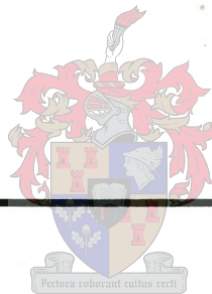


# A NEEDS ASSESSMENT SURVEY FOR CONTINUOUS PROFESSIONAL EDUCATION AMONGST DIAGNOSTIC RADIOGRAPHERS FROM THE FREE STATE PROVINCE

---



---

March 2000

Prepared for:        THESIS TOWARDS THE FULFILMENT OF THE  
                             REQUIREMENTS FOR THE M.Phil. DEGREE IN ADULT  
                             EDUCATION OF THE CENTRE FOR HIGHER & ADULT  
                             EDUCATION AT THE UNIVERSITY OF STELLENBOSCH

By M.S. Scholtz (Student number: 9788492)

Study Leader: Prof. CA Kapp

Co-study leader: Ms. G Joubert

## DECLARATION

I, THE UNDESIGNED, HEREBY DECLARE THAT THE WORK CONTAINED IN THIS THESIS IS MY OWN ORIGINAL WORK AND HAS NOT PREVIOUSLY IN ITS ENTIRETY OR IN PART BEEN SUBMITTED AT ANY UNIVERSITY FOR A DEGREE.



## SUMMARY

Continuing Professional Education (CPE) is a method by means of which radiographers and other health care professionals can systematically maintain, improve and broaden their knowledge and skills. Chances are that mandatory CPE will be introduced for South African radiographers by the year 2001. For this reason it was decided to undertake a needs assessment survey of Free State Province diagnostic radiographers.

The aim of this study was to assess the perceived needs of Free State Province radiographers. In this way adults, as consumers of CPE, were involved in the planning process. Results obtained from the needs assessment provide valuable information to providers of CPE activities. With the aid of the results, providers can plan activities responsibly, which will satisfy their target population.

The needs assessment was done by means of a mail-administered questionnaire, and a response rate of 58% was obtained. Data analyses showed that most of the radiographers were employed in small x-ray departments and, due to this fact, experienced constraints regarding CPE participation. Constraints such as staff shortages and a lack of backup staff were identified. New developments in radiography, management skills, computer skills and Ultrasound were the topic areas indicated by the highest percentage of respondents as high level of need areas.

Flexible learning strategies with adequate support mechanisms must be developed. In order to provide high-quality CPE activities, all stakeholders, such as the Technikon Free State, the Society of Radiographers, the employers and the radiographers, must share the responsibility of CPE. The study showed that close co-operation between stakeholders is essential to the success of CPE in the Free State Province.

## OPSOMMING

Voortgesette Professionele Onderwys (VPO) is 'n strategie wat radiograwe en ander professionele gesondheidsorgwerkers in staat stel om hulle kennis en vaardighede sistematies in stand te hou, te verbeter en uit te brei. Die moontlikheid bestaan dat Suid-Afrikaanse radiograwe teen die jaar 2001 verplig sal word om aan VPO deel te neem. Om hierdie rede is daar besluit om 'n behoeftebepalingsopname van die diagnostiese radiograwe in die Vrystaat Provinsie te doen.

Die doel van hierdie studie was om die behoeftes van die Vrystaat Provinsie se radiograwe, soos deur hulle self geïdentifiseer, te bepaal. Op hierdie manier kon radiograwe, as verbruikers van VPO, by die beplanningsproses betrek word. Die resultate van die behoeftebepalingsopname wat bekom is, bevat waardevolle inligting vir verskaffers van VPO-aktiwiteite. Met behulp van die resultate sal verskaffers van VPO-aktiwiteite wat hulle teikengroep se behoeftes sal bevredig, met verantwoordelikheid kan beplan.

Die behoeftebepaling is met behulp van pos- vraelyste gedoen. 'n Respons van 58% is verkry. Data-ontleding het getoon dat die meeste van die radiograwe werksaam was in klein x-straal-departemente wat gevolglik bygedra het dat hulle beperkinge met betrekking tot VPO-betrokkenheid ervaar het. Ander struikelblokke soos personeeltekorte en 'n gebrek aan aflospersoneel is geïdentifiseer. Nuwe ontwikkelinge in radiografie, bestuursvaardighede, rekenaarvaardighede en Ultraklank is deur die grootste persentasie respondente as die areas waarin die grootste behoefte bestaan, geïdentifiseer.

Buigsame leerstrategieë met toereikende ondersteuningsmeganismes moet ontwikkel word. Om hoë gehalte VPO-aktiwiteite te verskaf moet alle belangegroepe, onder andere die Technikon Vrystaat, die Vereniging van Radiograwe, die werkgewers en die radiograwe self gesamentlik die verantwoordelikheid vir VPO deel. Die studie toon dat noue samewerking tussen belangegroepe noodsaaklik is vir die sukses van VPO in die Vrystaat Provinsie.

## **ACKNOWLEDGEMENT OF FINANCIAL ASSISTANCE**

Financial assistance provided by the Centre for Science Development of the Human Sciences Research Council for this research is herewith gratefully acknowledged.

Views expressed in this thesis are those of the author and should not be attributed to the Centre for Science Development or the Human Sciences Research Council.



## **ACKNOWLEDGEMENTS**

Firstly, I would like to thank my Creator for providing me the opportunity to undertake and complete this study.

The support of this study by the Centre for Science Development is gratefully acknowledged.

Furthermore I would like to thank the following people:

Prof. Kapp, my study leader, for his assistance, patience and contributions to the study.

Mrs Gina Joubert, my co-study leader for her assistance and counselling. Her constant encouragement and statistical insights simplified the process tremendously. Despite her busy professional schedule, she was always available for consultation.

The Free State Province radiographers for their participation in the survey. Without their participation the study would have been impossible.

My colleagues at the Department of Paramedical Sciences at the Free State Technikon for their participation in the survey, and their support.

Mrs Annemarie Maritz, from the Stellenbosch University library and Mrs Anita du Toit, from the Free State Technikon library, for their assistance, patience and prompt reaction regarding literature requests.

Mrs Valerie Hanekom, from Free State Technikon, for proofreading of the script.

Last, but not least, I would like to express my sincere gratitude to my husband, Pieter, my daughter, Lerina and my parents, Dawid and Fien, for their support, patience, understanding and the extra burdens with which they had to cope during my studies. I shall always remember your selfless dedication.

## **LIST OF ABBREVIATIONS**

<b>CPD</b>	<b>Continuous Professional Development</b>
<b>CPE</b>	<b>Continuous Professional Education</b>
<b>CPR</b>	<b>Cardiopulmonary resuscitation</b>
<b>CT</b>	<b>Computer Tomography</b>
<b>HPCSA</b>	<b>Health Professional Council of South Africa</b>
<b>ISRRT</b>	<b>International Society of Radiographers and Radiological Technologists</b>
<b>MRI</b>	<b>Magnetic Resonance Imaging</b>
<b>NASAR</b>	<b>National Association of South African Radiographers</b>
<b>NQF</b>	<b>National Qualification Framework</b>
<b>SASO</b>	<b>Special Auxiliary Service Officers</b>
<b>SOR</b>	<b>Society of Radiographers</b>

# TABLE OF CONTENTS

## Page number

### CHAPTER 1

#### INTRODUCTION AND LITERATURE RESEARCH

<b>1.1</b>	<b>BACKGROUND</b>	<b>1</b>
1.1.1	Continuous Professional Education	2
1.1.2	Change and Continuous Professional Education	2
1.1.3	Provision of Continuous Professional Education	3
1.1.4	Adults as the audience of Continuous Professional Education	3
1.1.5	The South African Radiographer and Continuous Professional Education	5
1.1.6	The role of the needs assessment in Continuous Professional Education planning	8
<b>1.2</b>	<b>PROBLEM</b>	<b>11</b>
<b>1.3</b>	<b>SUBPROBLEMS</b>	<b>11</b>
<b>1.4</b>	<b>HYPOTHESIS / RESEARCH GOAL</b>	<b>12</b>
<b>1.5</b>	<b>OVERVIEW OF RESEARCH METHODOLOGY</b>	<b>12</b>
<b>1.6</b>	<b>DELIMITATIONS</b>	<b>13</b>
<b>1.7</b>	<b>NEED FOR THE RESEARCH</b>	<b>13</b>
<b>1.8</b>	<b>OUTCOMES</b>	<b>14</b>
<b>1.9</b>	<b>TERMINOLOGY</b>	<b>15</b>
1.9.1	Continuous Professional Education (CPE)	15
1.9.2	Profession	16
1.9.3	Diagnostic radiographers	17
1.9.4	South African Society of Radiographers	17
1.9.5	Learning need	17
1.9.6	Needs assessment	18
<b>1.10</b>	<b>RELATED LITERATURE</b>	<b>19</b>
1.10.1	Continuous Professional Education needs assessment for non-health professionals	19
1.10.2	Continuous Professional Education needs assessment for health professionals	20
1.10.3	Continuous Professional Education for radiographers	22



<b>1.11</b>	<b>ORGANISATION OF THE REMAINDER OF THE STUDY</b>	<b>24</b>
-------------	---	-----------

## **CHAPTER 2**

### **RESEARCH METHODOLOGY**

<b>2.1</b>	<b>INTRODUCTION</b>	<b>25</b>
<b>2.2</b>	<b>OVERVIEW OF THE RESEARCH METHODOLOGY</b>	<b>25</b>
<b>2.3</b>	<b>SELECTION OF THE TARGET POPULATION</b>	<b>29</b>
<b>2.4</b>	<b>DEVELOPMENT OF THE QUESTIONNAIRE</b>	<b>30</b>
<b>2.5</b>	<b>ADMINISTRATION OF THE QUESTIONNAIRE</b>	<b>32</b>
<b>2.6</b>	<b>DATA PROCESSING AND ANALYSIS</b>	<b>33</b>

## **CHAPTER 3**

### **RESEARCH RESULTS**

<b>3.1</b>	<b>INTRODUCTION</b>	<b>34</b>
<b>3.2</b>	<b>RESPONSE RATE</b>	<b>34</b>
<b>3.3</b>	<b>REPORTING OF RESULTS</b>	<b>36</b>
3.3.1	Demographic data	36
3.3.2	Organisational profile	37
3.3.3	The participant's position in the organisation	38
3.3.4	Educational and professional background	42
3.3.5	Recent Continuous Professional Education activity	43
3.3.6	Continuous Professional Education participation constraints	46
3.3.7	Organisational support	51
3.3.8	Perceived topic areas of need for Continuous Professional Education	53
3.3.9	Other needs	76
3.3.10	Priorities of perceived needs	77
<b>3.4</b>	<b>SUMMARY OF RESULTS</b>	<b>78</b>

## **CHAPTER 4**

### **DISCUSSION OF THE RESULTS**

<b>4.1</b>	<b>INTRODUCTION</b>	<b>80</b>
<b>4.2</b>	<b>DISCUSSION OF RESULTS</b>	<b>80</b>
4.2.1	Response rate	80
4.2.2	Demographic data	82
4.2.3	Organisational profile	82
4.2.4	The participant's position in the organisation	82
4.2.5	Educational and Professional background	83
4.2.6	Recent Continuous Professional Education activities	85
4.2.7	Continuous Professional Education participation constraining factors	87
4.2.8	Organisational support	88
4.2.9	Perceived topic areas of need for Continuous Professional Education	88
A.	General Radiography	90
B.	Screening examinations	90
C.	Specialised Radiography	90
D.	Patient care	91
E.	Image recording	92
F.	Radiation Protection	94
G.	Algorithm of image modalities for radiographic examinations	94
H.	New developments in Radiography	95
I.	Management skills	95
J.	Computer skills	96
4.2.10	Priorities of perceived needs	96
<b>4.3</b>	<b>SUMMARY OF DISCUSSION</b>	<b>96</b>

## **CHAPTER 5**

### **CONCLUSIONS AND RECOMMENDATIONS**

<b>5.1</b>	<b>SYNOPSIS OF RESEARCH METHODOLOGY AND RESULTS</b>	<b>98</b>
<b>5.2</b>	<b>CONCLUSIONS</b>	<b>99</b>
<b>5.3</b>	<b>RECOMMENDATIONS</b>	<b>101</b>
5.3.1	Future needs assessments	102
5.3.2	Provision of Continuous Professional Education	103



5.3.3	The main stakeholders of Continuous Professional Education in the Free State Province	105
5.3.3( a)	Technikon Free State	105
5.3.3( b)	Employers	106
5.3.3( c)	Society of Radiographers (SOR)	108
5.3.3( d)	Radiographers	108
5.4	THE WAY FORWARD FOR CONTINUOUS PROFESSIONAL EDUCATION FOR FREE STATE PROVINCE RADIOGRAPHERS	109
	BIBLIOGRAPHY	112
	APPENDIX	
APPENDIX A	CODE OF PROFESSIONAL CONDUCT	119
APPENDIX B	SOCIETY OF RADIOGRAPHERS CPE SCHEME FOR SOUTH AFRICAN RADIOGRAPHERS	120
APPENDIX C	INPUTS FROM FREE STATE PROVINCE SOCIETY OF RADIOGRAPHERS' MEMBERS REGARDING CONTINUOUS PROFESSIONAL EDUCATION	125
APPENDIX D	LETTER FROM THE PROFESSIONAL BOARD	128
APPENDIX E	TELEPHONIC INFORMATION GIVEN TO PARTICIPANTS	129
APPENDIX F	INFORMATION GIVEN BY FACSIMILE TO PARTICIPANTS	130
APPENDIX G	COVER LETTER AND QUESTIONNAIRE ACCOMPANYING PILOT QUESTIONNAIRE	131
APPENDIX H	FINAL VERSION OF THE QUESTIONNAIRE	134
APPENDIX I	COVER LETTER ACCOMPANYING QUESTIONNAIRE	146
APPENDIX J	POSTCARD REMINDER	147
APPENDIX K	COVER LETTER ACCOMPANYING REPLACEMENT QUESTIONNAIRES	148
APPENDIX L	TOPICS LISTED BY RESPONDENTS AS PRIORITY NEED AREAS	149

## LIST OF TABLES

		Page
TABLE 3.1	GEOGRAPHICAL DISTRIBUTION OF RADIOGRAPHERS AND THEIR RESPONSES	36
TABLE 3.2	AGE DISTRIBUTION OF RESPONDENTS	37
TABLE 3.3	TYPE OF ORGANISATION	37
TABLE 3.4	NUMBER OF RADIOGRAPHERS EMPLOYED BY X-RAY DEPARTMENTS	38
TABLE 3.5	TITLE OF PRESENT POSITION	38
TABLE 3.6	YEARS EMPLOYED IN PRESENT POSITION	39
TABLE 3.7	FORMAL LEVEL OF RESPONSIBILITY WITHIN THE DEPARTMENT STRUCTURE	39
TABLE 3.8	NUMBER OF STAFF SUPERVISED BY THOSE RESPONDENTS WHO SUPERVISE OTHER STAFF	40
TABLE 3.9	NUMBER OF PATIENTS PER RADIOGRAPHER PER DAY	41
TABLE 3.10	TERTIARY QUALIFICATIONS OF RESPONDENTS	42
TABLE 3.11	INVOLVEMENT WITH A RADIOGRAPHY ASSOCIATION	43
TABLE 3.12	CONTINUOUS PROFESSIONAL EDUCATION PARTICIPATION	44
TABLE 3.13	PAYMENT FOR CONTINUOUS PROFESSIONAL EDUCATION	45
TABLE 3.14	NUMBER OF ACTIVITIES ATTENDED OVER THE PAST TWO YEARS	45
TABLE 3.15	EXPENDITURE ON CONTINUOUS PROFESSIONAL EDUCATION OVER THE PAST TWO YEARS	46
TABLE 3.16	RATING OF CONSTRAINING FACTORS	48
TABLE 3.17	ASSOCIATION BETWEEN RECENT CONTINUOUS PROFESSIONAL EDUCATION ATTENDANCE AND CONSTRAINING FACTORS	50
TABLE 3.18	FREQUENCY WITH WHICH SESSIONS WERE PROVIDED	52
TABLE 3.19	CONTINUOUS PROFESSIONAL EDUCATION TOPICS PROVIDED DURING THE PAST SIX MONTHS	53
TABLE 3.20.1	CURRENT USAGE OF GENERAL RADIOGRAPHY	54
TABLE 3.20.2	CURRENT LEVEL OF NEED REGARDING RADIOGRAPHY OF EXTREMITIES	55
TABLE 3.20.3	CURRENT LEVEL OF NEED REGARDING RADIOGRAPHY OF THE CHEST	55
TABLE 3.20.4	CURRENT LEVEL OF NEED REGARDING RADIOGRAPHY OF THE BONY THORAX	56



<b>TABLE 3.20.5</b>	<b>CURRENT LEVEL OF NEED REGARDING RADIOGRAPHY OF THE ABDOMEN</b>	<b>56</b>
<b>TABLE 3.20.6</b>	<b>CURRENT LEVEL OF NEED REGARDING RADIOGRAPHY OF THE SKULL</b>	<b>57</b>
<b>TABLE 3.20.7</b>	<b>CURRENT LEVEL OF NEED REGARDING RADIOGRAPHY OF THE VERTEBRAE</b>	<b>57</b>
<b>TABLE 3.21.1</b>	<b>CURRENT LEVEL OF NEED REGARDING SCREENING EXAMINATIONS</b>	<b>58</b>
<b>TABLE 3.21.2</b>	<b>FUTURE LEVEL OF NEED REGARDING SCREENING EXAMINATIONS</b>	<b>58</b>
<b>TABLE 3.22.1</b>	<b>CURRENT LEVEL OF NEED REGARDING SPECIALISED RADIOGRAPHY</b>	<b>60</b>
<b>TABLE 3.22.2</b>	<b>FUTURE LEVEL OF NEED REGARDING SPECIALISED RADIOGRAPHY</b>	<b>61</b>
<b>TABLE 3.23.1</b>	<b>CURRENT LEVEL OF NEED REGARDING PATIENT CARE</b>	<b>62</b>
<b>TABLE 3.23.2</b>	<b>FUTURE LEVEL OF NEED REGARDING PATIENT CARE</b>	<b>63</b>
<b>TABLE 3.24.1</b>	<b>CURRENT LEVEL OF NEED REGARDING EXPOSURE SELECTION SKILLS</b>	<b>64</b>
<b>TABLE 3.24.2</b>	<b>FUTURE LEVEL OF NEED REGARDING EXPOSURE SELECTION SKILLS</b>	<b>64</b>
<b>TABLE 3.25.1</b>	<b>CURRENT LEVEL OF NEED REGARDING EFFECTIVE USE OF ANCILLARY EQUIPMENT</b>	<b>65</b>
<b>TABLE 3.25.2</b>	<b>FUTURE LEVEL OF NEED REGARDING EFFECTIVE USE OF ANCILLARY EQUIPMENT</b>	<b>65</b>
<b>TABLE 3.26.1</b>	<b>CURRENT LEVEL OF NEED REGARDING RADIOGRAPHIC PROCESSING</b>	<b>66</b>
<b>TABLE 3.26.2</b>	<b>FUTURE LEVEL OF NEED REGARDING RADIOGRAPHIC PROCESSING</b>	<b>66</b>
<b>TABLE 3.27.1</b>	<b>CURRENT LEVEL OF NEED REGARDING ANALYSIS OF THE IMAGE</b>	<b>67</b>
<b>TABLE 3.27.2</b>	<b>FUTURE LEVEL OF NEED REGARDING ANALYSIS OF THE IMAGE</b>	<b>67</b>
<b>TABLE 3.28.1</b>	<b>CURRENT LEVEL OF NEED REGARDING QUALITY ASSURANCE IN DIAGNOSTIC RADIOGRAPHY</b>	<b>68</b>
<b>TABLE 3.28.2</b>	<b>FUTURE LEVEL OF NEED REGARDING QUALITY ASSURANCE IN DIAGNOSTIC RADIOGRAPHY</b>	<b>69</b>
<b>TABLE 3.29.1</b>	<b>CURRENT LEVEL OF NEED REGARDING PURCHASING OF EQUIPMENT</b>	<b>69</b>
<b>TABLE 3.29.2</b>	<b>FUTURE LEVEL OF NEED REGARDING PURCHASING OF EQUIPMENT</b>	<b>70</b>
<b>TABLE 3.30.1</b>	<b>CURRENT LEVEL OF NEED REGARDING RADIATION PROTECTION</b>	<b>70</b>
<b>TABLE 3.30.2</b>	<b>FUTURE LEVEL OF NEED REGARDING RADIATION PROTECTION</b>	<b>71</b>
<b>TABLE 3.31.1</b>	<b>CURRENT LEVEL OF NEED REGARDING ALGORITHM OF IMAGE MODALITIES FOR RADIOGRAPHIC EXAMINATIONS</b>	<b>71</b>
<b>TABLE 3.31.2</b>	<b>FUTURE LEVEL OF NEED REGARDING ALGORITHM OF IMAGE MODALITIES FOR RADIOGRAPHIC EXAMINATIONS</b>	<b>72</b>
<b>TABLE 3.32.1</b>	<b>CURRENT LEVEL OF NEED REGARDING NEW DEVELOPMENTS IN RADIOGRAPHY</b>	<b>72</b>
<b>TABLE 3.32.2</b>	<b>FUTURE LEVEL OF NEED REGARDING NEW DEVELOPMENTS IN RADIOGRAPHY</b>	<b>73</b>

<b>TABLE 3.33.1</b>	<b>CURRENT LEVEL OF NEED REGARDING MANAGEMENT SKILLS</b>	<b>74</b>
<b>TABLE 3.33.2</b>	<b>FUTURE LEVEL OF NEED REGARDING MANAGEMENT SKILLS</b>	<b>75</b>
<b>TABLE 3.34.1</b>	<b>CURRENT LEVEL OF NEED REGARDING COMPUTER SKILLS</b>	<b>76</b>
<b>TABLE 3.34.2</b>	<b>FUTURE LEVEL OF NEED REGARDING COMPUTER SKILLS</b>	<b>76</b>
<b>TABLE 3.35</b>	<b>PRIORITY TOPICS WITH A RESPONSE FREQUENCY HIGHER THAN 5%</b>	<b>77</b>
<b>TABLE 3.36</b>	<b>NEEDS GIVEN AS FIRST PRIORITY BY RESPONDENTS</b>	<b>78</b>

**LIST OF FIGURES**

	<b>PAGE</b>
<b>FIGURE 3.1 FLOW DIAGRAM ACCORDING TO WHICH THE SAMPLE SIZE WAS ADJUSTED</b>	<b>35</b>
<b>FIGURE 5.1 DIAGRAM TO DEMONSTRATE THE CONTINUOUS CYCLE OF PLANNING CPE ACTIVITIES</b>	<b>111</b>



## CHAPTER 1

# INTRODUCTION AND LITERATURE RESEARCH

## 1.1 BACKGROUND

The study originated from the ever-increasing important role Continuing Professional Education (CPE)<sup>1</sup> has to play amongst South African professionals, and in particular health professionals. There is an increasing recognition that pre-service degrees are not sufficient for the lifetime of a professional, and that the knowledge of all mid-career professionals deteriorates over time, with information and skills infrequently used becoming less sharp (Kennedy and Queeney, 1991:209; Donen, 1998:1044; Hays, Bridges-Webb and Booth, 1993:176). CPE can bring this back into focus.

A personal Continuous Professional Education scheme (Continuous Professional Development, as it is referred to by the Society of Radiographers) was introduced for South African radiographers by the Society of Radiographers (SOR) in January 1998. Many radiography professionals, because of limited exposure to the concept, were unsure what to anticipate. Also, the providers of CPE activities were not sure what radiographers expected of them. Both the Technikon Free State and the Bloemfontein branch of the Society of Radiographers are regarded as major providers of Continuing Professional Education in the Free State Province. The researcher in her capacity as radiography lecturer at the Technikon Free State, as well as CPE representative of the Bloemfontein branch of the Society of Radiographers, felt that the first step in the planning of CPE activities would be to investigate the needs of Free State Province radiographers. This study was consequently initiated to determine the needs of diagnostic radiographers of the Free State Province who on a daily basis perform x-ray examination on patients. It was hoped that the results would provide valuable information to the providers of CPE activities.

---

From this point onward the abbreviation CPE will be used for the term Continuous Professional Education. It will be used to describe education which professionals undergo, referred to by some as Continuous Professional Development (CPD).



### **1.1.1 Continuous Professional Education**

Continuous Professional Education (CPE) is education undertaken by professionals to systematically maintain, improve, and broaden their knowledge and skills (Department of Continuing Education, Lancaster University, 1995:4; Ruscheniko, 1996:14). CPE is no longer regarded as a new idea, but definitely as a vital one (Allington and Kouzekanani, 1990:10). CPE can be seen as both a response agent and a proactive agent in that it responds to the rapidly changing clinical needs on the one hand, and on the other hand sets the pace for the shaping and changing of practice (Sunter, 1993:37). With CPE, professionals develop personal qualities necessary for the execution of their professional and technical duties. CPE helps professionals to provide service of a higher quality to clients by improving their knowledge, competence or performance. It further helps professionals to understand the ethical, political and technical dimensions of their work (Merriam and Cunningham, 1989:519). Professionals have an ethical responsibility to maintain competency through their entire professional career (Ruscheniko, 1996:15). CPE is one of the most important resources a professional can draw on to keep knowledge and practice current, and should be undertaken throughout the practitioner's working life (Todd, 1987:7, Kennedy and Queeney, 1991:208; Henwood, Edie, Flinton and Simpson, 1998:5).

### **1.1.2 Change and Continuous Professional Education**

Merriam and Cunningham (1989:514) says that CPE is growing at such a rate that it may culminate in the development of systems of continuing education that rival the preprofessional preparation programmes currently in existence. Change is regarded as the major reason for the expansion of CPE all over the world (Nowakowski, 1994:3; Cross, 1981:1). Changes in the demographics of entry-level persons in the workforce, a clear trend toward more highly technologically sophisticated systems, the increase in complexity of institutional functioning, adjustments in working patterns, as well as the economic recession and consequent role changes, have implications for the enhancement of professional skills and the modification of professional practice (Goldstein, 1993:11; Langsner, 1994:264; Becher, 1996:45; Kristjanson and Scalan, 1989:118; Yuen, 1991:1233). Likewise, innovations in therapy, in payment systems and delivery systems and the proliferation in employee specialisation are given as other reasons, which affect professionals and their practice, and therefore contribute to the growth of CPE (Hospital Research and Education Trust, 1970:1).



### **1.1.3 Provision of Continuous Professional Education**

Possible providers of CPE in the health professions are professional societies, hospitals, private vendors, health-related industries and higher education institutions (Escovitz and Davis, 1990:545; Merriam and Cunningham, 1989:520). CPE encompasses a wide range of activities. Both formal and informal learning can be recognized as CPE. Provision can be in the form of short courses, distance learning, management development, conferences, language training and workplace-based learning (Kehl, 1996:53; Hughes, 1990:429). Other possible CPE activities are described as research, post-qualification specialist studies, committee work, private study, branch / trade union activity, and workplace-based learning and attendance of meetings (Society and College of Radiographers of Great Britain, 1996:2).

Providers of continuing education programmes must decide what types of programmes to provide, to whom, as well as when, where and how (Kristjanson and Scalan, 1989:118). Beder (Courtenay and Holt, 1990:10) says: "Given that there is considerable competition for adults' time and money from other life activities, as well as from other providers of education, a methodology for attracting them is all the more important if continuing education programmes are to have sufficient numbers of learners." Through marketing, adults who are free to act in whatever manner they choose are motivated to participate in programmes. The product is the most critical factor in the marketing process (Courtenay and Holt, 1990:10). Adults who commit to participation, expect the programme to help them to achieve their goals. For this reason programmes determine the success of CPE in any profession. Successful programmes are systematically and co-operatively planned (Fowler, 1996:54; Merriam and Cunningham, 1989:235; Farley and Fay in Thurston, 1992:11; Laxdal, 1982:829). Roleplayers that should be involved in the planning are the individual, the employer, and the professional body and higher education institutions. Typical problems experienced due to unplanned CPE are discussed by Todd (1987:6) as follows:

- Participation resulting from arbitrary, top-of-the-head decisions without reference to any principled evaluation of what CPE is necessary.
- No record-keeping.
- Participation in CPE, particularly if the venue is attractive. This results in money and time spent on CPE, which may have no useful effect.

### **1.1.4 Adults as the audience of Continuous Professional Education**

The audience of CPE comprises adults. This has implications for CPE provision and explains the move away from pedagogy to andragogy (Kerwick and Tylee, 1998: 106). The reception of CPE is enhanced if sound adult education principles are incorporated into the design of the activities



(Carroll, 1993:163). Further, if andragogical principles are applied in the provision of CPE, adults are more successfully motivated to attend these CPE activities.

According to the andragogical viewpoint of adult learning theorists such as Knowles, adults are autonomous learners possessing great experience; adults are capable of setting their own goals and selecting their own problem areas; adults need to know why they should learn something before they will embark on the process; adults feel motivated to learn when the learning content relates to their life situation; adults are task- or problem-centered in their orientation to learning; and adults are more persistently motivated by intrinsic factors (Nelmapius, 1992:34, Yuen, 1991:1234). Knowles (1990:63) gives examples of intrinsic factors such as the desire for increased job satisfaction, self-esteem and the quality of life. Adults share basic human processes such as motivation, cognition and emotions (Merriam and Cunningham, 1989:516). However, because of their home context, school and work experience and their current life situation, adults cannot be regarded as a homogenous group of learners (Nelmapius, 1992:34; Knowles, 1990:59). Because of their situation, adults need coping strategies to manage all the facets of their life. If they do not find such strategies their motivation to continuously learn may be compromised (Stanley, Al-Shehri and Thomas: 1993:211). CPE providers can help learners in this regard.

Many of the andragogical assumptions relate to the perceived needs of learners, and have implications for the provision of CPE (Yuen, 1991:1234). CPE learners are attracted and retained if CPE is responsive to the participants' past and present characteristics and interests (Knox, 1990:262). Sometimes CPE programmes fail because it is not relevant to the life, work and experience of the programme participants. The content and format of CPE should be determined by determining the needs of the professional (Al-Shehri, 1992:386). Learners should ideally discover for themselves what their needs are, therefore they should be involved in all stages of the planning process of CPE, including the needs assessment (Nelmapius, 1992:34, Al-Shehri, 1992:386). CPE should be provided in such a manner that it is structured around life-related problems and experience (Nelmapius, 1992:34, Stanley *et al.*, 1993:211).

Another consideration is that the CPE audience is diverse. If it is assumed that the ages of participants vary, then it must also be assumed that the development of the participants varies (Bennett, 1990:173). Furthermore, as professionals move through career stages their needs and interests will change (Yuen, 1991:1234). Some of these facets should be considered in the planning and the design of programmes. Emphasis of CPE provision should be on flexibility and the close interaction of work and CPE (Chartered Society of Physiotherapists, 1994:9). It is easy to affect what a professional knows, but more difficult to affect what the professional does with that knowledge (Todd, 1987:8). When the knowledge and skills that are taught during CPE are integrated into existing practice patterns, the results will be applied to practice (Becher, 1996:48;



Todd, 1987:7; Kennedy and Queeney, 1991:209; Nowakowski, 1994:5). CPE programmes should emphasise regular, repeated contact, the presentation of material using a variety of media, and attention given to knowledge, attitudinal and behavioural aspects of learning (Gerbert, Sumser, Maguire and Miyasaki, 1991:139).

Adults need to be regarded as mature and self-directing beings. For professionals to maintain and develop competence through CPE, self-directed learning should be incorporated in the provision of CPE (Holm, 1998:623, Stanley *et al.*, 1993:210). Stanley *et al.* (1993:213) in a proposed model given by them to incorporate self-directed learning in CPE, suggest using methods such as mentorship and small group work. According to Holm (1998:623), clinical practice and problem-solving could be utilised for this. A democratic and participative learning environment where no training, but facilitation of learning takes place, is encouraged (Nelmapius, 1992:34). The focus should be shifted away from the content that has to be delivered to the learner who encounters the content. However, if content is totally strange to the adult learner, a more pedagogical approach would be realistic. South African adults have mostly passed through a pedagogical school system of dependent learners. Facilitators should keep this in mind by progressively introducing andragogical principles in the learning situation, so that learners will discover the advantages of self-directed learning (Nelmapius, 1992:34; Stanley *et al.*, 1993:212). The challenge for CPE then is to inspire self-directedness in professionals, and in this way transform them from extrinsically motivated attendees to intrinsically motivated learners (Al-Shehri, 1992:387).

All of the above accentuates the need for flexible CPE strategies which adapt to the needs of the adult learners, that are learner-orientated and therefore attractive to the target population (Pietroni, 1992:294, Knox, 1990:263). Programmes must meet the learning needs and at the same time improve the professionals' competence (Laxdal, 1982:827, Yuen, 1991:1236). Thorough and accurate assessment of learning needs contributes greatly to the achievement of this goal.

### **1.1.5 The South African Radiographer and Continuous Professional Education**

In South Africa, CPE has also slowly been gathering momentum. It is especially the case with the health professions. According to Ruscheniko (1997:13), "Continuing education for health professionals in South Africa is a very topical issue with both the Interim Medical and Dental Council and the final report of the National Commission for Higher Education identifying it as an essential activity expected of health professionals, to the point where it would appear that mandatory Continuous Professional Development will probably be introduced within the foreseeable future." Since this statement was made, a 5-year cyclic, mandatory CPE scheme



was introduced for general practitioners in January 1999 by the Interim National Medical and Dental Council of South Africa (Van Wyk, 1998:1542). All indications are that mandatory schemes will be introduced for radiographers by the year 2001. The half-life of the knowledge health professionals acquired prior to qualification varies between two and five years and is therefore not sufficient for the individual's lifetime of professional practice (Henwood *et al.*, 1998:5).

Whilst there is, as yet, no mandatory requirement in this country for radiographers to participate in CPE, the South African Society of Radiographers (SOR) issued a Code of Professional Conduct in 1998 which states the following (Appendix A):

"In order to perform his/her duties, every radiographer should continually strive to improve knowledge and skills by participating in continuing professional development." Similar principles appear in both the codes of ethics developed by the College of Radiographers in the United Kingdom and the American Society of Radiological Technologists (Haines and Henwood, 1998:79; Ehrlich and McCloskey, 1993:11).

The new health care policy of South Africa, together with the current economic recession, compels radiographers to improve themselves or bear the consequences. The new primary health care dispensation, it seems, will enable persons with no training in radiography, such as Special Auxiliary Service Officers (SASOs) to fulfil certain roles of qualified radiographers (Society of Radiographers of South Africa, 1997). For these unqualified or lesser-qualified persons to pose less of a threat to the radiography profession, radiographers will have to broaden their skill base. This can be done through CPE (Ruscheniko, 1996:15).

Due to the innovations in radiography technology, the expansion of knowledge and the proliferation in specialisation areas, curriculums used in preprofessional career preparation are constantly subject to change. Radiographers who have been qualified for many years were not exposed to the content of the latest syllabi and developments. These radiographers need to update and expand their knowledge and skills. Although it is acknowledged that radiographers gain experience after qualification and that some radiographers address a lack in knowledge by methods such as self-study or learning by doing, all radiographers may not always have the opportunity to do so. They may not even be aware that such a need exists.

Further impetus is given to the provision of continuing education by the increased public scrutiny and community pressures on health care that translate into legislative and administrative requirements that specify the standard of health care to be delivered. To respond effectively to accountability demands made by the public, continuing education must prepare health professionals thoroughly (Yuen, 1991:1234).



In the document of the Society and College of Radiographers of Great Britain (1996:2), the outcomes of CPE for radiographers are given as a higher standard of performance and the improvement of the quality of services delivered. The employer and the most important stakeholder of all, namely the patient, benefit from this. If radiographers do not regularly update and expand their knowledge and skills, it will lead to stagnation and regression. This may even cause the credibility of the profession to be questioned (Haines and Henwood, 1998: 86).

It seems strange that radiographers in the 1990s still feel that they can rely on a single qualification to carry them through their working life and this without any updates (Haines and Henwood, 1998: 83). Some radiographers, as already discussed, up until now participated in CPE activities such as learning in the workplace, congresses, workshops. In the researcher's opinion this was often incidental rather than planned, because participation is voluntary. The researcher furthermore feels that in most cases, radiographers may not even have known that they were actually participating in CPE. This non-structured, non-systematic way in which programmes were offered may have resulted in duplication and / or omission of key concepts or topics for CPE and an unbalanced emphasis on the theory or practice (Mandernack, 1990:195).

Fortunately, an opportunity to address the need for updating and expansion of knowledge and skills came in the form of a personal CPE scheme. It was introduced in January 1998 by the SOR of South Africa (Ruscheniko, 1997:13-17) and is referred to as a personal Continuing Professional Development (CPD) scheme. A similar scheme was introduced for United Kingdom radiographers in January 1997 (Society and College of Radiographers of Great Britain, 1996). Registration for the South-African scheme is currently limited to members of the SOR only. On completion of a two-year cycle a certificate of CPE participation is issued by the SOR. This is done on provision that the member has accumulated the specified number of 50 credits or more (Appendix B).

