The role of self-direction in Australian sonographers’ professional development

by

Maureen Phillips
DCR(R), DMU, MHealth(res)

Submitted in fulfilment of the requirements for the degree of

Doctor of Philosophy

Deakin University

January, 2011
I am the author of the thesis entitled

The role of self-direction in Australian sonographers' professional development

submitted for the degree of Doctor of Philosophy

This thesis may be made available for consultation, loan and limited copying in accordance with the Copyright Act 1968.

Full Name..................Maureen Phillips........

I certify that I am the student named above and that the information provided in the form is correct.

Signed ......

Date..........1st August, 2011.........
I certify that the thesis entitled

The role of self-direction in Australian sonographers’ professional development

submitted for the degree of Doctor of Philosophy is the result of my own work and that where reference is made to the work of others, due acknowledgment is given.

I also certify that any material in the thesis which has been accepted for a degree or diploma by any university or institution is identified in the text.

Full Name........Maureen Phillips.................................................................

I certify that I am the student named above and that the information provided in the form is correct.

Signed ....... [Signature Redacted by Library]

Date...................1st August, 2011.................................................................
Acknowledgments

First and foremost, I would like to thank Associate Professor Peter Smith, initially for accepting me as his student, and then for his guidance, encouragement, patience and humour throughout my candidature.

Secondly, I wish to acknowledge all the sonographers who took the time to furnish me with such rich information, without them this thesis would not exist.

Thank you to Dr. Kerry Thoirs, Dr. Sharron King and Dr. Karen Wilkinson for all your help, advice, encouragement and proof reading.

Finally, I thank my husband, Barry Phillips for his support and unfailing belief in me.
Contents

Acknowledgments ....................................................................................................................... iv
Tables ........................................................................................................................................ xiii
Figures ...................................................................................................................................... xiv
Abstract .................................................................................................................................... 1
Chapter 1 ................................................................................................................................... 3
Australian Sonographers’ Continuing Professional Development ............................................. 3
  1.1 Background ..................................................................................................................... 3
  1.2 Accreditation and continuing professional development .................................................. 7
  1.3 Medical Radiation Sciences ............................................................................................... 13
  1.4 Aim of the study .............................................................................................................. 18
  1.5 Contents of thesis ......................................................................................................... 18
Chapter 2 ................................................................................................................................... 21
Adult and Workplace Learning ..................................................................................................... 21
  2.1 Introduction .................................................................................................................... 21
  2.1 Motivation .................................................................................................................... 21
  2.2 Adult learning ............................................................................................................... 23
  2.3 Communities of practice and workplace learning ........................................................... 27
    2.3.1 Communities of practice ......................................................................................... 28
    2.3.2 Workplace learning ............................................................................................... 30
  2.4 Mentoring .................................................................................................................... 32
  2.5 Critical reflection and transformational learning ............................................................... 34
  2.6 Self-direction in learning ............................................................................................... 37
  2.7 Conclusion .................................................................................................................... 44
Chapter 3 ................................................................................................................................... 47
Continuing Professional Development ....................................................................................... 47
  3.1 Introduction .................................................................................................................... 47
  3.2 Overview of CPD ............................................................................................................ 47
5.7 Principal components analysis ........................................................................................... 103
5.8 Interpretation of the Factors ............................................................................................. 108
5.8.1 Factor 1 ................................................................................................................ ........ 108
5.8.2 Factor 2 ................................................................................................................ ........ 108
5.8.3 Factor 3 ................................................................................................................ ........ 109
5.8.4 Factor 4 ................................................................................................................ ........ 109
5.9 Factor Scores ............................................................................................................. ....... 109
5.10 Non-loading variables .................................................................................................... .. 109

