design.

6.2.4 The Application of an Experience-based Chiropractic Curriculum

Sub-question 4 is clarified in Chapter 5: what is the relevance of appropriation of lived-experience to the application of a chiropractic curriculum?

It has been found that:

a) The learning climate of a chiropractic curriculum can be clarified and is shown to have unique characteristics even though much of the psychological and social foundations and research methodologies of other learning environments apply directly to the chiropractic clinical learning environment. While the concept is intangible, the effects of learning climate are substantial, pervasive and very real to students and encompass everything going on in their lives. The chiropractic clinical learning environment is complex in that an integral part of the curriculum involves the examination, touching and manipulation of fellow students from the commencement of the course. This culminates in providing care to patients which require application of great skill, knowledge and care involving delicate interventions on vulnerable, exposed patients with some attendant risk and high ethical and moral requirements.

Creation of a positive chiropractic learning climate necessitates teacher focus on student motivation, acquisition of a personal identity, integration into the learning environment, promotion of self-confidence and autonomy; and understanding of the concepts underlying moral education, mattering and clinical learning.

It is argued that the learning climate of a chiropractic curriculum can be readily regulated through an integrative clinical curriculum design, the ICCD. This climate is consciously addressed in the design of structured learning packs and controlled in practical-tutorial sessions and in reality clinical teaching-learning experiences through an emphasis on reflection.
b) **The quality management of a chiropractic curriculum** could be clarified through: i) definitions derived from the literature; ii) identification of pre-requisite activities including a map with provinces of what should be managed; iii) procedures for encouraging and assessing quality criteria against which to judge performance; iv) engaging in basic quality management activities i.e. setting goals and standards for the program and defining how practice will be evaluated against standards and subsequently improved; v) through explication of the accreditation of the curriculum as a quality assessment measure.

Quality assessment frameworks for the Australian chiropractic curriculum could be created as a result of a descriptive analysis of the literature derived from external accrediting agencies and RMIT University. The total quality management (TQM) model of Warren Piper could be applied to a province of the chiropractic curriculum i.e. competency-based assessment. The process for professional accreditation of chiropractic education could be clarified and the stakeholders in evaluation and accreditation identified and the characteristics of a ‘good’ accreditation system defined. It could be demonstrated how the chiropractic ICCD promotes total quality management through the use of highly structured frameworks on which structured learning packs are based and through teaching-learning specifications for practical and tutorial sessions which facilitate an interactive learning process.

c) **The management of change** in a chiropractic curriculum could be clarified through identification of a range of factors which impact on the introduction of a chiropractic ICCD including: i) the relevance of innovation; ii) environment for change; iii) the importance of change to total quality management; iv) learners’ views, understanding and commitment to change; v) change as political process; psycho-social decision variables in the management of change and receptivity to change. An extensive checklist of factors, which facilitate the change process has been synthesised from factors identified in this case study and previously reported in the literature. It is shown how change decisions about the introduction of a chiropractic ICCD are influenced by: the views of the stakeholders; comparison of present and proposed curriculum models; knowledge of the innovation, compatibility, triability, observability and status of the proposed change; and receptivity to change. The latter is in turn influenced by the perception of a need to change, dissatisfaction with present practice, discrepancies in performance, imposition by others, disbeliefs, uncertainties and setbacks. It was found that the decision to adopt change is impacted upon by: i) lack of clarity about innovation; ii) lack of teachers’ capability to carry out the innovation; iii) lack of tools,
equipment and physical resources; iv) unfavourable organisational conditions; v) innovations which are divorced from 'real life' situations; vi) lack of incentives and the relative inability of the consumers to understand. It is demonstrated how these factors can be controlled in relation to the adoption of a chiropractic ICCD.

6.2.5 Conclusions

The research question - can it be demonstrated that the personal appropriation of lived experience by learners is necessary to the implementation of a chiropractic curriculum has been clarified through an explication of each of the sub-questions.