As with any other new developments, there were a few stumbling blocks to overcome. Mistakes were made. A national four-member CPE committee was composed. How and by whom this committee was founded, and on which grounds the CPE committee members were elected have not been made clear. It is this committee who was responsible for the planning and design of the CPE scheme.

It seems that more radiographers joined the CPE scheme than was initially expected. The Society was not properly prepared for this. It appears that many members of the CPE scheme are already disillusioned, and those who did not become members of the scheme, now regard it with suspicion. The causes for this could be that many administrative problems were experienced; objectives were not clearly stated; radiographers were not provided with sufficient information, and reading programmes were not immediately available as was expected. To



remedy this, the first CPE cycle was extended by another year. It appears that the credits awarded for CPE activities are also discouraging. From discussions at SOR meetings, from the minutes of the different SOR branches and from the inputs received from Free State Province members of the SOR (Appendix C), it seems that radiographers feel the time spent on some activities is not worth the credits awarded for it. The perception exists that it is impossible to obtain the required number of credits in the specified CPE cycle.

For radiographers CPE was and is a new concept. This represents change. In the researcher's opinion radiographers were not properly prepared for the change and they were not sufficiently involved in the planning stages of the scheme. The biggest mistake was that the CPE scheme was undertaken without sufficient involvement of the target population. According to comments made by radiographers, especially those in rural areas, and those working in smaller establishments, they feel left out. Conventional wisdom in adult education supports the principle that adult learners should always be given the opportunity to participate in planning their own learning experience (Merriam and Cunningham, 1989:235). Motivation and commitment evolve from this. It is of paramount importance to the success of the educational process.

The new CPE scheme had a discouraging start and the success of it may be in the balance. To rectify this, the first step would be to involve radiographers in the planning and the development of the scheme.

### **1.1.6 The role of the needs assessment in Continuous Professional Education planning**

Most people become ready to learn something when they experience a need to learn it in order to cope more satisfactorily with real life tasks or problems (Wlodkowski, 1993:117). An essential component of the instructional design process and a very important aspect of quality improvement is a careful and systematic approach to the assessment of participants' needs (Fish, Gipple and Katz, 1985:79; Kristjanson and Scalan, 1989:122; Holm, 1998:622; Pietroni, 1992:294; Kerwick and Tylee, 1998:108; Goldstein, 1993:20). Larcombe and Maggs as quoted by Barriball, While and Norman, (1992:1134) say, "Without an effective system for identifying a need, the provision of continuing professional education remains arbitrary, random and inequitable." The needs assessment evaluates practice and identifies current knowledge and skills and sets this against an assessment of the abilities required to meet current and forthcoming practice demands (Todd, 1987:7; Fowler, 1996:54; Gerbert *et al.*, 1991:138; Langsner, 1994:271; Moorby, 1991, 48; Williams, Davis, Hale and Collins, 1989:132; Mancall and Bertland, 1988:88).



A careful needs assessment should give an accurate and empirically based view of existing conditions. An effective vehicle for determining learning needs is to construct a model of desired behaviour, performance or competencies. The three sources of data for building such a model are the individual, the organisation and the society. For the adult educator the individual learner's own perception of what he/she wants to become, what he/she wants to be able to achieve and at what level he/she wants to perform are the starting points in building a model of competencies. This is the primary level needs assessment (Witkin, 1984:6). The primary level of the needs assessment focuses on the individuals who actually receive the educational services. It gathers information from the individuals who know most about their educational needs (Graham and Mihal, 1986:38). Primary-level needs are generally addressed before secondary-level needs. Primary-level needs assessment would include drawing up a representative sample of practitioners (Todd, 1987:21); asking them what their perceived needs are; monitoring practice to try and establish what is currently happening in a profession; and asking experienced and respected practitioners to reflect on what they see as important curriculum areas that should be addressed by CPE for their profession (Todd, 1987:22). Job analysis is a useful starting point for the needs assessment, because it defines the content of jobs that can serve as the basis for the needs assessment (Bartram and Gibson, 1995:161). The scope of professionals' task must be clearly understood to realise these objectives (Todd, 1987:29). Triggers that give direction to the needs assessment are identified in this way (Bartram and Gibson, 1995:1). The four main areas addressed by a needs assessment are the following: the demographic characteristics of the clientele, the perceived relevance of educational topics and the form of the target group, motivational factors influencing participation in continuing education and deterrents to participation (Kristjanson and Scalan, 1989:119; Wlodkowski, 1993:109). Identification of deterrents is important because it leaves programme planners with a checklist of aspects to consider during the planning phase (Valentine and Darkenwald, 1990:30). Detering factors can interfere with the practitioner's ability to meet CPE requirements (Langsner, 1994:147). If deterrents are removed, it can also be considered as a response to the needs of programme participants (Langsner, 1994:149). Examples of deterrent factors are the relevancy of programmes to learners, the cost of programmes, work constraints, a lack of quality, insufficient benefits, family constraints and uninvolvement (Becher, 1996:52; Scalan and Darkenwald, 1984,165).



When planning the needs assessment, it must be decided what would be the most effective communication strategy for obtaining data from key informants. Factors to consider are time, cost, training of data gatherers, and the potential for misunderstanding. In Witkin (1984:63) the survey method is described as the most widely used data collection method. Many studies use both questionnaires and interviews to obtain data. Non-interactive methods such as written questionnaires are often less costly and information can be obtained more quickly in this way (Witkin, 1984: 264; Williams *et al.*, 1989:133;). It is a valuable method to validate needs and causes identified during interactive group processes. Witkin (1984:264) lists advantages of written questionnaires as follows:

- One can survey many people in a wide geographical area.
- Large amounts of data can be gathered in a relatively short time.
- With structured instruments there is less chance for side-tracking and irrelevant inputs.
- The process is relatively easy to manage.
- No special training of data gatherers is required.
- Survey data can be analysed by computer.

He lists the following disadvantages of written questionnaires:

- possible misunderstanding of questions;
- a high rate of non-returns;
- difficulty in using complex methods of assigning priorities; and
- failure to take into account cultural and / or linguistic differences in respondent groups.

The purpose of a needs assessment is not to suggest solutions to problems, but to identify those areas where solutions are most required. English says it enables one to have the ability to adapt to and anticipate constituent changes and needs (Hazel-Ford, Sarvela, Wright and Gimenez, 1993:11). Analyzing training needs provides focus and direction for the investment an organisation has to make in its people (Bartram and Gibson, 1995:1). It generates information from jobholders about their perceived training needs in relation to job performance, it gauges attitudes toward training and it identifies common training themes (Bartram and Gibson, 1995:167). This helps with the development of training plans. With the right training and development, people in an organization can be the biggest asset of that organization. Some training needs are obvious, but analysis is still necessary in order to prioritise the needs and to make sure that time and money are not invested in the wrong areas (Todd, 1987:122). More needs are usually identified that can be addressed with existing resources (Merriam and Cunningham, 1989:237; Laxdal, 1982:829). Prioritisation should, however, be kept simple, and should not become too boring and time-consuming (Witkin, 1984:234).

A training needs survey involves people who take responsibility for identifying and justifying their own training needs (Bartram and Gibson, 1995:161). Knowles (1990:125) said that a basic



finding of behavioural science research is that a person's commitment to a decision is directly proportional to the person's involvement and influence in the planning and decision-making. It accentuates the importance of involving the learners in the whole planning process of CPE, from the needs assessment phase through to the evaluation stage. "Unfortunately, many programs are doomed to failure because trainers are more interested in conducting the training program than in assessing the needs of their organisation." (Goldstein, 1993:20). Wheatley says that understanding the needs and desires of current and prospective customers is a basic marketing function (Hazel-Ford *et al.*, 1993:11). A learner at school is often told what to learn, while the professional decides this for himself / herself (Holm, 1998:621). If CPE consumers are not given the opportunity to indicate their needs as part of the programme development process, they will "vote with their feet" (Kennedy and Queeney, 1991:209). Adult learners are motivated when they find an instructor who respects their needs and creates a learning process by which these needs can be met. To deny the felt needs of adult learners would be to insult their intelligence and self-determination (Wlodkowski, 1993:108).

Determination of needs and priorities "enhances each of the main elements of effective education: individualization or personal involvement, feedback, relevance, understanding, and motivation." (Laxdal, 1982:829).

## **1.2 PROBLEM**

The purpose of the study was to conduct a needs assessment survey of the CPE needs of Free State Province radiographers in order to identify high-priority need areas to assist in the provision of CPE activities.

## **1.3 SUBPROBLEMS**

With the needs assessment, the following subproblems were addressed in order to gain the information required for the provision of CPE activities.

- 1.3.1 Information was required on the work environment of radiographers. It may influence the needs of radiographers, and therefore, information had to be gathered concerning the nature of the organisation, workplace and the position of the radiographer in the organisation.
- 1.3.2 Information on the formal education and professional background of the individual was required. This could also influence the needs of radiographers.



- 1.3.3 Information regarding the individual's involvement in continuing professional development activities over the past two years and reasons for limited participation or non-participation had to be gathered. The information would be valuable to activity planners and could explain some of the needs of radiographers regarding CPE.
- 1.3.4 Determination of high-priority topic areas of radiographers' perceived needs for their current and future professional education was required. It was the main interest of the study, as this would identify possible CPE topics.

## **1.4 HYPOTHESIS / RESEARCH GOAL**

It is hypothesised that:

- 1.4.1 Free State Province radiographers' needs would be influenced by the nature of the organisation, workplace and the position of the radiographer in the organisation;
- 1.4.2 the formal education and professional background of the individual would influence the needs of a radiographer;
- 1.4.3 the factors that deter radiographers to participate in CPE would influence their needs;
- 1.4.4 Free State Province radiographers have definite perceived current and future needs regarding certain topics and providers of CPE activities should address these.

## **1.5 OVERVIEW OF RESEARCH METHODOLOGY**

The research that will be described was self-initiated research with the objective of obtaining a Master's degree in adult education. It stemmed from the researcher's interest in CPE. The aim was to make a contribution to the existing body of scientific knowledge regarding CPE and thereby making a contribution to the activities that must be provided for radiographers.

It was felt that due to the nature of the problem or the data required, as outlined earlier in the chapter, the descriptive survey approach would be the best method to address the problem. The reason for this being that the data had to be obtained by means of observational research (Leedy, 1985: 133).

The target group of the study was composed entirely of diagnostic radiographers in the Free State Province. A mail-administered questionnaire was chosen as the means of collecting data. As will be discussed in Chapter 2, it is acknowledged that this is not the optimal survey method. However, under the circumstances this was regarded as the best method. One of the reasons amongst others was the wide geographical distribution of the target population. Mail-



administered questionnaires are relatively inexpensive and easy to administer. At the same time, much information can be obtained at once.

The shortcomings of this method were minimised by using an extensive literature search and subjecting the survey tool to pilot testing. A detailed description of the methods incorporated to increase the reliability and validity of the chosen method, will be discussed in Chapter 2.

## **1.6 DELIMITATIONS**

1.6.1 The study was limited to all diagnostic radiographers employed in the Free State Province. A list of names and addresses was obtained from the latest available register kept by the Health Professional Council of South Africa (HPCSA). It was updated in 1996, but for the purposes of the study it was outdated. Therefore, to ensure that all diagnostic radiographers in the Free State Province were included in the study, chief radiographers of the different hospitals and departments rendering radiographic services in the Free State Province were contacted telephonically. They were given an explanation of the study and were requested to supply the names and addresses of those radiographers working with them. This was used for cross-reference purposes.

1.6.2 The study was limited to all diagnostic radiographers, namely public sector radiographers and private sector radiographers, who as part of their daily duty perform x-ray examinations of patients in the Free State Province. Radiographers registered in the other categories, such as Nuclear Medicine, Radiotherapy and Ultrasound, were only included in the study if they were employed as a diagnostic radiographer at the time of the study. All other diagnostic radiographers who are not primarily responsible for executing radiographic examinations on patients on a daily basis were excluded from the study. The study included 4 radiography lecturers employed by the Technikon Free State, 1 radiographer employed by the University of the Orange Free State; the Deputy Director of Health: Radiography; 3 assistant directors and 2 regional chiefs.

## **1.7 NEED FOR THE RESEARCH**

It is only since January 1998 that radiographers can register for a personal CPE scheme. At this stage only radiographers who are members of the SOR are able to register for this scheme. To most of the radiographers in the Free State Province the concept of CPE is new. From informal discussions with radiographers it appears that many radiographers are not even aware of the existence of CPE and the term "CPE" is foreign to them.



Although the Professional Board for Radiographers indicated that an assessment of the needs of radiographers has already been undertaken as can be seen in Appendix D, it is not obvious what form of assessment has been undertaken. Up until now, no radiographers in the Free State Province have been aware of such an assessment.

The characteristics of the Free State Province and the radiography infrastructure in the Free State are different from those in other provinces. This results in needs unique to these radiographers. It is the belief of the researcher that effective and efficient CPE can only be provided if there are national, regional and local organisations concerned with CPE. A needs assessment is essential to provide the courses requested and needed by radiographers (Haines and Henwood, 1998:80). In the researcher's opinion the involvement of radiographers in CPE planning through the needs assessment will be in the interest of CPE in the Free State Province, as well as in the interest of the profession.

## **1.8 OUTCOMES**

Through the needs assessment it will be possible:

- to identify the possible topics for CPE activities and deterrent factors to CPE participation;
- to identify the unique circumstances and needs of Free State Province radiographers. Guba and Lincoln say a needs assessment is of no value unless it is tied to local values (Witkin, 1984:17).

It is hoped that through this needs assessment all radiographers in the Free State area will:

- be made aware of CPE;
- feel a part of the CPE planning and development process and because of that will support CPE;
- indicate their perceived needs for CPE; and
- be encouraged to take responsibility for their development, because a needs assessment leads to self-assessment.

The research results will be valuable to those who wish to provide successful and responsive CPE activities for Free State Province radiographers. Providers include the Technikon Free State, the various hospitals in the region and the Bloemfontein branch of the Society of Radiographers. Not only will they be able to accommodate learner needs, but they will also get an indication of how resources should be allocated. Since the researcher is actively involved with both the Technikon Free State and the Bloemfontein branch of the SOR, the results of the study will be implemented to the benefit of radiographers in the Free State Province. CPE that take into

consideration the requirements and needs of learners, increase learner motivation and draw greater numbers of participants. This is to the benefit of providers.

Professionals also influence the time, money and the quality of the lives of the public to whom they render a service. CPE that aims at affecting professional practice will therefore not only be to the benefit of the professional who attends these programmes, but also to the benefit of employers and the patients.

Finally it is hoped that with minimal changes this survey instrument could be used to identify the learning needs of all radiographers in South Africa, including those in the other categories. With other categories radiographers qualified and operating in the areas of Ultrasound, Nuclear Medicine and Radiotherapy are implicated.

## **1.9 TERMINOLOGY**

In the following section the most important terminology used throughout the study will be explained by means of definitions as obtained from the literature, as well as terminology specific to the radiography profession.

### **1.9.1 Continuous Professional Education (CPE)**

Barriball *et al.* (1992:1130) says, "There is no agreed definition of continuing professional education in the literature." Mostly there is disagreement as to whether CPE is an all-embracing term covering any learning experience that takes place after initial education, or whether it focuses on structured and planned incidents only.

Stone (Broadbent and Grosser, 1985:3) defines continuing professional education broadly as follows:

"... advanced degree seeking (beyond the first professional degree) and management and communication training and incorporates all activities and efforts, formal and informal, by the individual to upgrade his knowledge, abilities and competencies and understanding in his field of work or specialization so that he becomes a more effective professional and be able to handle responsibilities of greater scope and accountability."



The College of Radiographers (UK), as quoted by Ruscheniko (1996:14), gives the following definition:

"Continuous Professional Development is the systematic maintenance, improvement, and broadening of knowledge and skills and the development of personal qualities necessary for the execution of professional and technical duties throughout the practitioner's working life."

In the document compiled by the Society and College of Radiographers of Great Britain (1996) the following is said of Continuous Professional Development (CPD):

- CPD is **continuing** because it is part and parcel of your whole working life.
- CPD is **professional** because it is about developing your personal competence in your professional role.
- CPD is about **development** because it is concerned with improving and enhancing personal and professional performance.

Although both of the above two sources refer to Continuing Professional Development, the term used throughout the text, as already discussed, is Continuous Professional Education.

The American Nurses' Association (Hughes, 1990:429) defines Continuing Education for nurses as planned learning experiences beyond a basic nursing educational programme. These experiences are designed to promote the development of skills and attitudes for the enhancement of nursing practice, thus improving health care to the public.

In the researcher's opinion CPE is an ongoing learning process concerning professionals whereby they strive to update and improve or expand their professional knowledge and skills after basic qualification. Therefore it may include any learning opportunities or experiences that will lead to the enrichment of both the professional and the profession.

### 1.9.2 Profession

The most basic definition of the term "profession" is "to earn one's living from a set of skills in which one has expertise". In Benatar (1997:428) it is said that: "Sociologists view the professions as social phenomena comprising a set of role characteristics, which include:

- possession of specialized knowledge and training that enable professionals to know what to do in particular circumstances, to be able to provide a rational explanation for their actions, and to undertake the action safely;
- dedication to public service; and
- socially approved self governance."

Benatar says that, according to a professional perspective of the concept of professionalism, it is much more. It has to do with the good conduct, the virtuous character and the commitment to



excellence inherent in the professional role. Professionals are expected to have integrity, to be worthy of trust, to be more concerned with caring for others than with making money, and to have a substantial commitment to their client's welfare. They are admired and respected for an ethic of service and for commitment to the use of professional skills and knowledge with excellence and in morally acceptable ways.

Professions are service- or community-orientated occupations that apply a systematic body of knowledge to problems that are highly relevant to the central values of society. "Professions have a relatively high degree of control over and influence on the lives of other people in society" (Merriam and Cunningham, 1989:518).

To synthesise professionals have a specific body of scientific knowledge at their disposal that enables them to make decisions and at the same time take responsibility for these decisions, while rendering a service to the public.

### **1.9.3 Diagnostic radiographers**

Burns (1992:2) defines diagnostic radiographers as professionals who are responsible for producing high-quality images of the human body by using x-radiation. These images are used to assist radiologists in making a diagnosis of the patient's condition.

### **1.9.4 South African Society of Radiographers**

In *The South African Radiographer* (1998:2), the Society of Radiographers (SOR) of South Africa is described as follows: "The Society of Radiographers of South Africa is a non-profit association with voluntary membership. It is open to all radiographers, student radiographers and supplementary diagnostic radiographers who are registrable with the Health Professionals Council of South Africa, and organizations and institutions with direct interest in the profession of radiography. The Society is regionally represented in all the large centers in South Africa and is a member of the International Society of Radiographers and Radiological Technologists (ISRRT)."

### **1.9.5 Learning need**

Knowles (1990:128) defines a learning need as the discrepancy or gap between the competencies specified in a model and the present level of development of the learners.

Witkin (in Merriam and Cunningham, 1989:236) more or less agrees with this statement. He says that the term 'need' is properly used as a noun with the denotation of a discrepancy or gap between some desired or acceptable condition and the actual condition in a state of affairs.



The Hospital Research and Education Trust (1970:7) used the term 'need' as meaning a lack in knowledge, skill, or attitude that prevents an employee from giving satisfactory job performance, or that interferes with his or her potential for assuming greater responsibilities.

Abrahamson (1985:114) goes further and identifies two main types of learning needs, namely perceived needs that represent the perspectives of the learners, while actual or true needs are more objectively determined by independent assessment using factually recorded data. Perceived needs are defined by what people consider their needs to be – the consumer point of view (Witkin, 1984:7; Atwood and Ellis, in Kristjanson and Scalan, 1989:119). It can also be described as a desire or want of an individual.

### **1.9.6 Needs assessment**

Needs assessment according to Merriam and Cunningham (1989:236) involves establishing the existence of gaps between the present and desired capabilities, skills and outcomes and prioritisation of these. The present condition is determined empirically with the aid of observations, questionnaires, tests, performance analyses, record reviews and other means of documentation (Merriam and Cunningham, 1989:236). The desired conditions are constructed, based on the values and desires of those involved in the planning.

Fish *et al.* (1985:79) say that a needs assessment is the process by which the relevancy of the content of CPE programmes is determined and educational needs are identified and analysed. For Moore (Włodkowski, 1993:108), needs assessment refers to any systematic process for collecting and analysing information about the educational needs of individuals, groups or organizations. Fish *et al.* (1985:80) suggest that an educational need could be identified by determining:

- the required level of competency an individual must have to perform effectively on the job;
- the individual's present level of competency; and
- the precise difference between the current level of competency and the required level of competency.

Needs assessment is defined as a systematic procedure that sets priorities and makes decisions about programmes and the allocation of resources (Witkin, 1984:2). This procedure involves the collection and analysis of data from many sources, including the perceptions of constituent groups whom now or in future may be affected by decisions growing out of the needs assessment.



Kaufman (Witkin, 1984:14) defines a needs assessment as "a formal analysis that shows and documents the gaps between current results and desired results, arranges the gaps in priority order and selects the needs to be resolved."

Kristjanson and Scalan (1989:119) differentiate between a needs identification and needs assessment. Needs identification is the process that describes learning requirements of a group, using some measurement tool or assortment of tools. The needs assessment follows on this and involves a judgement to estimate the relative importance of these needs.

Swanson and Jennett (1992:235) define the needs assessment for continuing medical education as a systematic diagnostic process that is used to determine clinicians' learning needs. This is done prior to the selection and delivery of the education programme and is regarded as a means to improve the relevance of continuing medical education delivered to physicians. For the purposes of this study, this is the most accurate description of what is meant by needs assessment, and it is also in this context that it is applied throughout the study.

## **1.10 RELATED LITERATURE**

The literature search revealed a large number of writings related to continuing professional education. Although there has been a considerable amount of literature published in the broad area of continuing professional education, South African literature related to the topic is scarce. This makes literature describing continuing professional needs assessment surveys done for South African professionals even more scarce. Literature from mainly the United States, the United Kingdom and Australia was consulted to cover the topic.

### **1.10.1 Continuous Professional Education needs assessment for non-health professionals**

One Australian source was pertinent to the study. During 1985, Broadbent and Grosser (1985) conducted a study in which special librarians and information centre managers were interviewed to ascertain their continuing professional development activities, needs and aspirations. The study investigated areas such as the extent and nature of organisational support for CPE, the formal continuing education activities and professional involvement of those interviewed, and participants' perceptions of their present and future needs for continuing professional development. The study found that "organizations and not individuals were the major providers of funds for continuing professional activities and the amounts spent were relatively low; the major constraints to such participation were given as lack of time and lack of suitable courses to attend." The study identified that areas of need were clustered around those which focus on information technology and management skills.



### **1.10.2 Continuous Professional Education needs assessment for health professionals**

The following is mainly a discussion of the needs assessment studies conducted amongst health care professionals.

A study conducted by Kennedy and Queeney (1991) describes a needs assessment amongst Pennsylvania physicians, done mainly to identify content areas of greatest interest, as well as their preferences regarding scheduling and delivery of CPE. They concluded that greater involvement of physicians in the programme planning process, from the needs assessment through evaluation, might have a greater influence on the effect of CPE participation. Programme planners should strive to deliver quality programmes that are attractive to physicians.

Young and Rudney (1991) describe a regional survey conducted to assess the perceived continuing education needs of United States dentists. Dentists were asked to identify programme topics, teaching methods, and schedules, course sponsors and new areas of need. The study found that dentists would like educational institutions to provide in-depth programmes that are "accessible in distance, time and price." The researchers concluded that proper understanding of the needs of dentists might improve their future participation in CPE.

Mitchell (1997) undertook a study that sought to explore the CPE needs of midwives in the South-West of England. A questionnaire was used to determine the needs, and a response rate of 45% was achieved. The results showed a demand for part-time and distance learning. The format and the timings had to be such that midwives could take up opportunities with ease. It was also found that more written information and early notification of CPE activities were required. Flexible learning strategies and adequate learning support must be developed to accommodate midwives. Sharing the responsibility of CPE between manager and practitioner was also emphasised.

To plan activities that are responsive to the needs of professionals, it is important to also identify those factors that influence participation in CPE. Langsner conducted two such studies. In one such a study, Langsner (1993) examined reasons for CPE participation of therapeutic recreation professionals. If the reasons why professionals participate in CPE are overlooked, it can lead to the erosion of the decision-making power of health professionals regarding the CPE process. Especially with mandatory CPE, it increases the possibility that CPE services will become less responsive to the needs of professionals. The two most important reasons for participation in CPE were identified as "professional service" and "professional improvement". From the study Langsner concluded that the objective of CPE for therapeutic recreation professionals should not only be to address recognized professional issues, but also to respond to specifically identified needs of those who participate in it.



In the other study undertaken by Langsner (1994), deterrents to participation in CPE of therapeutic recreation professionals were examined. If deterrents to participation in CPE are not known, programmes are not responsive to the needs of <sup>their</sup> ~~its~~ intended participants. This can influence professionals' ability to meet requirements for recertification in cases of mandatory continuing professional education. The six deterrent factors to CPE participation in this study was ranked as cost, work constraints, lack of quality, lack of benefit, family constraints and uninvolvement. Four of these factors could be addressed by those who plan CPE programmes (lack of quality, cost, lack of benefit and work constraints), and in doing so meet the needs of learners.

Escovitz and Davis (1990), amongst other things, reviewed and compared the qualitative improvements in the needs assessment in continuing medical education in the United States and Canada. They reported that "Continuing Medical Education in the United States and Canada is a substantial and seemingly disorganized enterprise with over half a million physician consumers." In many CPE programmes there is a lack of emphasis on the clear definition of the needs of participants. Certain medical schools, however, have made progress in this regard. One school assesses applicant needs through knowledge tests and evaluation of clinical skills by using standardised patients. At another school, self-assessment was introduced as a means of improving both the needs assessment and the learner's active involvement in the educational process. The programme provides internists with a syllabus, as well as testing and feedback on correct and incorrect answers. According to Escovitz and Davis, research conducted over the past two decades have begun to validate the efficacy of careful needs assessment and active learner participation.

Woolfolk, Lang, Farghaly, Ziemiecki and Faja (1991) conducted a study to determine the relative effectiveness of several Continuing Dental Education formats in transmitting information to Michigan dentists. The study was also undertaken to compare participants' perceptions of the usefulness of the specific components of each format. They concluded that if practitioners' perceptions of need and usefulness were accommodated, the outcomes of CPE were more likely to be successful. To accommodate everybody, CPE should be constructed according to varying formats.

In a commentary by Purdie (1994), he says that mandatory recertification programmes are increasingly being implemented in Europe. He says that CPE is the process whereby a professional can show that he is fit to be recertified as a specialist. He describes a study conducted amongst medical specialists, which concluded that 71% of the respondents favoured the creation of a Specialist Register for those meeting CPE recertification requirements. Instead of a mandatory CPE programme, this method of encouraging medical practitioners to participate in CPE, was suggested. Any interested party would then be permitted to examine the register.



The implications of an individual's name not appearing in the register will then be affected by the interested parties. Removal of a name from the register would not only have direct implications clinically, but also medico-legally.

### 1.10.3 Continuous Professional Education for radiographers

Although there is a paucity of literature describing CPE needs assessments for South African professionals, some indication of the current recognition of the importance of CPE for South African radiographers might be found in the fact that five of the latest editions of *The South African Radiographer* (since 1996 – 1998), contained articles on CPE. It was mainly a discussion of the newly introduced personal CPE scheme for society members. Lately, this is also frequently a topic of discussion at Society of Radiographer meetings and congresses.

A United Kingdom article by Henwood *et al.* (1998) describes the needs for and outcomes of CPE for radiographers. They said that the numerous changes that will occur throughout a radiographer's professional life, together with the short half life of knowledge, compels radiographers to participate in CPE. CPE provides the opportunity for radiographers to "retain basic knowledge, enhance existing knowledge and to acquire new knowledge throughout their working life". For CPE to be successful, they suggested that providers be sensitive to the factors which deter and those that support mature learners. Henwood *et al.* noted that employers will have to be convinced of the benefits of CPE, and they should keep in mind that if they invest in CPE for their staff, they would retain and attract well-qualified and motivated staff. CPE should aim at meeting the diversity of needs, including managers' needs, radiographers' needs and those of the profession.

A study conducted by Haines and Henwood (1998) amongst 150 United Kingdom radiographers to determine if CPE met clinical needs, revealed that radiographers desired a structured, unambiguous programme that is widely available to all concerned parties. For the sake of the current and future profession and the quality and efficiency of the service provided to professionals, CPE programmes had to meet the needs of all the concerned parties. Co-operation amongst stakeholders such as the service providers, the radiographers, the educationalists and the professional body will make CPE realistic and credible. Skills chosen frequently by these radiographers were counselling, computer skills and other information technology issues. The gap between the initial training and the impact of new technology was highlighted by the frequent choice of new modalities as topic area for CPE. Haines and Henwood said, "Radiographers must take steps to keep abreast of any 'shifting sands' otherwise they may find themselves compromised by more aggressive peer groups who have sought to push themselves forward into areas traditionally fenced by clear role and occupational division".



A study conducted by Henwood and Huggett (1999) describes an in-depth look at the CPE needs of radiographers and imaging department managers. Major deterrents to attendance of CPE were identified as cost, time and lack of appeal of courses on offer. It was suggested that providers should look at creative new ways of providing CPE. Examples given were audio- and videotapes, the Internet, teleconferencing and distance learning material. Further close liaison and open and honest communication between all stakeholders were emphasised for the co-ordination and provision of CPE in order to overcome the problems identified in the study.

An article taken from a report by Cunningham (1993) describes how diagnostic radiographers in Wales improved their competence. Questionnaires were used to carry out the study. Four groups were involved, namely radiographers, their supervisors, the principals of the three schools of radiography and the organisers of Welsh study days of the five years preceding the study. An overall response rate of 91% was obtained. Reading *Radiography Today* was the most widely used method of updating. Further popular methods were lunchtime meetings and short courses. Mandatory CPE was supported by 79% of the respondents. Many of these respondents attributed their non-participation in formal courses to the lack of study leave opportunities. It was recommended that an education officer be appointed within each department that would promote and facilitate continuing education and in-service training. Further suggestions were that departmental managers take responsibility for their department's study leave budget and study leave allocations.

Although South African literature describing needs assessment surveys for radiographers <sup>is</sup> are not available, the literature found mainly described the emerging importance of CPE for radiographers and the newly introduced CPE scheme of the SOR. By using published literature from other professions and countries as a whole, it is possible to synthesise the following major issues for CPE and the determination of professionals' needs:

- It is important to involve participants in the CPE process by means of the assessment of their needs.
- It is important to conduct a carefully planned needs assessment for CPE to help ensure the success of CPE.
- Part of the needs assessment should be to determine factors that motivate and deter professionals from CPE participation.

The above summary relates to the central theme of this investigation and it is therefore felt that the related literature justifies the need for the study.

## **1.11 ORGANISATION OF THE REMAINDER OF THE STUDY**

Chapter 2 is a discussion of the methodology used for this research. The main approach followed in this study is descriptive in nature (Leedy, 1985:133, De Vaus, 1996: 134). A mail-administered questionnaire was used as principal method of collecting data. Although this type of research design is not without problems, the researcher will explain why this method was selected as main instrument for collecting data. Chapter 2 will furthermore give an indication of how the target population was selected, how the mail-administered questionnaire was developed and administered, and finally, how the data will be processed and analysed. Chapter 3 reports the results of the investigation, while Chapter 4 discusses the results and the implications for the provision of CPE in the Free State Province. The final chapter gives a brief summary of the results and findings, the conclusion reached, recommendations made, and develops a model of guidelines for CPE provision in the Free State Province.



## CHAPTER 2

# RESEARCH METHODOLOGY

### 2.1 INTRODUCTION

As indicated in Chapter 1, the aims of this study were to identify the Continuing Professional Educational needs of Free State Province radiographers. In the light of the aims and the resources available it was decided that the most appropriate methodology was to use a mail-administered questionnaire as the principal means of collecting data.

The needs assessment survey was conducted from October 1998 to November 1998. The purpose of the survey was:

- to determine the general and educational background characteristics of Free State radiographers;
- to identify the extent of their tasks, skills, activities and responsibilities; and
- to gather information that would provide a basis for the development of future offerings in the continuous professional education of radiographers.

The study focused on the CPE needs of Free State Province radiographers as perceived by them. Perceived needs were chosen as it is generally easier to determine them than true / actual needs, and because behavioural change from participation in CPE can only be ensured when learners recognize the needs and adopt programme goals for themselves (Laxdal, 1982:829). Needs as perceived by radiographers are an important participation motivator and this is a key factor in ensuring the success of educational programmes (Laxdal, 1982: 829).

### 2.2 OVERVIEW OF THE RESEARCH METHODOLOGY

In the world we, as humans, are living in we are constantly subject to change. The change requires continuous readjustment that is made possible through knowledge. Knowledge enables one both to know what to do and how to do it. This contributes a pragmatic character to knowledge that gives meaning to life.



To gain knowledge, one method is to systematically search for meaning and truth. It is a constant process, that is sometimes more successful than at other times. To improve the chances of success, we must search for this knowledge in a systematic way. This is nothing other than research. Research on its own does not mean anything without reflection on the validity of the research.

The epistemological dimension of this research is to search for the true CPE needs as perceived by Free State Province radiographers. If this can be obtained, it could be directly applied in practice, so that useful CPE activities can be planned. This imbues the study with the characteristics of applied research.

As with any other research, the researcher is aware that no research is without constraints that will, inevitably, impede the search for truth. The research problem, as discussed in chapter 1, gave rise to certain constraining factors that had to be addressed in the design of the research. However, it is seldom possible to eliminate all errors and mistakes from a research project (Mouton, 1996:108).

The threats to the validity of the research and the consequent adjustments will now be discussed.

An ontological constraint of the study is that the needs are determined as perceived by radiographers. It may not in all cases reflect the true needs, as this will mainly depend on how good the respondents know themselves and how honest they are with themselves and/or the researcher. However, the adult learner is internally motivated and therefore more successfully motivated to learn if the needs that he/she experiences are addressed. Therefore, the results will still be valuable and valid in the sense that they are based on the needs experienced by the respondents themselves.

The main approach of this study was that of a descriptive survey. The general aim of the study was to summarise the patterns of the responses obtained from the respondents. The summaries were used to describe the demographic data of the respondents, the profile of the organisations in which respondents were employed, the position of respondents in the organisation, the educational and professional background of respondents, respondents' recent continuing professional education activities, constraints to CPE participation, organisational support for CPE and perceived topic areas of need for current and future CPE.



According to Leedy (1985:134), the basic structure of a descriptive survey consists of:

- A technique of observation by means of which data can be collected.
- A carefully selected population.
- Careful attention to the research design to limit the influence of bias and a systematic way of organising and presenting the data, so that valid and accurate conclusions can be drawn.

The study consisted of two phases. Phase one was a minor part of the study. It was conducted by means of semi-structured interviews with ten radiographers purposefully selected to represent the target population. Interviews were conducted telephonically. The information obtained from this, together with an exhaustive literature research (as will be discussed further in this chapter), was used to construct the first draft of the questionnaire. To successfully handle the interview as a technique for gathering data, the following was done:

- The interview with the selected radiographers was set up in advance.
- An agenda of questions were faxed to each interviewee directly after an interview date was set up. The date for the interview was confirmed in this fax.

For phase two, the principal method of data collection was by the use of a mail-administered questionnaire. This method was used, because the target population is distributed across a wide geographical area. In this way many radiographers could be reached at a minimum cost. Staffing requirements with mail-administered questionnaires are lower (De Vaus, 1996:111). As this research was conducted by one person, it was easier to use this method of data collection. Also, because the concept of CPE is relatively new or vague, the use of mail-administered questionnaires was seen as a means of introducing the concept to radiographers in this area. Furthermore, with this method a lot of information could be obtained, including demographic information of the target population; information of recent CPE activities of the target population and also the opinions of the target population regarding their needs for CPE. The mail-administered questionnaire was seen as a simpler method to obtain all the information from respondents with such diverse circumstances and backgrounds.

Methodological constraints due to this survey method may have led to a reduction in the validity of the research. Radiographers as the objects of inquiry are social beings with differences. These differences may lead to differences in the interpretation of questions and responses. A shortcoming of the mail-administered questionnaire is that the responses to questions cannot be controlled. Some questions may be misinterpreted due to language constraints, the layout may lead to a reduction in sample size, terms may be misleading and the length of the questionnaire may discourage participation in the survey.

To minimise these shortcomings, the questionnaire was carefully designed and constructed in order to increase the probability of favourable reception and return of the questionnaire. The



researcher endeavoured to be courteous in the cover letter and questionnaire by explaining the importance of each radiographer's response and by beginning all requests with "Please mark with an X.....". An effort was also made to make the questionnaire as simple to read and respond to as possible. The number of open-ended questions was limited and these were arranged in such a way that the questionnaire did not appear cluttered. Adequate margins were left as far as possible, and response areas were clearly indicated. One disadvantage in the design of the questionnaire was its length. As will be explained in chapter 4, the length of the questionnaire may have contributed to reduction of the sample size. However, in the case of a more specialised population and a relevant topic, a longer questionnaire can be better tolerated (De Vaus, 1996:109). The reasons for the extensiveness of the questionnaire will be given in chapter 4.