Chapter 6 ............................................................................................................................... ...... 111
Belief in the Value of CPD .................................................................................................... ........ 111
6.1 Overview of chapter ........................................................................................................... 111
6.2 ANOVA..................................................................................................................... ..... 111
6.2.1 ‘urban/rural’ and ‘gender’ ........................................................................................ 113
6.2.2 ‘urban/rural’ and ‘age groups’ ................................................................................. 114
6.2.3 ‘gender’ and ‘age groups’ ....................................................................................... 116
6.2.4 ‘gender’ and ‘sonography as sole occupation’ .......................................................... 117
6.2.5 ‘gender’ and ‘years as a sonographer’ ...................................................................... 118
6.2.6 ‘age groups’ and ‘sonography as sole occupation’ .................................................... 120
6.2.7 Summary of ANOVA for ‘Belief in the Value of CPD’ .............................................. 121
6.3 Responses to open-ended survey questions ..................................................................... 122
6.3.1 Positive perceptions in the ‘Belief in the Value of CPD’ ........................................... 125
   General comments .............................................................................................................. 125
   Professionalism ............................................................................................................... .... 126
   Positive Outcomes of CPD .............................................................................................. 126
   Qualified comments ........................................................................................................... 127
6.3.2 Negative perspectives of CPD .................................................................................... 127
   General comments against mandatory CPD ................................................................. 128
8.1 Overview of chapter ........................................................................................................... 160
8.2 ANOVA.................................................................................................................................. 161
  8.2.1 ‘urban/rural’ with ‘gender’ .............................................................................................. 161
  8.2.2 ‘urban/rural’ with ‘age groups’ ....................................................................................... 162
  8.2.3 ‘urban/rural’ with ‘years as a sonographer’ ................................................................. 163
  8.2.4 ‘urban/rural’ with ‘sonography as sole occupation’ .................................................. 164
  8.2.5 ‘gender’ with ‘age groups’ .............................................................................................. 165
  8.2.6 ‘gender’ with ‘years as a sonographer’ ......................................................................... 166
  8.2.7 ‘gender’ with ‘sonography as sole occupation’ ........................................................... 168
  8.2.8 ‘age groups’ with ‘years as a sonographer’ ................................................................. 169
  8.2.9 ‘age groups’ with ‘sonography as sole occupation’ .................................................. 170
  8.2.10 ‘years as a sonographer’ and ‘sonography as sole occupation’ ................................... 171
8.3 Responses to open-ended survey questions .......................................................................... 173
  8.3.1 Reflective Practice ......................................................................................................... 173
  8.3.2 Self-direction ................................................................................................................. 173
    Attendance at CPD activities ............................................................................................... 174
    Professionalism .................................................................................................................. 175
    Regarding CPD .................................................................................................................. 175
8.4 Discussion ........................................................................................................................... 176

Chapter 9 .................................................................................................................................... 182
Motivators ................................................................................................................................... 182
  9.1 Overview of chapter ......................................................................................................... 182
  9.2 ANOVA.................................................................................................................................. 182
  9.2.1 ‘urban/rural’ with ‘age groups’ ....................................................................................... 183
  9.2.2 ‘urban/rural’ with ‘years as a sonographer’ ................................................................. 184
  9.2.3 ‘gender’ with ‘years as a sonographer’ ......................................................................... 185
  9.2.4 ‘age groups’ and ‘years as a sonographer’ ................................................................. 187
  9.2.5 ‘age groups’ and ‘sonography as sole occupation’ .................................................. 188
### Tables