The findings indicate that the raison d'etre of the chiropractic curriculum is the appropriation of lived experience through carefully designed and implemented learning experiences which qualify graduates to care for each of their patients by managing syndromes, promoting health and preventing disease within the context of individual patient needs.

It is therefore reasonable to state that there is support for the hypothesis that Kierkegaard's phenomenology about education as lived experience which needs to be personally appropriated by learners, is relevant to the design of a chiropractic curriculum.
6.3 RECOMMENDATIONS AND IMPLICATIONS OF THE RECOMMENDATIONS

6.3.1 Recommendations and Implications of the Recommendations for Chiropractic Practice

The recommendations with direct relevance to chiropractic practice relate primarily to:

- the use of a clinical decision-making framework;
- the development of evidence-based clinical decision-making and hypothesis formulation;
- the consideration of a wide range of assessment and therapeutic care options during clinical decision-making.

**Recommendation 1 - That chiropractic practice be based on a clinical decision-making framework.** This means that the factors which influence chiropractic clinical decision-making are identified and placed in a taxonomy which includes domains, categories and classes that serve, through integration, correlation and meaning attribution, to discipline vast amounts of clinical knowledge, skills and values drawn from both previous and continuing, life-long learning experiences.

The implications of this recommendation are that a) practitioners will develop a cognitive framework, rich in subsumers, to which new knowledge, skills and values can be attached; b) a framework for life-long learning will be created; c) retention of knowledge, skills and values will be increased; d) the content of the professional knowledge-base will be augmented; and e) application of the professional knowledge-base in reality practice will become more effective in the interest of patients served.

**Recommendation 2 - That future chiropractic practice becomes evidence-based through clinical hypothesis formulation.** This suggests that practice be linked to evidence that the procedures implemented in patient care are effective and are the most appropriate to the management of patients in the context of their health status. Such evidence should be informed by research and/or by consensus workshops of experienced practitioners.

The implications of this recommendation are that: a) chiropractic practice will become more science-based, yet have the benefit of empiricism; b) the scientific body of knowledge of chiropractic will be expanded and better organised; c) the credibility of the profession will be enhanced; d) future research will be facilitated; and e) society will benefit through more effective and efficient chiropractic care.
Recommendation 3 - That chiropractic practice be based on the implementation of a wide selection of patient assessment and therapeutic care options. This means that a wide range of procedures used in caring for patients are applied in the context of the patient's needs rather than adapting patients to a limited number of procedures favoured by a practitioner.

The implications of this recommendation are that it can reasonably be expected that:

a) practitioners will be more alert to the range of assessment, diagnostic and therapeutic care options available to them; b) patients will be assessed and cared for in the context of what they require; c) referral for conjoint care or specialist attention will be promoted through basing decisions on a wider basis of evidence; d) patient care will be improved; and e) professional credibility will be enhanced through scientific and evidence-based practice.

6.3.2 Recommendations and Implications of the Recommendations for the Education and Training of Chiropractors

The recommendations for the education and training of chiropractors relate to the following major issues:

- process of curriculum design
- organisation of curriculum design
- use of a cyclical design for the development phase of curriculum design
- learning climate and quality assurance
- inclusion of formal philosophy in the curriculum
- focus of the curriculum on adult experiential learning
- intent in relation to chiropractic work
- integration of the curriculum content
- concept and skills maps
- the use of learning packs
Recommendation 1 - That each chiropractic institution establishes a clear process for curriculum design.

The implications of this recommendation are: a) that a curriculum design team be selected with particular care, attention being given to the views they bring to the curriculum development task as a result of their philosophical, sociocultural and psychological views i.e. their world-view which will impact on the curriculum design strategies; b) a curriculum definition should be arrived at as early as possible in the process in order to define the extent, elements, and breadth of the task that the team sets for itself; c) that an algorithm for the curriculum design be agreed upon so as to provide a map of the steps to be taken, albeit with the possibility of amendments along the way; d) that agreement be reached early on a model for the design of the curriculum to provide an overview of the process to be followed; e) that a taxonomy of the domains, elements, categories etc of the curriculum be created to provide a framework which considers all necessary elements of the curriculum within which development may take place; and that the taxonomy be used to provide a framework within which major curriculum design questions and a wide range of sub-questions can be asked as a stimulus for obtaining the data required on the basis of which decisions should be made.