To assess the reliability and validity of the indicators, the questionnaire was pilot tested before carrying out the actual study. This helped to remove possible misleading questions, although in the end there were still some misinterpretations. Furthermore it showed that the questionnaire was too long. Following this, adjustments were made to shorten the length.

The next stage in phase two of the study was the actual gathering of data from the target population. Response rates were maximised by motivating respondents in the cover letter to complete the questionnaire by explaining the importance of their responses to the outcomes of the study.

To establish trust, the purpose of the identification number included on the questionnaire was explained in the cover letter. Respondents were, however, assured that their responses would be treated confidentially and would in no way be traced to individuals once the survey process was concluded. Furthermore the cover letter was used to provide instructions and the contact telephone number of the researcher. The Technikon Free State's support for the study was shown by using its letterhead.

Return postage and an addressed envelope were included for the return of the questionnaire, in order to cater for the convenience of the respondents and because it would be unreasonable to expect the respondents to pay the postage.

Two mail follow-ups and one telephonic follow-up were used to increase response rates.



## 2.3 SELECTION OF THE TARGET POPULATION

The study was limited to all diagnostic radiographers employed in the Free State Province area. This included public sector radiographers, as well as private sector radiographers, who, as part of their daily duty, perform x-ray examinations of patients. Radiographers registered in other categories such as Nuclear Medicine, Radiotherapy and Ultrasound were only included in the study, if they were employed as a diagnostic radiographer at the time of the study. All other diagnostic radiographers, who are not primarily responsible for executing radiographic examinations on patients on a daily basis, were excluded from the study. To obtain the names and addresses of all the radiographers in the Free State province, the latest update of the register kept by the Health Professionals Council of South Africa (HPCSA) was obtained. It was updated in 1996, but for the purpose of the study it was not sufficient. An alternative method had to be found that could be used as cross-reference. The Free State Department of Health was not in possession of a list of names of those radiographers employed by them. They could, however, supply the researcher with a list of the names of all government-subsidised hospitals with x-ray departments. This amounted to 32 hospitals. Each hospital was contacted telephonically by mid-July 1998.

If available, the head radiographer was given an explanation of the objective of the study, and why the names of the radiographers working in his/her department were required. If the head radiographer was not available, the second person in charge was requested to compile the list of names of those radiographers employed by his/her institution. The list of names could either be sent by mail, by telephone, fax or E-mail. Each person was also asked whether he or she was aware of any x-ray departments or other institutions such as private practices that employed radiographers in their town or area. The number of hospitals or x-ray departments that were contacted amounted to 46. In this way the names and addresses of 212 radiographers were obtained. They came from only 36 of the 46 x-ray departments, because some radiographers performed radiographic services in more than one x-ray department, and other x-ray departments were no longer operational.

As already mentioned, radiographers who were not actively performing x-ray examinations on patients as part of their daily duty, were excluded from the study. The number of radiographers who failed to satisfy the criteria for the target population amounted to 11. This included the Deputy Director of Health: Radiography, 3 Assistant Directors of Health: Radiography, 4 Radiography lecturers, 1 radiographer employed by the University of the Orange Free State, as well as two regional chief radiographers who did not have daily contact with patients, and were only responsible for administrative and other duties.



The number of radiographers registered at the HPCSA for 1996 amounted to 300. From this group the number of radiographers registered in other categories, and the number of radiographers who had resigned, as well as the 11 radiographers who did not in other ways satisfy the criteria of the target population, were subtracted. Also, the number of radiographers registered in other provinces, as well as those who were not registered with the HPCSA and those females who were registered in their maiden names were taken into account. After considering all of the above data, the number of radiographers were compared with the names obtained from department heads. It compared favourably.

The total number of radiographers included in the study was 201. As all of the identified population who satisfied the target population criteria, were included in the study, considerations of sampling are not relevant.

## 2.4 DEVELOPMENT OF THE QUESTIONNAIRE

The method employed to determine the learning needs of Free State Province radiographers, involved two phases and combined a qualitative and a quantitative approach. Initially semi-structured interviews were used together with a list of topics for inclusion in the questionnaire. Information on the skills, tasks and possible needs were obtained from a sample of 10 diagnostic radiographers. The 10 radiographers were purposefully selected to represent the target population. They were contacted telephonically in the last week of July 1998. The purpose of the study was explained to them and their participation in this part of the study was requested. A copy of the information given to them can be seen in Appendix E. A mutually convenient appointment time was arranged to conduct a telephonic interview. The appointment time together with the information that would be required from the participants, was faxed to each participant on 31 July 1998. This was done to ensure that each participant understood what was required of him/her, and to ensure that all participants received the same information. A copy of this information is included as Appendix F. The researcher conducted telephonic interviews over the ensuing two weeks of August 1998. The information obtained from the interviews, together with an exhaustive literature search of the prescribed books for the Baccalaureate of Technology Degree (Diagnostic Radiography), the existing syllabi of the same course, and literature available on needs assessment, were used to construct the first draft of the questionnaire. The questionnaire was divided into four parts.

- Part One: Nature of your organisation – questions related to the nature of the organisation and the position of the radiographer within the organisation.
- Part Two: About you – questions on the formal educational and professional background of the respondent.



- Part three: About your continuous professional education activities – details of the individual's involvement in continuing professional development activities over the past two years, reasons for limited participation or non-participation and preferred mode(s) of learning.
- Part four: About your continuing professional education – perceived current and future needs for professional development and priorities of the cited needs.

To increase the reliability and validity of the questionnaire, it was pilot tested during September 1998. Several professionals were used for this part of the study. This included two former heads of diagnostic departments, three current department heads, two lecturers of radiography at the Technikon, four other Technikon lecturers of the Department of Paramedical Sciences, one final-year National Diploma in Radiography student, and four radiotherapy radiographers. All four radiotherapy radiographers had an initial qualification as a diagnostic radiographer. Two had prior experience as qualified radiographers in a diagnostic department. Radiographers used for the pilot study were persons who did not qualify for the final study. Those chosen to participate in the pilot study were contacted telephonically to request their participation. They were given at least two weeks to complete the questionnaire. A letter to explain the purpose of the pilot study, together with a short questionnaire compiled to assess the draft questionnaire, were delivered by hand to each participant (Appendix G). Each participant was also given the draft questionnaire with its accompanying cover letter. Participants were asked to complete the questionnaire as if they were actively practising diagnostic radiography. In addition to this, soliciting criticism from the pilot sample was used to assess item clarity. Analysis of respondent comments indicated that the questionnaire could be both improved and shortened by revising or deleting certain items. Consequently some questions were shortened or deleted. The section on general radiography was shortened and another question was deleted altogether. A copy of the final version of the questionnaire is included as Appendix H.

The survey tool consisted of 12 pages. Questions were designed to provide data to meet the following objectives:

- To gather limited demographic information about the population.
- To determine the extent of CPE programmes attended in the past by Free State diagnostic radiographers.
- To identify possible factors that act as deterrents to CPE participation.
- To identify the perceived education and training needs of diagnostic radiographers from the Free State area.
- To identify appropriate methods of accommodating these, such as preferred methods of instruction for CPE programmes.
- To prioritise the needs of respondents.



Phase 2 was conducted by using a mail-administered questionnaire which was chosen as the main means of data collection. It was decided that this would be the most appropriate survey method in the light of the wide geographical distribution of the target population; the large amount of data that had to be gathered in a relatively short period of time; and the resources available for the research. Response rates with this type of survey are traditionally lower than with, for example, face-to-face interviews. This may have introduced bias into the sample, because non-respondents tend to be different from respondents (Goldstein, 1993:48; De Vaus, 1996:108). To improve response rates, radiographers were told about the prospective study at a radiography forum meeting held on 12 June 1998.

## 2.5 ADMINISTRATION OF THE QUESTIONNAIRE

The mail-administered survey consisted of a first mailing of:

- A single-page cover letter (Appendix I). This explained the purpose of and the need for the research, requested the participation of each radiographer in the study, gave an explanation of Continuous Professional Education, the approximate time needed to complete the questionnaire, as well as why the questionnaire had only been compiled in English. It was also explained to respondents that an identification number was included in the questionnaire to facilitate the sending of follow-up documents. Despite the identification number, respondents were assured that their responses would be treated confidentially and would in no way be traced to individuals once the survey process has been concluded. Instructions as to how and when to post the completed questionnaire were given, together with the telephone number of the researcher. A letterhead of the Technikon Free State was used to indicate the Technikon's support for the study. To personalise the cover letter, the names of respondents and salutations were individually typed. Each cover letter was signed individually.
- An envelope. Envelopes were addressed individually.
- A stamped return envelope. This was pre-addressed to the researcher.

The initial questionnaire was posted on 06 October 1998. A Tuesday was chosen as mail-out date, so that the respondents would receive the questionnaires as soon as possible after the mail-out date (Dillman, 1978:180). Respondents were asked to return questionnaires by 7 November 1998, thereby avoiding mailing close to the December holidays.

A postcard reminder was sent out on 21 October 1998 to all names on the mailing list (Appendix J). These reminders sent out two weeks after the original mail-out date thanked those who had responded and also acted as a courteous reminder to those who had not. The researcher's

telephone number was again included in case someone did not receive a questionnaire or the questionnaire was misplaced. This was also individually signed and addressed.

Replacement questionnaires, together with a shorter cover letter, were sent out four weeks after the original mail-out date on 2 November 1998 (Appendix K). This was sent to those subjects who had not responded to the initial mailing. The cover letter informed non-respondents that their questionnaires had not yet been received and appealed for the return thereof.

The procedure during the third stage was to contact all the x-ray departments with less than a 50% response. This was done telephonically on 24 November 1998. An appeal was made to department heads to encourage radiographers to participate in the study.

## **2.6 DATA PROCESSING AND ANALYSIS**

The questionnaire was designed to facilitate coding for data analysis using SAS. The researcher coded questionnaires. Data typists at the Computer Centre, UOFS, punched in the data. Data were analysed by the Department of Biostatistics, UOFS, after extensive data checking. The results were summarised according to frequencies and percentages or medians, as appropriate. Associations were investigated, using Fisher or chi-squared tests, as appropriate.

In chapter 3 the results of the investigation are reported, while in chapter 4 the results and their implications are discussed.



## **CHAPTER 3**

# **RESEARCH RESULTS**

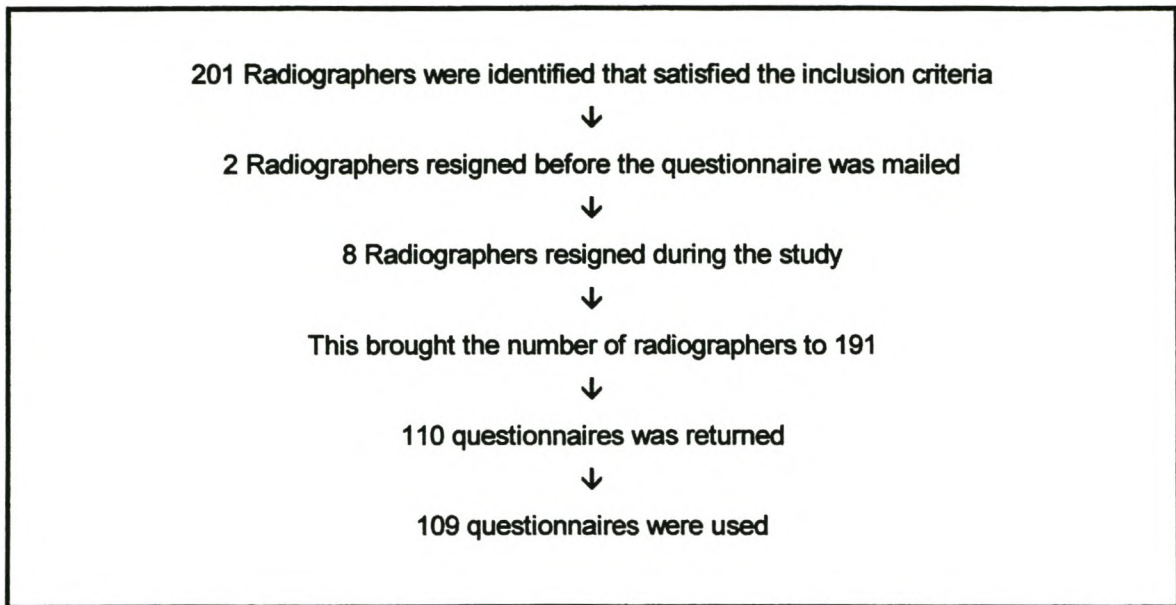
### **3.1 INTRODUCTION**

The needs assessment for diagnostic radiographers in the Free State Province was, as explained in the preceding two chapters, done by means of a mail-administered questionnaire. To obtain the required information, the questionnaire was divided into six main areas: the organisational profile, the participant's position in the organisation, educational and professional background, recent professional development activity, Continuing Professional Education participation constraints, organisational support, and the perceived continuing professional education needs of the respondents.

### **3.2 RESPONSE RATE**

Two hundred and one radiographers were identified that satisfied the inclusion criteria for the target population. Only 199 questionnaires were sent out to 36 x-ray departments. The researcher was aware of two radiographers who had resigned from radiography before the questionnaires were sent out. Eight radiographers resigned during the study. The adjusted sample size was thus 191. Questionnaires returned as undeliverable were immediately mailed again, but this time to the address of the employing institution of these radiographers. Of the 191 questionnaires, 110 were returned (58%). One questionnaire was incomplete and was discarded as invalid. This brought the useable number of questionnaires returned from the 36 x-ray departments to 109 (*Figure 3.1*).

**FIGURE 3.1**  
**FLOW DIAGRAM ACCORDING TO WHICH THE SAMPLE SIZE WAS ADJUSTED**



In the type of survey reported, the possibility of sampling bias had to be considered, because 100% of the questionnaires had not been returned. An unintentional selection process may operate therein that radiographers from Bloemfontein who have better access to CPE are more likely to respond or not to respond. To try to determine if this was so, the response rate was calculated by region. The response rate from rural area radiographers (74.4%) was higher than the 46.0% responses from Bloemfontein radiographers (*Table 3.1*).



**TABLE 3.1**  
**GEOGRAPHICAL DISTRIBUTION OF RADIOGRAPHERS AND THEIR RESPONSES**

Area	Questionnaires mailed	Radiographers who resigned during the study	Questionnaires returned	Response percentage
<b>1. Bloemfontein x-ray departments</b>				
Private practice, employed by radiologists	32	3	17	58.6
Private practice, self- employed	3	0	3	100.0
Government hospitals	76	0	29	38.2
Other	5	0	3	60.0
Total	116	3	52	46.0
<b>2. Rural area x-ray departments</b>				
Private practice, employed by radiologists	18	0	14	77.7
Private practice, self- employed	0	0	0	0.0
Government hospitals	53	4	36	73.4
Other	12	1	8	72.7
Total	83	5	58	74.4

### 3.3 REPORTING OF RESULTS

#### 3.3.1 Demographic data

The demographic data of respondents are reported here. Adjustments were made and this part of the reporting does not correlate with the sequence on the questionnaire. The ages of respondents ranged from 22 years to 72 years (*Table 3.2*). The mean age of the 109 respondents was 35.8 and the median was 34 years.

**TABLE 3.2**  
**AGE DISTRIBUTION OF RESPONDENTS (n=109)**

Age	Frequency	Percentage
Younger than 30 years	36	33.0
30-39 years	36	33.1
40-49 years	29	26.1
50-60 years	7	6.4
Older than 60 years	1	0.9

As expected, the majority of respondents were females (82.6%) with only 17.4% male.

### 3.3.2 Organisational profile

Participants were asked to give some background information concerning the nature, type and size of the organisation where they were employed. This data were necessary to glean a picture of the employing bodies. Of the respondents surveyed, 59.2% came from government sponsored organisations (*Table 3.3*).

**TABLE 3.3**  
**TYPE OF ORGANISATION (n=108)**

Type of organisation	Frequency	Percentage
Tertiary government hospital	21	19.4
Regional government hospital	24	22.2
District government hospital	18	16.7
Private practice, employed by radiologist	31	28.7
Private practice, self-employed	4	3.7
Mine hospitals	8	7.4
Municipal clinic	1	0.9
Medicross	1	0.9

Most participants came from small x-ray departments (*Table 3.4*). Almost 70% were from x-ray departments that employed less than 10 radiographers. The median size of x-ray departments was 6 radiographers. All radiographers may not have interpreted the term "department" the



same. It seems as if some radiographers regarded “department” as a section of the whole x-ray department.

**TABLE 3.4**  
**NUMBER OF RADIOGRAPHERS EMPLOYED BY X-RAY DEPARTMENTS (n=104)**

Radiographers employed	Frequency	Percentage
1 Radiographer	15	14.4
2-4 Radiographers	22	21.2
5-10 Radiographers	35	33.6
11-20 Radiographers	13	12.5
21-40 Radiographers	19	18.3

### 3.3.3 The participant's position in the organisation

The questionnaire contained a cluster of questions (Questions 3, 4, 5, 6 and 7) aimed at giving some indicators of the participant's position and responsibilities within the organisation.

Responses to the question concerning the title of the respondent's present position (*Table 3.5*) indicated that most (36.8%) respondents were employed as radiographers, 33.0% as senior radiographers, although a relatively large number were employed in the higher ranks, with 28.3% as chief radiographers.

**TABLE 3.5**  
**TITLE OF PRESENT POSITION (n=106)**

Title	Frequency	Percentage
Radiographer	39	36.8
Senior Radiographer	35	33.0
Chief Radiographer	30	28.3
Assistant Director	1	0.9
Other	1	0.9

Responses in *Table 3.6* showed that the majority of respondents were relatively new appointees to their current positions. Nearly three quarters (70.1%) of respondents had been employed in

their current position for less than 5 years. Only 7.5% had been in their current position for more than ten years. One respondent had filled his/her present position for 23 years. The median was 3 years.

**TABLE 3.6**  
**YEARS EMPLOYED IN PRESENT POSITION (n=107)**

Years in present position	Frequency	Percentage
Less than 2 years	29	27.1
2-4 years	46	43
5-7 years	13	12.1
8-10 years	11	10.3
11-15 years	3	2.8
16-20 years	4	3.8
Over 20 years	1	0.9

Participants were asked to indicate their level of formal responsibility within the department's structure on a scale from 1(lower) to 5 (upper). The purpose of this was to justify the perceived continuing development needs of respondents. It should be kept in mind that responses to this question were subjective, because radiographers' perceptions were asked. From *Table 3.7* it can be seen that 30.2% respondents regarded their formal level of responsibility in the organisation to be in the middle level, 25.5% to be in the upper middle and 32.1% indicated a senior level of responsibility within the department.

**TABLE 3.7**  
**FORMAL LEVEL OF RESPONSIBILITY WITHIN THE DEPARTMENT STRUCTURE (n=106)**

Formal level of responsibility	Frequency	Percentage
Category 1 (Lower level)	1	0.9
Category 2 (Lower middle level)	12	11.3
Category 3 (Middle level)	32	30.2
Category 4 (Upper middle level)	27	25.5
Category 5 (Upper level)	34	32.1



The overwhelming majority of radiographers surveyed (73.3%) supervised other members of staff. Of these, 58.1% supervised 1-10 professionals (*Table 3.8*), and 71.6% supervised 1-10 non-professionals (*Table 3.8*). The median for both professionals and non-professionals supervised was 2.

**TABLE 3.8**  
**NUMBER OF STAFF SUPERVISED BY THOSE RESPONDENTS WHO SUPERVISE OTHER STAFF**

Professional staff supervised (n=74)	Frequency	Percentage
0	22	29.7
1-5	36	48.7
6-10	7	9.4
11-20	3	4.1
21-30	3	4.0
Over 30	3	4.1
<hr/>		
Non-professional staff supervised (n=74)	Frequency	Percentage
0	16	21.6
1-5	45	60.8
6-10	8	10.8
11-20	4	5.4
Over 20	1	1.4

To elicit further information on the level and status of the respondents in the organisation, they were asked to indicate their gross salary per year. Given the sensitive nature of the question, respondents were given the option of not responding. Fifty-six respondents (51.3%) took this option. The percentage of 48.6%, who responded, is not sufficient to make any conclusions. Salaries indicated ranged from R34830.00 to R 120 000.00 per year. The median gross salary was R59307.00.

When asked to indicate how many patients were seen per day in each department, responses ranged from 3 to 350 patients per day. The median was 60 patients per day. The median number of patients each radiographer saw per day was obtained by using the information gathered with questions 2 and 9. Question 2 asked respondents to indicate approximately how

many radiographers their departments employs and question 9 asked respondents how many patients on average their departments saw per day. The results are given in *Table 3.9*. The median was 10 patients per day. Again the problem with the interpretation of the term “department” may have influenced the results.

**TABLE 3.9**  
**NUMBER OF PATIENTS PER RADIOGRAPHER PER DAY (n=99)**

Number of patients per day	Frequency	Percentage
Less than 5	12	12.1
5-10	41	41.4
11-20	36	36.4
21-30	7	7.1
More than 30	3	3

The majority (86.1%) of respondents indicated that their departments followed set protocols. Of the 36 departments it was clear that 25 (69.4%) follow set protocols, 8 (22.2%) do not and in 3 (8.3%) cases the respondents gave contradictory answers. Of those who indicated that they follow set protocols, 90.2% indicated that new staff are adequately trained in these department protocols (n=92).

An overwhelming majority (95.3%) indicated that there was not a high staff turnover in their departments (n=107). Of the 36 departments, 32 (89%) did not have a high staff turnover, in 3 (8.3%) departments respondents gave contradictory answers, and in 1 (2.7%) department no answer was given.

Nearly seventy percent (68.8%) of respondents indicated that no person acted as mentor to newcomers (n=109). Of the 31.2% (34) who indicated that there were persons who acted as mentors to newcomers, 58.8% indicated that the same person did not always act as mentor to newcomers. Three quarters (75%) indicated that mentors did not receive some form of relief from other duties (n=32). When this information was compared per department, contradictory information was obtained, for example, at one large hospital 10 respondents responded with a “yes” to question 13, and 6 responded with a “no”.

Respondents were asked to indicate whether they performed radiographic services in more than one hospital or clinic. Many respondents misinterpreted this question. It seems that they



indicated rotation through their department as performing radiographic services in more than one clinic. For this reason, results obtained with question 16 are invalid and will not be reported.

### 3.3.4 Educational and professional background

This part of the questionnaire focussed on participants' educational and professional backgrounds. Questions 17-21 sought information on qualifications attained, current studies and membership of professional associations.

More than one category could be marked at the question that sought information on the educational qualifications of respondents. Nearly a third (26.2%) of respondents indicated that they were in possession of a 2-year Radiography Diploma (*Table 3.10*). The majority of respondents were in possession of a 3-year Technikon Diploma (44.9%) and 31.8% indicated a Baccalaureate Radiography. No respondents indicated a Master's or Doctorate degree. Most of the other responses included qualifications in other radiography categories such as nuclear medicine and radiotherapy. Very few respondents indicated the year in which the qualification had been obtained. For this reason results obtained from this part of question 17, will not be reported.

**TABLE 3.10**  
**TERTIARY QUALIFICATIONS OF RESPONDENTS (n=107)**

Tertiary qualification	Frequency	Percentage
Radiography Diploma (2 years)	28	26.2
National Diploma: Radiography (3 years)	48	44.9
Diploma in Tertiary Education	1	0.9
B. Radiography Degree (3 years)	34	31.8
B. Tech. Degree Radiography (4 year)	0	0
National Higher Diploma: Radiography	4	3.7
Honors Degree	6	5.6
Master's Degree	0	0
Doctoral Degree	0	0
Other Radiography categories	4	3.7
Other	3	2.8

At the time of the study, 13.2% of respondents were engaged in studies towards gaining a further tertiary qualification. Of the 14 respondents who indicated that they were engaged in further

studies, 35.7% were busy with a B. Tech degree, and 64.2% were busy with another level of qualification. This included 4 baccalaureate degrees, 2 national diplomas, 1 honors degree, 1 certificate course and 1 unknown response. When asked to identify the field of qualification, only 35.7% were involved in studying for a radiography qualification. Three respondents identified the fields of study as human resource development, 2 as business administration, 2 as B. Com. degrees, 1 as accounting, and 1 as a B. Sc. degree.

To elicit information on the respondents' involvement with a professional association, respondents were asked to indicate whether they currently were a member of any radiography association. More than one category could be marked. More than half of the respondents (52.4%) indicated that they were not a member of any radiography association (*Table 3.11*). Speculations are that NASAR in the meantime was dissolved. No definite information regarding this is available at the moment. However, if this is true, an even higher non-membership number may be expected.

**TABLE 3.11**  
**INVOLVEMENT WITH A RADIOGRAPHY ASSOCIATION (n=103)**

Professional involvement	Frequency	Percentage
SOR	39	37.9
NASAR	7	6.8
ISRRT	3	2.8
Cardiology Society	3	2.9
Other	2	1.9
None	54	52.4

### 3.3.5 Recent Continuous Professional Education activity

Part three of the questionnaire sought information concerning the professional development activities of respondents over the preceding two years.

When asked to indicate if they were aware of CPE before receiving the questionnaire, 68.8% of respondents indicated that they were aware of CPE for radiographers. It is gratifying to see that 100% of the respondents felt that CPE was important. As seen in *Table 3.12*, 62.6% of respondents felt that CPE participation should be compulsory. One respondent marked both the "yes" and "no" answer.



The overwhelming majority of respondents (78.9%) indicated that they would prefer to participate in CPE activities both on their own and in groups (*Table 3.12*).

Respondents preferred both formal and non-formal CPE activities (40.4%) to either formal or non-formal (*Table 3.12*) activities alone.

**TABLE 3.12**  
**CONTINUOUS PROFESSIONAL EDUCATION PARTICIPATION**

Compulsory CPE participation (n=107)	Frequency	Percentage
Yes	67	62.6
No	39	36.4
Yes and No	1	0.9
Preferred CPE participation method (n=109)	Frequency	Percentage
On your own	8	7.3
In groups	14	12.8
Both	86	78.9
None	1	0.9
Preferred format of CPE activities (n=109)	Frequency	Percentage
Formal	26	23.9
Non-formal	36	33
Both	44	40.4
None	3	2.8

Sixty-four (61%) of the 105 respondents had attended workshops, conferences or seminars over the past two years.

When asked to indicate who had paid for these activities, more than half (57.1%) of the participants indicated that they had paid for themselves (*Table 3.13*). More than one category could be marked.

**TABLE 3.13**  
**PAYMENT FOR CONTINUOUS PROFESSIONAL EDUCATION (n=63)**

Payment for activities	Frequency	Percentage
Self	36	57.1
Organisation	25	39.7
Society of radiographers	5	7.9
X-ray and medical companies	10	15.9
Other	2	3.2

Of those who had attended CPE, the largest percentage of respondents (41.3%) indicated that they had attended only 1 activity such as a workshop, conference or seminar in the preceding two years (*Table 3.14*). The median was 2 activities.

**TABLE 3.14**  
**NUMBER OF ACTIVITIES ATTENDED OVER THE PAST TWO YEARS (n=63)**

Number of activities attended	Frequency	Percentage
1 activity	26	41.3
2 activities	19	30.1
3 activities	10	15.9
4 – 5 activities	5	7.9
More than 5	3	4.8

Expenditure on CPE activities was rather low. Most of the participants (40%) indicated that only up to R200.00 was spent on these activities by themselves or their organisations (*Table 3.15*). Unfortunately the scales used at this question were misleading. Respondents could indicate R1000.00 or R2000.00 in more than one category. For this reason, information in the middle area can be misleading.



**TABLE 3.15**  
**EXPENDITURE ON CONTINUOUS PROFESSIONAL EDUCATION OVER THE PAST TWO**  
**YEARS (n=60)**

Expenditure on CPE	Frequency	Percentage
None	5	8.3
Less than R200.00	24	40
R200.00-R1000.00	17	28.3
R1000.00-R2000.00	8	13.3
R2000.00-R4000.00	3	5.0
More than R4000.00	3	5.0

### 3.3.6 Continuous Professional Education participation constraints

Some people find it difficult to participate in activities for a variety of reasons. Respondents were asked to rate each of the 24 factors listed in question 33 of the questionnaire, as 'major constraint', 'minor constraint' or 'no constraint' to their involvement in CPE activities.

*Table 3.16* summarises responses obtained with this question. Two respondents indicated other at four and five, although "other" was not given as an option to them. Missing responses were of such a nature that the true response of the respondents could not be deduced. The sample size varies between 99 and 107. Nine factors were chosen by more than three-quarters of respondents as a major or minor constraint. These were a lack of time after-hours to attend courses, no time release from work to attend courses, after-hour duties, payment of fees / expenses, professional workload, staff shortages, lack of back-up staff, difficulty in obtaining leave and not always being aware of programmes provided. Six factors were more significant than the other nine as they were chosen by more than 85% of the respondents. They included lack of time after-hours (89.7%), no time release from work (85.6%), after-hour duties (90.5%), staff shortages (87.6%) and lack of back-up staff (89.5%), and not always being aware of programmes provided (92.4%).

Between 50 – 75% of respondents chose the following as major or minor constraints:

- time of CPE activities is not suitable (63.7%)
- duration / too long (52.4%)
- venue / location unsuitable (61.2%)
- lack of suitable courses (64.1%)
- lack of reward / incentives (65.4%)
- dangerous to travel long distances (58.1%)
- other responsibilities (54.5%)

Employer not interested in CPE, lack of motivation – no need, lack of transport, not used to study anymore, lack of day care facilities for children, single parent, lack of confidence in organisation providing the training and language in which the activities are presented, were negligible sources of constraint for course attendance by most of the sample.



**TABLE 3.16**  
**RATING OF CONSTRAINING FACTORS**

Possible constraining factors	n	Major constraint	Minor constraint	No constraint
1. Lack of time after-hours	107	45.8	43.9	10.3
2. No time release from work	104	43.3	42.3	14.4
3. After-hour duties	105	53.3	37.1	9.5
4. Time of CPE activities is not suitable	102	17.6	46.1	35.3
5. Duration / Too long	103	9.7	42.7	46.6
6. Venue / Location unsuitable	103	17.5	43.7	38.8
7. Payment of fees / expenses	105	33.3	48.6	18.1
8. Professional workload	103	35.9	46.6	17.5
9. Staff shortages	105	68.6	19.0	12.4
10. Lack of back-up staff	105	74.3	15.2	10.5
11. Difficult to obtain leave	105	35.2	41.9	22.9
12. Employer is not interested in CPE	101	12.9	23.8	63.4
13. Lack of suitable courses	103	37.9	26.2	35.9
14. Lack of rewards / incentives	104	35.6	29.8	34.6
15. Lack of motivation – no need	99	18.2	26.3	55.6
16. Dangerous to travel long distances	105	29.5	28.6	41.9
17. Lack of transport	105	13.3	33.3	53.3
18. Not always aware of programmes provided	105	56.2	36.2	7.6
19. Not used to study anymore	105	14.3	30.5	55.2
20. Lack of day care facilities for children	104	12.5	17.3	70.2
21. Single parent	104	1.9	2.9	95.2
22. Other responsibilities	101	12.9	41.6	45.5
23. Lack of confidence in organisation providing the training	102	4.9	16.7	78.4
24. Language in which activities are presented	104	7.7	21.2	71.2

The association between the attendance of workshops, conferences or seminars over the last two years, and the constraints to CPE participation were investigated (*Table 3.17*).

Close to statistical significant differences was obtained between those who attended workshops over the previous two years and those who did not, with payment of fees / expenses (major constraint for 48.7% of non-attendants compared to the 12.7% attendants; p-value: 0.054); staff

shortages (major constraint for 76.9% non-attendants compared to the 63.5% attendants; p-value: 0.052); lack of back-up staff (major constraint for 84.6% non-attendants compared to 66.7% attendants; p-value: 0.062); not always aware of programmes provided (major constraint for 71.1% of non-attendants compared to the 48.4% of attendants; p-value: 0.083) and language in which activities is presented (major constraint for 12.7% of attendants compared to no non-attendants; p-value: 0.050).

Other non-significant tendencies were obtained, and will be listed with major constraint mentioned first. These were: lack of time released from work (major constraint for 52.6% non-attendants compared to the 38.1% attendants), duration of courses too long (major constraint for 15.8% non-attendants compared to the 4.8% attendants), unsuitable venue or location (major constraint for 27.0% non-attendants compared to the 12.7% attendants), difficulty to obtain leave (major constraint for 43.6% non-attendants compared to the 30.2% attendants), employer not interested in CPE (major constraint for 16.1% attendants compared to the 8.3% non-attendants), lack of suitable courses (major constraint for 44.4% attendants compared to the 27.0% non-attendants), danger in travelling long distances (major constraint for 38.5% non-attendants compared to the 25.4% attendants), not used to study anymore (major constraint for 17.5% attendants compared to the 7.7% non-attendants), lack of day care facilities (minor constraint for 23.7% non-attendants compared to the 12.7% attendants) and lack of confidence in the organisation providing the training (major constraint for 8.1% attendants compared to no non-attendants).



**TABLE 3.17**  
**ASSOCIATION BETWEEN RECENT CONTINUOUS PROFESSIONAL EDUCATION**  
**ATTENDANCE AND CONSTRAINING FACTORS**

Constraining factors	Recent CPE Participation	Major constraint	Minor constraint	No constraint	p-value chi-square
1. Lack of time after hours	Attendants (63)	44.44	44.44	11.11	0.951
	Non-attendants (40)	47.50	42.50	10.00	
2. No time release from work	Attendants (63)	38.10	46.03	15.87	0.348
	Non-attendants (38)	52.63	36.84	10.53	
3. After hour duties	Attendants (63)	52.38	36.51	11.11	0.834
	Non-attendants (39)	56.41	35.90	7.69	
4. Time of CPE activities is not suitable	Attendants (62)	17.74	48.39	32.26	0.908*
	Non-attendants (37)	16.22	45.95	37.84	
5. Duration / Too long	Attendants (62)	4.84	46.77	46.77	0.219*
	Non-attendants (38)	15.79	36.84	47.37	
6. Venue / Location unsuitable	Attendants (63)	12.70	47.62	39.68	0.172
	Non-attendants (37)	27.03	35.14	37.84	
7. Payment of fees / expenses	Attendants (63)	25.40	53.97	20.63	0.054
	Non-attendants (39)	48.72	35.90	15.38	
8. Professional workload	Attendants (63)	36.51	47.62	15.87	0.705
	Non-attendants (37)	37.84	40.54	21.62	
9. Staff shortages	Attendants (63)	63.49	26.98	9.52	0.052
	Non-attendants (39)	76.92	7.69	15.38	
10. Lack of back up staff	Attendants (63)	66.67	22.22	11.11	0.062
	Non-attendants (39)	84.62	5.13	10.26	
11. Difficult to obtain leave	Attendants (63)	30.16	47.62	22.22	0.300
	Non-attendants (39)	43.59	33.33	23.08	
12. Employer is not interested in CPE	Attendants (62)	16.13	22.58	61.29	0.548
	Non-attendants (36)	8.33	25.00	66.67	
13. Lack of suitable courses	Attendants (63)	44.44	25.40	30.16	0.206
	Non attendants (37)	27.03	29.73	43.24	
14. Lack of reward / incentives	Attendants (64)	37.50	29.69	32.81	0.876
	Non-attendants (37)	32.43	32.43	35.14	
15. Lack of motivation – no need	Attendants (61)	19.67	27.87	52.46	0.771
	Non-attendants (35)	17.14	22.86	60.00	

\* Fisher's exact test



**TABLE 3.17**  
**ASSOCIATION BETWEEN RECENT CONTINUOUS PROFESSIONAL EDUCATION**  
**ATTENDANCE AND CONSTRAINING FACTORS (Continued)**

Constraining factors	Recent CPE Participation	Major constraint	Minor constraint	No constraint	p-value chi-square
16. Dangerous to travel long distances	Attendants (63) Non-attendants (39)	25.40 38.46	30.16 25.64	44.44 35.90	0.377
17. Lack of transport	Attendants (63) Non-attendants (39)	11.11 17.95	34.92 30.77	53.97 51.28	0.613
18. Not always aware of programmes provided	Attendants (64) Non-attendants (38)	48.44 71.05	42.19 23.68	9.38 5.26	0.083
19. Not used to study anymore	Attendants (63) Non-attendants (39)	17.46 7.69	26.98 35.90	55.56 56.41	0.351
20. Lack of day care facilities for children	Attendants (63) Non-attendants (38)	11.11 15.79	12.70 23.68	76.19 60.53	0.231
21. Single parent	Attendants (63) Non-attendants (38)	1.59 2.63	3.17 2.63	95.24 94.74	1.000*
22. Other responsibilities	Attendants (62) Non-attendants (36)	14.52 11.11	43.55 38.89	41.94 50.00	0.724
23. Lack of confidence in organisation providing the training	Attendants (62) Non-attendants (37)	8.06 0.00	12.90 21.62	79.03 78.38	0.147*
24. Language in which activities is presented	Attendants (63) Non-attendants (38)	12.70 0.00	22.22 21.05	65.08 78.95	0.050*

\* Fisher's exact test

### 3.3.7 Organisational support

Sixty-two (58.5%) of 106 respondents indicated that their organisation did not offer any planned in-service training for radiographers. The information was not analysed by department, because radiographers working in different sections of an x-ray department may not receive the same in-service training. Of the 44 who indicated that sessions were provided, 43 gave an indication whether any of these sessions were provided over the past two years. Forty-two (97.7%) indicated that such sessions were provided over the past two years.