Table 1.1: Continuing professional development/education requirements for MRS ........................ 16
Table 3.1 Advantages and disadvantages of inputs and outputs based CPD schemes. ...............63
Table 5.1: Demographic frequencies of respondents to survey .......................................................... 96
Table 5.2: Written survey responses ........................................................................................... . 103
Table 5.3 Structure matrix of PCA for sonographer CPD survey .................................................. 106
Table 5.4: Component Correlation Matrix ..................................................................................... 107
Table 6.1: ANOVA results of ‘urban/rural’ and ‘gender’ ............................................................... 113
Table 6.2: ANOVA results of ‘urban/rural’ and ‘age groups’ .......................................................... 115
Table 6.3: ANOVA results of ‘gender’ and ‘age groups’ ................................................................ 116
Table 6.4: ANOVA results of ‘gender’ and ‘sonography as sole occupation’ .............................. 117
Table 6.5: ANOVA results of ‘gender’ and ‘years as a sonographer’ ............................................ 119
Table 6.6: ANOVA results of ‘age groups’ and ‘sonography as sole occupation’ ......................... 120
Table 6.7: Categorisation of ‘Belief in the Value of CPD’ component comments ....................... 123
Table 6.8: Frequencies of responses in the category ‘Belief in the Value of CPD’ ....................... 124
Table 7.1: ANOVA results of ‘urban/rural’ and ‘gender’ ............................................................... 137
Table 7.2: ANOVA results of ‘urban/rural’ and ‘age groups’ .......................................................... 139
Table 7.3: ANOVA results of ‘urban/rural’ and ‘years as a sonographer’ .................................... 141
Table 7.4: ANOVA results of ‘urban/rural’ and ‘sonography as sole occupation’ ..................... 142
Table 7.5: ANOVA results of ‘gender’ and ‘age groups’ ............................................................... 144
Table 7.6: ANOVA results of ‘years as a sonographer’ and ‘sonography as sole occupation’ ...... 145
Table 7.7: Categorisation of ‘Barriers to Participation’ component comments ......................... 148
Table 7.8: Frequencies of responses in the category ‘Barriers to Participation’ ......................... 148
Table 8.1: ANOVA results of ‘urban/rural’ and ‘gender’ ............................................................... 161
Table 8.2: ANOVA results of ‘urban/rural’ and ‘age groups’ .......................................................... 162
Table 8.3: ANOVA results of ‘urban/rural’ and ‘years as a sonographer’ .................................... 163
Table 8.4: ANOVA results of ‘urban/rural’ and ‘sonography as sole occupation’ ..................... 165
Table 8.5: ANOVA results of ‘gender’ and ‘age groups’ ............................................................... 166
Table 8.6: ANOVA results of ‘gender’ and ‘years as a sonographer’ ............................................ 167
Table 8.7: ANOVA results of ‘gender’ and ‘sonography as sole occupation’ .............................. 168
Table 8.8: ANOVA results of ‘age groups’ and ‘years as a sonographer’ .................................... 169
Table 8.9: ANOVA results of ‘age groups’ and ‘sonography as sole occupation’ ......................... 170
Table 8.10: ANOVA results of ‘years as a sonographer’ and ‘sonography as sole occupation’ .... 171
Table 9.1: ANOVA results of ‘urban/rural’ and ‘age groups’ .......................................................... 183
Table 9.2: ANOVA results of ‘urban/rural’ and ‘years as a sonographer’ ..................................... 184
Table 9.4: ANOVA results of ‘age groups’ and ‘years as a sonographer’ .................................. 187
Table 9.5: ANOVA results of ‘age groups’ and ‘sonography as sole occupation’ ..................... 188
Table 9.6: ANOVA results of ‘years as a sonographer’ and ‘sonography as sole occupation’ ..... 190
Table 9.7: Categorisation of ‘Motivators’ component comments ............................................. 192
Table 9.8: Frequencies of comments per demography in the category ‘Motivators’ ................. 192
Table 11.1: Strategies for Australian sonographer CPD ............................................................... 241