Recommendation 2 - That the organisation phase of the curriculum design be clarified in relation to foundations, paradigms and design strategies before the curriculum development process proceeds.

The implications of this recommendation are: a) a thorough clarification of the philosophical foundations of the curriculum allows the curriculum team to reach clear decisions about the philosophical approach to be taken in the teaching of chiropractic, and the concepts to be inculcated in learners; b) clarification of the socio-cultural foundations of the curriculum will provide a clear understanding of which groups control the educational system, institution, department and the program and how their ideologies will tend to influence the curriculum design; how decisions about resource allocation are taken; which ideologies and belief systems about the role of chiropractors in the community need to be considered and how the social factors influence curriculum context and implementation; c) a review of the psychological foundations of the curriculum is critically important since psychological factors permeate all steps and domains of curriculum design. Understanding, particularly of the psychology of learning relating to a cognitive framework, mastery learning, integration etc., will have far-reaching effects on the members of the curriculum team and their understanding
of how learning is facilitated. Psychology also promotes understanding of how the developers interact with one another; and d) a clarification of the paradigms relevant to the chiropractic curriculum form a very important basis for the understanding required to balance the emphasis placed on each of the approaches within an eclectic curriculum design.

**Recommendation 3 - That a cyclical design be used for the development phase of a chiropractic curriculum in which the elements of context, intent, content, learning experiences and competency-based assessment are treated as inter-dependent components where a change to any one element has the potential to influence all other elements.**

The implications of this recommendation are: a) knowledge of the various design strategies and selection of those strategies which are most suitable to the chiropractic curriculum will provide a template which will influence the development of the other elements of the curriculum i.e. intent, content, learning experiences, competency-based assessment; b) implementation of this recommendation will require that the context of the curriculum be accurately determined through a situational analysis which should provide a realistic approach to all other elements considered during the development phase; c) clarification of the intent of the curriculum in relation to societal needs will serve to drive the selection of content, the implementation of learning experiences and the competency-based assessment necessary to validate that learning which meets the intent of the curriculum did in fact take place; d) the curriculum content will be selected on the basis of societal needs which are expressed through the intent of the curriculum and expressed primarily in terms of the health problems they will need to manage, the disease prevention and health promotion principles they need to apply and the graduate attributes in terms of values which should be inculcated; e) the learning experiences designed for the implementation of the curriculum will facilitate transfer information, knowledge and skills in such a way that the intent of the curriculum will be met; and f) competency-based assessment will be influenced directly through the intent and context of the curriculum.
Recommendation 4 - That the application of the curriculum should have particular regard for the control of the learning climate and quality assurance. The implications of this recommendation are that a) the learning climate will be based on a clear definition of climate conducive to the facilitation of chiropractic learning by providing students with the best support possible; b) the quality assurance requirements will need to satisfy any quality audit about the appropriateness and rigour, relevance and desired outcomes of the curriculum; c) self-evaluation will serve as an important component of the quality assurance process and form the basis for d) change management which would be implemented scientifically with due regard for the wide range of factors which need to be considered; and e) will include due consideration for the external evaluation of the curriculum as an ultimate judgement of whether the curriculum team has been successful in its curriculum design task.

Recommendation 5 - That formal philosophy be included in the chiropractic curriculum. The implications of the recommendation are: a) it will in time overcome the problem associated with the assumption that many chiropractors speak of chiropractic philosophy without a clear understanding of what philosophy and its methods are and what the relationship is between science and philosophy; b) it will clarify how important logic is to clinical decision-making; epistemology to the understanding of limitations of human endeavour and axiology to the ethics of private practice and; c) it will impress on learners how important it is to have a humanistic approach to chiropractic practice while at the same time implementing scientific method in evidence-based clinical decision making in order to provide the best possible care and expand the knowledge base of the discipline, thereby meeting various societal expectations for the advancement of chiropractic.