Respondents indicated that the frequency with which these sessions were provided was mostly on a monthly basis (*Table 3.18*). Four respondents listed the following as other options: 2-weekly; only when new equipment is installed; once a year; it used to be monthly. The other 8 respondents did not specify, what they meant by “other”.

**TABLE 3.18**  
**FREQUENCY WITH WHICH SESSIONS WERE PROVIDED (n=41)**

Session frequency	Frequency	Percentage
Weekly	8	19.5
Monthly	16	39.0
Quarterly	5	12.2
Other	12	29.3

Only 31 respondents gave an indication of the topics of the activities provided over the last six months. Twenty-six topics were listed in this area. The two main topics addressed were theatre procedures and chest x-rays. A summary of the topics listed by more than 1 respondent can be seen in *Table 3.19*. The following topics were listed by 1 respondent only: New radiographic positions; Role of radiographers; Tutor workshops; Abdominal x-rays; Film evaluations; Vascular Angiography; Congress; Radiographic Contrast Media; Administration of the x-ray department; Abnormalities of the lower limb; Patient care and improving the quality of radiographer performance; Minimising patient dosage; Labour relations; Almost everything concerning radiography. More than one topic could be mentioned.

**TABLE 3.19**  
**CONTINUOUS PROFESSIONAL EDUCATION TOPICS PROVIDED DURING THE PAST SIX**  
**MONTHS (n=31)**

CPE topics provided	Frequency	Percentage
Theatre procedures	8	26
Chest x-rays	8	26
Skull x-rays	7	23
Pattern recognition of the chest	6	19
Cardiopulmonary resuscitation	5	16
Mammography	4	13
Pattern recognition of the abdomen	4	13
Reject film analysis	4	13
Pattern recognition of the skull	3	10
Pattern recognition	2	6
Pattern recognition of cervical vertebrae	2	6

Only 38.8% of the respondents (n=103) indicated that they had adequate channels at their departments to express their professional learning needs.

Respondents were asked to indicate if they rotated through their departments. Nearly three quarters (73.8%) of the 107 respondents indicated that they rotated through their departments. Of them, 64.5% said that they worked in all areas.

### **3.3.8 Perceived topic areas of need for Continuous Professional Education**

One of the main purposes of this study was to identify specific topic areas of need for the provision of continuing education.

Participants were asked their views on both needs related to their present jobs, and those that they felt important to their own future professional development. Need was defined as 'a discrepancy between current level of performance and desired level of performance'. Respondents were not asked directly if they would use a specific skill or topic in future, but they were rather asked to indicate this by expressing their level of need regarding a specific topic or skill for their future development. Therefore it was discouraging to see that all respondents did not always give an indication of their level of need for the category future level of need.



To determine the perceived needs, the questionnaire was divided into 10 sections, namely: General Radiography; Screening Examinations; Specialised Radiography; Patient Care; Image Recording; Radiation Protection; New Developments in Radiography; Management Skills; Computer Skills. The section on Image Recording was sub-divided into 6 areas, namely Exposure Selection Skills, Effective Use of Ancillary Equipment, Radiographic Processing, Analysing the Image, Quality Assurance in Diagnostic Radiography, and Equipment. With each area identified, participants were asked to indicate whether they “presently use / do the following”. Following this, they were asked to indicate if they experienced a High (H), Medium (M), Low (L) level of need, or No (N) need for assistance in their present position. Respondents were also asked to indicate their level of need regarding their future development, using the same scale.

The number of subjects displayed in subsequent tables varied, because some respondents did not complete all survey questions. It should also be noted that not all respondents gave an indication of their future level of need as was expected by the researcher. Therefore a 100% response rate was not obtained in each case.

From *Table 3.20.1* it can be seen that most respondents currently perform general radiography. For each of the listed areas, less than 10% of respondents do not currently use it.

**TABLE 3.20.1**  
**CURRENT USAGE OF GENERAL RADIOGRAPHY**

General radiography	n	Currently uses	Currently not using
1. Extremities	109	94.5	5.5
2. Chest	109	95.4	4.6
3. Bony Thorax	109	91.7	8.3
4. Abdomen	109	93.6	6.4
5. Skull	109	93.6	6.4
6. Vertebrae	109	93.6	6.4

Respondents' current level of need regarding any one of the six areas listed under extremities was low (*Table 3.20.2*). As pattern recognition is a relatively new area of responsibility given to radiographers, it is surprising to see that only 16.8% of respondents had a high-level of need regarding pattern recognition of extremities.

**TABLE 3.20.2**  
**CURRENT LEVEL OF NEED REGARDING RADIOGRAPHY OF EXTREMITIES**

Extremities	n	High	Med	Low	None
1. Positioning	103	5.8	2.9	19.4	71.8
2. Exposure selection	103	6.8	3.9	22.3	67.0
3. Image evaluation	102	9.8	7.8	25.5	56.9
4. Recognition of anatomy	103	7.8	11.7	20.4	60.2
5. Pattern recognition	95	16.8	15.8	25.3	42.1
6. Additional views	101	9.9	13.9	26.7	49.5

Respondents' current level of need regarding any one of the six areas under chest radiography were low, with pattern recognition having the highest percentage high level of need at 22.9% (Table 3.20.3).

**TABLE 3.20.3**  
**CURRENT LEVEL OF NEED REGARDING RADIOGRAPHY OF THE CHEST**

Chest	n	High	Med	Low	None
1. Positioning	104	7.7	4.8	11.5	76.0
2. Exposure selection	104	8.7	4.8	16.3	70.2
3. Image evaluation	103	12.6	18.4	21.4	47.6
4. Recognition of anatomy	104	11.5	16.3	20.2	51.9
5. Pattern recognition	96	22.9	32.3	13.5	31.3
6. Additional views	102	8.8	14.7	29.4	47.1

More than 50% of respondents had a low level of need or no need regarding the six areas listed under the section on radiography of the bony thorax (Table 3.20.4). Pattern recognition was chosen by the highest percentage of respondents as a high level of need at 19.6%.



**TABLE 3.20.4**  
**CURRENT LEVEL OF NEED REGARDING RADIOGRAPHY OF THE BONY THORAX**

Bony Thorax	n	High	Med	Low	None
1. Positioning	100	6.0	8.0	17.0	69.0
2. Exposure selection	99	6.1	13.1	21.2	59.6
3. Image evaluation	100	12.0	16.0	24.0	48.0
4. Recognition of anatomy	100	8.0	17.0	16.0	59.0
5. Pattern recognition	92	19.6	26.1	16.3	38.0
6. Additional views	98	12.2	17.3	23.5	46.9

More than half of the respondents indicated that they either had a low level of need or no need at all regarding radiography of the abdomen (Table 3.20.5). Pattern recognition was the highest percentage scoring high level of need at 22.3%.

**TABLE 3.20.5**  
**CURRENT LEVEL OF NEED REGARDING RADIOGRAPHY OF THE ABDOMEN**

Abdomen	n	High	Med	Low	None
1. Positioning	102	4.9	2.9	16.7	75.5
2. Exposure selection	102	6.9	5.9	23.5	63.7
3. Image evaluation	102	10.8	17.6	25.5	46.1
4. Recognition of anatomy	102	10.8	18.6	22.5	48.0
5. Pattern recognition	94	22.3	27.7	19.1	30.9
6. Additional views	99	12.1	15.2	27.3	45.5

Although the percentage of respondents with a low level of need or no need was again high for all six areas of skull radiography, the percentage of respondents with a high level of need regarding pattern recognition of the skull and additional views of the skull was higher than any one of the same areas of the other sections on general radiography (Table 3.20.6). It was respectively 24.5% and 16%.

**TABLE 3.20.6**  
**CURRENT LEVEL OF NEED REGARDING RADIOGRAPHY OF THE SKULL**

Skull	n	High	Med	Low	None
1. Positioning	101	6.9	8.9	26.7	57.4
2. Exposure selection	102	7.8	5.9	25.5	60.8
3. Image evaluation	102	12.7	25.5	23.5	38.2
4. Recognition of anatomy	102	14.7	24.5	20.6	40.2
5. Pattern recognition	94	24.5	29.8	19.1	26.6
6. Additional views	100	16.0	24.0	27.0	33.0

In *Table 3.20.7* pattern recognition was the area with the highest percentage of high level of need for radiography of the vertebrae (23.4%).

**TABLE 3.20.7**  
**CURRENT LEVEL OF NEED REGARDING RADIOGRAPHY OF THE VERTEBRAE**

Vertebrae	n	High	Med	Low	None
1. Positioning	102	5.9	3.9	22.5	67.6
2. Exposure selection	102	5.9	6.9	26.5	60.8
3. Image evaluation	102	12.7	13.7	30.4	43.1
4. Recognition of anatomy	102	14.7	12.7	26.5	46.1
5. Pattern recognition	94	23.4	27.7	22.3	26.6
6. Additional views	100	13.0	14.0	31.0	42.0

From *Table 3.21.1* it can be seen that all respondents perform screening examinations to some extent. Screening examinations of the urinary system and that of the gastro-intestinal system were performed most often at 67.3% and 64.8%.

Compared to the other examinations, many respondents did not perform screening examinations of the cardiovascular system, but it was also this area where the highest percentage was indicated for high level of need to assist in participants' present position (26,9%).



**TABLE 3.21.1**  
**CURRENT LEVEL OF NEED REGARDING SCREENING EXAMINATIONS**

Screening Examinations	Do you presently use / do the following			Level of need to assist in your present position				
	n	Yes	No	n	High	Med	Low	None
1. Gastro-intestinal system	108	64.8	35.2	67	10.4	11.9	35.8	41.8
2. Biliary Tract	108	56.5	43.5	58	8.6	17.2	25.9	48.3
3. Central nervous system	107	40.2	59.8	42	4.8	26.2	33.3	35.7
4. Respiratory system	107	34.6	65.4	33	6.1	15.2	30.3	48.5
5. Cardiovascular system	107	27.1	72.9	26	26.9	19.2	15.4	38.5
6. Urinary system	107	67.3	32.7	68	7.4	17.6	27.9	47.1
7. Arthrography	107	29.9	70.1	32	6.3	12.5	34.4	46.9
8. Reproductive system	108	59.3	40.7	62	9.7	17.7	32.3	40.3
9. Salivary glands	108	58.3	41.7	60	8.3	20.0	33.3	38.3
10. Lachrymal system	102	36.3	63.7	37	8.1	21.6	37.8	32.4

Cardiovascular screening was also indicated by almost half of the respondents as a high level of need for the future development (*Table 3.21.2*). Not all respondents gave an indication of their future need. The response sample size varied between 81 to 91.

**TABLE 3.21.2**  
**FUTURE LEVEL OF NEED REGARDING SCREENING EXAMINATIONS**

Screening examinations	n	High	Med	Low	None
1. Gastro-intestinal system	91	22.0	24.2	20.9	33.0
2. Biliary tract	88	23.9	22.7	19.3	34.1
3. Central nervous system	84	33.3	19.0	20.2	27.4
4. Respiratory system	81	34.6	19.8	18.5	27.2
5. Cardiovascular system	81	46.9	21.0	11.1	21.0
6. Urinary system	91	22.0	25.3	17.6	35.2
7. Arthrography	79	36.7	21.5	12.7	29.1
8. Reproductive system	89	21.3	24.7	23.6	30.3
9. Salivary glands	91	26.4	24.2	18.7	30.8
10. Lachrymal system	83	31.3	19.3	19.3	30.1

*Table 3.22.1* lists the data for the present usage of Specialised Radiography and also the current level of need concerning it. From this table it can be seen that participants performed most of the specialised examination to some extent with forensic radiography done less often at 3.9%. The examinations performed most often were Pediatric Radiography (81.5%) and Trauma Radiography (80.6%). The highest percentage of respondents indicated Basic Ultrasound (53.6%), followed by Advanced Ultrasound (45.5%), in this section as a high level of need for their current development. More than one quarter of respondents also indicated a high level of need regarding Spiral Computer Tomography (32.1%), Basic Computer Tomography (31.8%), Vascular Interventional Procedures (29.4%), Advanced Computer Tomography (26.7%), Digital Radiography (26.3%) and Mammography (25.8%).



**TABLE 3.22.1**  
**CURRENT LEVEL OF NEED REGARDING SPECIALISED RADIOGRAPHY**

Specialised Radiography	Do you presently use / do the following			Level of need to assist in your present position				
	n	Yes	No	n	High	Med	Low	None
1. Mammography	108	29.6	70.4	31	25.8	32.3	32.3	9.7
2. Tomography	108	65.7	34.3	69	11.6	26.1	30.4	31.9
3. Bone Density Scanning	106	14.2	85.8	14	14.3	21.4	28.6	35.7
4. Theatre Radiography	108	68.5	31.5	71	7.0	14.1	38.0	40.8
5. Ward Radiography	108	74.1	25.9	77	6.5	10.4	32.5	50.6
6. Trauma Radiography	108	80.6	19.4	80	16.3	23.8	26.3	33.8
7. Pediatric Radiography	108	81.5	18.5	81	14.8	17.3	34.6	33.3
8. Dental Radiography	108	23.1	76.9	21	9.5	19.0	42.9	28.6
9.1 Vascular Interventional Procedures e.g. embolisation, angiography	106	17.9	82.1	17	29.4	41.2	17.6	11.8
9.2 Non-vascular Interventional Procedures e.g. percutaneous puncture, percutaneous drainage procedures	106	28.3	71.7	28	7.1	50.0	21.4	21.4
10.1 Magnetic Resonance Imaging (Basic)	108	15.7	84.3	17	23.5	17.6	29.4	29.4
10.2 Magnetic Resonance Imaging (Advanced)	107	14.0	86.0	15	20.0	33.3	40.0	6.7
11.1 Computer Tomography (Basic)	108	41.7	58.3	44	31.8	27.3	18.2	22.7
11.2 Computer Tomography (Advanced)	103	32.0	68.0	30	26.7	33.3	16.7	23.3
11.3 Spiral Computer Tomography	105	27.6	72.4	28	32.1	21.4	17.9	28.6
12.1 Ultrasound (Basic)	106	27.4	72.6	28	53.6	25.0	14.3	7.1
12.2 Ultrasound (Advanced)	104	11.5	88.5	11	45.5	36.4	0.0	18.2
13. Digital Radiography	106	19.8	80.2	19	26.3	26.3	36.8	10.5
14. Forensic Radiography	103	3.9	96.1	4	0.0	25.0	75.0	0.0

Responses to the section on future need for specialised radiography were low. The highest number of responses was obtained with theatre radiography (91). For 11 of the 14 areas of

Specialised Radiography, respondents indicated a high level of need of 50% and higher to assist them in their future position (Table 3.22.2). Most of the participants experienced no need with ward radiography at 49.4%.

**TABLE 3.22.2**  
**FUTURE LEVEL OF NEED REGARDING SPECIALISED RADIOGRAPHY**

Specialised Radiography	n	High	Med	Low	None
1. Mammography	83	51.8	20.5	12.0	15.7
2. Tomography	88	29.5	26.1	17.0	27.3
3. Bone Density Scanning	77	66.2	10.4	5.2	18.2
4. Theatre Radiography	91	20.9	16.5	27.5	35.2
5. Ward Radiography	87	16.1	17.2	17.2	49.4
6. Trauma Radiography	87	27.6	19.5	24.1	28.7
7. Pediatric Radiography	87	25.3	20.7	26.4	27.6
8. Dental Radiography	77	32.5	19.5	13.0	35.1
9.1 Vascular Interventional Procedures, e.g. embolisation, angiography	80	65.0	18.8	7.5	8.8
9.2 Non-vascular Interventional Procedures, e.g. percutaneous puncture, percutaneous drainage procedures	79	48.1	24.1	6.3	21.5
10.1 Magnetic Resonance Imaging (Basic)	81	67.9	4.9	9.9	17.3
10.2 Magnetic Resonance Imaging (Advanced)	78	66.7	7.7	7.7	17.9
11.1 Computer Tomography (Basic)	86	61.6	10.5	14.0	14.0
11.2 Computer Tomography (Advanced)	82	62.2	15.9	12.2	9.8
11.3 Spiral Computer Tomography	82	58.5	14.6	14.6	12.2
12.1 Ultrasound (Basic)	85	68.2	15.3	3.5	12.9
12.2 Ultrasound (Advanced)	78	66.7	14.1	3.8	15.4
13. Digital Radiography	84	66.7	15.5	7.1	10.7
14. Forensic Radiography	73	45.2	15.1	16.4	23.3

*Table 3.23.1* summarises the data on the section: patient care. Cultural diversity training was used or done by the smallest number of participants (24.3%). (This may have been a misleading question. It should have been rephrased to ask if training in cultural diversity was usable in respondents' present position.) All the other areas, except first aid, were being used by more than 50% of respondents. The areas with the highest percentage of high level of need were indicated as cultural diversity training (47.8%) and basic medical Sotho language (43.9%).



**TABLE 3.23.1**  
**CURRENT LEVEL OF NEED REGARDING PATIENT CARE**

Patient Care	Do you presently use / do the following			Level of need to assist in your present position				
	n	Yes	No	n	High	Med	Low	None
1. Communication with the patient	108	99.1	0.9	104	11.5	17.3	19.2	51.9
2. Evaluation of patient physical needs	108	88.0	12.0	92	8.7	22.8	21.7	46.7
3. Dealing with acute situations	107	87.9	12.1	91	23.1	23.1	23.1	30.8
4. Dealing with dying and death	106	59.4	40.6	61	26.2	16.4	32.8	24.6
5. First Aid	107	42.1	57.9	43	32.6	34.9	23.3	9.3
6. Professional and ethical conduct	107	94.4	5.6	97	16.5	19.6	27.8	36.1
7. Legal aspects for the radiographer	106	54.7	45.3	57	31.6	29.8	21.1	17.5
8. Basic medical Sotho language	107	63.6	36.4	66	43.9	28.8	12.1	15.2
9. Cultural diversity training	103	24.3	75.7	23	47.8	17.4	8.7	26.1
10. Medical terminology	107	87.9	12.1	91	20.9	29.7	26.4	23.1
11. Management of the patient with a drip, colostomy, etc.	108	85.2	14.8	90	10.0	27.8	40.0	22.2
12. Management of the Aids patient	107	71.0	29.0	74	24.3	28.4	23.0	24.3
13. Infection control	105	76.2	23.8	78	30.8	28.2	21.8	19.2
14. Safety in the hospital (fire procedures, electrical shock, transfer of the patient, disaster training)	107	57.9	42.1	59	25.4	27.1	25.4	22.0
15. Guidelines for the use of contrast agents	107	72.9	27.1	76	21.1	28.9	27.6	22.4
16. Clinical assessment of the patient	107	77.6	22.4	81	18.5	29.6	34.6	17.3

All respondents did not indicate their future level of need regarding patient care. Responses varied between 78 for cultural diversity training and 97 for communication with the patient. In *Table 3.23.2* most respondents for their future development had a high level of need for basic

medical Sotho language (57.3%) and legal aspects for the radiographer (50.0%). The highest percentage of respondents indicated communication with the patient (44.3%) as a no need topic.

**TABLE 3.23.2**  
**FUTURE LEVEL OF NEED REGARDING PATIENT CARE**

Patient Care	n	High	Med	Low	None
1. Communication with the patient	97	17.5	15.5	22.7	44.3
2. Evaluation of patient physical needs	94	16.0	24.5	21.3	38.3
3. Dealing with acute situations	93	32.3	21.5	22.6	23.7
4. Dealing with dying and death	84	29.8	17.9	32.1	20.2
5. First Aid	86	41.9	31.4	17.4	9.3
6. Professional and ethical conduct	92	19.6	21.7	26.1	32.6
7. Legal aspects for the radiographer	88	50.0	27.3	13.6	9.1
8. Basic medical Sotho language	89	57.3	18.0	10.1	14.6
9. Cultural diversity training	78	41.0	26.9	14.1	17.9
10. Medical terminology	95	25.3	33.7	23.2	17.9
11. Management of the patient with a drip, colostomy, etc.	95	20.0	22.1	35.8	22.1
12. Management of the Aids patient	91	35.2	25.3	20.9	18.7
13. Infection control	90	35.6	30.0	17.8	16.7
14. Safety in the hospital (fire procedures, electrical shock, transfer of the patient, disaster training)	90	40.0	25.6	22.2	12.2
15. Guidelines for the use of contrast agents	91	34.1	25.3	25.3	15.4
16. Clinical assessment of the patient	90	25.6	26.7	32.2	15.6

A high percentage of respondents indicated current use of all four areas listed under exposure selection skills (*Table 3.24.1*). Of all the topics listed under this section, the highest percentage of high level of need was indicated for exposure manipulation and conversion problems (14.1%).



**TABLE 3.24.1**  
**CURRENT LEVEL OF NEED REGARDING EXPOSURE SELECTION SKILLS**

Exposure selection skills	Do you presently use / do the following			Level of need to assist in your present position				
	n	Yes	No	n	High	Med	Low	None
1.1 Influence of exposure factors	102	96.1	3.9	97	11.3	21.6	32.0	35.1
1.2 Radiographic exposure charts e.g. variable kVp technique, fixed kVp technique	109	81.7	18.3	87	10.3	21.8	34.5	33.3
1.3 Automatic exposure control devices	109	65.1	34.9	68	13.2	23.5	33.8	29.4
1.4 Exposure manipulation and conversion problems	105	69.5	30.5	71	14.1	23.9	38.0	23.9

The highest percentage of high level of need for respondents' future needs regarding exposure selection skills (*Table 3.24.2*) was again given as exposure manipulation and conversion problems (20.2%). The response sample was small, with the most responses obtained with radiographic exposure charts at 99.

**TABLE 3.24.2**  
**FUTURE LEVEL OF NEED REGARDING EXPOSURE SELECTION SKILLS**

Exposure selection skills	n	High	Med	Low	None
1.1 Influence of exposure factors	98	15.3	23.5	32.7	28.6
1.2 Radiographic exposure charts e.g. variable kVp technique, fixed kVp technique	99	17.2	20.2	33.3	29.3
1.3 Automatic exposure control devices	95	17.9	29.5	23.2	29.5
1.4 Exposure manipulation and conversion problems	89	20.2	32.6	24.7	22.5

Table 3.25.1 displays the data obtained at the sub-section on effective use of ancillary equipment. In all four areas listed under this sub-section, a high percentage of respondents indicated that they currently use this sub-section of radiography. The highest percentage of high level of current need in this regard was intensifying screens at only 19.0%.

**TABLE 3.25.1**  
**CURRENT LEVEL OF NEED REGARDING EFFECTIVE USE OF ANCILLARY EQUIPMENT**

Effective use of ancillary equipment	Do you presently use / do the following			Level of need to assist in your present position				
	n	Yes	No	n	High	Med	Low	None
2.1 Grids	109	91.7	8.3	98	14.3	16.3	29.6	39.8
2.2 Intensifying screens, e.g. different types used	108	93.5	6.5	100	19.0	17.0	26.0	38.0
2.3 Films	109	99.1	0.9	106	17.0	15.1	26.4	41.5
2.4 Cassettes	107	98.1	1.9	103	14.6	14.6	24.3	46.6

In Table 3.25.2 the highest percentage of respondents showed intensifying screens as a high level of need. It was again low at only 18.6%. The response sample was low and varied between 96 and 100 for the future needs of respondents regarding effective use of ancillary equipment.

**TABLE 3.25.2**  
**FUTURE LEVEL OF NEED REGARDING EFFECTIVE USE OF ANCILLARY EQUIPMENT**

Effective use of ancillary equipment	n	High	Med	Low	None
2.1 Grids	96	15.6	22.9	29.2	32.3
2.2 Intensifying screens e.g. different types used	97	18.6	26.8	20.6	34.0
2.3 Films	100	16.0	24.0	22.0	38.0
2.4 Cassettes	97	14.4	24.7	16.5	44.3



In Table 3.26.1 it can be seen that four of the five areas of radiographic processing are presently being used by more than 55% of the respondents, with 40.6% currently using daylight systems. The highest percentage of high level of need to assist in the present position was indicated as daylight systems (26.8%). Processing mistakes closely followed this. A quarter (25%) of the 80 respondents indicated this as a high level of need for their current development.

**TABLE 3.26.1**  
**CURRENT LEVEL OF NEED REGARDING RADIOGRAPHIC PROCESSING**

Radiographic Processing	Do you presently use / do the following			Level of need to assist in your present position				
	n	Yes	No	n	High	Med	Low	None
3.1 Processing [Developing, Fixing, Archiving (washing and Drying)]	104	91.3	8.7	84	15.5	20.2	22.6	41.7
3.2 Processing mistakes	108	75.0	25.0	80	25.0	25.0	28.8	21.3
3.3 Darkroom design and layout	104	55.8	44.2	55	12.7	21.8	25.5	40.0
3.4 Silver recovery	107	67.3	32.7	69	18.8	29.0	17.4	34.8
3.5 Daylight systems	106	40.6	59.4	41	26.8	26.8	24.4	22.0

Table 3.26.2 indicates scores for the future development regarding radiographic processing. Daylight systems were the option with the highest percentage for high level of need (34.1%). Few respondents gave an indication of their future need regarding radiographic processing. The response sample varied between 88 and 95.

**TABLE 3.26.2**  
**FUTURE LEVEL OF NEED REGARDING RADIOGRAPHIC PROCESSING**

Radiographic Processing	n	High	Med	Low	None
3.1 Processing [Developing, Fixing, Archiving (Washing and Drying)]	88	20.5	21.6	22.7	35.2
3.2 Processing mistakes	95	25.3	29.5	24.2	21.1
3.3 Darkroom design and layout	88	15.9	26.1	19.3	38.6
3.4 Silver recovery	95	17.9	34.7	20.0	27.4
3.5 Daylight systems	91	34.1	23.1	16.5	26.4

On the area analysing the image, 90.6% of respondents indicated that they currently use this (Table 3.27.1), with both high and medium levels of need at 30.9%.

**TABLE 3.27.1**  
**CURRENT LEVEL OF NEED REGARDING ANALYSIS OF THE IMAGE**

Analysing the image	Do you presently use / do the following			Level of need to assist in your present position				
	n	Yes	No	n	High	Med	Low	None
4.1 Analysing image quality, e.g. density, contrast, detail, distortion	106	90.6	9.4	94	30.9	30.9	18.1	20.2

For future development the same number of responses (34.3%) was shown for high and medium level of need. Only 99 of respondents gave an answer to this sub- section (Table 3.27.2).

**TABLE 3.27.2**  
**FUTURE LEVEL OF NEED REGARDING ANALYSIS OF THE IMAGE**

Analysing the image	n	High	Med	Low	None
4.1 Analysing image quality e.g. density, contrast, detail, distortion	99	34.3	34.3	16.2	15.2

Quality assurance for general radiography, for x-ray imaging equipment, for processors and for x-ray recording systems is currently done by more than half of the respondents (Table 3.28.1). From this table the highest percentage of responses to high level of need was given as Ultrasound at 48%. This was followed by quality assurance of processors or Sensitometry (34.5%) and Magnetic Resonance Imaging (31.6%).



**TABLE 3.28.1**  
**CURRENT LEVEL OF NEED REGARDING QUALITY ASSURANCE IN DIAGNOSTIC**  
**RADIOGRAPHY**

Quality assurance in diagnostic radiography	Do you presently use / do the following			Level of need to assist in your present position				
	n	Yes	No	n	High	Med	Low	None
5.1 General radiography	108	89.8	10.2	94	21.3	19.1	21.3	38.3
5.2 Mammography	108	29.6	70.4	31	29.0	32.3	22.6	16.1
5.3 Digital Radiography	105	20.0	80.0	20	30.0	35.0	20.0	15.0
5.4 Computer Radiography	108	29.6	70.4	31	22.6	41.9	22.6	12.9
5.5 Magnetic Resonance Imaging	108	18.5	81.5	19	31.6	15.8	26.3	26.3
5.6 Ultrasound	107	25.2	74.8	25	48.0	20.0	20.0	12.0
5.7 Of x-ray imaging equipment, e.g. generators	104	51.9	48.1	51	23.5	27.5	21.6	27.5
5.8 Of processors (Sensitometry)	106	57.5	42.5	58	34.5	25.9	12.1	27.6
5.9 Of x-ray recording systems, e.g. intensifying screens	105	55.2	44.8	56	28.6	17.9	30.4	23.2
5.10 Reject analysis	102	33.3	66.7	34	20.6	20.6	26.5	32.4

Less than 96 respondents responded to each of the subsections of the question future level of need (*Table 3.28.2*) regarding quality assurance. As already explained, it was expected that all respondents would respond to the subsections regarding their future level of need. Most respondents indicated a high level of need for Ultrasound (61.7%), Magnetic Resonance Imaging (58.4%), Computer Tomography (58.3%) and Digital Radiography (51.7%).

**TABLE 3.28.2**  
**FUTURE LEVEL OF NEED REGARDING QUALITY ASSURANCE IN DIAGNOSTIC RADIOGRAPHY**

Quality Assurance in Diagnostic Radiography	n	High	Med	Low	None
5.1 General radiography	95	26.3	17.9	23.2	32.6
5.2 Mammography	82	47.6	20.7	11.0	20.7
5.3 Digital Radiography	87	51.7	20.7	14.9	12.6
5.4 Computer Radiography	84	58.3	16.7	13.1	11.9
5.5 Magnetic Resonance Imaging	82	58.5	13.4	11.0	17.1
5.6 Ultrasound	81	61.7	13.6	8.6	16.0
5.7 Of x-ray imaging equipment e.g. generators	90	31.1	26.7	21.1	21.1
5.8 Of processors (Sensitometry)	92	39.1	26.1	16.3	18.5
5.9 Of x-ray recording systems e.g. intensifying screens	92	32.6	23.9	22.8	20.7
5.10 Reject analysis	87	34.5	24.1	18.4	23.0

Table 3.29.1 shows that from the 105 respondents who responded to the question on purchasing of equipment, 68.6% indicated that they at present do not use this, but of those who do, a third (33.3%) indicated that they have a high level of need in this regard.

**TABLE 3.29.1**  
**CURRENT LEVEL OF NEED REGARDING PURCHASING OF EQUIPMENT**

Equipment	Do you presently use / do the following			Level of need to assist in your present position				
	n	Yes	No	n	High	Med	Low	None
6.1 Purchasing of equipment	105	31.4	68.6	33	33.3	24.2	15.2	27.3

Responses obtained from only 86 radiographers regarding future need for purchasing of equipment, indicated that 51.2% respondents experienced a high level of need in this regard (Table 3.29.2).



**TABLE 3.29.2**  
**FUTURE LEVEL OF NEED REGARDING PURCHASING OF EQUIPMENT**

Equipment	n	High	Med	Low	None
6.1 Purchasing of equipment	86	51.2	14.0	11.6	23.3

Most of the areas under this section are currently being used by most of the respondents, although the newest radiation legislation and regulations are used by only 41.7% of the respondents, and radiation biology by only 26.2% of the respondents (*Table 3.30.1*). Radiation biology was shown as the greatest need for current development. Fifty percent of the respondents indicated this as a high level of need.

**TABLE 3.30.1**  
**CURRENT LEVEL OF NEED REGARDING RADIATION PROTECTION**

Radiation Protection	Do you presently use / do the following			Level of need to assist in your present position				
	n	Yes	No	n	High	Med	Low	None
1. Minimising patient exposure dose	109	98.2	1.8	105	19.0	21.9	20.0	39.0
2. Protecting yourself and others from radiation	109	99.1	0.9	105	19.0	15.2	22.9	42.9
3. Dosimetry	108	77.8	22.2	80	18.8	18.8	27.5	35.0
4. Caring for radiation dosimeters	107	67.3	32.7	68	20.6	14.7	25.0	39.7
5. Newest radiation legislation and regulations	108	41.7	58.3	43	27.9	34.9	20.9	16.3
6. Radiation Biology	107	26.2	73.8	26	50.0	19.2	23.1	7.7

In *Table 3.30.2* most respondents indicated a high level of need for their future development in the newest radiation legislation and regulations (48.9%) and radiation biology (42.2%). Responses to the question were low between 83 and 97.

**TABLE 3.30.2**  
**FUTURE LEVEL OF NEED REGARDING RADIATION PROTECTION**

Radiation Protection	n	High	Med	Low	None
1. Minimising patient exposure dosage	97	21.6	27.8	16.5	34.0
2. Protecting yourself and others from radiation	95	24.2	22.1	15.8	37.9
3. Dosimetry	91	20.9	26.4	24.2	28.6
4. Caring for radiation dosimeters	87	20.7	14.9	25.3	39.1
5. Newest radiation legislation and regulations	88	48.9	25.0	12.5	13.6
6. Radiation Biology	83	42.2	31.3	12.0	14.5

Only 67 of the 109 respondents gave an answer to the question on whether they presently use algorithm of image modalities for radiographic examinations. Of them only 37.3% indicated that they currently use this (*Table 3.31.1*). The highest number of respondents indicated a medium level of need (33.3%). (The low response number may be an indication that respondents did not comprehend the question or were not aware of the meaning of the question and therefore did not answer it. The layout of the question may also have been misleading.)

**TABLE 3.31.1**  
**CURRENT LEVEL OF NEED REGARDING ALGORITHM OF IMAGE MODALITIES FOR RADIOGRAPHIC EXAMINATIONS**

Algorithm of image modalities for radiographic examinations	Do you presently use / do the following			Level of need to assist in your present position				
	n	Yes	No	n	High	Med	Low	None
Algorithm of image modalities for radiographic examinations (assisting in choosing appropriate diagnostic examinations)	67	37.3	62.7	24	20.8	33.3	25.0	20.8

Only 59 of respondents indicated their future level of need regarding algorithm of image modalities for radiographic examinations (*Table 3.31.2*). Of them, 39% indicated a high level of need regarding this for their future development.



**TABLE 3.31.2**  
**FUTURE LEVEL OF NEED REGARDING ALGORITHM OF IMAGE MODALITIES FOR**  
**RADIOGRAPHIC EXAMINATION**

Algorithm of image modalities for radiographic examinations	n	High	Med	Low	None
Algorithm of image modalities (assisting in choosing appropriate diagnostic examinations)	59	39.0	30.5	13.6	16.9

*Table 3.32.1* indicates respondents' current level of need regarding new developments in radiography. From the indicated current usage of the areas listed in the table, it is clear that these are new developments that have not been implemented in all areas of the Free State Province. No respondent currently uses Photothermography, and only 0.9% uses filmless systems. The new development with the highest rating for current usage came from laser imaging (28.4%). For their current development regarding Teleradiography, the same number of respondents indicated both a high and a low level of need of 33.3%. Of the 16 who responded to the question regarding workshops provided by x-ray equipment companies, 43.8% indicated a high level of need.

**TABLE 3.32.1**  
**CURRENT LEVEL OF NEED REGARDING NEW DEVELOPMENTS IN RADIOGRAPHY**

New Developments in Radiography	Do you presently use / do the following			Level of need to assist in your present position				
	n	Yes	No	n	High	Med	Low	None
1. Teleradiography	109	11.0	89.0	12	33.3	16.7	33.3	16.7
2. Filmless systems	107	0.9	99.1	1	0.0	0.0	100.0	0.0
3. Photothermography	108	0.0	100.0	0.0	0.0	0.0	0.0	0.0
4. Laser imaging	109	28.4	71.6	31	19.4	32.3	25.8	22.6
5. Dry Daylight processing	103	10.7	89.3	11	9.1	45.5	27.3	18.2
6. Workshops provided by x-ray equipment companies	105	16.2	83.8	16	43.8	31.3	18.8	6.3

For future development, responses indicated a high level of need regarding all new developments in radiography. It should, however, again be kept in mind that only 86 or less respondents responded to this section, and that it was expected that each respondent would give

an indication of his/her future level of need. *Table 3.32.2* illustrates that more than half of the respondents viewed this as high-need areas. The highest score for high level of need was indicated for workshops provided by x-ray companies (72.9%), and the lowest for laser imaging (53.5%).

**TABLE 3.32.2**  
**FUTURE LEVEL OF NEED REGARDING NEW DEVELOPMENTS IN RADIOGRAPHY**

New Development in Radiography	n	High	Med	Low	None
1. Teleradiography	85	69.4	15.3	4.7	10.6
2. Filmless systems	86	66.3	19.8	4.7	9.3
3. Photothermography	84	61.9	11.9	8.3	17.9
4. Laser imaging	86	53.5	19.8	14.0	12.8
5. Dry Daylight processing	83	59.0	19.3	10.8	10.8
6. Workshops provided by x—ray equipment companies	85	72.9	14.1	7.1	5.9



For all 12 areas of management skills, 46.8% or less respondents currently uses these skills (*Table 3.33.1*). For each of the 12 management areas, respondents indicated a high level of need. The highest percentage of high level of need was shown as motivational skills (50%) and the lowest percentage for planning skills at 35.7%.