Figures

Figure 2.1 Kolb’s Learning Cycle, adapted from Smith & Dalton (2005). ..................................... 27
Figure 2.2 The Personal Responsibility Orientation Model, adapted from Brockett & Hiemstra, 1991
p. 99. .......................................................................................................................................... 40
Figure 3.1 The CPD Cycle (http://www.nes.scot.nhs.uk/) .......................................................... 61
Figure 3.2 Kolb’s experiential learning cycle (1984) http://www.rcn.org.uk/ ......................... 62
Figure 5.1 CPD Activities undertaken in the two years prior to the survey ............................. 100
Figure 6.1 ‘urban/rural’ and ‘gender’ ......................................................................................... 114
Figure 6.2 ‘urban/rural’ and ‘age groups’ ................................................................................ 116
Figure 6.3 ‘gender’ and ‘age groups’ ...................................................................................... 117
Figure 6.4 ‘gender’ and ‘sonography as sole occupation’ ....................................................... 118
Figure 6.5 ‘gender’ and ‘years as a sonographer’ ................................................................. 120
Figure 6.6 ‘age groups’ and ‘sonography as sole occupation’ .............................................. 121
Figure 7.1 ‘urban/rural’ and ‘gender’ ...................................................................................... 138
Figure 7.2 Error bars demonstrating differences between males and females and between females
in city and rural locations for the factor ‘Barriers to Participation’ ....................................... 138
Figure 7.3 ‘urban/rural’ and ‘age groups’ .............................................................................. 140
Figure 7.4 ‘urban/rural’ and ‘years as a sonographer’ .............................................................. 142
Figure 7.5 ‘urban/rural’ and ‘sonography as sole occupation’ ................................................ 143
Figure 7.6 ‘gender and ‘age groups’ ......................................................................................... 144
Figure 7.7 ‘Years as a sonographer’ and ‘sonography as sole occupation’ ............................ 146
Figure 8.1 ‘urban/rural’ and ‘gender’ ...................................................................................... 162
Abstract
This thesis examines the role of self-direction in the continuing professional development of Australian sonographers. In order to maintain accreditation, Australian sonographers are required to undertake continuing professional development (CPD). This thesis describes and analyses sonographers' attitudes to their CPD, the barriers they may face in fulfilling their requirements and how they utilise reflective practice in their learning and CPD.

The majority of sonographers are female, many of whom live and work in rural areas which have their own constraints, such as distance and remoteness. Many sonographers have heavy work schedules and may work in understaffed departments. This thesis argues that although most sonographers are in favour of professional development, in the presence of deterrents and demotivators, the ability of sonographers to utilise self-direction in their learning to its fullest extent will be adversely affected. Further to this, the mandatory input only nature of CPD and also the large number of activities presented to sonographers may prevent full utilisation of self-direction in their CPD.

The theoretical framework for this thesis was based on the Personal Responsibility Orientation model devised by Brockett and Hiemstra (1991) to conceptualise and explain self-direction in learning. A mixed-methods research design, including both quantitative and qualitative components was designed. A survey devised specifically for the investigation of sonographers' attitudes and opinions to CPD was sent out to members of the Australian Sonographers Association. The questionnaire invited comments giving added depth to the survey. Nine sonographers volunteered for interview. The interviews added further insight into the findings.

The survey had a good response rate with 682 completed surveys returned, allowing for the findings to be generalised amongst this population group. Most sonographers were in favour of CPD and also mandatory CPD. Barriers to participation recognised included family, costs and time/workload issues. In general, rural female sonographers perceived that they were significantly
more affected by these barriers than their city counterparts. Some sonographers were only undertaking CPD to ‘get the points’, nevertheless, it was apparent that the majority did care about their work and reflected upon it daily. Workload and work conditions, location and gender have a role to play in whether sonographers utilise self-direction in learning. Sonographers do not appear to plan their formal CPD to any great extent, some due to the barriers discussed throughout this thesis and others either because they presume they do not need to or do not know how. This thesis suggests that a mandatory inputs only based model for CPD may be detrimental to the self-direction in learning of many Australian sonographers and proposes that an outputs based scheme based on an existing UK model may be preferable.
Chapter 1

Australian Sonographers’ Continuing Professional Development

My interest in sonographer education stems from 1976 when I first began my career in sonography. At that time, sonography was in its infancy and there was no formal training, in fact it was just an extension of my job as a radiographer. Equipment and range of sonographic examinations were limited and training was ‘on-the-job’. Most learning came from trial and error and eventually experience. Looking back, it was often a nerve-wracking experience for early sonographers with minimal training to be responsible for scanning patients and reporting findings to physicians and obstetricians, for at this time, few radiologists had any knowledge of ultrasound. This experience motivated many early sonographers to keep on learning, primarily from a great interest and fascination in the job at hand, but also quite possibly from a fear of not knowing enough to perform the job well!