Recommendation 6 - That the chiropractic curriculum convert from subject-based, pedagogical, teacher-focused, conventional teaching strategies to focus on student-centred, andragogical, problem-based, experiential, reality learning. Implications of this recommendation are that: a) formal lectures during which students need to take copious notes would be almost entirely eliminated in favour of large group tutorials characterised by problem-solving exercises, clarification of concepts through visual images and interactive discussion accompanied by small group practical sessions for psychomotor clinical skills development and extensive reality learning in clinical settings with a strong focus on community-based practice; b) autonomous and life-long learning will be strongly promoted through the use of highly structured, self-directed learning packs which are
constructed within a framework which promotes the development of structured subsumers to promote learning and retention, clinical decision-making and hypothesis formulation and evidence-based clinical practice.

**Recommendation 7 - That the primary intent of the chiropractic curriculum should focus on the graduate attributes to be attained; on the aims, goals and objectives which are linked to the attainment of competency in managing disease prevention and health promotion in future clients and patients and in efficiently and effectively caring for the syndromes, most prevalent in the society which they will need to serve.** Implications of the recommendation are that: a) in designing a curriculum, extensive work needs to be undertaken to determine the competency-based professional standards required for the geographical region in which the graduates will work; and in rating and ranking the health problems (syndromes), disease prevention and health promotion principles which the future graduate will need to manage in order to be able to meet societal needs for chiropractors; and b) studies need to be undertaken to determine the graduate attributes which are perceived to be the most desirable for future chiropractors by the patient population, and members of the profession.

**Recommendation 8 - That the chiropractic curriculum be changed to teach all content in an integrative manner.** The implications of this recommendation are that a) subject-based teaching be eliminated or that b) a chiropractic major be created to run through each semester of the course and to serve as an integrating unit responsible for the integration of factors from all domains, categories of classes of chiropractic knowledge, skills and values during the study of each region of the body and also during the study of each health problem for each region of the body; c) a clinical decision-making framework will need to form the core for the integration of all knowledge, skills and values thereby promoting the development of a strong cognitive framework, rich in subsumers, which promotes the learning of new material by attaching items to mental hooks in a structured manner; d) vertical and horizontal integration of learning will be greatly facilitated; and e) the relevance of the learning and facilitation of the establishment of good clinical decision-making patterns, good practice habits and ultimately good patient care will be greatly enhanced.
Recommendation 9 - That the intent of the chiropractic curriculum be translated into concept and skills maps based on the syndromes and the disease prevention and health promotion principles which need to be fully mastered for graduates to be competent in the chiropractic management of patients in the jurisdiction(s) in which they will practice. The implications of this recommendation are that a) chiropractic educational institutions will show competence, accountability and responsibility in relation to their mission of serving society; b) patients will receive better care since the curriculum will focus on scientifically determined patient/community needs which form the raison d'etre of the chiropractor.

Recommendation 10 - That learning in the chiropractic curriculum be facilitated through the use of highly structured learning packs designed according to the principles of the Integrative Clinical Curriculum Design (ICCD). The implications of this recommendation are that the learning provided through “lived experience” enables students to discover and understand the value of a clinical taxonomy and to structure their learning to explore the relationships between the domains and categories of factors essential to the formulation and testing of a working hypothesis in clinical decision making. The learning packs are perceived to promote mastery learning and reduce the time required to attain professional competency in complex clinical skills:

• the Readers in the learning package guide and assist students to locate key information from publications. Students are able to add to their Readers and apply information to promote evidence-based clinical practice;

• the Study Guide in the learning package guides the depth and focus of study of the learning content, and integrates traditional modules and learning tasks of practical and tutorial sessions and self and peer assessment;

• the Practical and Tutorial Manual enables students to record and reflect on learning experiences and guide them in the way experiences are sequentially introduced and integrated;

• the Case Study Manual contextualises learning experiences. It enables students to use the clinical decision-making taxonomy to improve critical thinking, solve problems and make clinical judgements on effectiveness and safety of patient management. The case studies also enable students to transfer learning to a real world situation;
finally, the Teachers' Manual in the package enables teachers to understand and learn the components of the integrated clinical modules and facilitate student learning by being given specifications for the facilitation of learning in relation to all aspects of learning packs. It also provides model answers to questions.