**TABLE 3.33.1**  
**CURRENT LEVEL OF NEED REGARDING MANAGEMENT SKILLS**

Management skills	Do you presently use / do the following			Level of need to assist in your present position				
	n	Yes	No	n	High	Med	Low	None
1. Financial management	109	27.5	72.5	27	37.0	22.2	22.2	18.5
2. Leadership development	109	35.8	64.2	36	44.4	22.2	22.2	11.1
3. Staff relations (Management of department staff)	107	41.1	58.9	42	45.2	23.8	21.4	9.5
4. Organisational communication skills	108	38.0	62.0	40	45.0	20.0	25.0	10.0
5. Motivational skills	108	36.1	63.9	36	50.0	19.4	13.9	16.7
6. Problem-solving skills	109	46.8	53.2	49	44.9	22.4	20.4	12.2
7. Conflict management	109	40.4	59.6	43	41.9	25.6	23.3	9.3
8. Time management	109	38.5	61.5	40	37.5	15.0	20.0	27.5
9. Management of workload	108	45.4	54.6	47	36.2	21.3	23.4	19.1
10. Cost reductions	108	46.3	53.7	48	37.5	20.8	25.0	16.7
11. Planning skills	108	40.7	59.3	42	35.7	23.8	16.7	23.8
12. Meeting skills	108	37.0	63.0	38	36.8	21.1	26.3	15.8

Results indicated that most of the radiographers who responded, experienced a high level of need for their future management skill development (*Table 3.33.2*). Planning skills again was indicated by the lowest percentage of respondents as a high level of need at 46.2%, and motivational skills the highest at 58.6%.

**TABLE 3.33.2**  
**FUTURE LEVEL OF NEED REGARDING MANAGEMENT SKILLS**

Management skills	n	High	Med	Low	None
1. Financial management	84	53.6	17.9	14.3	14.3
2. Leadership development	88	55.7	26.1	8.0	10.2
3. Staff relations (Management of department staff)	88	51.1	28.4	11.4	9.1
4. Organisational communication skills	89	51.7	28.1	9.0	11.2
5. Motivational skills	87	58.6	21.8	10.3	9.2
6. Problem-solving skills	90	55.6	25.6	8.9	10.0
7. Conflict management	90	52.2	25.6	11.1	11.1
8. Time management	89	49.4	24.7	12.4	13.5
9. Management of workload	90	47.8	26.7	14.4	11.1
10. Cost reductions	89	50.6	24.7	12.4	12.4
11. Planning skills	91	46.2	33.0	11.0	9.9
12. Meeting skills	90	46.7	27.8	12.2	13.3

*Table 3.34.1* shows that for each area of the section computer skills, 39.8% or less of respondents currently use it. Word processing, spread sheets, computer-related radiological equipment and Internet were shown as high-priority areas with a high level of needs at 37.5%, 41.7%, 40.5% and 30.8% respectively.



**TABLE 3.34.1**  
**CURRENT LEVEL OF NEED REGARDING COMPUTER SKILLS**

Computer skills	Do you presently use / do the following			Level of need to assist in your present position				
	n	Yes	No	n	High	Med	Low	None
1. Word-processing programme	108	22.2	77.8	24	37.5	29.2	25.0	8.3
2. Spread sheets	108	11.1	88.9	12	41.7	8.3	33.3	16.7
3. Hospital systems	107	25.2	74.8	25	24.0	32.0	28.0	16.0
4. Computer-related radiological equipment e.g. CT and MR	108	39.8	60.2	42	40.5	21.4	26.2	11.9
5. E-mail	109	15.6	84.4	17	29.4	11.8	47.1	11.8
6. Internet	109	11.9	88.1	13	30.8	7.7	53.8	7.7

For each area of computer skills, most of the 90 to 94 respondents indicated a high level of future need (*Table 3.34.2*). The lowest percentage was indicated for hospital systems (61.1%), and the highest percentages was indicated for word-processing programmes (70.7%).

**TABLE 3.34.2**  
**FUTURE LEVEL OF NEED REGARDING COMPUTER SKILLS**

Computer skills	n	High	Med	Low	None
1. Word-processing programme	92	70.7	17.4	4.3	7.6
2. Spread sheets	91	64.8	14.3	8.8	12.1
3. Hospital systems	90	61.1	18.9	8.9	11.1
4. Computer-related radiological equipment, e.g. CT and MR	94	66.0	14.9	13.8	5.3
5. E-mail	91	63.7	17.6	8.8	9.9
6. Internet	90	64.4	15.6	11.1	8.9

### 3.3.9 Other needs

Respondents were asked to indicate any other perceived needs, which was not listed. The list of continuing education topics appeared to be inclusive, since only 3 of the 109 respondents suggested other topics. Between them 4 topics were suggested: Labour Law; Training Management; Industrial Relations and a Society for Radiographers in the Goldfield region.

### 3.3.10 Priorities of perceived needs

Having indicated for each of the 10 main sections listed, the relative level of need for continuing professional development, participants were then asked to identify the ten priority areas of need. Only 59 of the 109 (54.1%) respondents gave usable responses to this question. Many respondents gave no indication, while others misinterpreted the question. Instead of listing their priority needs, they prioritised the main sections. As this is too broad, it could not be used. In *Table 3.35* topics identified by more than 5% of respondents are listed. The 120 topics that were given by respondents are listed in Appendix L.

**TABLE 3.35**  
**PRIORITY TOPICS WITH A RESPONSE FREQUENCY HIGHER THAN 5% (n=109)**

Priority Topics	Number of Respondents	Percentage of Respondents
1. Computer Skills	20	18.3
2. Computer Tomography	19	17.4
3. Ultrasound	16	14.7
4. Magnetic Resonance Imaging	16	14.7
5. Basic Sotho Medical Language	14	12.8
6. Pattern Recognition	13	11.9
7. Management	13	11.9
8. Basic Ultrasound	10	9.2
9. Advanced Ultrasound	9	8.3
10. Mammography	9	8.3
11. Radiation Protection	9	8.3
12. Legal aspects of Radiography	8	7.3
13. Trauma Radiography	8	7.3
14. Digital Radiography	8	7.3
15. Teleradiography	8	7.3
16. First Aid	7	6.4
17. Motivational skills	6	5.5
18. Newest Radiation Regulations	6	5.5
19. Advanced Magnetic Resonance Imaging	6	5.5

A summary of respondents' first priority needs is seen in *Table 3.36*. Computer Tomography (CT) was indicated by 6 respondents. Ultrasound, Pattern Recognition and Basic Ultrasound



were indicated by 5 respondents each, and Magnetic Resonance Imaging (MRI), Management and Advanced Magnetic Resonance Imaging were chosen by 4 respondents each.

**TABLE 3.36**  
**NEEDS GIVEN AS FIRST PRIORITY BY RESPONDENTS**

Most important needs	Number of respondent
1. Computer Tomography	6
2. Ultrasound	5
3. Pattern recognition	5
4. Basic Ultrasound	5
5. Magnetic Resonance Imaging	4
6. Management	4
7. Advanced Magnetic Resonance Imaging	4
8. Basic Computer Tomography	2
9. Trauma Radiography	1
10. Automatic Exposure Control	1
11. Newest Radiation Regulations	1
12. Anatomy of the heart	1
13. Legal aspects for the radiographer	1
14. Advanced Ultrasound	1
15. Pattern recognition of the skull	1
16. Computer skills	1
17. Vascular Radiology	1
18. Dry Daylight processing	1
19. X-ray department administration	1
20. Radiographers rights in private practice	1
21. To diagnose	1

### 3.4 SUMMARY OF RESULTS

Radiographers surveyed in this study, indicated needs for continuing professional development. These needs clustered around topics listed under new developments in radiography, management skills and computer skills. A topic was regarded as a high level of need area when it was indicated by more than 40% of the respondents. Such topics and possible reasons for this will be discussed in the next chapter.

Although more topics were identified for future needs, there was considerable overlapping between needs seen as important to assist in the participant's position and those required for future development.

The main constraints to CPE participation were lack of time after-hours, after-hour duties, staff shortages, lack of back-up staff and that respondents were not always aware of the programmes provided.

The following chapter discusses the findings with major implications for the provision of CPE in the Free State Province.



## CHAPTER 4

# DISCUSSION OF THE RESULTS

### 4.1 INTRODUCTION

In this chapter, the results obtained in chapter 3 will be discussed. The discussion will include explanations of the rather low response rate and the geographical distribution of the respondents. A discussion of the demographic data of respondents will be given, as well as an organisational profile of the x-ray departments in which respondents are employed. Further, the results obtained regarding the participant's position in his/her organisation, the educational and professional background of the respondents, the recent CPE activities in which the respondents participated, the constraints respondents experienced to participation in CPE, and the support respondents received from their organisation for CPE, will be discussed. A major focus for the study was the identification of topic areas for CPE as the need was perceived by respondents. The results obtained from this section of the questionnaire will be discussed both relating to current and future levels of need. Only those topics that received high level of need percentages higher than 40% were regarded as a high level of need and will consequently be discussed. For the topics where the researcher anticipated that a high level of need would be indicated by more than 40% of the respondents and where this was not the case, possible explanations will be given.

### 4.2 DISCUSSION OF RESULTS

#### 4.2.1 Response rate

The response rate of 58.0% was lower than the 69% obtained in a similar study done in the UK without further follow-up (Henwood and Huggett, 1999:4). Although this was not as high as was expected, it is still felt that valuable information can be obtained from the results. Possible reasons for this may be that the researchers used individual contacts to hand out questionnaires, instead of mail-administered questionnaires. Further, negative feelings created amongst radiographers towards the new CPE scheme introduced by the SOR may have contributed to the lower return rate. Many radiographers at the time of the study already may have had a bad



experience with the scheme or were not properly informed about the scheme. This led to a potential weakness in the study. Also, because the CPE scheme is only limited to members of the SOR, some radiographers may not have felt like participating. To limit these negative feelings towards the study, an explanation of the importance of assessing needs was given in the cover letter. Furthermore, it was also explained that the study was not initiated by the SOR, but that the needs assessment was undertaken to obtain a Master's degree in Adult Education. A Technikon letterhead was used to indicate that the Technikon supported the study. The very extent of the information sought in the questionnaire may have contributed to the rather low response rate. As it was a first-time needs assessment, and because no relevant information is currently available for Free State Province CPE providers, the questionnaire was extensive. To minimise the problem, radiographers were given an indication of how long it would take to complete the questionnaire. The number of open-ended questions was limited to hasten the process of completing the questionnaire.

In view of these negative influences on the needs analysis, and in view of the wide representation obtained according to the geographical distribution, the information obtained with this survey is considered sufficient to provide a basis for CPE planning in the Free State Province.

Although the response rate obtained with this survey was lower than that obtained with similar studies conducted amongst radiographers in other countries, it compares favourably with other studies conducted amongst health professionals. In the study conducted by Young and Rudney (1991:319), a response rate of 55% was obtained. A study conducted to determine medical education needs of rural general practitioners in South Australia, obtained a response rate of only 33% (Gill and Game, 1994:664). Both these studies found the results obtained with the respective studies sufficiently representative for the planning and provision of CPE.

The response rate of the rural area radiographers was higher (74.4%) compared to the 46.0% responses from Bloemfontein radiographers (*Table 3.1*). The researcher is of the opinion that Bloemfontein radiographers up until now have had an advantage over rural area radiographers regarding CPE activities. Most of the activities were provided in Bloemfontein and the main providers of CPE activities are situated in Bloemfontein. Both the Free State branch of the SOR and the Technikon Free State are situated in Bloemfontein. It is suspected that Bloemfontein radiographers do not experience problems related to CPE to the same extent as those radiographers in rural areas. The probability of Bloemfontein radiographers being aware of activities provided is greater compared to radiographers in the rural areas. Furthermore, Bloemfontein radiographers do not have to travel long distances to attend CPE activities. Lack of staff and after-hour duties are not such a problem as in the rural areas, because there is a lot of back-up staff, as well as students available, to do after-hour duties. Rural area radiographers



probably were keen to respond, as they saw the questionnaire as an opportunity to express their needs and concerns.

#### **4.2.2 Demographic data**

Most of the respondents were female (82.6%), as expected. One of the major CPE participation constraining factors identified by respondents was a lack of time after-hours. The fact that most respondents are female and generally have other responsibilities to attend to, can explain this. Providers should keep this in mind when scheduling activities (Griffin, 1997:78). Timing, length of activities and location of activities should be considered. A shortcoming of the study was that nothing was asked regarding specific times for CPE that would best suit the needs of the respondents. This must be included in future surveys.

#### **4.2.3 Organisational profile**

Almost 70% of respondents were employed by hospitals with small x-ray departments (*Table 3.4*). Small x-ray departments were regarded as those employing less than 10 radiographers. It explains some of the major constraining factors identified by respondents, such as staff shortages, lack of back-up staff and difficulty in obtaining leave. This will be discussed under constraining factors.

#### **4.2.4 The participant's position in the organisation**

Nearly a third of respondents fill a higher ranked position (29.2%) like chief radiographer or assistant director (*Table 3.5*). Thirty three percent of respondents fill the position of senior radiographer. Although ranked higher than radiographer, this rank is usually obtained within three years after qualification. The high percentage of chief radiographers in the study can be explained by the rank promotions that were done in 1996. It was a one-time event, where most of the senior radiographers were promoted to the rank of chief radiographer. Because both senior radiographers and chief radiographers in most cases were promoted in this way, it does not necessarily imply that they were given more responsibilities. It is, however, acknowledged that rural area radiographers in these posts may, because of the size of the hospital, have other or more responsibilities than their peers in Bloemfontein. As will be discussed later, management skills were generally chosen by more than 35.7% of the respondents as a current high level of need and by more than 46% of respondents as a future high level of need. The more responsibilities of the rural area radiographers may in part explain this. Those radiographers with not such high ranks may also indicate the high need for management skills, because they are hoping to be promoted in future.



Information obtained from respondents regarding their level of responsibility indicated that 57.6% of respondents assessed their level of responsibility in the upper middle to upper level of responsibility (*Table 3.7*). It does not correlate with the information obtained from the question on the title of the respondents' present position (*Table 3.5*). According to that only 1 (0.9%) respondent had the title of assistant director. It corresponds to an upper middle level of responsibility. As already mentioned, this was a subjective question. It may, however, correlate with the conclusion that radiographers in rural x-ray departments have greater responsibilities than those in Bloemfontein x-ray departments. It must also be remembered that radiographers employed by private practices do not necessarily follow the same ranking as in government hospitals. Therefore their responsibilities may also not be the same. It may explain the high percentage of high level of need indicated at the section Management Skills.

It appears that some respondents misinterpreted the question on how many staff members were supervised by them. Some, for example, indicated the number of students supervised by them throughout the year, while others indicated the number of students supervised by them on average at any one time. Although respondents might have misinterpreted this question, the majority of respondents (73.3%) indicated that they supervise other staff. It also supports the conclusion that respondents' level of responsibility is generally higher than their ranks.

As already shown, the number of responses obtained with the question on the gross salary respondents earned per year was not sufficient to make any conclusions.

The majority of respondents (68.9%) indicated that no person acted as a mentor to newcomers. This is an area of concern. Mentoring is an excellent CPE activity that can be provided by employers, with relative ease and at minimum cost. Information obtained from the majority of respondents (86.1%), as well as per department, indicated that departments (69.4%) follow set protocols. Mentors amongst other things could be a great help for newcomers in this regard. The adjustment period of new staff could be simplified with a mentor that could inform them about department protocols. As in any mentoring relationship, it is not only the mentee that will benefit from such a relationship, but also the mentor. Even x-ray departments will benefit, because one sure outcome would be less repeat films, therefore lower film costs, decreased patient dosages and therefore more satisfied patients.

#### **4.2.5 Educational and Professional background**

Most of the respondents were in possession of a three-year qualification (*Table 3.10*). The highest level of educational attainment of respondents was indicated as an honours degree. There seems to be reluctance amongst Free State Province radiographers to study further. The information is worrying. It appears that Free State Province radiographers are not committed to



formal further education. It may reflect negatively on their commitment to CPE. It is the researcher's opinion that this is not only the case in the Free State Province, but also nationally. A culture of lifelong learning may not exist amongst radiographers. More likely explanations are that up until now no real incentives were in place for radiographers who engaged in formal further study. Further, no or very little distance education courses were available, making it nearly impossible for radiographers in rural areas to undertake further study. Likewise, the cost of further study can also be a possible cause for the low percentage of radiographers engaging in further study. It may also be that radiography is mostly regarded as a practice-based profession and no career opportunities exist for higher qualifications. Because employers such as radiologists feel that they do not need highly qualified radiographers, they do not encourage further study. Study leave brings about staffing problems. Furthermore, employers may feel that they need to increase the salary of such radiographers. A selected part of a letter included on one questionnaire nicely summarises the problem. To get the same impact, the respondent's own words were used: "The importance of furthering one's studies – Without recognition of qualifications many radiographers don't see need to – that is why many radiographers don't bother furthering their studies in their field, but would rather study something else in which they will benefit." However, it must be kept in mind that radiographers who do not perform x-ray examinations on patients on a daily basis, were excluded from the study. Of the 11 radiographers excluded from the study, three are in possession of a Master's degree.

It is nevertheless encouraging to see that at least 13.2% of radiographers are currently engaged in formal further study. It compares favourably with a similar study conducted amongst UK radiographers. From that sample, 15% was engaged in postgraduate courses (Henwood and Hugget, 1999:4). The number of respondents engaged in formal further study in an area of radiography is worrying. Only 35.7% of those studying further are engaged in studies towards obtaining a qualification in radiography. Eight of the 14 respondents are busy with a management-related course. From informal discussions with some radiographers it appears that they do not see a future for themselves in radiography. They only use the profession as a vehicle for qualifying themselves in another area. Also, uncertainties such as restricted health budgets and job insecurity in the government service compel radiographers to seek alternatives.

Another area of concern is that more than half (52.4%) of the respondents indicated that they were not involved with any professional association (*Table 3.11*). From those who indicated that they were members of a professional association, it may be that the 6.8% belonging to NASAR do no longer belong to a professional association. It is speculated that NASAR has been dissolved, although a final answer regarding this is still awaited. If one looks at the national SOR membership numbers, it is clear that this is a national problem. According to the minutes of the latest National Council of the Society of Radiographers' meeting held on 16-17 April 1999, the total Society membership on 31 December 1998 was 755. It is only 17.8% of radiographers if the



total number of radiographers registered with the HPCSA during 1999 is taken into account. The total number of radiographers registered at the HPCSA in June 1999 was 4232 radiographers. One of the characteristics of a professionalising occupation is the collective identity obtained through, amongst other things, association membership (Houle, 1989:49). The low membership has implications for CPE. If it is assumed that radiographers are not interested in a professional society, their commitment to CPE may even be questioned. Also, a professional society provides a means of informing members about forthcoming CPE activities such as congresses. If membership is low, it is difficult to inform all radiographers about such activities.

#### **4.2.6 Recent Continuous Professional Education activities**

Nearly seventy percent of respondents (68.8%) indicated that they were aware of CPE before receiving the questionnaire. If one looks at the low percentage of involvement with a professional association, it is surprising, especially seen in the light that the CPE scheme at the moment is a SOR-driven scheme. However, it can be that respondents have heard about CPE from other sources, such as the 1997 newsletter of the Interim National Medical and Dental Council of South Africa (Bulletin, 1997:5). They could also have heard about CPE from general practitioners who from January 1999 have been obliged to participate in CPE. Furthermore, it may show the relevance of the topic at the moment or that respondents were reluctant to indicate their ignorance. From the researcher's experience of informal discussions with radiographers, the latter may be true.

It is gratifying to see that 100% of respondents feel that CPE is important and that more than half (62.6%) of respondents feel that participation should be compulsory (Table 3.12). It is hoped that this demonstrates the strong desire of respondents to keep abreast. From a Wales study, 79% of responding radiographers felt that CPE should be mandatory. Evidence from another study suggests that professionals acknowledge their professional responsibility to maintain competence (Stanley, Al-Shehri and Thomas, 1993:211). In a regional study done in the UK, 46% of the radiographers felt that CPE attendance should be compulsory (Henwood and Huggett, 1999:5). Possible explanations for the support amongst Free State Province radiographers might be that they are not aware of the full implications of compulsory CPE. The focus of this question was holistic. In the study conducted by Henwood and Huggett (1999:5), respondents were asked specifically about compulsory attendance of study events. Respondents' support for mandatory CPE will be to the benefit of CPE, should it become compulsory. However, it is hoped that this will not be the case. To make CPE mandatory, would be to go against all adult education principles. The learner at school level and pre-service level is usually told what to learn, while the professional directs his/her own learning (Holm, 1998:621). Studies have shown that mandatory CPE does little to bring about change, because one "cannot mandate learning, only attendance" (Donen, 1998:1045). The development of radiographers as professionals and therefore as



lifelong learners should rather be encouraged, as well as the development of quality programmes that address learner needs. It is hoped that this will encourage radiographers to voluntarily participate in CPE activities, because they want to become better professionals and because they feel that they will benefit from CPE activities.

From *Table 3.12* it is clear that the majority of respondents would prefer to participate in CPE activities both on their own and in groups, and also preferred both formal and informal CPE formats. The result contrasts with studies conducted by Henwood and Huggett (1999:8) and Cunningham (1993:18). In both these studies, radiographers preferred short courses, single study days and seminars to formal formats (education for qualification purposes). Cunningham (1993:18) explains the preference for short courses is due to the availability of funds and opportunities. It is not clear from the information available whether respondents were given the option to choose both, as is the case with the Free State Province study. Free State Province radiographers may have chosen both because they really do want to improve their qualifications and at the same time keep up to date by means of short courses. As already explained, they may not always have had the opportunity to do so.

The majority of respondents (61%) indicated that they had not participated in workshops, conferences or seminars over the past two years. More than forty percent (41.3%) indicated that they had attended only one such an activity in the preceding two years (*Table 3.14*). It is almost double the amount of Welsh radiographers (23%) who indicated that they had attended conferences on one occasion only (Cunningham, 1993:18). However, they only indicated annual attendance and conference attendance, while radiographers in this study indicated workshops, conferences or seminars attended over the past two years. Again, it was encouraging to see that more than half of the respondents (57.1%) indicated that they paid for CPE activities themselves (*Table 3.13*). It indicates respondents' acknowledgement of their responsibility to keep abreast and may even show that respondents are already in the process of becoming lifelong learners.

An area of concern was the rather low expenditures for CPE activities. Summarised in *Table 3.15*, most respondents (40%) indicated that only about R200.00 was spent on CPE activities by both themselves and their organisations. Although the misleading scales should be kept in mind, expenditure is low. This information, together with the past experiences of providers, shows that radiographers are not prepared to pay a lot for CPE activities. It will be a challenge to providers to plan both quality activities and at the same time keep costs as low as possible.



#### **4.2.7 Continuous Professional Education participation constraining factors**

Many factors may influence health professionals' participation in CPE and may even prevent professionals from meeting an educational need. If professionals can find coping strategies to manage this, it may lead to increased attendance. Providers can and must assist with this, otherwise they may spend considerable effort in designing attractive events, with low attendance numbers (Knox, 1990:265; Mitchell, 1997:400).

From *Table 3.16* it can be seen that 9 of the 24 factors listed, emerged as a constraint for more than three-quarters of respondents. Six of the 9 were more significant than the others, because they were chosen by more than 85% of the respondents. The six were lack of time after-hours; no time release from work; after-hour duties; staff shortages; lack of back-up staff and not always being aware of the programmes provided. Many professionals consistently list staff shortages, time and funding as constraints to CPE participation (Larcombe and Maggs in Mitchell, 1997:395). The UK study conducted by Henwood and Huggett (1999:5) reported cost, time and lack of appeal of courses on offer as major constraining factors. As already mentioned, after-hour duties, staff shortages and lack of back-up staff may be due to the fact that many respondents came from small x-ray departments. It has implications for providers of activities. The implications will be discussed under the heading Recommendation in chapter 5.

The availability of CPE courses or the lack thereof was not tested. It is regarded as a drawback to the study. The researcher's assumption is that many courses and opportunities especially for formal further education are not available for Free State Province radiographers, though this was not listed as a possibility by respondents in the question where respondents were requested to indicate any other constraining factors as experienced by them.

In *Table 3.17* the results of the comparison of the constraining factors experienced by those who attended CPE activities over the past two years compared with those who did not, are demonstrated. Close to statistically significant differences were obtained with staff shortages, lack of back-up staff, not always being aware of the programmes provided and the language in which activities are presented. Providers of CPE activities should take all four into consideration. The first two relate to the fact that radiographers are employed in small x-ray departments far away from the areas where courses are usually presented. Again a possible solution to these problems would be to present courses closer to all radiographers and to make alternative relief arrangements available.



#### **4.2.8 Organisational support**

More than half of the respondents (58.5%) indicated that their organisations did not offer any planned in-service training. It is a major area of concern. In-service training is one of the best methods to exchange knowledge and to keep employees updated. Again the small sizes of most of the x-ray departments may be responsible for this. Co-operation amongst regional x-ray departments should be encouraged. If small departments offer in-service training co-operatively, even if only once a month, radiographers could benefit. Responsibility could be taken on a rotational base, exposing all to the benefits of in-service training. It will provide better resource allocation and may even enhance the learning to be derived from it, because professionals will share experiences.

The frequency with which these in-service training sessions were provided, was also low. Most of the respondents (39%) indicated that they were presented on a monthly basis. Much greater benefits will be achieved if in-service training is provided on a more regular basis.

Another concern is that only 38.8% respondents indicated that they had adequate channels in their departments to express their professional learning needs. The problem should be addressed. Employers must be encouraged to assist with this. The benefits of CPE should be explained and demonstrated to them. They need not address all the needs themselves. They could pass on the information to providers such as the Technikon who could then address the needs. Supervisors can, for example, summarise the widespread needs of their employees. Knox (1990:269) also supports this type of collaboration.

The fact that nearly three quarters of the respondents indicated that they rotated through their departments is encouraging. Through rotations, radiographers are exposed to a greater variety of examinations, keeping their knowledge and skills in these areas updated.

#### **4.2.9 Perceived topic areas of need for Continuous Professional Education**

It should be remembered that with the questionnaire, respondents were more likely to reflect their perceived needs rather than their actual needs, which may not always be the same (Smith, Singleton, Teague, Ross-Harper, Wilke and Hilton, 1998:573; Kerwick and Tylee, 1998:108; Gill and Game, 1994:667). As explained in chapter 1, perceived needs relate to those needs experienced by individuals themselves, while actual needs are more objectively obtained through independent assessments. The best way to obtain the actual needs would be to derive them from the observation of the professional in practice or from factually recorded data (Ward in Kerwick and Tylee, 1998:108; Abrahamson, 1985:114). However, the implication for manpower in this regard makes this type of needs assessment nearly impossible. The numbers of



radiographers in the Free State Province and the wide geographical distribution contributes to this. Furthermore, radiographers may regard such an assessment with suspicion as they are not used to it. For these reasons it was decided that the questionnaire would be the most appropriate method for the first-time needs assessment. It also involved the radiographers in the process of identifying their needs.

The topic list from which respondents could choose in this questionnaire was extensive. Categories were sub-divided into topic areas. Radiographers had a wide choice and could relate topics to their present practice, which differed enormously between radiographers. The smaller division of categories may explain the relatively low percentages of high level of need indicated by radiographers. If some of the needs identified were grouped together, it would lead to higher response rates in certain categories. Although this sub-division may be regarded negatively because of the length of the questionnaire, it also benefited the study. Respondents could focus more specifically. It has been observed that family physicians would rather attend CPE courses based upon specific aspects of a clinical problem than topics of general interest (Williams, Davis, Hale and Collins, 1989:138). The study conducted by Henwood and Huggett asked respondents to consider radiography subject areas rather than smaller topics as possible areas of need. The three most preferred subjects identified by the UK respondents (Henwood and Huggett, 1999:5) were counselling (69.1%), pathology (66.0%) and management (64.7%). It is difficult to explain why counselling was so popular. In the current South African national syllabi for a diagnostic radiographer, this is not even included. It is felt that the short duration and type of patient contact in diagnostic radiography do not necessitate this subject being included. For this reason this topic was not included in the study. A shortcoming in this study is that pathology was not included as a topic in the study. It may be concluded that Free State Province radiographers did not regard this as a major need, as it was not identified as a possible topic during the construction of the questionnaire, as well as during the pilot study. Also, respondents did not mention it in the other category of the questionnaire. Still, it should have been addressed in the needs assessment. Management, as seen from the results in *Table 3.33.2*, was also a popular category with the Free State Province radiographers.

It is interesting to see that what the researcher regarded as important development areas for qualified radiographers, were not always identified by them as such. Examples of this included pattern recognition (*Table 3.20.2 – 3.20.7*) and reject analysis (*Table 3.31.1*). It may be that radiographers are either not aware of the meaning of the terms, or that practice does not yet require them to exhibit, for example, pattern recognition skills. Role changes such as the inclusion of pattern recognition is generally discussed at SOR meetings. A more likely conclusion therefore, is that, because many respondents do not belong to a professional association, they may not be aware of the role change, because of the lack of sufficient information.



Further, the response rate for the future level of need was discouraging. The researcher expected all respondents to give an indication of their future level of need. It seems that respondents only gave an indication when they felt sure that they would use a skill in future. Responses to future level of need ranged between 59 to 100 respondents. In the section to follow, this will be indicated.

## **A. General Radiography**

As expected, the majority of the respondents currently perform general radiography (*Table 3.20.1*). Although pattern recognition was higher than any other subarea listed under general radiography, it was never higher than the 24.5% for pattern recognition of the skull (*Table 3.20.6*). Given that none of the respondents could have followed a pre-service course where this was included, it is strange that radiographers did not experience this as a high level of need. As already explained, radiographers may not be aware that this is now part of the scope of the radiographer, or radiographers do not understand the term, or do not comprehend the full implications, or they are not yet expected to use these skills in their respective practice areas.

## **B. Screening examinations**

No area under screening examination featured, as a major current development need. However, for the future development almost half (46.9%) of the 81 respondents identified cardiovascular screening examinations as a high level of need (*Table 3.21.2*). It may be that radiographers think about developing these needs to work in their own practice. Currently, the only private practice in the Free State Province in which radiographers work for themselves is a cardiovascular practice.

## **C. Specialised Radiography**

In *Table 3.22.1* it is indicated that for 14 of the 19 areas, more than 50% of the respondents did not currently use the area – specialised radiography. Although a high percentage of respondents did not use most of the areas, those who did, indicated a high level of need for Basic Ultrasound (53.6%) and Advanced Ultrasound (45.5%) to assist them in their present position. It demonstrates the current significance of Ultrasound. The primary health care policy makes Ultrasound a national sought-after commodity. Also, of all the x-ray equipment required to successfully run one's own department, an Ultrasound machine would be one of the cheapest to acquire. Furthermore, it is a non-ionising and a non-invasive procedure, making the risks involved with this lower than with conventional radiography. Cunningham also found Ultrasound the most popular course amongst Welsh radiographers. She attributed this to the widespread use of this modality (1993:18).



The response sample for the future development of specialised radiography was generally small (*Table 3.22.2*). Between 73 and 91 responses were obtained with these topics. More than 50% of those who responded to the question, indicated that they had a high level of need for Mammography (51.8%); Bone Density Scanning (66.2%); Vascular Interventional Procedures (65%); Basic Magnetic Resonance Imaging (67.9%); Advanced Magnetic Resonance Imaging (66.7%); Basic Computer Tomography (61.6%), Advanced Computer Tomography (62.2%); Spiral Tomography (58.5%); Basic Ultrasound (68.2%); Advanced Ultrasound (66.7%) and Digital Radiography (66.7%). Basic Ultrasound again obtained the highest percentage (*Table 3.22.3*). The other ten areas identified as high level of need areas are all relatively new or developing areas in the Free State Province. Because of the size of the province and the size of most of the x-ray departments, it is not in all cases viable to have modalities such as Computer Tomography (CT), Magnetic Resonance Imaging (MRI) and Mammography. In private practices these types of modalities are seen generally. Therefore, these radiographers may have contributed to the high level of need identified in this area. Also, the high percentage of high level of need identified by most respondents may indicate their strong desire to keep abreast, even though they do not use the skills. It may also indicate that these respondents expect to use these skills in future. A similar study conducted by Henwood and Hugget (1999:5) found the following: CT (57.3%), MRI (42.6%) and Ultrasound (29.4%). The term Computer Tomography instead of Computed Tomography was used throughout the questionnaire. Although this is the wrong term, it appears as though respondents interpreted it correctly.

#### **D. Patient care**

Of all the areas listed under patient care, it was only first aid (42.1%) and cultural diversity (24.3%) training that was not currently used to the same extent as the other 14 areas (*Table 3.23.1*). Basic medical Sotho language was identified as a high level of need area by 43.9% of respondents. With the integration of conventional black and white hospitals, the numbers of Sotho-speaking patients seen by all radiographers are increasing. Many of these patients come directly from Lesotho and are only able to speak Sotho. Patient communication in these instances is difficult and virtually non-existent, making the procedure difficult for both radiographer and patient. The high percentage (47.8%) of respondents who indicated cultural diversity training as a high level of need to assist in their current development, can also be ascribed to the increasing number of black patients seen in all hospitals. Also, employers and employees are becoming culturally more diverse, requiring more understanding of each other.

The number of responses for future development was lower than expected, ranging between 78 to 97. Five areas listed under patient care were identified as high level of need areas by more than 40% of the respondents. From *Table 3.23.2* it can be seen that first aid, legal aspects for the radiographer, basic medical Sotho language, cultural diversity training and safety in the



hospital were indicated by more than 40% of the respondents as a high level of need. Possible explanations for the rather high percentage of high level of need for first aid could be that this is regarded as a nice-to-know "subject". First aid is not necessarily only applicable to the work environment, but also to, for example, the home environment of radiographers. Furthermore, radiographers may feel that this skill would help them in becoming a multi-skilled health care worker. It can come in handy in especially small clinic set-ups, where Cardiopulmonary Resuscitation (CPR) teams are not readily available. From the latest minutes of the National Council of the SOR of April 1999, it was noted that updating of CPR would be recommended as compulsory CPE credit. CPR can be regarded as a sub-area of first aid.

With quality of service becoming all the more important and with the high prices of medical costs, patients are becoming more aware of their rights. It explains the high percentage of respondents indicating legal aspects for the radiographer, as future development need.

The small x-ray departments in which radiographers function at the moment and may be required to function in, in future can also explain the need for safety in the hospital. Again these skills will come in handy where radiographers function on their own, and do not have back-up teams available as in large hospitals.

## **E. Image recording**

The magnitude of image recording and the areas of application in radiography necessitated it to subdivide this section into smaller units. It was interesting to note that high level of needs were only indicated by more than 40% of the respondents with the subsections quality assurance and purchasing of equipment. Possible explanations for this will be discussed in the subsequent subsections.

### **E1. Exposure selection skills**

Surprisingly low percentages of respondents indicated a high level of need to assist in their current and future development regarding exposure selection skills (*Table 3.24.1 and 3.24.2*). A possible explanation might be that, because radiographers use most of this in everyday work, they do not feel that they have a need. From a reject analysis done in one of the major hospitals in Bloemfontein in 1996, it was discovered that, although staff felt that they did not have a problem with this, they did. In this study, exposure manipulation and conversion problems were some of the biggest reasons for discarded films before and after offering the quality assurance programme (Meyer, 1996:200). This may reflect the fact that radiographers are not always aware of their true needs.



**E2. Effective use of ancillary equipment**

The percentages indicated for high level of need were not high for both current and future need regarding the effective use of ancillary equipment (*Table 3.25.1 and 3.25.2*). Respondents may again have regarded this as basic radiography work and therefore not experienced such a high level of need with these topics.

**E3. Radiographic processing**

Although still low, higher percentages of needs were indicated for the current level of need regarding radiographic processing. Processing mistakes and daylight systems had the highest percentages of high level of need at 25.0% and 26.8% respectively (*Table 3.26.1*). For future development, processing (20.5%), processing mistakes (25.3%) and daylight systems (34.1%) all scored high level of need percentages of higher than 20% (*Table 3.26.2*). An explanation for the popularity of the topic - processing mistakes, may be the fact that a lot of processing mistakes generally do occur in an x-ray department. Especially in small departments it would be nice to solve problems oneself instead of waiting for a technician. Also, this would reduce costs and save time and thereby prevent unnecessary repeat films. Daylight systems are popular amongst radiographers, as it is regarded as an easy processing method. Not much training is required in this, as it is a fully automated system. Respondents may have misinterpreted the question, indicating that they in future would like to have such a system.

**E4. Analysing the image**

It was interesting to see that 34.3% or less respondents indicated this as a high level of need for both their current and future development (*Table 3.27.1 and Table 3.27.2*). The researcher expected that this topic would be indicated by a higher percentage of respondents as a high level of need. Not only is it an important aspect of radiography, but because of its subjective nature, it is a difficult aspect of radiography. Radiographers, because of their years of experience, may feel that they possess adequate skills to analyse the x-ray image. However, they may not necessarily do it correctly. This is one of the areas that would have benefited from an alternative method of assessment. Radiologists who use images passed by radiographers to give a report, could have been asked to give their opinion of the quality of the images that were passed.