1.1 Background

Echo sounding and SONAR (sound navigation and ranging) are well recognised terms in fishing and geology which is where medical ultrasound, now termed sonography, had its beginnings. The physics and the technology of ultrasound have been the subject of ongoing research for over 200 years. In 1794, Italian biologist, Spallanzoni, was able to demonstrate that bats navigated in the dark by using echo reflection of inaudible sound. In 1826, the speed of sound in water was determined at Lake Geneva and the physics of sound was outlined by Rayleigh in 1877. In 1878, Pierre Curie and Jacques Curie discovered the piezo-electric effect of quartz crystals needed for generation and reception of ultrasound frequencies in the megahertz range. The sinking of the Titanic spurred inventors on to develop a reliable device for detecting underwater icebergs. World War 1 encouraged them even further in the push to find a warning device for submarine detection (Woo, 2002).
The first use of ultrasound on solid materials in the 1930s was to find flaws in metal objects. From there it was only a short time before pioneers in its use began experimenting first on animals and then on human beings. Initially ultrasound was thought of only as a means for treatment in muscle disorders, a use it still has. Later, it was found that ultrasound would prove useful as a diagnostic test and humans were first scanned using an ultrasound device for diagnosis in the mid 1950s. The images were crude at this time and it was not until computers became more sophisticated and the silicon chip was invented that ultrasound really started to advance. From the late seventies onwards the technological progression has been rapid, leading to ever more technologically sophisticated imaging. Now, with the ‘higher-end’ models of equipment we are able to image very small objects, blood flow and also see organs and foetuses in 3D real time if necessary (Woo, 2002).

Researchers in Australia, along with others from Scotland, the USA and Japan were leaders in the design and development of ultrasound equipment, with Australia being at the forefront in the use of ultrasound for diagnostic imaging and the education of its operators. The use of ultrasound as a diagnostic imaging technique is known as (ultra)sonography and specialist operators of ultrasound equipment for diagnostic medical purposes are known as (ultra)sonographers. At the time this study was undertaken there were approximately 3400 sonographers accredited by the Australasian Sonographer Accreditation Registry (ASAR).

The term ultrasonographer, later shortened to sonographer, for a person who is trained in performing ultrasound examinations, did not exist until about 1973/4. At the same time, some doctors, initially primarily obstetricians, began to realise the potential of the technology and radiographers, nuclear medicine technicians and nurses began to learn the new technology. In many parts of the world, in particular in Eastern Europe and the Indian subcontinent, sonography is still seen as the domain of the physician and is underutilised.
In Australia, the first society for people with an interest in ultrasound, Australasian Society for Ultrasound in Medicine and Biology (ASUMB), began in 1970. Later it was changed to the Australasian Society for Ultrasound in Medicine (ASUM). The ASUM was intended to encompass all facets of the discipline and it became the ‘voice’ of ultrasound in Australasia. The society set the protocols and principles pertaining to the diagnostic use of ultrasound. In 1976, ASUM introduced an examination for radiologists and other medical personnel involved in diagnosing and reporting ultrasound scans. In 1980, the first examinations were held for sonographers to obtain the Diploma of Medical Ultrasonography (DMU). Some sonographers who had been practising for four or more years were awarded a ‘grandfather’ clause by the ASUM, whereby their experience was deemed to have been sufficient to allow this. Others, like me, were awarded a ‘grandmother’ clause and only had to undertake oral and practical examinations.