The significance of this innovative approach is that a) it saves student time in attaining competency and the staff time required for facilitation of learning; and b) produces an easily updatable product with a long life span; c) rote memorisation and regurgitation of facts, which are soon forgotten or become meaningless, are eliminated in favour of the development of clinical decision-making skills which are directly relevant to the lifelong vocational pursuits of the graduate, yet based on evidence-based decision-making and clinical practice; d) self confidence is progressively developed and thereby a good self-image, important to efficient and effective interaction with patients; e) the problem of rote learning is overcome by designing learning experiences which reinforce key concepts vital to future practice by using the professional major in the chiropractic course to draw together learner knowledge, skills and attitudes covered in all other subjects in the course by having learners interact with all content studied during a semester in each part of the learning packs; f) mastery learning serves to integrate knowledge in an efficient and effective way while allowing autonomous, yet highly structured, guided learning in a non-threatening environment including personal interaction with learning packs; optional, self-directed small-group work and large-group tutorial and small-group practical sessions where intended learning experiences are known ahead of time, can be prepared for, and cover major concepts, skills and attitudes relating to reality practice; g) opportunities for learners to explore on their own or in groups, or to ask for clarification in tutorials while placing content in the context of patient care in which it will be used during the professional life of the learner, thereby establishing a pattern for life-long learning; h) the number of factors used in decision-making is increased through the use of a case analysis pro-forma based on a taxonomy to develop critical thinking skills, problem solving and hypothesis formulation, testing and validation; i) extensive opportunities are provided for feedback through self- and peer-assessment based on questions in the study guides, marked case analyses, formative competency-based assessment in reality clinical practice and summative competency-based assessment on real and simulated cases;
j) probably most important, the context within which learning is provided motivates students to learn because of active engagement with all discipline areas which are perceived in terms of the reality of practice; k) learning time to attain competence is reduced; l) sequencing and transfer are greatly improved since the work presented by service departments in the basic medical sciences of anatomy, physiology and pathology will assume much greater relevance to learners who are expected to be much better motivated as a result of contextualisation of all learning within the clinical decision-making taxonomy i.e. service subjects are offered in tandem with the learning packs for the professional major; m) much greater relevance is attributed to content since the learning packs identify all major concepts and therefore provide excellent guidance on subject content required to be taught by service departments, i.e. it makes content more relevant, useable and available when needed for integration; n) opportunities for experiential, exploratory and collaborative learning are created; and n) the change management strategies used in medical education are readily facilitated because of their direct relevance to what this innovation sets out to achieve.
6.4.1 Introduction
Since the development of chiropractic education as a distinct discipline is in its infancy, significant research needs to be undertaken to further clarify those aspects of the discipline of medical education which have special or particular relevance to chiropractic education. It has been demonstrated that some of the curriculum needs of chiropractic as manual medicine are different from the needs for educating and training general medical practitioners. A number of research questions are posed in relation to each of the four major stages of curriculum development and in each of the domains of the curriculum design taxonomy proposed in this dissertation. All of the questions and sub-questions stated below are in the context of future research on a chiropractic integrative clinical curriculum design (ICCD).

6.4.2 Curriculum Research Questions Relating to the Framework and Process of Developing of Chiropractic Curriculum

Research question 1: Which framework and process for curriculum development is most suitable to the introduction of a chiropractic ICCD at a specific chiropractic institution?