**E5. Quality assurance in Diagnostic Radiography**

For current development the highest percentage of responses for high level of need was obtained with Ultrasound at 48% (*Table 3.28.1*). The current upsurge of interest in Ultrasound again explains the high percentage. It is strange that general radiography, x-ray recording systems,



Sensitometry and reject analysis obtained low percentages. Possible explanations might be that not all radiographers in an x-ray department are responsible for this. In the rural areas, the regional chief usually undertakes quality assurance. Furthermore, all departments may not do this and because of that respondents felt that it was not a required skill for their current development. All the topics listed under this subcategory for future development (*Table 3.28.2*) scored higher percentages for high level of need. Quality assurance these days is key issue in nearly every sphere and may explain the interest in future development. From *Table 3.28.2* more than half of the respondents indicated a high level of need for Digital Radiography (51.7%), Computer Radiography (58.3%), Magnetic Resonance Imaging (58.5%); and Ultrasound (61.7%). It may indicate the expectation of radiographers to work in these areas in future or to develop knowledge regarding these areas. It correlates with the information obtained from *Table 3.22.2*. Although higher than for current development, it is strange that percentages for general radiography, Sensitometry, x-ray recording systems and reject analysis were low. It may be that respondents feel that they have the required knowledge and skills for these aspects of radiography, or as already explained, do not feel that they would require these skills.

#### **E6. Equipment**

The percentage for high level of current need regarding purchasing of equipment was 33.3% compared to the 51.2% for future need (*Table 3.29.2*). It was expected, especially if one looks at the high percentage of respondents with a medium to high level of responsibility. From a discussion with a regional chief radiographer, it appears that each region is responsible for its own budget. For this reason, radiographers are co-responsible for the choice of equipment. Therefore it is expected that they would like to develop skills regarding purchasing of equipment.

#### **F. Radiation Protection**

Only radiation biology scored a high percentage of high level of need for current development under the radiation protection section (*Table 3.30.1*). The reason why nearly half the respondents listed this as a high level of need might be that diagnostic radiographers up until now had little if any exposure to this subject. The highest percentages for future need were given as the newest radiation legislation and regulations (48.9%) and radiation biology (42.2%) in *Table 3.30.2*. New radiation legislation and regulations have direct implications for radiographic practice and therefore the high score was expected.

#### **G. Algorithm of image modalities for radiographic examinations**

For this section the response rate for both the current need and future need was low (*Table 3.31.1 and 3.31.2*). Possible reasons for this might be that radiographers were unsure what was



meant by the term. However, this is highly unlikely, because an explanation of the term was given. A more likely explanation is that, because of the position of this section at the bottom of a page with no topics listed under the heading, respondents missed it. It is a pity, as it was expected that respondents would indicate a high level of need for this skill. From informal discussion with radiographers in rural areas, it appears that they do require these skills. This is especially the case where no radiologists are available.

## **H. New developments in Radiography**

Three of the topics under this category were chosen by few or no respondents as a current high level of need (*Table 3.32.1*). These are very new developments for the Free State Province and as such not extensively used in the Province. For this reason these topics were not identified as current high level of need areas. Teleradiography had a current high level of need of 33.3%. In the Free State Province Teleradiography will soon be introduced. It explains the higher score for this topic. An important means of introducing new radiographic developments to radiographers is through the workshops provided by x-ray equipment companies. The percentage of 43.8% indicated for high level of need by respondents supports this. For future development each of the 6 topics under new developments in radiography had percentages higher than 53% (*Table 3.32.2*). These findings demonstrate the novelty of these developments to radiographers. Very few, if any, have been exposed to this at pre-diploma and pre-degree levels. It indicates respondents' desire to develop their knowledge.

## **I. Management skills**

It is strange that for each of the 12 topics listed under management skills, less than 50% of respondents currently use it (*Table 3.33.1*). It does not correlate with the information respondents gave to the question on their level of responsibility (*Table 3.7*). It may be due to the subjective nature of the question, or that although radiographers have more responsibilities, it does not necessarily imply management skills. However, relatively high percentages of high level of need were indicated for each of the topics. From *Table 3.33.1* it can be seen that it ranged from 35.7% for planning skills to 50% for organisational communication skills. The percentages indicated for future high level of need for management skills were high (*Table 3.33.2*). Motivational skills scored the highest at 58.6% and planning skills the lowest at 46.2%. The unsure climate of jobs and resources makes motivation of staff an important quality over which department heads must dispose. These high percentages correlate with the information, which indicated that most of the radiographers busy with studies were studying in a management-related field. Development of management skills can be regarded as major focus areas for activity providers. The information agrees with the findings of Henwood and Huggett (1999:5).



## J. Computer skills

The number of respondents who currently use computer skills was low. Most respondents (39.8%) use computer-related equipment. Spreadsheets and computer-related radiological equipment were indicated as a current high level of need by more than 40% of the respondents (Table 3.34.1). It is to be expected with the ever-increasing importance of computer technology in the workplace and other spheres. Clearly, because all respondents do not currently use information technology systems such as the Internet and E-mail, it did not obtain such high percentages. However, for future needs all the topics scored percentages of higher than 61%. Again this category can be regarded as a focus area for activity providers.

In conclusion, of the categories, it was the new development areas in radiography that obtained the highest percentages for high level of need. These included the development of management and computer skills and the topics listed under new developments. Ultrasound, possibly because of current extensive use, was also listed as a high-priority area. The categories with the lowest percentages for high level of need were 'general radiography', which was expected as it forms a large part of the daily responsibility of most of these radiographers.

### 4.2.10 Priorities of perceived needs

It is a pity that just over half (54%) of respondents gave unusable information to the question on their priority need areas. The four areas indicated by most of these respondents were: management skills; Computer Tomography; Ultrasound and Magnetic Resonance Imaging (Table 3.35). Management skills and Ultrasound was also identified by more than 40% of respondents as a current high level of need. The future needs of the respondents correspond with all four of these topics.

## 4.3 SUMMARY OF DISCUSSION

Although the response rate of 58.0% was not as high as was hoped for, the result obtained from the study could be used as a basis for the provision and planning of CPE in the Free State Province.

Providers should concentrate on the constraints to CPE participation that was mainly experienced to the small x-ray department set-ups in which rural area radiographers are employed. Furthermore, programme providers should focus on topics such as Ultrasound, management and computer skills.

In the following chapter, the conclusion and recommendations arising from the study will be discussed. A possible framework for the way forward will also be suggested.



## **CHAPTER 5**

# **CONCLUSIONS AND RECOMMENDATIONS**

In this chapter conclusions will be made that will be followed by recommendations for CPE provision in the Free State Province. The chapter will then be concluded with suggestions for a possible working solution for the planning and provision of CPE in the Free State Province.

### **5.1 SYNOPSIS OF RESEARCH METHODOLOGY AND RESULTS**

As stated in chapter 1, the purpose of the study was to conduct a needs assessment survey to identify high-priority need areas as perceived by Free State Province radiographers for the provision of CPE. It was hoped that the results of the study would provide useful information to providers of CPE and that this would be incorporated into the planning and provision of CPE activities.

Because of the nature of the study, the research mainly made use of a descriptive survey approach as was discussed in chapters 1 and 2. The principal survey tool consisted of a mail-administered questionnaire as it was felt that this would be the most appropriate method to obtain the required data. Furthermore, it was hoped that this type of needs analysis would involve the target population in the planning of CPE.

It was hypothesised in chapter 1 that the needs of radiographers are influenced by the nature and position of radiographers in their employing organisations. From the results it was seen that this was indeed the case. Almost 70% of the respondents were employed in small x-ray departments with 10 or less radiographers. This explained most of the constraints radiographers experienced with attending CPE activities. Also, 57.6% of radiographers indicated their level of responsibility to be in the upper middle to upper level. This explained the interest in management skills as manifested by the fact that 35.7% of respondents indicated a high level of need for management skills.

The low educational attainment level of radiographers can partly be ascribed to the lack of distance education opportunities for formal further study and the difficulties radiographers have in attending further education opportunities. It directly relates to the second hypothesis that



radiographers' needs are influenced by their educational background. The need for more distance education opportunities and the need for recognition of higher qualifications can be derived from this.

Thirdly, it was hypothesised that deterring factors to participation in CPE influence radiographers' needs. This hypothesis can also be accepted. Five of the 6 factors chosen by more than 85% of respondents as a major or minor constraint to CPE participation can be attributed to the small x-ray departments and working conditions in which Free State Province radiographers are employed. The need for easily accessible CPE courses can be identified from this. Furthermore, respondents need to be informed in advance about possible CPE programmes that will be provided.

According to the fourth hypothesis, Free State Province radiographers have definite perceived current and future needs regarding specific topics. The results confirm that respondents have perceived needs for their current and future needs. More than 40% of the respondents had a current high level of need for Basic and Advanced Ultrasound; Basic Medical Sotho language; cultural diversity training; quality assurance for Ultrasound; Radiation Biology; workshops provided by x-ray equipment companies; leadership development; staff relations; organisational communication skills; motivational skills; problem-solving skills; conflict management; spread sheets and computer-related radiological equipment. More topics were indicated by respondents as a high level of need for future development. The topics chosen by more than 40% of the respondents for their future development as a high level of need were: Cardiovascular Screening; Mammography; Bone Density Scanning; Vascular and Non-vascular Interventional Procedures; Basic and Advanced Magnetic Resonance Imaging; Basic and Advanced Computer Tomography; Spiral Tomography; Basic and Advanced Ultrasound; Digital Radiography; Forensic Radiography; first aid; legal aspects for the radiographer; Basic Medical Sotho language; cultural diversity training; safety in the hospital; quality assurance for Mammography, Digital Radiography; Computer Tomography; Magnetic Resonance Imaging and Ultrasound; purchasing of equipment; Radiation Biology; newest radiation legislation and regulations; all the topics under the categories new developments in radiography, management skills and computer skills. These topics can be used as the basis for the planning of CPE for radiographers in the Free State Province.

## 5.2 CONCLUSIONS

Although some problems were experienced due to unclear or incorrect terminology on the questionnaire and incomplete responses, due to questionnaire layout, much useful information was obtained. A more extensive pilot study would have identified some of these problems.



The study was the first of its kind conducted amongst Free State Province radiographers and, as far as known, nationally. Most of the radiographers in the Free State Province are employed in small x-ray departments. It explains the constraints these radiographers experience with the attendance of CPE activities. Providers should consider this when planning CPE activities. Providers should plan activities with a variety of formats and at a minimum cost. Providers should design CPE activities that will make access to and participation in these activities as simple as possible. Provision of activities close to radiographer' locations, the availability of more back-up staff, rotation of staff and more suitable times, should be considered. Activities should be better marketed, with more written information and early notification of events.

The educational attainment level of radiographers is low. Further study is not popular. Providers such as the Technikon Free State must make available more accessible distance education opportunities. Employers should encourage radiographers to participate in further education. Higher qualifications should be structured in such a way that it has a definite benefit to both radiographers and employers. Incentives for further study should be put in place.

Radiographers should strive towards furthering the professionalism of their occupation and themselves. Professional training must be incorporated in CPE. Radiographers must be encouraged to become members of a professional association. The benefits of this should be clear to them.

Mentors can play a more important role in the Free State Province, especially because most departments follow set protocols. This will be to the advantage of the newcomer, the mentor, the employer and the patient.

In-service training is underutilised. It can be an inexpensive and effective method of CPE that uses the workplace as a learning source. Although the small size of most x-ray departments may be a problem, co-operation between institutions could help with this. Private practices and government hospitals can, for example, arrange case study evenings or lunch hour meetings as in-service training methods.

Adequate channels through which radiographers can express their learning needs do not exist in most departments. This must be rectified. Again co-operation between x-ray departments and providers can ensure that needs identified in this way are addressed.

This study offered 107 topics in 10 separate category areas from which radiographers could choose for their educational purposes. The breadth of the information should assist programme providers with guidance and insight when planning CPE activities to accommodate Free State Province radiographers. The results suggested that radiographers have a need to develop areas



that are new in radiography rather than refreshing already developed knowledge and skills. More than 40% of respondents currently have a high level of need for Basic and Advanced Ultrasound; Basic Medical Sotho language; cultural diversity training; quality assurance for Ultrasound; Radiation Biology; workshops provided by x-ray equipment companies; leadership development; staff relations; organisational communication skills; motivational skills; problem-solving skills; conflict management; spread sheets and computer-related radiological equipment. A greater variety of topics were identified for future development. It may be because radiographers do not currently use all the skills and expects to use them in future, or the current need is not so strong that it should be addressed immediately. The results suggested that radiographers have a desire to keep their knowledge up to date. The most favoured topics (indicated by more than 40% of respondents as a high level of need) for future development were: Cardiovascular Screening; Mammography; Bone Density Scanning; Vascular and Non-vascular Interventional Procedures; Basic and Advanced Magnetic Resonance Imaging; Basic and Advanced Computer Tomography; Spiral Tomography; Basic and Advanced Ultrasound; Digital Radiography; Forensic Radiography; first aid; legal aspects for the radiographer; Basic Medical Sotho language; cultural diversity training; safety in the hospital; quality assurance for Mammography, Digital Radiography, Computer Radiography, Magnetic Resonance Imaging and Ultrasound; purchasing of equipment; Radiation Biology; the newest radiation legislation and regulations; all the topics in the categories of new developments in radiography, management skills and computer skills.

Some of the topics, which the researcher had anticipated would be identified as high need areas, were not identified as such. These included pattern recognition, radiographic exposure charts, exposure manipulation and conversion problems, exposure selection skills, processing mistakes, quality assurance of general radiography, and processors, reject analysis, dosimetry and algorithm of image modalities. As explained, possible reasons for this might be that radiographers are not aware that they should possess these skills (pattern recognition), or that they are not aware that a need exists, or that, because of the format and layout of the questionnaire, a question was skipped (algorithm of image modalities). To demonstrate that a need exists, alternative methods of identification must be used in future. It may include information obtained from records such as reject analysis and needs as identified by other persons such as employers, patients or students.

### **5.3 RECOMMENDATIONS**

From the results of the study it was possible to make the following recommendations for the planning and provision of CPE in the Free State Province. Recommendations were made for: the future assessment of needs; the provision of CPE and the major stakeholders of CPE in the Free State Province.



### 5.3.1 Future needs assessments

The responsibility for CPE in the Free State Province lies with Technikon Free State, the SOR, employers and with the radiographer. From the results it was clear that close co-operation on all levels is essential to the success of CPE. Co-operation between stakeholders could lead to creative solutions to problems, without one party bearing all the responsibility. To be successful, CPE must be structured and planned. This is required to prevent a considerable waste of resources, a reduction in staff competence and a lowering of morale (Cunningham, 1993:16). In this questionnaire nothing was asked about the CPE policy statements and management controls of employing organisations. However, although important, from some of the answers given by respondents it can be concluded that CPE is not effectively managed. Answers given to question on adequate channels to express learning needs support this deduction. Managed CPE has a better chance of success because it simplifies the process of reviewing, justifying and sustaining CPE (Jones and Robinson, 1997:206). Records of CPE such as a CPE logbook, passport, portfolio, and other records of employers should be kept. From this, information such as money and time spent on activities and outcomes achieved, can be obtained. With managed CPE, radiographers' development activities could be related to strategic business objectives, which will be to the advantage of the employer. If providers want to maximise CPE participation, they must identify learning experiences most likely to attract professionals and at the same time provide quality programmes (Kennedy and Queeney, 1991:209). The needs assessment forms the basis of CPE planning (Holm, 1998:623). Free State Province providers must also be encouraged to meet the needs of radiographers. Professionals in most cases pay for themselves. Therefore they decide what they want to attend. If their needs are not met, they will not attend.

The main purpose of this study was only to determine the perceived needs of Free State Province radiographers. As already discussed, it may not in all cases have been the actual needs of the radiographers. However, Free State Province providers could use the needs identified in this study as a point of departure. Regular updating of the needs assessment is required. Educational needs change, because circumstances are always changing and skill requirements are constantly changing due to the changing medical knowledge (Gill and Game, 1994:667; Kristjanson and Scalan, 1989:121). Also, in future, other methods of determining needs should be incorporated in the needs assessment. These include identifying needs through peer group assessment and analysis of records such as obtained with reject analysis. Furthermore, the needs of other stakeholders such as employing organisations, that of the patient and that of students should be assessed (Laxdal, 1982:828). If employer wishes are met, employees may have a greater chance of attending CPE activities and funding may be less of a problem.



### 5.3.2 Provision of Continuous Professional Education

Provision of CPE should not be about making money. Providers should be committed to the development of the profession. Not only the activities that will be provided, but also the provision of a service is important. Free State Province radiographers will benefit from an information service. Information could be given regarding providers of CPE activities, forthcoming activities, the newest literature, names and addresses of specialists. This will be to the benefit of both the radiographer and the provider. Providers should keep in mind that those with a positive image “encourages enrollments and a poor programme encourages attrition” (Knox, 1990:265). If the credibility of continuing education is questioned, its continuance may be threatened (Sunter, 1993:38). Continuing education can then become expensive. In this regard professional educational expertise is significant (Mitchell, 1997:399). In the Free State Province such expertise is scarce and should be developed. Training the trainer courses should be developed that will help with the training of adult education facilitators. They will be responsible for the planning and provision of CPE.

Providers should be encouraged to search for principles that promote adult and learner-centered ideas which stimulate deep learning (Snadden and Thomas, 1998:193, Donen, 1998:1045, Pietroni, 1992:294, Stanley, Al-Shehri and Thomas, 1993:212). For this reason CPE activities must make use of interactive and reflective components that are related to the experience of the radiographer (Brookfield, 1990:15). Providers should concentrate on the learner and on the learning potential of his/her experience (Stanley *et al.*, 1993:212).

Activity providers must recognise that radiographers are at various stages in the transition from being dependent to self-directed learners as is the case with any group of learners. Therefore, the level of motivation of radiographers, as well as their learning capacity will be different. The provision of options will help to attract and retain participants. Options with regards to format, topics, complexity of content, time, location, pace and the accommodation of various learning styles should preferably be given to radiographers (Knox, 1990:263; Hays, Bridges-Webb and Booth, 1993:176). Providers should not only be concerned with designing good programmes, but these programmes should be provided in such a manner that they appeal to the professionals they wish to serve (Kennedy and Queeney, 1991:206). To improve radiographer participation, providers should address sources of encouragement and discouragement. Information obtained from the constraining factors could help providers with this. The constraining factors as was discussed in chapter 4 have implications for the provision of CPE activities. From the constraints it was clear that more use should be made of CPE activities that make access as easy as possible for radiographers in small rural area x-ray department set-ups. Relief staff and after-hour duties cause problems in small rural area x-ray departments. For this reason, provision of CPE that does not require radiographers to take time off from work or that minimises the time off



from work should be encouraged. Possible CPE formats that would accommodate this are informal CPE activities such as discussions with colleagues, case studies and peer coaching (Tolnai, 1991:419). These methods assume that learning takes place by means of social interaction within the context of practice (Mitchell, 1997:397). It is inexpensive and at the same time radiographers would not be expected to take leave for long periods of time, simplifying arrangements for leave and after-hour duties. Another relatively inexpensive method regarding both time and money is the reading of the appropriate literature. Critical reading (the selection of material, the ability to retain and access information, as well as the evaluation of what is read) is a formidable challenge to generalists away from the support of an institution (Al-Sheri *et al.*, 1993:249). To simplify this, a journal club could be established where reading and experience would be shared. Because radiographers may find it difficult to have access to a wide range of relevant journals and new books, providers should think of ways of accommodating this. Radiographers should be taught and encouraged to use the web or electronic magazines to increase their access and exposure to the newest available literature. Use of electronic media will also reduce expenses.

Another possible solution would be to make more distance education courses available. It is recognised that distance education courses are not ideal for basic radiography qualification due to the practical nature of the courses, but it is felt that it has a definite role to play in post basic-qualifications. As the fundamental work is already done at pre-diploma level, contact sessions would be sufficient for distance education courses. Again this solution would require the minimum time away from work.

Another important possibility is that providers should make available more activities closer to radiographers in small x-ray departments. It may even implicate the duplication of activities in both the Bloemfontein area and in the smaller rural areas. Activities could even be duplicated by video-recording such events. These solutions would simplify relief arrangements, because back-up staff would be required for shorter periods of time. It would also mean a shorter travelling time which would make it possible for radiographers to attend CPE activities and at the same time be available for after-hour duties. Furthermore, providers should do their best to schedule activities at more suitable times. A typical constraint of adult learners is the lack of time after-hours. As has already been discussed, specific times had not been asked, which is a shortcoming that should be addressed in follow-up needs assessments.

The Department of Health and other employers will also have an important role to play. Better relief arrangements could be provided in the rural areas. The possibility of rotating newly qualified staff in rural areas should be considered. Another option would be to use third-year student rotations in rural areas as relief options. In order to make this a viable option, student



rotations should coincide with CPE activities. It would give rural area radiographers the opportunity to attend CPE activities in other large centres such as Bloemfontein.

Providers should consider methods of making all radiographers aware of the activities that would be provided by them. Attendance of activities will improve if more radiographers are aware of activities. More written information and early notification of activities to be provided must be given to radiographers. Co-operation between employers and providers will contribute toward this. Providers could, for example, ask regional chiefs to distribute information of forthcoming activities amongst the radiographers working in their regions. It will reduce mailing costs and associated problems. Co-operation should be extended to private and other practices. New technologies such as E-mail facilities could be used more extensively. This is a cheap and efficient method, with the only disadvantage being that not all x-ray departments have access to such facilities. Fortunately most of the government hospitals possess E-mail facilities.

Competition for funding increases. This, together with the fact that more staff in future may be obliged to participate in CPE, will compel individuals to become responsible increasingly for their own funding. Providers must think about payment options and keeping costs as low and as reasonably as possible.

To encourage participation, short courses should be accredited and registered with the National Qualification Framework (NQF) to offer credits that can add up to obtain a qualification such as a certificate. A series of accredited short courses presented over a period of three years could be developed. The accumulation of the credits for these short courses could even be equal to a Master's of Technology degree.

### **5.3.3 The main stakeholders of Continuous Professional Education in the Free State Province**

The recommendations regarding the roles of the main stakeholders in the CPE of Free State Province radiographers will now be given in more detail.

#### **5.3.3( a) Technikon Free State**

The Technikon Free State must strengthen its educational competence and must increase the number of activities provided. One option would be to look at a unit specifically committed to the continuing education of radiographers. The possibility of this is currently being considered. Educational provision and research should be commitments of this department.



Amongst other things, it could, as already discussed, provide radiographers with an information service and other services. Facilities for outside users at the Technikon library must be established. The Technikon could also involve radiographers in the selection of new books to increase awareness of resources. Information on new books and journals available could be sent to radiographers on a monthly base with a CPE newsletter. A newsletter is not only a useful means of providing information, but can also be used as an updating method. It appeals because of the relatively low cost, and of the dissemination of information at controlled intervals with little disruption of practice (Woolfolk *et al.*, 1991:222). More viable methods for the future could be to send out electronic newsletters.

The most important function would be to provide high-quality CPE activities. More short courses must be provided. The Technikon Free State should also look into providing courses not only in Bloemfontein, but also in the rural areas close to all radiographers. The department must be responsible for training the trainer courses as already discussed.

It is foreseen that the Technikon Free State will be the main provider of further education possibilities. Access to further education opportunities should be made simpler by means of the provision of distance education courses with adequate learner support. This was also suggested by Henwood *et al.* (1999:9), who mentioned methods such as the Internet and teleconferencing. The infrastructure currently available at the Technikon Free State for these methods of instruction is inadequate and must be updated. The way in which the B. Tech. degree is currently being offered, to a certain degree, fulfil some of these requirements. It is provided according to a block system, making attendance easier. However, if more learners are to be accommodated in future, the number of facilitators should be increased.

### **5.3.3( b) Employers**

Employers can be regarded as both supporters and providers of CPE. Ways must be found to encourage employees to participate in CPE. It seems as though little support currently exists for Free State Province radiographers to participate in CPE. Henwood and Huggett (1999:9) said that radiographers should be "encouraged and not penalized for participating" in CPE. If radiographers are expected and encouraged to keep up to date and abreast of new developments, it is essential that time and reasonable funding are made available for them. Also, managers or employers need to realise that CPE increases motivation and work satisfaction. It reduces costly staff turnover and improves organisational efficiency (Mitchell, 1997:401; Nolan, Grant, Melhuish and Maguire, 1993:323). The climate of change, uncertainty of job security, little or no incentives and financial constraints do not lend itself to encouragement of CPE participation. A study done by Kerwick and Tylee (1998:106) showed that general practitioners' involvement in CPE was recognised by awarding a financial allowance. Mitchell (1997:395) says



that a number of studies have shown that career incentives such as promotion are significant motivational factors, which influence CPE participation. Whether this would be possible in the current economic climate is uncertain, but it could provide a solution. Employers can encourage CPE by considering the CPE record of applicants who apply for a position in their department. In this way radiographers will be able to see that it is worthwhile to participate in CPE activities.

Employing organisations should also provide guidance and advice to radiographers regarding CPE. Employers must provide proper channels through which radiographers can make their learning needs known.

"Experience is education, if one will learn from it" (Aygarn in Keht, 1996:53). Employers must remember that they can implement relatively cheap, easy and quite successful methods of CPE in the workplace. The in-house environment, if managed effectively, is a suitable learning environment for adult education and therefore CPE (Kerwick, and Tylee, 1998:106; Cunningham, 1993:19; Holm, 1998:625). In-service education opportunities allow greater numbers to participate with minimal disruption to departmental routine. In smaller x-ray departments this could be arranged in co-operation with other departments, including private practices. Lunchtime discussions and case study events are methods that could be used. Rotation between x-ray departments could also be regarded as in-service training. It exposes radiographers to other techniques and ways of doing. Mentor programmes are regarded as a highly participative experience sharing CPE activity (Stanley *et al.*, 1993:213). As already discussed, this is an under-utilised area. Such a system should be implemented very carefully. Radiographers should not regard it as checking up on their abilities, otherwise the scheme will not succeed. Mentors could also assist with the identification of educational needs. Cunningham (1993:18) identified another form of in-service training specifically for radiographers. She suggested that radiographers should sit in on radiologists' reporting sessions. It is considered a good opportunity for departmental education. It is inexpensive, would most certainly improve standards of practice and communication between radiographer and radiologist. Larger departments where radiologists are employed on a full-time basis should definitely look into this possibility.

Employers should show their support for CPE through the purchasing of books and journals. Cunningham (1993:18) suggested that all departments should make more use of audio-visual aids by acquiring more suitable educational video material. It was also suggested by Henwood *et al.* (1999:9). A video club could even be initiated. The small size of the Free State Province will make this a workable solution. A minimum number of videos could be purchased and exchanged between departments.



Employers may even be willing to assist in paying professional subscription fees and in this way increase SOR membership. In this manner radiographers can be made more aware of the new developments and requirements of their profession.

Employers must make available persons who can be trained as trainers for rural areas. In this way the needs of more radiographers can be satisfied.

### **5.3.3( c) Society of Radiographers (SOR)**

Without the trust and support of radiographers for the SOR, its existence, as well as that of the CPE scheme, is hanging in the balance. Co-operation and commitment by both parties will be required to ensure the future existence of a professional association.

SOR membership is at an unprecedented low level and attendance of meetings is decreasing. It seems as though radiographers do not feel that they benefit from SOR membership. Something should be done about this. Provision of CPE activities relevant to radiographers should be a priority of the SOR. The Free State branch of the SOR should also look into more suitable times for meetings and should think about the rotation of meetings throughout the Free State Province. In this way all Free State Province radiographers will get the opportunity to attend meetings and to be exposed to SOR. The Wales study conducted by Cunningham (1993:17) found that radiographers supported lunchtime departmental meetings for educational purposes. They preferred this to society meetings after hours. Cunningham (1993:17) attributes this to the female dominated workforce for whom lunchtime meetings represent more efficient use of a working women's time.

### **5.3.3( d) Radiographers**

Radiographers have a responsibility to keep abreast of professional and technical developments (Price in Cunningham, 1993:16). Only when professionals make a conscious effort to keep up with technology can they expect to advance in life. The cornerstone of any true professional is the lifelong process of education that makes the professional a lifelong learner (Watson in Cunningham, 1993:16). Its importance is ever-increasing. Wealth is being measured increasingly in terms of knowledge rather than in terms of monetary value. South African professionals are beginning to realise this, with CPE becoming more important.

Radiographers also have a role to play in the development of CPE. They should realise that they are the consumers of CPE. As such they need to be demanding and have the right to be so. They must make their needs known and must insist that the CPE befit their profession. They must remember that providers have a responsibility to provide education according to their professional needs (Koop, 1990:108). The study conducted by Henwood and Hugget (1999:5)



revealed radiographers' reluctance to take responsibility for identifying their needs. In the study it was found that radiographers rely on their managers to tell them what CPE they require. From the discussion of the results it seems that Free State Province radiographers may not in all cases be adequate diagnosticians regarding their learning needs. True professionals should be able to identify their own educational needs (Jarvis, 1983, Houle 1984 in Mitchell, 1997:399). The way forward is to find methods to improve the capacity of radiographers to define their own learning needs. Some of the methods radiographers can use to identify and meet their needs are by the use of portfolios, peer assessment, mentoring, discussion with educationalists, individual performance reviews and job descriptions. However, for most of these methods the organisation must foster a climate conducive to learning, where the individual can feel free to admit a gap in knowledge and skills (Mitchell, 1997:397). Qualities such as trust, support, overt praise and recognition of achievement need to be displayed within these types of organisations (Mitchell, 1997:401). Self-assessment of needs is preferable to peer evaluation, although both are valuable (Holm, 1998:623). Radiographers should be encouraged to keep a portfolio that involves them in the identification process. The learners themselves should identify their needs, but also learn from the process (Pietroni, 1992:296). A portfolio is a purposeful collection of evidence that exhibits the learner's efforts, progress and achievements in one or more areas. It demonstrates that learning has taken place by including the learner's participation in selecting content, the criteria for judging merit and evidence of self-reflection. (Snadden and Thomas, 1998:192, Donen, 1998:1044, Pietroni, 1992:295, Paulson *et al.* in Snadden and Thomas, 1998:193). Radiographers should also view working with students as an opportunity of identifying gaps in their own knowledge and skills. Many radiographers in the teaching hospitals, some private practices and some rural area hospitals at some stage work with students. Being involved with the teaching and assessment of students, assists with need identification (Mitchell, 1997:398).

Radiographers must at some level recognise their learning needs with regard to patient care and professionalism, and they must be able to reflect on this compared to standards set by peers, regulatory bodies, patients, literature and themselves. Radiographers need education in professionalism. It is improbable that they will attend CPE sessions of their own free will. To include these types of topics in courses alongside more popular subjects may be a way of increasing educational activities in professionalism.

#### **5.4 THE WAY FORWARD FOR CONTINUOUS PROFESSIONAL EDUCATION FOR FREE STATE PROVINCE RADIOGRAPHERS**

The information obtained in the study should be published as widely as possible. It would ensure that as many as possible of the roleplayers, including radiographers at grass roots level, be informed of the results of the study. In this way they will be able to see that their participation in



the study was useful and it is hoped that this will change the negative feelings of Free State Province radiographers towards CPE.

Furthermore, to ensure a workable partnership between all the stakeholders and to plan CPE responsibly, a CPE committee should be formed. All the stakeholders, including public as well as private sector radiographers, should be represented on this Committee. One of the functions of this Committee would be to formulate a vision and mission statement for the provision of CPE in the Free State Province. Another function would be the planning of CPE activities. In this way each stakeholder would be able to inform the people or organisation which they represent of their responsibilities and of the development of CPE.

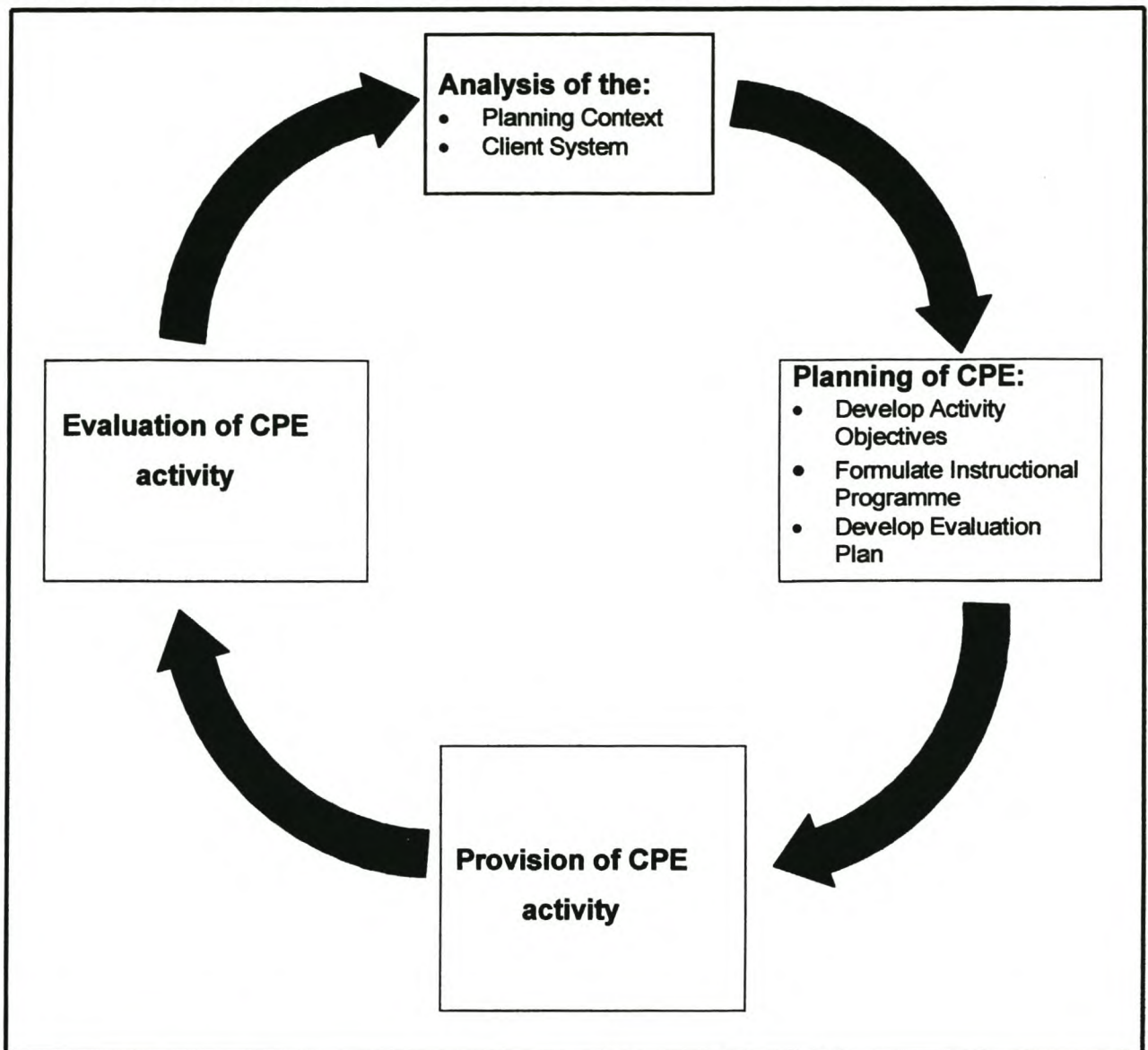
Planning of activities should be done on an ongoing basis (*Fig 5.1*). A summary of the suggested stages in the planning processes is given. The first stage would be to analyse the planning context and the client system. Part of this has already been done by means of this needs assessment. However, as has already been mentioned, the needs assessment must be updated regularly, because needs are always changing. After a suitable topic has been chosen, the programme objectives should be developed, followed by the formulation of an instructional plan, and then designing an effective evaluation plan.

Programme objectives are important for the evaluation of a programme. It can serve as a benchmark for measuring the progress and achievements of a programme (Merriam and Cunningham, 1989:238). To make sure that the objectives serve the target population, all stakeholders must be involved in the development of these objectives.

Formulating the instructional programme would include the selection of instructional strategies, resources, facilitators and the formulation of an administrative plan. Formulation of the administrative plan would include deciding on advance publicity and financial planning. As the results have shown, advance publicity is important, so that radiographers can be informed of all CPE activities that will be presented, in time to make the necessary arrangements.

Evaluation of the programme is one of the most important stages in the development of an activity. Evaluation results can be used to see if programme objectives have been realised and whether the target population is satisfied with the outcomes of an activity. Mistakes made can be identified and rectified in future planning.

**FIGURE 5.1**  
**DIAGRAM TO DEMONSTRATE THE CONTINUOUS CYCLE OF PLANNING CPE ACTIVITIES**



In conclusion then, the changing work practices, the responsibilities of being a radiographer, the requirements to maintain competence, and the domestic and family commitments of radiographers place a heavy burden on the shoulders of today's radiographers. It is acknowledged that radiographers have a responsibility to be lifelong learners, but this responsibility should be shared with the other stakeholders in CPE in the Free State Province. Providers of education must be responsible for the offering of high-quality CPE activities that involve learners in the identification of their training needs and which are learner-centered at the same time (Kerwick and Tylee, 1998:109). Activities should be developed with flexible learning strategies and adequate support mechanisms. Partnerships between all the stakeholders of CPE in the Free State Province are the key to the future success of CPE.



## BIBLIOGRAPHY

Abrahamson, S. 1985. *Evaluation of Continuing Education in the Health Professions*. Boston: Kluwer Nijhoff Publishing.