In comparison with today’s standards, knowledge required at that time was relatively minimal. Examinations were conducted and written by interested members of ASUM. Formal education was a matter of a few dedicated professionals volunteering to give lectures in various key areas of interest. Text books were almost non-existent and only a few research and clinical papers had been written. Of course, this has changed dramatically over the ensuing years. Nowadays, there are text books available for all facets of sonography and all professional associations publish their own journals, with the majority of them being peer-reviewed. The DMU, although still in existence, has almost been superseded by post-graduate diplomas in medical sonography run by several universities. There are at least two general conferences a year in Australia and several specialist conferences, for example, on vascular sonography.

Due to ever changing and improving technology, sonographers have had to keep abreast of advances. Some of this happened just by working with new equipment and discussion with colleagues, but it also meant that sonographers had to be continually reading articles and books in order to maintain their levels of expertise. Conferences and workshops held by the ASUM were a
good way for knowledge to be exchanged. Employers often did not require their sonographers to have a formal qualification in ultrasound and some experienced sonographers ‘never got round to’ obtaining their DMU. Sonographers were not even recognised by governments as a separate profession or job classification (and are still not recognised by some State governments, for example, Queensland and New South Wales public hospital systems).

Educational institutions were slow to offer courses for sonographers. Apart from Royal Melbourne Institute of Technology, which has offered a graduate diploma since 1983, it was 1995 before any other tertiary institution did likewise. In defence of the universities, it is probably fair to say that there were not enough sonographers and student sonographers in the country to warrant the outlay of setting up new programs. Currently the majority of universities offering graduate diploma programs for medical sonography provide them in distance education mode. In addition, all of these universities offer higher degrees. None of the programs are full-time as all students need significant amounts of on the job training. Student sonographers, for the most part, now have access to excellent and comprehensive training.

The ASUM did not initially recognise sonographers as full members of the Society and accordingly they had little say in matters such as education, accreditation and advocacy. Sonographers began to feel that they deserved and were worthy of a greater input into their profession and in 1990 a group of Victorian sonographers came together to form the Victorian Sonographers Association. This group grew into the Australian Sonographers Association (ASA), which is an Association run by sonographers with the interests and education of sonographers in mind. The association now has over 2500 members and has introduced its own CPD scheme, reporting to the ASAR, and also self-regulation in the form of certification of qualified sonographers.
Chapter 1: Australian Sonographers’ Continuing Professional Development

### 1.2 Accreditation and continuing professional development

As a result of promotion by the Association from the mid 1990s, a push towards accreditation became imperative. The Federal Government supported this, partly through a political interest in radiologists at that time, in regards to Medicare payments, but they also listened to the needs of sonographers. A group of interested parties that included representatives from Government, ASUM, ASA, AIR (Australian Institute of Radiographers) and the universities formed the Australasian Sonographer Accreditation Registry (ASAR). One of the reasons for this move by sonographers was an increasing need to become formally recognised as professional in their own right. Accreditation for sonographers came into being on 1st November 2002. From that time sonographers who perform medical ultrasound examinations that receive a Medicare benefit must be accredited with this body. Likewise, all educational institutions that teach sonography must be accredited and re-accredited regularly, every three to five years. A mandatory policy of continuing professional development (CPD) for all accredited sonographers was also introduced.

The mandatory policy states that an accumulation of 40 CPD credits over a triennium is required to maintain accreditation. The role of the ASAR is threefold:

- To accredit sonography training programs and education programs within Australia.
- To maintain a registry of accredited sonographers.
- To establish minimum standards of CPD and to monitor the CPD requirements for sonographers to remain on the registry (ASAR, 2010).