6.4.3 Research on the Foundations and Paradigms of the Chiropractic Curriculum

Research question 2: Which concepts from the curriculum foundations and paradigms should be included in a chiropractic ICCD?
A number of sub-questions which need to be investigated include:

a) which concepts from the discipline of formal philosophy should be included in a chiropractic ICCD?

b) which paradigms and models of health care should be included in a chiropractic ICCD?

c) which concepts relating to the sub-culture of chiropractic should be included in a chiropractic ICCD to facilitate the professionalisation of learners?

d) which concepts relating to practice in a multi-cultural setting should be included in a chiropractic ICCD to fully prepare graduates for the application of full scope of chiropractic practice in communities for which graduates are being prepared?

e) which concepts relating to psychology as discipline should be included in relation to care of patients of various age groups and to facilitate disease prevention, health promotion and therapeutic care of the health problems which graduates will need to manage?

f) which psychological concepts relating to the facilitation of teaching/learning, including student assessment, should be conveyed in staff development programs?

g) which characteristics of the educational paradigms should be included in an eclectic paradigm for the chiropractic ICCD?

6.4.4 Curriculum Research Questions Relating to the Development of an Integrative Chiropractic Curriculum

The results from this study would serve as a model which could be followed by chiropractic institutions in various parts of the world.

Research Question 3: What should the intent of a chiropractic curriculum in a specific jurisdiction be?

The following sub-questions are recommended to elucidate this question:

a) What ratings would key stakeholders give to each of the goals, competencies and concepts in a chiropractic ICCD for a specific jurisdiction?

b) Which graduate attributes does the chiropractic profession expect from graduates in a particular jurisdiction?
c) Which graduate attributes do chiropractic patients expect from graduates in a particular jurisdiction?

d) What ranking should be given to each of the health problems included in the chiropractic curriculum in a particular jurisdiction as a result of a survey involving the profession and chiropractic academics?

e) Which principles of disease prevention and health promotion should be included in a chiropractic curriculum for a particular jurisdiction?

Research Question 4: What should the content be of an integrative chiropractic curriculum in a particular jurisdiction?

The following sub-questions are important in resolving this question:

a) Which concepts relating to each of the domains of a chiropractic clinical decision-making framework should be included in order to adequately cover the chiropractic management of each of the health problems studied in the curriculum?

b) Which concepts relating to each of the domains of a chiropractic clinical decision-making framework should be included in order to attain graduate competency in relation to each of the principles of disease prevention and health promotion in a chiropractic curriculum in a particular jurisdiction?

Research Question 5: Which teaching-learning strategies result in the most favourable student response during the implementation of an integrative chiropractic curriculum in a particular jurisdiction?

The following sub-questions are important:

a) What do students think about problem-based learning involving case studies using an integrative pro forma for chiropractic decision-making?

b) What do students think about the effectiveness of large group tutorials as a means of mediating an integrative chiropractic curriculum?

c) What do students think about each type of learning experience included in the practical sessions of a particular chiropractic curriculum?
d) **What do students think about the teaching-learning strategies used to facilitate psychomotor skills development in manual medicine?**

**Research Question 6:** What are the results of assessment in an integrative chiropractic curriculum in a particular jurisdiction?

The following include sub-questions which could be used to clarify the question:

a) **What do students think about each type of assessment used in an integrative chiropractic curriculum?**

b) **How do the results of a cohort of students correlate different types of assessment for the same knowledge, skills and attitudes?**

### 6.4.5 The Application of a Chiropractic ICCD

**Research Question 7:** What are students’ perspectives about the relative importance of factors which influence learning climate in a particular chiropractic institution?

**Research Question 8:** What should be included in a strategic and operational plan for the management of an integrative chiropractic curriculum?