Allington, G.H. and Kouzekanani, K. 1990. A Needs Assessment Investigation of Continuing Medical Education in Risk Management. *The Journal of Continuing Education in the Health Professions*, 10:9-21.

Al-Shehri, A. 1992. The market and educational principles in continuing medical education for general practice. *Medical Education*, 26:384-388.

Al-Shehri, A., Stanley, I. and Thomas, P. 1993. Continuing Education for General Practice. 2. Systematic learning from experience. *British Journal of General Practice*, 43:249-253.

Barriball, K.L., While, A.E. and Norman, I.J. 1992. Continuing Professional Education for Qualified Nurses: A Review of the Literature. *Journal of Advanced Nursing*, 17:1129-1140.

Bartram, S. and Gibson, B. 1995. *The Training Needs Analysis Toolkit*. Amherst, Massachusetts: Human Resource Development Press.

Becher, T. 1996. The Learning Professions. *Studies in Higher Education*, 21(1):43-55.

Benatar, S.R. 1997. The meaning of professionalism in Medicine. *SAMJ*, 87(4):427-431.

Bennett, N. L. 1990. Theories of Adult Development for Continuing Education. *The Journal of Continuing Education in the Health Professions*, 10:167-175.

Broadbent, M. and Grosser, K. 1985. *Special Library and Information Center Managers - Their Continuing Professional Development*. Melbourne: Department of Information Services, Royal Melbourne Institute of Technology.

Brookfield, S.D. 1990. 5<sup>th</sup> Ed. *Understanding and Facilitating Adult Learning*. San Francisco: Jossey-Bass Publishers.

Burns, E.F. 1992. *Radiographic Imaging – A Guide for Producing Quality Radiographs*. Philadelphia: W.B. Saunders Company.

Carroll, R.B. 1993. Implications of Adult Education Theories for Medical School Faculty Development Programmes. *Medical Teacher*, 15:163-170. (From EBSCO publishing. 13 May 1999. <http://gw3.epnet.com/>).

Chartered Society of Physiotherapists of Great Britain. 1994. *Continuing Professional Development: What is it and What Does it Mean?* 80(8):623-64.

Courtenay, B. and Holt, M.E. 1990. Using Impact Evaluation to Improve Marketing Plans in Continuing Higher Education. *Journal of Continuing Higher Education*, 28(1):10-15.

Cross, K.P. 1981. *Adults as Learners - Increasing Participation and Facilitating Learning*. San Francisco: Jossey Bass Publishers.

Cunningham, A. 1993. How Diagnostic Radiographers in Wales improve their Competence. *Radiography Today*, 59(679):16-19.

De Vaus, D.A. 1996. 4<sup>th</sup> Ed. *Surveys in Research*. London: UCL Press.

Department of Continuing Education – Lancaster University. 1995. *Achieving Growth – Stimulating the demand for Continuing Professional Development Among young professionals in North West England*. Lancaster: Department on Continuing Education – Lancaster University.

Dillman, D.A. 1978. *Mail and Telephone Surveys – The Total Design Method*. New York: Wiley.

Donen, N. 1998. No to Mandatory Continuing Medical Education, Yes to Mandatory Practice Auditing and Professional Educational Development. *Canadian Medical Association Journal*, 158(8):1044–1046. (From EBSCO publishing. 12 May 1999. <http://gw11.epnet.com/>).

Ehrlich, R.A. and McCloskey, E.D. 1993. 4<sup>th</sup> Ed. *Patient Care in Radiography*. St Louis: Mosby.

Escovitz, G.H. and Davis, D. 1990. A Bi-national Perspective on Continuing Medical Education. *Academic Medicine*, 65(9):545-550.

Fish, G.L., Gipple, L.D. and Katz, J.E. 1985. Assessing CPE Needs. A critical step in providing quality instruction. *Journal of Accountancy*, 160, July:79-82.



Fowler, A. 1996. How to manage your own CPD. **People Management**, 2:54-55.

Gerbert, B., Sumser, J., Maguire, B.T. and Miyasaki, M.S. 1991. Planning, Implementation, and Evaluation of AIDS Education Programmes for Dentists. **Journal of Dental Education**, 55(2):138-144.

Gill, D. and Game, D. 1994. Continuing medical education needs of rural GPs in South Australia. **Australian Family Physician**, 23(4):663-667.

Goldstein, I.L. 1993. 3<sup>rd</sup> Ed. **Training in Organizations**. California: Brookes / Cole Publishing Company.

Graham, K.J. and Mihal, W.L. 1986. Can Your Management Development Needs Surveys be Trusted. **Training and Development Journal**, 140, March:38-42.

Griffin, S. 1997. Learning Needs of Occupational Therapists in the Area of Team Work Practice. **Australian Journal of Adult and Community Education**, 37(2):76-92.

Haines, P. and Henwood, S.M. 1998. Does CPET meet clinical needs? **Radiography**, 4:79-87.

Hays, R.B., Bridges-Webb, C. and Booth, B. 1993. Quality Assurance in General Practice. **Medical Education**, 27:175-180.

Hazel-Ford, T.D., Sarvela, P.D., Wright, W.R. and Gimenez, S. 1993. Marketing-Related Continuing Education Needs for Health and Human Service Administrators. **The Journal of Continuing Higher Education**, 4(8):11-17.

Henwood, S.; Edie, J.; Flinton, D. and Simpson, R. 1998. Continuing professional development – a re-examination of the facts. **Radiography**, 4:5-8.

Henwood, S.M. and Huggett, S.M. 1999. Radiographic CPD Requirements – A Regional Study. **Radiography**, 5:3-10.

Hospital Research and Educational Trust. 1970. **Training and Continuing Education – A Handbook for Health Care Institutions**. Chicago: The Trust, c1970.

Holm, H.A. 1998. Quality Issues in Continuing Medical Education. **British Medical Journal**, 316(7131):621. (From EBSCO publishing. 12 May 1999. <http://gw11.epnet.com/>).

Houle, C.O. 1989. *Continuing Learning in the Professions*. San Francisco: Jossey-Bass Publishers.

Hughes, P. 1990. Evaluating the impact of Continual Professional Education (ENB 941). *Nurse Education Today*, 10:428-436.

Interim National Medical and Dental Council of South Africa. 1997. Continuing Education – What it entails, *Bulletin*, 1, October:5-6.

Jarvis, P. 1996. 2<sup>nd</sup> Ed. *Adult and Continuing Education – Theory and Practice*. London: Routledge.

Jones, N. and Robinson, G. 1997. Do organisations manage continuing professional development? *Journal of Management Development*, 16(3):197-207.

Kehl, R.J. 1996. Are there benefits to Continuing Professional Development? *Civil Engineering*, 66, October:52-53.

Kennedy, D.W. and Queeney, DS. 1991. Marketing Continuing Medical Education Programmes. *The Journal of Continuing Education in the Health Professions*, 11(3):205-214.

Kerwick, S. and Tylee, A. 1998. Continuing Medical Education in Primary Care Psychiatry. Comparing the Needs and Wants of General Practitioners. *International Review of Psychiatry*, 10(2):106-111. (From EBSCO publishing. 12 May 1999. <http://qw11.epnet.com/>).

Knowles, M.S. 1990. 4<sup>th</sup> Ed. *The Adult Learner: A Neglected Species*. Houston. Gulf Publishing Company.

Knox, A. 1990. Influences on Participation in Continuing Education. *Journal of Continuing Education in the Health Professions*, 10(3):261-274.

Koop, CE. 1990. Why CME? *Journal of Continuing Education in the Health Professions*, 10(2):103-109.

Kristjanson, L.J. and Scalan, J.M. 1989. Assessment of Continuing Nursing Education Needs: A Literature Review. *Journal of Continuing Education in Nursing*, 20(3):118-123.

Langsner, S.J. 1993. Reasons for Participation in Continuing Professional Education: A Survey of the NTRS. *Therapeutic Recreation Journal*, 27(4):262-273.



Langsner, S.J. 1994. Deterrents to Participation in Continuing Professional Education: A Survey of the NTRS. *Therapeutic Recreational Journal*, 28(3):147-161.

Laxdal, O.E. 1982. Needs Assessment in Continuing Medical Education: A Practical Guide. *Journal of Medical Education*, 57:827-834.

Leedy, P.D. 1985. 3<sup>rd</sup> Ed. *Practical Research – Planning and Design*. New York: Macmillan Publishing Company.

Mancall, J.C. and Bertland, L.H. 1988. Step One Reported: Analysis of AASL's First Needs Assessment for Continuing Education. *School Library Media Quarterly*, 16(2):88-98.

Mandernack, S.B. 1990. An Assessment of Education and Training Needs for Bibliographic Instruction Librarians. *Journal of Education for Library and Information Science*, 30(3):193-201.

Merriam, S.B. and Cunningham, P.M. 1989. *Handbook of Adult and Continuing Education*. San Francisco: Jossey-Bass Publishers.

Meyer, C. 1996. Die Invloed van 'n Kwaliteitskontroleprogram op die Beelddigtheid van Radiografiese Opnames Gemeet as Persentasie van die nie-Diagnostiese Films. Ongepubliseerde Magister in Radiografie-tesis, Universiteit van die Oranje Vrystaat, Bloemfontein.

Mitchell, M. 1997. The Continuing Professional Education Needs of Midwives. *Nurse Education Today*, 17(5):394 –402.

Moorby, E. 1991. *How to succeed in employee development - Moving from vision to results*. London: McGraw-Hill Book Company.

Mouton, J. 1996. *Understanding Social Research*. Pretoria: JL van Schaik Publishers.

Nellmapius, E. 1992. Adult learners: Recognising the Importance and Differences. *Human Resource Management*, 8(8):34-35.

Nolan, M., Grant, G., Melhuish, E. and Maguire, B. 1993. Do the benefits of continuing education outweigh the costs? *British Journal of Nursing*, 2:321-324.

- Nowakowski, A. 1994. A Special Section – Goal-Based Scenarios: A New Approach to Professional Education. *Educational Technology*, 34(9):3-8.
- Pietroni, R. 1992. New strategies for higher professional education. *British Journal of General Practice*, 42:294-296.
- Purdie, D.W. 1994. Continuing Medical Education. *British Journal of Obstetrics and Gynaecology*, 101:281-283.
- Ruscheniko, I.H.F. 1996. Continuing Professional Development (Part One). *The South African Radiographer*, XXXIV(2):14-15.
- Ruscheniko, I.H.F. 1997. Personal Continuing Professional Development (CPD) Scheme. *The South African Radiographer*, XXXV(2):13-17.
- Scalan, C.S. and Darkenwald, G.G. 1984. Identifying Deterrents to Participation in Continuing Education. *Adult Education Quarterly*, 34(3):155-166.
- Smith, F., Singleton, A., Teague, P.A., Ross-Harper, R., Wilke, G. and Hilton, S. 1998. An Evaluation of an Educational Group for General; Practitioner Continuing Education and Development. *Medical Teacher*, 20(6):572-581. (From EBSCO publishing. 12 May 1999. <http://gw11.epnet.com/>).
- Snadden, D. and Thomas, M. 1998. The use of portfolio learning in medical education. *Medical Teacher*, 20(3):192-204. (From: EBSCO publishing. 12 May 1999. <http://gw11.epnet.com/>).
- Society and College of Radiographers of Great Britain. 1996. *Facing the future together: The challenge of life-long learning*. London: Society and College of Radiographers (Great Britain).
- Society of Radiographers of South Africa. 1997. SASO's in x-ray departments? A thorny problem. *The South African Radiographer*, XXXV(2):21.
- Society of Radiographers of South Africa. 1998. Aims of the Society of Radiographers. *The South African Radiographer*, XXXVI(2):2.
- Stanley, I., Al-Shehri, A. and Thomas, P. 1993. Continuing Education for General Practice. 1. Experience, Competence and the Media of Self-directed Learning for Established General Practitioners. *British Journal of General Practice*, 43:210-214.



Sunter, S. 1993. The effectiveness of continuing education. *Nursing Standard*, 8(6):37-39.

Swanson, R.W. and Jennett, P.A. 1992. Observations on the Content of a Formal CME Course Before and After Needs Assessment. *The Journal of Continuing Education in the Health Professions*, 12:235-239.

Thurston, H.I. Mandatory Continuing Education: What the Research Tells Us. *Journal of Continuing Education in Nursing*, 23:6-14.

Todd, F. 1987. *Planning Continuing Professional Development*. London: Croom Helm.

Tolnai, S. 1991. Continuing medical education and career choice among graduates of problem-based and traditional curricula. *Medical Education*, 25:414-420.

Valentine, T. and Darkenwald, G.G. 1990. Deterrents to Participation in Adult Education: Profiles of Potential Learners. *Adult Education Quarterly*, 41(1):29-42.

Van Wyk, M. 1998. CPD cycle extended. *The South African Medical Journal*, 88(12):1542.

Williams, A.R., Davis, R.C., Hale, C.D. and Collins, T.R. 1989. Patterns of Concern: Needs Assessment and Continuing Education Needs Among Public Health Physicians. *Journal of Continuing Education in the Health Professions*, 9(3):131-139.

Witkin, B.R. 1984. *Assessing Needs in Educational and Social Programmes*. San Francisco: Jossey-Bass Publishers.

Wlodkowski, R.J. 1993. *Enhancing Adult Motivation to Learn*. San Francisco: Jossey-Bass Publishers.

Woolfolk, M.W., Lang, W.P., Farghaly, M.M., Ziemiecki, T.L. and Faja, B.W. 1991. Varying the Format of CDE: Practitioners' Perceptions of Need and Usefulness. *The Journal of Continuing Education in the Health Professions*, 11(3):215-224.

Young, L.J. and Rodney, J.D. 1991. Continuing Dental Education Needs Assessment: A Regional Survey. *The Journal of Continuing Education in the Health Professions*, 11:319-330.

Yuen, F. 1991. Continuing Nursing Education: Some Issues. *Journal of Advanced Nursing*, 16:1233-1237.

## **Code of Conduct for the Profession of Radiography**

**This "Code of Conduct", compiled by the Society of Radiographers of South Africa serves as a guide by which radiographers should evaluate their professional conduct and reflect standards of behaviour expected of members of the Society of Radiographers.**

**In order to perform his/her duties every radiographer should:**

1. provide respectful and courteous care to all patients regardless of race, colour, religion, sex, age, national or ethnic origin, creed or socio-economic status, presenting disease, mental or physical disability.
2. perform procedures and techniques efficiently and effectively by applying appropriate theoretical and practical knowledge.
3. provide patients with a full explanation of procedures to be performed and respect the right of the patient to choose.
4. protect the patient's right to privacy and maintain all patient information in strictest confidence.
5. not perform a procedure or examination if in his/her opinion it is unethical or regarded to be harmful to the patient.
6. report unethical or illegal professional behaviour or practice to the appropriate authorities.
7. apply the ALARA principle and conduct to all radiographic examinations and treatment procedures with due regard to current radiation safety regulations.
8. be conversant with the rules and regulations that apply to the profession.
9. continually strive to improve knowledge and skills by participating in continuing professional development.
10. co-operate in the training of student radiographers and impart knowledge and skills to them.
11. co-operate in the delivery of effective health care in South Africa
12. follow the guidelines of the Health Professions Council of South Africa with regard to advertising his/her professional services.



# Personal continuing professional development (CPD) scheme

## Society of Radiographers of South Africa

Continuing education for health professionals in South Africa is a very topical issue with both the Interim Medical and Dental Council and the final report of the National Commission for Higher Education identifying it as an essential activity expected of health professionals, to the point where it would appear that mandatory CPD will probably be introduced within the foreseeable future. This will mean that in order to renew registration with the Medical and Dental Council a radiographer will have to prove that he/she has completed a certain number of CPD activities within a given period of time. Compulsory CPD has already been introduced in other countries such as the United States, and the United Kingdom seems set to follow shortly.

Public demand for accountability, the rapid technology explosion and role development all contribute to the concern for maintaining professional standards. It is generally accepted that all practising health professionals should continually update their skills and knowledge in order to remain competent and prevent obsolescence. Preferably CPD should be a voluntary activity reflecting the individual's acceptance of his/her professional role and the desire to maintain the highest possible standards of practice. To this end the Society of Radiographers is to implement a **voluntary** CPD accreditation scheme for its members.

The aims of the scheme are :

1. To encourage members to become actively involved in ongoing CPD in the interests of their personal professional development.
2. To enhance the public image of the profession by encouraging high standards of practice.
3. To advance the profession through continuous development of practising radiographers.
4. To prepare members for the time when CPD will become compulsory.

By participating in the scheme the member will acquire a personal record of Society accredited CPD activities. Upon successful completion of a 24 month cycle, provided the necessary number of credits have been obtained, the member will be issued with a Certificate of CPD Participation. The certificate acts as proof of CPD participation which could be used for motivating salary increments, promotion or simply to form part of a radiographer's CV. Increasingly, advertisements for posts and especially promotion posts require submission of a Curriculum Vitae as one of the necessary documents. This concept is new for radiographers who have usually been appointed on the grounds of recent qualification or promoted on experience. Where there is competition for jobs, as may be the case more often in the future, a CV

can make the difference between an appointment and disappointment. It is never too early to begin developing a CV and a personal CPD scheme can be part of such a development.

For further reading about CPD refer to September 1996 and March 1997 issues of *The South African Radiographer*.

### How will the scheme work?

The scheme will be operational from 1 January 1998 and registration forms will be available from Branch Secretaries from the end of 1997. The scheme will be evaluated as we progress and changes may be made if feedback shows this is necessary.

It must be remembered that the scheme is **voluntary** and radiographers are under no compulsion to participate.

### 1. Length of cycle and credits

The scheme will run over a **24 month cycle** during which time the participant must accumulate **50 credits**, with a minimum of **20 credits per annum**. Members who are registered in more than one category need only obtain 50 credits, not double.

The cycle will always run from 1 January to 31 December of the following year.

**to page 14**



## 2. Registration with the scheme

Application forms are available from the local Branch Secretary. The cost of registering for the two year cycle is R 50.00, which includes three "free" directed reading programmes of the member's choice. **The registration fee must be paid directly into the CPD bank account by the applicant** before sending in the application form. Details of the bank account are included on the application form. **Please do not send cash/cheques etc to the Administrative Office.**

The following must be sent to the Administrative Office:

- Completed application form
- A copy of the bank deposit slip for the R 50.00 registration fee - **do not send original**
- Proof of current membership of the Society of Radiographers - a copy of subscription receipt will suffice.

**Registration must be completed before 28 February of the first year of a cycle.**

**It will be possible to join the scheme every year.**

Upon registration the member will be sent:

1. A personal record form for the member to record all CPD activities that he/she participates in during the two years. This record form will serve to indicate how many credits have been obtained. **This is retained by the member for his/her personal record.**
2. Credit application forms, which are filled in and submitted to the Administrative Office for approval and accreditation.
3. A personal CPD registration number which must be quoted on all correspondence/credit application forms.

Please note that applications will not be processed unless accompanied by a copy of the bank deposit slip for the registration fee.

## 3. Who may join the scheme?

The scheme is open to full members of the Society of Radiographers only. It should be noted that members may be practising, non-practising or even retired - employment is not a prerequisite. Proof of current membership is required when registering with the scheme.

Newly qualified members need not join the scheme for three years nor those who immediately upon qualification proceed to a second category. In other words initial qualification in a category/categories exempts the radiographer for three years.

## 4. Credit application procedure

When a member has completed a CPD activity, he/she must apply to the Administrative Office for accreditation.

### 4.1 Standardised credits

There are two routes:

#### 4.1.1 Group activities

These include Branch open meetings/seminars, etc where a number of scheme members attend. The Branch will submit a list of all the scheme members who participated, directly to the Administrative Office. In this case an individual must keep a record of the activity, but will not be required to submit the credit application him/herself.

#### 4.1.2 Individual activities

Standardised CPD credits that are completed by the member on an individual basis (e.g. directed reading programmes, short courses, etc) need to be submitted

by the individual, on the credit application form and sent directly to the Administrative Office upon completion. When applying on an individual basis, a copy of the necessary documentation (e.g. certificates) must be included - note that originals must be retained by the member. ( See 6 below)

### 4.2 Non-standardised credits

Credits for non-standardised activities must be applied for to the National CPD committee via the Administrative Office. The correct application form must be completed and all relevant documentation (copies) must be submitted. The National CPD Committee will submit the credit approval directly to the Administrative Office and inform the participant of the credits awarded, thus the participant is not required to apply to the Administrative Office him/herself.

**All credits, standardised and non-standardised can only be claimed for CPD activities that are completed during the particular two year cycle and may not be accumulated or transferred to the next cycle. Please refer to the special arrangements regarding academic courses carrying the full 50 credits.**

The Administrative Office will record all CPD credits and once a year send a statement of credits to the member. It is important that members keep a back-up record of all CPD activities on their record card.

## 5. Completion of the cycle and the issue of the certificate of participation

At the end of the 24 month cycle (biennium), provided that the necessary criteria have been met, namely a minimum of 50 credits

**to page 15**



## **from page 14**

and a yearly subminimum of 20 credits, the member will be sent a certificate of CPD participation which will reflect the total number of credits obtained during the cycle i.e 50 or more credits.

Scheme members must also send proof of current Society membership (copy of subscription receipt) to the Administrative Office before the certificate will be issued. Deadline for submission of receipt is: 30 September of the second year of the cycle. Credits obtained during one cycle cannot be transferred to the next cycle.

Upon completion of a CPD cycle, the participant can re-register for the next cycle.

## **6. Copies of records and certificates**

Although records will be kept nationally by the Administrative Office, participants are advised that the Society does not accept responsibility for incorrect/lost records, or forms/documents that are mislaid in the post. It is therefore in the individual's interest to keep originals of all certificates and photocopies of all credit application forms mailed to the Administrative Office.

## **7. Registration fees**

An administrative fee of R50.00 for the two year cycle will be levied to cover administrative costs. The fee will also include three "free" directed reading programmes of the member's own choice. The fee should be paid directly into the CPD bank account (details on the application form) and a copy of the bank deposit slip sent to the Administrative Office.

## **8. Credit list**

A list of standardised CPD activity credits has been drawn up and will

be sent to each participant upon registration. This will assist the participant to plan his/her activities for the biennium.

## **9. Accreditation of seminars/short courses/workshops/study days**

Organisers of CPD activities (e.g. the branches, technikons, companies) can apply in advance to the Administrative Office for accreditation of individual courses, etc. This can be done by completing the appropriate accreditation form and sending it to the Administrative Office. The latter will then allocate the number of credits that can be given. Branches/technikons will then be in a position to inform participants in advance of the number of credits a particular activity carries and also to indicate the credits on the certificate of attendance.

## **10. Certificates of attendance**

Members attending Society activities (Branch and National level) will in future be given a certificate of attendance which will also indicate the credit allocation.

## **11. Non-standardised CPD activities**

These are CPD activities that do not fall into the above categories and participants must apply to the National CPD Committee for evaluation and accreditation. Examples of non-standardised activities would include:

- Staff exchanges
- In-service training
- Informal short courses with no formal evaluation

There are many non-standardised activities that can be considered as CPD and participants should feel free to approach the National CPD Committee for evaluation and accreditation.

## **12. Directed reading programmes**

The Society is developing directed reading programmes and this will make at least some CPD activities accessible to all members. Reading programmes will be drawn up covering a variety of topics and a list will be sent to members who register for the scheme. Branches will also receive updated lists.

Three free directed reading programmes are included in the R50.00 registration fee.

They are not, however, sent automatically upon registration and it will be up to the member to request them. The cost of subsequent programmes is R 8.00.

## **What is a directed reading programme?**

A directed reading programme is a short reading activity covering a specific topic (e.g. carcinoma of the prostate), with each aimed to take 3-4 hours to complete. The reading material is provided together with a short objective test of 20 questions. When the member is satisfied that he/she understands the article/s thoroughly, the test is completed and sent to the Administrative Office for marking. If the member achieves 60% or more, 3 credits will be awarded. The test question paper will not be returned to the member.

**to page 16**



**from page 15**

### ***How to apply for a directed reading programme***

A list of available programmes will be sent to members and Branches. Requests for directed reading programmes must be made **directly to the Administrative Office**, on the special application form. Payment of the fee (if applicable) must be made directly into the CPD bank account and a copy of the bank deposit slip included with the application form. Members are entitled to three free programmes during the cycle.

Please note that reading programmes which have to be paid for will not be posted to the member unless a copy of the deposit slip is included.

## **Standardised CPD activities**

### **1. Educational activities**

- Qualification in a second category: 50 credits
  - Higher qualification in the same category: 50 credits
    - B. Tech
    - B. Rad (Hons)
  - National Diploma or equivalent in relevant area (e.g. management): 50 credits
  - BA/BSc in a relevant area (e.g. education, psychology, sociology etc): 50 credits
  - All higher degrees eg. M Tech, M Rad etc: 50 credits
- For further information about the credit allocation for those activities marked with an asterisk see 1.1 below.**
- Short courses through a recognised education institution in which there is some form of formal evaluation:

7 hours or 1 day: 5 credits

8 - 15 hours or 2 days: 10 credits

16 - 21 hours or 3 days: 15 credits

22 - 28 hours or 4 days: 20 credits

29 hours or more - 5 days or more: 25 credits

- Provincial Training and Development Programmes with formal evaluation:

Daily - full time: 5 credits per day

Full week: 25 credits

- Attendance at a congress / workshop/seminar: 5 credits per full day, 3 credits per half day
- Directed reading programmes: 3 credits per programme  
(See comments about the development of these programmes)

#### **1.1\*Educational activities carrying 50 credits**

The 50 credits can be claimed in a number of ways, according to the circumstances of the member.

1. The full 50 can be claimed upon successful completion, in one cycle period (of 2 years)
2. The 50 credits can be claimed in two separate amounts of 25 per annum upon successful completion of half the course.
3. The 50 credits can be claimed over a three year period - and can be used in two CPD cycles.

Examples:

1. A member registers for the CPD programme and simultaneously for a B Tech. At the end of the 2 year cycle, he/she has successfully completed the B Tech and can therefore claim the full 50 credits for the whole cycle.
2. A member registers for the CPD programme, and in year

two of the cycle registers for a B Tech. Provided that he/she successfully completes that year, 25 credits can be claimed. The following year, the member registers for another CPD cycle period and can claim the remaining 25 credits upon successful completion of the remaining B Tech courses.

However, **the total credits remain at 50**, irrespective of whether the member uses them in one or two cycles.

### **2. Professional and related activities**

- Presentation of a paper at a congress/ seminar
  - Regional: 6 credits per paper
  - National: 8 credits per paper
  - International: 10 credits per paper
- Poster presentation at a congress
  - Regional: 4 credits per poster
  - National: 6 credits per poster
  - International: 8 credits per poster
- Publication of a peer reviewed scientific paper in a recognised journal
  - Main author: 10 credits per paper
  - Co-authors (2 only): 5 credits per paper
- Publication of short non-peer reviewed articles in a recognised journal
  - Main author: 5 credits per paper
  - Co-authors (2 only): 3 credits per paper
- Editor of a recognised scientific/professional journal

**to page 17**



**from page 16**

<p>Chief/Co-ordinating editor: 6 credits per journal</p> <p>Editorial board members: 2 credits per journal</p> <p>Editorial: 3 credits per journal</p> <p>- Organiser of a congress/ seminar/workshop</p> <p>Regional: 2 credits per day of the congress duration</p> <p>National: 4 credits per day of the congress duration</p> <p>International: 5 credits per day of the congress duration</p> <p>- Lecturing/examining if it falls outside job description</p> <p>Guest lecturing: 2 credits per hour (maximum 10 credits per year)</p>	<p>Examiner/moderator per examination: 3 credits per examination (maximum 6 credits per year)</p> <p>- Developing CPD activities - directed reading programmes</p> <p>Chief person responsible: 6 credits per programme</p> <p>Co-developers (maximum 2): 3 credits per programme</p> <p>- Officer of a professional/ scientific body ( e.g Professional Board, Society of Radiographers, etc)</p> <p>National: 6 credits per year</p> <p>Local: 3 credits per year</p> <p>- Committee work - excluding the above ( e.g hospital, regional, national, voluntary - Lifeline, Hospice etc)</p>	<p>National: 4 credits per year</p> <p>Local: 2 credits per year</p> <p>- Trade union activity: 2 credits per year</p> <p>- First Aid /CPR certificates 10 credits per certificate (only one certificate per cycle)</p> <p>- SOR/other open meetings of approximately 1- 2 hours duration: 1 credit per meeting</p> <p><b>National CPD Committee</b></p> <p><i>N Ebrahim</i></p> <p><i>M Horak</i></p> <p><i>L Munro</i></p> <p><i>I Ruscheniko</i></p>
--	--	---

## Study opportunities in England

University College of St Martin,  
Lancaster, offers a number of study  
opportunities for South African  
radiographers, including an end-on  
BSc (Hons), Radiography Studies and  
MSc in Medical Diagnostic Imaging.

The courses are primarily delivered  
through a distance learning mode, and  
most modules are available in this format.  
Students will however be required to  
attend certain modules at St Martin's.  
For further information contact:

**Iona Ruscheniko**  
**22 Hattingh Rd**  
**Summerstrand**  
**Port Elizabeth 6001**  
**Tel/fax: (041) 583-5160 (H)**  
**(041) 504-3450 (W)**

**Inputs from Free State Province Society of Radiographers' members  
regarding Continuous Professional Education.**

**1 FEBRUARIE 1999**

**DIE VOORSITTER**

**VERENIGING VAN RADIOGRAWE VAN SUID-AFRIKA**

Is: "CPD"

Na aanleiding van verskeie faktore aangaande die 'CPD' wat onduidelik en onaanvaarbaar blyk te wees, wil ek ook dié skrywe vir u insae en oorweging deurgee.

Ons is bewus van die feit dat daar op Nasionale vlak tans gekyk word na die punte wat toegeken word, maar ons voel dat daar sekere aspekte van die beroep as Radiograaf is wat oor die hoof gesien word met die toekenning van die CPD sisteem.

Ons voel almal baie sterk en stem saam dat dit noodsaaklik is om 'n sisteem daar te stel om die standaarde van ons beroep so hoog as moontlik te kan handhaaf met die vinnige vooruitgang en ontwikkeling van tegnologie in die oog. Dit is duidelik dat daar wel 'n behoefte is om konstant blootgestel te word aan leesstof, gevallestudies, inligting en kongresse om sodoende die Radiograaf in praktyk in staat te stel om op datum te bly met ontwikkeling en daarmee standaarde hoog te hou en ook ons beroep as Radiograaf te beskerm.

Omstandighede wat egter volgens ons oor die hoof gesien word, is die feit dat die Radiograaf in praktyk, veral in privaat praktyke, nie oor die tyd beskik om altyd alle vergaderings by te woon en/of lesings, kongresse ens. tot die maksimum te kan benut nie.

Die gevoel is dus dat die Radiograaf in praktyk wat aktief die professie beoefen geen krediet volgens die CPD sisteem verwerf nie. Geen Radiograaf kan goeie Radiografie beoefen, selfs met die beste tegnologie tot hom/haar beskikking sonder die nodige kennis met betrekking tot die betrokke apparaat en kliniese vereistes nie. Al die Radioloë in privaat praktyke vereis van hulle personeel om ten volle opgelei te bly, en sover my ondervinding in die verband betref, gaan meeste van dié Radioloë ook baie moeite en onkoste aan om die personeel op datum te hou met nuwe ontwikkeling en tegnologie.



Dit blyk dus asof slegs die akademiese sy van die beroep as Radiograaf beloon word met die CPD stelsel en dat die praktiese Radiograaf geen punte kan verdien deur die feit dat dit juis hy/sy is wat die standaard daar stel nie. Huidiglik is daar dus geen kriteria waarvolgens die praktiese Radiograaf haar “talente” en kennis op die tafel kan lê vir beoordeling nie. Die gebrek aan tyd (en tyd in privaat praktyk beteken ook geld) beperk ook die Radiograaf wat nie ‘n akademiese pos beklee nie, in die sin dat hy/sy nie haar werksure kan gebruik om die nodige werkstukke uit te werk of leesstukke voor te berei nie. Ons voorsien ook dat dié probleem moontlik gaan oorloop na die Radiograaf wat op die oomblik nog vir Staatsinstansies werk en heelwat “navorsingstyd” tot hul beskikking het, aangesien dit wil voorkom asof al hoe minder poste beskikbaar is, en die werkslading per persoon dus in so ‘n mate kan verhoog dat selfs die Staatswerker nie binne werksure tyd sal kry vir ekstra lees, navorsing en gevallestudies nie.

Bo en behalwe dat die enkele punte wat verwerf kan word vir byeenkomste en lesings wat bygewoon word, dink ek ook die hoeveelheid punte wat per twee jaar tydperk as minimum gestel word uit verhouding is met die enkele toekennings wat gedoen word. As voorbeeld wil ek tog gebruik ‘n lesing wat deur die Bloemfonteinse tak van die Vereniging gereël was in 1998, die was ‘Pattern recognition in chest X-ray’. Die betrokke Radiograaf het geweldig baie moeite gedoen om voorbeelde bymekaar te maak en ‘n hoë standaard lesing saam te stel. Hoewel die betrokke ‘n akademiese pos beklee het dit geweldig baie tyd en voorbereiding van haar kant geveer. Vir die lesing het sy slegs 2 punte verwerf en elke Radiograaf wat die lesing bygewoon het, het slegs 1 punt verwerf. Dit is die laagste vorm van motivering, veral as jy voltyds die praktiese sy van Radiografie beoefen en die minimum tyd tot jou beskikking het.

Volgens my is dit ook ‘n ‘eenringting’ toekenning, aangesien die meeste van die lesings, praatjies, gevallestudies, leesstukke ens. van die lessenaars van die Radiografe in akademiese poste afkomstig is. Die betrokkenes word betaal om lesings uit te werk ,

gewoonlik vir studente en is in die geskikte posisie om navorsing en opleeswerk te doen terwyl hulle aan diens is. Dit blyk dus dat die helfte van dië werk dus binne werksure kan geskied. Sonder om weer die hele paragraaf te herhaal – is dit egter nie moontlik vir die Radiograaf in praktyk nie.

Eenrigting toekenning noem ek, aangesien baie min van die Radiograwe in akademiese poste in staat is om nog huidiglik aktief in beroep te kan dien, juis omdat tegnologie so vinnig vooruitgaan. Baie van dië Radiograwe kan dus nie meer Radiografie doen in al sy aspekte nie, bv. RT, MR, Beendigheid, Stereotaktiese Mammografie ens. nie.

Die Radiograaf in praktyk word gedwing om ook die akademiese sy van bv. bogenoemde apparaat en kliniese posisionering te bemeester alvorens hy/sy die ondersoek suksesvol kan uitvoer, maar daar is geen kriteria waarby dië prakties (en akademies)opgeleide Radiograaf punte kan verwerf nie.

- Is daar byvoorbeeld plek in die sisteem waar die Radiograaf in praktyk ook 'n wesenlike bydrae kan lewer, sonder om slegs akademiese voorleggings te doen?

Ons sal dit hoog op prys stel as u direk met ons kan kontak om 'n antwoord op die bogenoemde vrae en bekommernisse te bekom.

Ek dank u vir u tyd

Namens Radiograwe in praktyk

Die uwe



Sonja Myburgh

(Senior Radiografis in privaat praktyk, ondervinding in Algemeen, Neuro-Kardiovaskulêr, sowel as RT en MR – praktiseer as Radiografis vir die afgelope 16 jaar.)



## Letter from the Professional Board



Ms M Scholtz  
Technikon Orange Free State  
Private Bag 20539  
BLOEMFONTEIN  
9300

## SOUTH AFRICAN MEDICAL AND DENTAL COUNCIL

P O BOX 205  
PRETORIA  
0001

553 VERMEULEN STREET  
ARCADIA  
PRETORIA

☎ (012) 328-6680  
FAX (012) 328-5120  
e-mail [hpcs3@samdc.co.za](mailto:hpcs3@samdc.co.za)

### SECTION: PROFESSIONAL BOARDS

My ref: 22/4/13  
Mr B Mokgonyana/mh (Ext 271)

12 May 1998

### THE PROFESSIONAL BOARD FOR RADIOGRAPHY

Dear Ms Scholtz

#### CONTINUOUS PROFESSIONAL DEVELOPMENT

Your facsimile dated 3 February 1998 in the above respect was recently considered by the Professional Board.

The Professional Board resolved that you be informed that a needs assessment on continued education in the radiography profession had already been undertaken by the Professional Board and that your request could therefore not be acceded to.

I hope the above is clear to you and shall be pleased to be of further assistance in future.

Please quote the abovementioned reference number in correspondence to Council.

Yours sincerely

B MOKGONYANA  
for REGISTRAR

**Telephonic information given to participants**

**Name:** \_\_\_\_\_  
**Telephone number:** \_\_\_\_\_

I am Marietjie Scholtz from Technikon Free State. I am conducting a needs assessment survey for Continuous Professional Development amongst Free State radiographers on behalf of Technikon Free State.

A needs assessment survey involve people in identifying and justifying their own training needs. The information obtained from this is used to plan training and to determine the attitude of people towards training.

As you may know CPD is the development that professionals undergo on a continuous base after they have completed their basic qualification. This may include formal further study for qualification purposes or attendance of congresses, workshops and in service training programs. At the moment this is a very topical issue amongst radiographers and chances are good that radiographers will be forced to participate in CPD. The reason then why I want to determine the needs of radiographers regarding this are so that program providers such as the Technikon would be able to provide programs that radiographers wish or need to attend.