The following sub-questions will assist in elucidating the main question:

a) **What should be included in the description of the quality management framework for an integrative chiropractic curriculum?**

b) **What are the aims of the quality management plan of an integrative chiropractic curriculum?**

c) **What are the goals of the quality management plan of an integrative chiropractic curriculum?**

d) **What should be included in a map of what has to be managed within each province of the quality management plan of an integrative chiropractic curriculum?**

e) **Which procedures for encouraging and assessing quality should be included in the management plan of an integrative chiropractic curriculum?**
f) Which criteria against which to judge performance should be included in an integrative chiropractic curriculum?

g) Which procedures should be followed in setting goals and standards for each of the items in each province of the quality management plan of an integrative chiropractic curriculum?

h) Which procedures should be followed to evaluate practice against standards in each province in the management plan of an integrative chiropractic curriculum?

i) Which procedure should be followed to improve practice in each province included in the management plan of an integrative chiropractic curriculum?

j) Which factors should be included in a review of the operational plan and how often should this be done of an integrative chiropractic curriculum?

k) What data should be collected and analysed from student evaluations and external sources in carrying out an operational plan of an integrative chiropractic curriculum?

l) Which strategies should be employed as part of an operational plan in order to improve practice of an integrative chiropractic curriculum?
Challenges faced by educators responsible for the facilitation of learning in chiropractic clinical science, as in other fields of clinical medicine, can be placed in the context of Kierkegaard's phenomenological approach to education which suggests that only that which has been experienced by learners (i.e. attained through lived-experience) has been truly learned.

Learners in a chiropractic manual medicine program have to assimilate and organise large amounts of information; critically assess it and arrive at a working hypothesis about the assessment, treatment, care and referral of patients. In order to facilitate their learning it is essential to identify, design and apply learning experiences based on the use of a cognitive framework for clinical decision making and clinical learning and of a framework and algorithms for the design and implementation of the curriculum.

Curriculum design is greatly facilitated through careful attention to each of the following articulating and inter-related domains and categories of a curriculum design taxonomy: Domain 1 - Curriculum Process - conceptual framework of the curriculum process; Domain 2 - Curriculum Organisation - philosophical foundations; sociological and cultural foundations; psychological foundations; curriculum paradigms; Domain 3 - Curriculum Development - design strategies; the contextual framework of the curriculum; curriculum intent; content; learning experiences; competency-based assessment; and Domain 4 - Curriculum Application - learning climate; quality assurance; accreditation and change management.

The defining characteristics of an integrative clinical curriculum design model for chiropractic include: a) clarification of perceived problems with the integration of knowledge in the chiropractic curriculum; and of the curriculum intent; b) integration of content through a holistic approach to teaching-learning; c) the use of frameworks to facilitate learning; d) the use of a highly structured cognitive framework rich in subsumers to which new knowledge, skills and values can be repeatedly attached by learners; e) the use of a clinical decision-making taxonomy which promotes integration of knowledge, skills and values in reality learning to facilitate hypothesis formulation, evidence-based practice and decision-making; f) facilitation of learning through the implementation of structured learning packs including study guides, readers, practical/tutorial manuals, case study manuals and other means of
student guidance; g) emphasis on problem solving, particularly through case studies; h) the use of change management strategies applicable to medical curricula to accomplish vivification of the chiropractic curriculum; i) facilitation of learning through large group tutorials and small group practicals.

It is demonstrated how curriculum delivery in chiropractic may be enhanced through the use of highly structured learning packs which provide quality student guidance through Study Guides, conveys curriculum content through Readers and multi-media methods, promotes problem solving through use of Case Study Manuals and a case analysis pro-forma which subsumes all factors relevant to clinical decision-making in future practice; and through experiential exercises contained in a Practical/Tutorial manual and facilitated through personalised teacher guidance for learners during teacher-mediated small group practical and large group tutorial sessions and small group student-mediated tutorials. In this approach to teaching-learning, the quality of the curriculum is to a large extent controlled through the use of frameworks and specifications for each aspect of the teaching-learning strategies contained in a Teachers’ Manual, within which academic staff have abundant opportunity for scholarly work and the exercise of their academic freedom and innovation in a context designed to produce the desired curriculum outcome i.e. chiropractic practitioners who are competent to provide and deal in a humanistic and scientific way with the art of evidence-based, effective, efficient and economical chiropractic patient care.
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