To determine the needs a mail administered survey will be used. At the moment I am busy with the construction of the survey and would like to involve you with this. The reason for this is to ensure that the needs of practising radiographers are tested, and not my own opinion of what those needs might be. Ten names of radiographers was drawn for this purpose and included yours.

If you would be willing to assist me with this, I will make an appointment with you for a later date that will suit you.

Are you willing to answer three questions regarding this?

If yes, what time would suit you?

<b>Date</b>	
<b>Time</b>	
<b>Contact number</b>	
<b>Fax number</b>	

I am going to give you the questions, so that you can think about it.

**Question 1**

Name the 10 most important skills of a radiographer.

**Question 2**

Name 10 themes for CPD, which you would like to attend.

**Question 3**

Name 5 possible factors that act as deterrents to CPD participation.

Would you like me to repeat any of the questions?  
 Would you like to ask me any questions?

Thank you very much. I will then contact you on \_\_\_\_\_



**Information given by facsimile to participants**

**Name:** \_\_\_\_\_

Thank you for your willingness to participate in this part of the study. Without your help it would have been impossible to do this study. The questions are as follows:

**Question 1**

Name the **ten** most important skills of a radiographer. This may include knowledge and practical skills and behavioral skills required to perform your job.

**Question 2**

What training will help you to become more effective in your job? To answer this, name **ten** possible topics for Continuous Professional Development (CPD) that would benefit you. This may include:

Technical training – relevant to the tasks you perform in your job.

Interpersonal skills training – relevant to the interaction you have with people in order to perform your job.

Information training – to keep you up to date with new developments and changes that will affect how you perform your job.

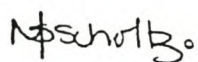
**Question 3**

Name **five** possible factors that act as deterrents to CPD participation.

Thank you very much for your co-operation. It is appreciated.

I will phone you back on \_\_\_\_\_ at \_\_\_\_\_.

Yours faithfully



Marietjie Scholtz

## Cover letter and questionnaire accompanying pilot questionnaire



# Technikon

*Vrystaat • Free State • Foreistata*

Dear

Thank you for your willingness to participate in the pilot study. As I have indicated in our telephone interview I am conducting a needs assessment survey of all qualified diagnostic radiographers in the Free State Province. The objective is to determine how radiographers feel about Continuous Professional Education (CPE), and what their needs are regarding Continuous Professional Education.

Continuous Professional Education is the development that professionals undergo on a continuous base after they have completed their basic qualification. This may include formal further study for qualification purposes, or attendance of congresses, workshops and in service training programs, etcetera. At the moment this is a very topical issue amongst radiographers. The possibility that Continuous Professional Education may become mandatory for all health professionals does exist. The information obtained from the questionnaire will thus be useful to determine what radiographers need and desire for their Continuous Professional Education activities. The information will also be useful to providers of Continuous Professional Education such as the Technikon. Providers can use the information to plan activities according to the needs and wishes of radiographers.

To do this I am using a mail-administered questionnaire. To assess the reliability and validity of the questions before carrying out the actual study a pilot test must be done. This is the reason why I chose ten people who closely resembles the target population. You were one of the ten. Your responses will help me to determine which questions are ambiguous, incomprehensible, leading, etcetra.

Would you please take the time to complete the following questions with regards to the questionnaire? Do not hesitate to critique the questionnaire as this will only help to improve the quality of the questions and therefor the answers.

Thank you very much for your assistance. I do value your opinion and time. It is invaluable to the success of the study.

Sincerely

Marietjie Scholtz

Privaatsak X 20539  
Private Bag X 20539  
Bloemfontein  
9300

Pres Brandstraat 20  
20 Pres Brand Street  
Bloemfontein  
9301

Tel:  
(051) 507- 3911  
Faks/Fax:  
(051) 507- 3199



1. How long approximately did it take you to complete the questionnaire?  
\_\_\_\_\_ minutes

- ### 2.1 Did you find any questions incomprehensible?

1. Yes                      2. No

- 2.2 If yes, will you indicate which questions were incomprehensible?

---

---

---

- ### 3.1 Were some of the questions ambiguous?

1. Yes                      2. No

- 3.2 If yes, will you indicate which questions were ambiguous?

---

---

---

- 4.1 Did you feel that you were leaded at any questions?

1. Yes                      2. No

- 4.2 If yes, will you indicate which at which questions?

---

---

---

- 5.1 Did you at any time feel uncomfortable to answer the questions?

1. Yes                      2. No

- 5.2 If yes, will you indicate which questions were incomprehensible?

---

---

---

---

---

- ### 6.1 Is the questionnaire too long?

1. Yes                      2. No

- 7.1 Do you think any more information should be included?

1. Yes                      2. No

- 7.2 If yes, will you please specify

---

---

8.1 Do you feel anything should be omitted?

1. Yes

2. No

8.2 If yes, please specify

---

---

---

---

9.1 Do you think any questions is too long?

1. Yes

2. No

9.2 If yes, please indicate.

---

---

---

10.1 Are all the questions relevant to the study?

1. Yes

2. No

10.2 If not, please specify.

---

---

---

---

11.1 Other comments. Please specify.

---

---

---



**Final version of the questionnaire****NEEDS ASSESSMENT QUESTIONNAIRE FOR CONTINUOUS PROFESSIONAL EDUCATION.**

Please read through the following questions. Answer all the questions. Mark with a circle the number of the appropriate answer.

**NATURE OF YOUR ORGANISATION.**

1. Which of the following best describes the type of organisation in which you currently work?
1. Government hospital – Tertiary (Universitas-, National hospital)
  2. Government hospital – Regional (Pelonomi-, Goldfields-, Bethlehem-, Manapo- and Boitumelo hospital)
  3. Government hospital – District (all other government hospitals)
  4. Private practice employed by a radiologist
  5. Private practice self employed
  6. Other, please specify \_\_\_\_\_

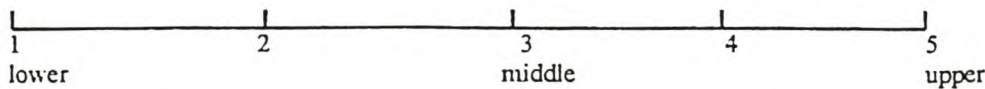
2. Approximately how many radiographers does your department employ? \_\_\_\_\_

3. What is the title of your present position?

1. Radiographer
2. Senior Radiographer
3. Chief Radiographer
4. Assistant Director
5. Other, please specify \_\_\_\_\_

4. How many years have you been in this position? \_\_\_\_\_

5. Which level best describes your formal level of responsibility within your department's structure? Please indicate a position on the following scale.



6. Do you supervise any other members of staff? (Include professional and non-professional). If no, continue to question 8.

1. Yes
2. No

7. If so, how many?

1. Professional, for example radiographers, radiography students \_\_\_\_\_
2. Non-professional, for example darkroom assistants \_\_\_\_\_

8. Would you be willing to indicate your gross salary per year? If not, please go on to the next question.

\_\_\_\_\_

9. How many patients on average does your department do per day?

\_\_\_\_\_

10. Does your department follow set protocols (standard set of projections)? If no, continue to question 12.

1. Yes
2. No

11. Is new staff adequately trained in your department protocols?

1. Yes
2. No

For office use only

--	--	--

1-4

--

4

--	--

5-9

--

7

--	--

8-9

--

10

--

11

--	--

12

--	--

14

--	--	--	--	--	--

16

--	--	--

22

--

25

--

26

12. Is there a high staff turnover (new staff member/s once every three months or more often) in your department?  
1. Yes 2. No
13. Do you use mentors who act as advisors or teachers for new comers? If no, continue to question 16.  
1. Yes 2. No
14. Does the same person always act as mentor to new comers?  
1. Yes 2. No
15. Do mentors receive some form of relief from their other duties?  
1. Yes 2. No
16. Do you perform radiographic services in more than one hospital / clinic?  
1. Yes 2. No

For office use only

<input type="checkbox"/>	27
<input type="checkbox"/>	28
<input type="checkbox"/>	29
<input type="checkbox"/>	30
<input type="checkbox"/>	31

### ABOUT YOU

Now I would like to ask a number of questions about your educational and professional background.

17. Which of the following tertiary qualification do you have? (You can mark more than one).  
Please indicate the year in which the qualification was obtained next to the qualification.

- |  |       |
|--|-------|
| 1. Radiography Diploma (2 year)          | _____ |
| 2. National Diploma Radiography (3 year) | _____ |
| 3. Diploma in Tertiary Education         | _____ |
| 4. B Rad Degree (3 year)                 | _____ |
| 5. B Tech Degree Radiography (4 year)    | _____ |
| 6. National Higher Diploma Radiography   | _____ |
| 7. Honours Degree                        | _____ |
| 8. Masters Degree                        | _____ |
| 9. Doctoral Degree                       | _____ |
| 10. Other, please specify                | _____ |

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	32-
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35-
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	38-
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	41-
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	44-
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	47-
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50-
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	53-
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	56-
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	59-

18. Are you currently engaged in any studies towards gaining a further tertiary qualification? If no, continue to question 21.  
1. Yes 2. No \_\_\_\_\_

<input type="checkbox"/>	62
--------------------------	----

19. If so, what is the level of this qualification?

1. B. Tech Degree  
2. Honours  
3. Masters degree  
4. Doctoral Degree  
5. Other, please specify \_\_\_\_\_

<input type="checkbox"/>	63
--------------------------	----

20. What is the field of qualification named in question 19?

1. Radiography  
2. Other, please specify \_\_\_\_\_

<input type="checkbox"/>	64
--------------------------	----

21. Are you currently a member of any Radiography association? Please indicate.

1. Society of Radiographers of South Africa (SOR)  
2. National Association of South African Radiographers (NASAR)  
3. International Society of Radiographers and Radiation Technologists (ISRRT)  
4. Other, please specify \_\_\_\_\_  
5. None

<input type="checkbox"/>	65
<input type="checkbox"/>	66
<input type="checkbox"/>	67
<input type="checkbox"/>	68
<input type="checkbox"/>	69



22. How old are you? \_\_\_\_\_ years

23. Would you please indicate your gender?

1. Male 2. Female

For office use only

<input type="checkbox"/>	<input type="checkbox"/>	70-7
<input type="checkbox"/>		72

### ABOUT YOUR CONTINUOUS PROFESSIONAL EDUCATION ACTIVITIES

Please answer the following question related to your Continuous Professional Education activities. Mark with a circle the appropriate answer.

24. Before receiving this questionnaire were you aware of Continuous Professional Education for radiographers?

1. Yes 2. No

<input type="checkbox"/>	73
--------------------------	----

25. Do you think Continuous Professional Education is important for radiographers?

1. Yes 2. No

<input type="checkbox"/>	74
--------------------------	----

26. Do you think Continuous Professional Education participation should be compulsory for radiographers?

1. Yes 2. No

<input type="checkbox"/>	75
--------------------------	----

27. Would you prefer to participate in Continuous Professional Education activities?

1. On your own e.g. reading programs  
2. In groups e.g. seminars, workshops  
3. Both 1 and 2  
9. None  
4. Other, please specify

<input type="checkbox"/>	76
--------------------------	----

28. Would you prefer formal (education for qualification purposes e.g. degree, certificate, etc.) or non-formal (education not for qualification, obtained by methods such as reading programs, journals, etc.) Continuing Professional Education activities?

1. Formal  
2. Non-formal  
3. Both  
9. None

<input type="checkbox"/>	77
--------------------------	----

29. Have you attended any workshops, conferences or seminars in the last two years? If no, continue to question 33.

1. Yes 2. No

<input type="checkbox"/>	78
--------------------------	----

30. If so, who paid for these activities? You can mark more than one.

1. You paid for yourself  
2. Your organisation  
3. The Society of Radiographers  
4. X-ray and other medical companies  
5. Other, please specify

<input type="checkbox"/>	1
<input type="checkbox"/>	2
<input type="checkbox"/>	3
<input type="checkbox"/>	4
<input type="checkbox"/>	5

31. How many such activities have you attended in the last two years? \_\_\_\_\_

<input type="checkbox"/>	<input type="checkbox"/>	6-
--------------------------	--------------------------	----

32. Please estimate the total amount of money (costs and expenses) spent by you and/or your organisation on your continuing professional education activities in the past two years.

1. Up to R200  
2. R200-R1000  
3. R1000-R2000  
4. R2000-R4000  
5. More than R4000  
9. None

<input type="checkbox"/>	8
--------------------------	---

33. People sometimes find it difficult to participate in Continuous Professional Education activities such as workshops, conferences, further study for qualification purposes, etcetera. Could you indicate if any of the following are usually major or minor constraints to your involvement in continuing professional education activities? Please mark with an "X" your answer in the appropriate column.

	Major constraint	Minor constraint	No constraint
1. Lack of time after hours			
2. No time release from work			
3. After hour duties			
4. Time of CPE activities is not suitable.			
5. Duration / Too long			
6. Venue / Location unsuitable			
7. Payment of fees / expenses			
8. Professional workload			
9. Staff shortages			
10. Lack of back up staff			
11. Difficult to obtain leave			
12. Employer is not interested in CPE			
13. Lack of suitable courses			
14. Lack of reward / incentives			
15. Lack of motivation – no need			
16. Dangerous to travel long distances			
17. Lack of transport			
18. Not always aware of programs provided			
19. Not used to study anymore			
20. Lack of day care facilities for children			
21. Single parent			
22. Other responsibilities			
23. Lack of confidence in organisation providing the training			
24. Language in which activities is presented			
25. Other (please specify)			

For office use only

9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34



34. Does your organisation offer any planned in service training for radiographers? If no, continue to question 38.  
1. Yes 2. No
35. If yes, have any of these planned in service-training sessions for radiographers been provided by your organisation in the last two-year?  
1. Yes 2. No
36. If yes to question 35, how is it arranged?  
1. On a weekly basis  
1. On a monthly basis  
2. Quarterly  
4. Other, please specify
- 
37. If yes to question 36, could you please list the topics of those activities provided in the last six months (If any)?
- 
- 
- 
38. Do you have adequate channels at your department to express your professional learning needs?  
1. Yes 2. No
39. Do you rotate (work in alternative x-ray rooms) through your department? If no, continue to the next section.  
1. Yes 2. No
40. If yes, do you work in:  
1. All the areas  
2. Selected areas

For office use only

☐

35

☐

36

☐

37

☐

38

☐

40

☐

42

☐

44

☐

45

☐

46

### ABOUT YOUR CONTINUING PROFESSIONAL EDUCATION

I am interested in your views on two different aspects of professional development needs. It is those needs perceived by you as:

1. directly related to your present job, and
2. important to your own professional development, especially in future.

These may overlap in some areas. By need is meant a discrepancy as perceived by you between your current level of knowledge, skill or performance and your desired level of knowledge, skill or performance.

Could you go through this list and indicate with a circle around the appropriate answers whether you presently use any of the following skills, or whether you currently have a **high (H)**, **medium (M)**, or **low (L)** level of need to develop competence in that skill, or **no need (N)** at all. Please also indicate if you will need any of the skills in future. This may for example be required when you are promoted, when you move from one section of radiography to another or when you move from rural areas to urban areas or any other applicable circumstances in the next five years.

Due to the length of the questionnaire it is impossible to obtain detailed information of the type of need you would experience with for example extremities (Section A on the following page). For this reason it was decided to obtain general information. Should it become known that a need exists regarding for example extremities, we will consider obtaining further information.

							47-53
							54-60
							61-67
							68-74
							1-7
							8-14

139



B. SCREENING EXAMINATIONS	Do you presently use / do the following		Level of need to assist in your present position				Level of need to assist your future development			
1. Gastro-intestinal system	Yes	No	H	M	L	N	H	M	L	N
2. Biliary tract	Yes	No	H	M	L	N	H	M	L	N
3. Central nervous system	Yes	No	H	M	L	N	H	M	L	N
4. Respiratory system	Yes	No	H	M	L	N	H	M	L	N
5. Cardiovascular system	Yes	No	H	M	L	N	H	M	L	N
6. Urinary system	Yes	No	H	M	L	N	H	M	L	N
7. Arthrography	Yes	No	H	M	L	N	H	M	L	N
8. Reproductive system	Yes	No	H	M	L	N	H	M	L	N
9. Salivary glands	Yes	No	H	M	L	N	H	M	L	N
10. Lachrymal system	Yes	No	H	M	L	N	H	M	L	N
11. Other, please specify	Yes	No	H	M	L	N	H	M	L	N
	Yes	No	H	M	L	N	H	M	L	N
C. SPECIALIZED RADIOGRAPHY	Do you presently use / do the following		Level of need to assist in your present position				Level of need to assist your future development			
1. Mammography	Yes	No	H	M	L	N	H	M	L	N
2. Tomography	Yes	No	H	M	L	N	H	M	L	N
3. Bone Density Scanning	Yes	No	H	M	L	N	H	M	L	N
4. Theater Radiography	Yes	No	H	M	L	N	H	M	L	N
5. Ward Radiography	Yes	No	H	M	L	N	H	M	L	N
6. Trauma Radiography	Yes	No	H	M	L	N	H	M	L	N
7. Pediatric Radiography	Yes	No	H	M	L	N	H	M	L	N
8. Dental Radiography	Yes	No	H	M	L	N	H	M	L	N
9.1 Vascular Interventional Procedures e.g. embolisation, angioplasty	Yes	No	H	M	L	N	H	M	L	N
9.2 Nonvascular Interventional Procedures e.g. percutaneous puncture, percutaneous drainage procedures	Yes	No	H	M	L	N	H	M	L	N
10.1 Magnetic Resonance Imaging (Basic)	Yes	No	H	M	L	N	H	M	L	N
10.2 Magnetic Resonance Imaging (Advanced)	Yes	No	H	M	L	N	H	M	L	N
11.1 Computer Tomography (Basic)	Yes	No	H	M	L	N	H	M	L	N

For office use only

			15-17
			18-20
			21-23
			24-26
			27-29
			30-32
			33-35
			36-38
			39-41
			42-44
			45-47
			48-50

			51-53
			54-56
			57-59
			60-62
			63-65
			66-68
			69-71
			72-74
			75-77

			78-80
--	--	--	-------

			1-3
			4-6
			7-9

Level of need

H - High level of need

M - Medium level of need

L - Low level of need

N - No need



C. SPECIALIZED RADIOGRAPHY (Continue)	Do you presently use / do the following		Level of need to assist in your present position				Level of need to assist your future development			
11.2 Computer Tomography (Advanced)	Yes	No	H	M	L	N	H	M	L	N
11.3 Spiral Computer Tomography	Yes	No	H	M	L	N	H	M	L	N
12.1 Ultrasound (Basic)	Yes	No	H	M	L	N	H	M	L	N
12.2 Ultrasound (Advanced)	Yes	No	H	M	L	N	H	M	L	N
13. Digital Radiography	Yes	No	H	M	L	N	H	M	L	N
14. Forensic Radiography	Yes	No	H	M	L	N	H	M	L	N
15. Other, please specify	Yes	No	H	M	L	N	H	M	L	N
	Yes	No	H	M	L	N	H	M	L	N
D. PATIENT CARE	Do you presently use / do the following		Level of need to assist in your present position				Level of need to assist your future development			
1. Communication with the patient	Yes	No	H	M	L	N	H	M	L	N
2. Evaluation of patient physical needs	Yes	No	H	M	L	N	H	M	L	N
3. Dealing with acute situations	Yes	No	H	M	L	N	H	M	L	N
4. Dealing with dying and death	Yes	No	H	M	L	N	H	M	L	N
5. First aid	Yes	No	H	M	L	N	H	M	L	N
6. Professionalism and ethical conduct	Yes	No	H	M	L	N	H	M	L	N
7. Legal aspects for the radiographer	Yes	No	H	M	L	N	H	M	L	N
8. Basic medical Sotho language	Yes	No	H	M	L	N	H	M	L	N
9. Cultural diversity training	Yes	No	H	M	L	N	H	M	L	N
10. Medical terminology	Yes	No	H	M	L	N	H	M	L	N
11. Management of the patient with a drip, colostomy etc.	Yes	No	H	M	L	N	H	M	L	N
12. Management of the Aids patient	Yes	No	H	M	L	N	H	M	L	N
13. Infection control	Yes	No	H	M	L	N	H	M	L	N
14. Safety in the hospital (fire procedures, electrical shock, transfer of pt, disaster training)	Yes	No	H	M	L	N	H	M	L	N
15. Guidelines for the use of contrast agents	Yes	No	H	M	L	N	H	M	L	N
16. Clinical assessment of the patient	Yes	No	H	M	L	N	H	M	L	N
17. Other, please specify	Yes	No	H	M	L	N	H	M	L	N
	Yes	No	H	M	L	N	H	M	L	N

For office only

			10-12
			13-15
			16-18
			19-21
			22-24
			25-27
			28-30
			31-33
			34-36
			37-39
			40-42
			43-45
			46-48
			49-51
			52-54
			55-57
			58-60
			61-63
			64-66
			67-69
			70-72
			73-75
			76-78
			1-3
			4-6
			7-9

Level of need

H - High level of need  
M - Medium level of need  
L - Low level of need  
N - No need



E. IMAGE RECORDING											
1. EXPOSURE SELECTION SKILLS		Do you presently use / do the following		Level of need to assist in your present position				Level of need to assist your future development			
1.1 Influence of exposure factors	Yes	No	H	M	L	N	H	M	L	N	
1.2 Radiographic exposure charts e.g. variable kVp technique, fixed kVp technique	Yes	No	H	M	L	N	H	M	L	N	
1.3 Automatic exposure control devices	Yes	No	H	M	L	N	H	M	L	N	
1.4 Exposure manipulation and conversion problems	Yes	No	H	M	L	N	H	M	L	N	
1.5 Other, please specify	Yes	No	H	M	L	N	H	M	L	N	
	Yes	No	H	M	L	N	H	M	L	N	
2. EFFECTIVE USE OF ANCILLARY EQUIPMENT		Do you presently use / do the following		Level of need to assist in your present position				Level of need to assist your future development			
2.1 Grids	Yes	No	H	M	L	N	H	M	L	N	
2.2 Intensifying screens e.g. different types used	Yes	No	H	M	L	N	H	M	L	N	
2.3 Films	Yes	No	H	M	L	N	H	M	L	N	
2.4 Cassettes	Yes	No	H	M	L	N	H	M	L	N	
2.5 Other, please specify	Yes	No	H	M	L	N	H	M	L	N	
	Yes	No	H	M	L	N	H	M	L	N	
3. RADIOGRAPHIC PROCESSING		Do you presently use / do the following		Level of need to assist in your present position				Level of need to assist your future development			
3.1 Processing [Developing, Fixing, Archiving(Washing and drying)]	Yes	No	H	M	L	N	H	M	L	N	
3.2 Processing mistakes	Yes	No	H	M	L	N	H	M	L	N	
3.3 Darkroom design and layout	Yes	No	H	M	L	N	H	M	L	N	
3.4 Silver recovery	Yes	No	H	M	L	N	H	M	L	N	
3.5 Day light systems	Yes	No	H	M	L	N	H	M	L	N	
3.6 Other, please specify	Yes	No	H	M	L	N	H	M	L	N	
	Yes	No	H	M	L	N	H	M	L	N	
4. ANALYSING THE IMAGE		Do you presently use / do the following		Level of need to assist in your present position				Level of need to assist your future development			
4.1 Analysing image quality e.g. density, contrast, detail, distortion	Yes	No	H	M	L	N	H	M	L	N	
4.2 Other, please specify	Yes	No	H	M	L	N	H	M	L	N	
	Yes	No	H	M	L	N	H	M	L	N	

For office use only

10-12

13-15

16-18

19-21

22-24

25-27

28-30

31-33

34-36

37-39

40-42

43-45

46-48

49-51

52-54

55-57

58-60

61-63

64-66

67-69

70-72

73-75

Level of need  
 H - High level of need  
 M - Medium level of need  
 L - Low level of need  
 N - No need



5. QUALITY ASSURANCE IN DIAGNOSTIC RADIOGRAPHY	Do you presently use / do the following		Level of need to assist in your present position				Level of need to assist your future development			
5.1 General radiography	Yes	No	H	M	L	N	H	M	L	N
5.2 Mammography	Yes	No	H	M	L	N	H	M	L	N
5.3 Digital Radiography	Yes	No	H	M	L	N	H	M	L	N
5.4 Computer Radiography	Yes	No	H	M	L	N	H	M	L	N
5.5 Magnetic Resonance Imaging	Yes	No	H	M	L	N	H	M	L	N
5.6 Ultrasound	Yes	No	H	M	L	N	H	M	L	N
5.7 Of x-ray imaging equipment e.g. generators	Yes	No	H	M	L	N	H	M	L	N
5.8 Of processors (sensitometry, etc.)	Yes	No	H	M	L	N	H	M	L	N
5.9 Of x-ray recording systems e.g. intensifying screens	Yes	No	H	M	L	N	H	M	L	N
5.10 Reject analysis	Yes	No	H	M	L	N	H	M	L	N
5.11 Other, please specify	Yes	No	H	M	L	N	H	M	L	N
6. EQUIPMENT	Do you presently use / do the following		Level of need to assist in your present position				Level of need to assist your future development			
6.1 Purchasing of equipment	Yes	No	H	M	L	N	H	M	L	N
6.2 Other, please specify	Yes	No	H	M	L	N	H	M	L	N
F. RADIATION PROTECTION	Do you presently use / do the following		Level of need to assist in your present position				Level of need to assist your future development			
1. Minimizing patient exposure dose	Yes	No	H	M	L	N	H	M	L	N
2. Protecting yourself and others from radiation	Yes	No	H	M	L	N	H	M	L	N
3. Dosimetry	Yes	No	H	M	L	N	H	M	L	N
4. Caring for radiation dosimeters	Yes	No	H	M	L	N	H	M	L	N
5. Newest radiation legislation and regulations	Yes	No	H	M	L	N	H	M	L	N
6. Radiation Biology	Yes	No	H	M	L	N	H	M	L	N
7. Other, please specify	Yes	No	H	M	L	N	H	M	L	N
G. ALGORITHM OF IMAGE MODALITIES FOR RADIOGRAPHIC EXAMINATIONS (assisting in choosing appropriate diagnostic examinations)	Yes	No	H	M	L	N	H	M	L	N

For office use only

			76-78
			1-3
			4-6
			7-9
			10-12
			13-15
			16-18
			19-21
			22-24
			25-27
			28-30

			31-33
			34-36

			37-39
			40-42
			43-45
			46-48
			49-51
			52-54
			55-57
			58-60

Level of need  
H - High level of need  
M - Medium level of need  
L - Low level of need  
N - No need



H. NEW DEVELOPMENTS IN RADIOGRAPHY	Do you presently use / do the following		Level of need to assist in your present position				Level of need to assist your future development			
1. Teleradiography	Yes	No	H	M	L	N	H	M	L	N
2. Filmless systems	Yes	No	H	M	L	N	H	M	L	N
3. Photothermography	Yes	No	H	M	L	N	H	M	L	N
4. Laser imaging	Yes	No	H	M	L	N	H	M	L	N
5. Dry daylight processing	Yes	No	H	M	L	N	H	M	L	N
6. Workshops provided by x-ray equipment companies to obtain information related to newest technology	Yes	No	H	M	L	N	H	M	L	N
7. Other, please specify	Yes	No	H	M	L	N	H	M	L	N
I. MANAGEMENT SKILLS	Do you presently use / do the following		Level of need to assist in your present position				Level of need to assist your future development			
1. Financial management	Yes	No	H	M	L	N	H	M	L	N
2. Leadership development	Yes	No	H	M	L	N	H	M	L	N
3. Staff relations (Management of department staff)	Yes	No	H	M	L	N	H	M	L	N
4. Organisational communication skills	Yes	No	H	M	L	N	H	M	L	N
5. Motivational skills	Yes	No	H	M	L	N	H	M	L	N
6. Problem solving skills	Yes	No	H	M	L	N	H	M	L	N
7. Conflict management	Yes	No	H	M	L	N	H	M	L	N
8. Time management	Yes	No	H	M	L	N	H	M	L	N
9. Management of workload	Yes	No	H	M	L	N	H	M	L	N
10. Cost reductions	Yes	No	H	M	L	N	H	M	L	N
11. Planning skills	Yes	No	H	M	L	N	H	M	L	N
12. Meeting skills	Yes	No	H	M	L	N	H	M	L	N
13. Other, please specify	Yes	No	H	M	L	N	H	M	L	N
	Yes	No	H	M	L	N	H	M	L	N
J. COMPUTER SKILLS	Do you presently use / do the following		Level of need to assist in your present position				Level of need to assist in your future development			
1. Word processing program	Yes	No	H	M	L	N	H	M	L	N
2. Spread sheets	Yes	No	H	M	L	N	H	M	L	N
3. Hospital system	Yes	No	H	M	L	N	H	M	L	N
4. Computer related radiological equipment e.g. CT and MR	Yes	No	H	M	L	N	H	M	L	N
5. E-mail	Yes	No	H	M	L	N	H	M	L	N
6. Internet	Yes	No	H	M	L	N	H	M	L	N
7. Other, please specify	Yes	No	H	M	L	N	H	M	L	N

For office use only

61-63

64-66

67-69

70-72

73-75

76-78

1-3

4-6

7-9

10-12

13-15

16-18

19-21

22-24

25-27

28-30

31-33

34-36

37-39

40-42

43-45

46-48

49-51

52-54

55-57

58-60

61-63

64-66

Level of need  
H - High level of need  
M - Medium level of need  
L - Low level of need  
N - No need

41. Please indicate any other needs you may have perceived and which is not listed in sections A-J, in the space provided:

42. From the information you have given in sections A-J, would you please indicate your ten most important continuing professional educational needs? One being the most important and 10 the least important.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

For office use only

67-68

69-70

71-72

73-74

75-76

77-78

79-80

1-2

3-4

5-6

7-8

9-10

11-12

13-14



## Cover letter accompanying questionnaire



# Technikon

*Vrystaat • Free State • Foreistata*

Dear

I need your help. I am conducting a needs assessment survey of all qualified diagnostic radiographers in the Free State Province. This study was undertaken to obtain a Masters of Philosophy in Adult Education. The objective of the study is to determine how radiographers feel about Continuous Professional Education (CPE), and what their needs are regarding Continuous Professional Education.

Continuous Professional Education is the development that professionals undergo on a continuous basis after they have completed their basic qualification. This may include formal further study for qualification purposes, or attendance of congresses, workshops and in service training programs, etcetera. At the moment this is a very topical issue amongst radiographers. The possibility that Continuous Professional Education may become mandatory for all health professionals does exist. The information obtained from you will be useful in assisting providers of Continuous Professional Education activities to plan these activities so that they meet the needs and wishes of radiographers. Would it not be much better to attend programs and activities that you have a need or desire to attend?

To do this I am using a mail-administered questionnaire. The questions asked will focus on four main areas:

- Your organisation or workplace.
- Some information about your educational and professional background.
- Some questions on your continuing professional education activities.
- Some questions on your continuing professional educational needs.

Your response is of the utmost importance. If no responses are received it may indicate that no needs regarding CPE exists.

Please take the time to complete the enclosed questionnaire. There are no right or wrong answers. Your opinion is invaluable to the success of the study as well as CPE. It will take you approximately 30 minutes to complete the questionnaire.

As you can see this form contains an indication number that will be used for follow-up purposes only. All responses will be treated confidentially and will in no way be traced to individual respondents once the survey process has been concluded.

There is no doubt that a questionnaire set in the preferred language of all respondents would have been the better choice. Unfortunately this would make the questionnaire clumsy. Therefore to overcome administrative problems it was only constructed in English. Please do accept my apologies for this.

Please drop your postage-paid, preaddressed envelope in the mail by 7 November 1998. If you have any comments or inquiries feel free to address them to myself. The telephone number is 051-5073428.

Thank you for your assistance. I do value your opinion and time.

Sincerely,

Marietjie S. Scholtz  
Lecturer radiography

Privaatsak X 20539  
Private Bag X 20539  
Bloemfontein  
9300

Pres Brandstraat 20  
20 Pres Brand Street  
Bloemfontein  
9301

Tel:  
(051) 507-3911  
Faks/Fax:  
(051) 507-3199

## Postcard reminder

20 October 1998

Last week a questionnaire seeking your opinion about the needs of radiographers regarding Continuing Professional Education was mailed to you.

If you have already completed and returned it to me please accept my sincere thanks. If not, please do so today. If the results are to accurately represent the opinions of Free State radiographers, it is extremely important that yours also be included in the study.

If for some reason you did not receive the questionnaire, or it got misplaced, please call me (051-5073428) and I will get another one in the mail to you today.

Sincerely,

A handwritten signature in black ink, appearing to read 'M Scholtz' with a stylized flourish at the end.

Marietjie Scholtz  
Lecturer: Radiography



Cover

letter

accompanying

replacement

questionnaires



# Technikon

*Vrystaat • Free State • Foreistata*

2 November 1998

Dear

Privaatsak X 20539  
Private Bag X 20539  
Bloemfontein  
9300

Pres Brandstraat 20  
20 Pres Brand Street  
Bloemfontein  
9301

Tel:  
(051) 507-3911  
Fuks/Fax:  
(051) 507-3199

About three weeks ago I wrote to you seeking your opinion on the needs you experience regarding Continuing Professional Education (CPE). As of today I have not yet received your completed questionnaire.

I have undertaken this study because of the belief that radiographers themselves must decide what topics they would like to be covered with CPE activities.

I am writing to you again because of the importance each questionnaire has to the usefulness of this study. In order for the results of this study to be truly representative of the Free State radiographers it is essential that each person return their questionnaire.

In the event that your questionnaire has been misplaced, a replacement is enclosed.

Your cooperation is greatly appreciated.

Cordially,

Marietjie Scholtz  
Lecturer: Radiography

**Topics listed by respondents as priority need areas.**

1. Ultrasound
2. Basic Ultrasound
3. Advanced Ultrasound
4. Respiratory System Radiography
5. Basic Sotho language
6. Medical terminology
7. Vascular Radiology
8. Black language
9. Mammography
10. Dealing with dying and death
11. Legal aspects of radiography
12. First aid
13. Radiation protection
14. Additional views of the skull
15. Automatic exposure control
16. Trauma radiography
17. Professional conduct
18. Film processing
19. Acute situations
20. Gastro-intestinal tract Radiography
21. Digital Radiography
22. Management training
23. Problem-solving skills
24. Organisational communication skills
25. Meeting skills
26. Procurement and requisition of stock, repairs and services
27. Time management skills
28. Advanced Spiral Computed Tomography
29. Interventional Computed Tomography
30. Computed Tomography
31. Basic Computed Tomography
32. Advanced Computed Tomography
33. Congress planning
34. Student tutorials
35. Bone density scanning



36. Use of ancillary equipment
37. Exposure selection skills
38. Purchasing of equipment
39. Analysing image quality
40. Newest radiation regulations
41. Radiation Biology
42. Teleradiography
43. Patient communication
44. Infection control
45. Management of workload
46. Financial management
47. Administration skills
48. Motivational skills
49. Staff management skills
50. Departmental planning skills
51. Radiographic Contrast Medium
52. Anatomy of the heart
53. Computed Tomography Anatomy
54. Radiographic Anatomy
55. Dental Radiography
56. Pattern recognition
57. Pattern recognition of the skull
58. Pattern recognition of the vertebrae
59. Pattern recognition of the chest
60. Advanced magnetic resonance imaging
61. Basic magnetic resonance imaging
62. Magnetic Resonance Imaging
63. Algorithm of imaging modalities
64. Congenital heart diseases
65. Sensitometry
66. Minimising patient dose
67. Processors
68. Angiography
69. Contrast examinations of the urinary tract
70. New techniques in Conventional radiography
71. Patient care
72. Quality assurance

73. Cardiopulmonary resuscitation
74. Disaster management
75. Dry daylight processing
76. Filmless systems
77. Photothermography
78. Processing mistakes
79. Administration of the x-ray department
80. Skull radiography
81. Cardiovascular System Radiography
82. Central nervous System Radiography
83. New developments in Radiography
84. Computer training
85. Word-processing programme skills
86. Use of E-mail skills
87. Use of Internet skills
88. Hospital computer systems skills
89. Radiography-related computer skills
90. Ward radiography
91. Basic rights of radiographers in private practice
92. Daylight systems
93. Cultural diversity training
94. Safety in the hospital
95. Training of new employees
96. In-house training
97. Leadership development
98. Recognition of Pathology
99. Interhospital rotation
100. Communication between the radiologist and the radiographer
101. Limited diagnostic skills
102. Proper handling of equipment
103. Teaching basic radiological principles to other staff such as nurses and doctors
104. Pediatric radiography
105. Laser
106. Chest x-rays of children
107. Safe handling of neonates
108. Alternative positions
109. Basic knowledge of other paramedical fields



- 110. An extra language
- 111. Interventional radiography
- 112. Practical training in future imaging modalities
- 113. Clinical assessment of the patient
- 114. Cost reductions
- 115. Patient language
- 116. Use of grids
- 117. Imaging problems
- 118. Specialisation in radiography
- 119. Abdominal x-rays
- 120. To be able to make a diagnosis