The ASAR is an independent body, separate from the professional organisations that sonographers may obtain membership in; but it does have a representative from each professional association, one representing the Universities and one the DMU committee. The professional associations run their own CPD programs alongside the ASAR, and credits are allowed to be transferred. Currently, the ASAR allow CPD credits to be collected from 10 broad groups of coded categories:
• Attendance at national/international meetings.
• Attendance at educational programs including live scanning workshops.
• Attendance at hospital grand rounds and relevant in-house seminars.
• ASAR approved web-site activities.
• Scientific or professional publication, peer reviewed or non-reviewed.
• Works presented at national or international meetings.
• Works presented at local meetings.
• Works presented at live scanning workshops.
• ‘Self-directed learning’\(^2\) to enhance patient outcomes and professional skills e.g. peer reviews, library research, reading relevant journal articles or texts.
• Any other documented educational or professional activity as approved by the Registry e.g. course convening, participation in relevant professional council meetings, examining within the profession, clinical program organising (ASAR, 2010).

The sonographer needs a certificate of attendance for each activity to be kept as a record. The system is based on trust although 10 per cent of sonographers each year are audited at random regarding their activities. Those who are audited have to account for their activities in a rigorous fashion. Whilst institutions that offer education for student sonographers must be accredited and account for their teaching policies and methods, offerings for CPD do not undergo rigorous inspection, although they are presented and organised by experienced, knowledgeable sonographers who volunteer to share their knowledge with others. However, individual activities are rarely, if ever, evaluated for usefulness and outcomes. Evaluations of conferences indicate satisfaction with venue, meals and the overall quality of the speakers etcetera, that is, they are undertaken to assess organisational and personal satisfaction rather than outcomes. In summary,

\(^2\) Self-directed learning is the phrase used by ASAR to denote independent study.
there appears to be no consistent or transparent process for approving or disapproving a CPD activity.

Since the inception of mandatory CPD, it has been interesting to note the burgeoning of all forms of education being offered by the professional sonographer associations. Whether all of these activities are warranted has not been investigated. Training needs analysis of the profession would be one way of rectifying this. As discussed by Gould, Kelly, White and Chidgey (2004) and Revel and Yussuf (2003), a training needs analysis would identify learning needs of the profession, recommend how to address these needs and implement the findings of the analysis. It is of interest that the Royal Australian College of General Practitioners always requires a comprehensive training needs analysis before acceptance of a program or activity for CPD. Whilst it has been mooted that well-designed CPD models may influence practice and competency (McPartland, 1990; Kerka, n.d.), there has been little evidence put forward that the previously listed CPD activities have done that in any of the professions studied. In addition, the increase in number of activities offered to a professional does not guarantee that there will be a subsequent increase in knowledge, in fact, there have been concerns voiced in the literature that a proliferation of inferior activities may occur due to mandatory CPD ensuring a captive audience (McPartland, 1990; Perry, 1995). The sonographer system is consistently under review by the ASAR and some of the previously listed activities have recently been removed or adjusted (ASAR, 2010).

As can be seen from the list outlined earlier, there is a wide variety of activities from which a sonographer may choose. However, for many the range of choices may be much narrower. Items which involve a sonographer presenting papers at conferences and demonstrating at workshops are generally not undertaken by most sonographers. The reasons for this may include fear of public speaking and general lack of confidence. In addition, a sonographer usually has a busy work schedule, which does not allow much time for preparation of talks and workshops. A similar situation occurs with the writing of articles. Writing an article takes time and commitment, especially
for those unfamiliar with the process and, until recently, there has not been a tradition of sonographers writing articles for journals. In addition, it has been my observation there has been little encouragement to do so by their employers and the profession generally.

There are two remaining activities from which a large number of credits may be gained. The first one of these is to study for a higher degree, although this only relates to ultrasound based courses and does not include research degrees. The remaining activity which carries a higher number of credits is attendance at, or participation in, a conference. It is my observation that the numbers attending sonographer conferences have more than doubled since CPD was introduced and interestingly, the cost has risen in proportion, possibly due to larger venues being required. Cost may be an important factor in whether a sonographer will attend a conference. If interstate travel is involved the total cost can be approximately $3000, which could be above some sonographers’ budgets. Some employers will fund some conference attendances, but usually this funding is on a roster basis for staff. However, cost may not be the only problem. For a sonographer who works in rural and outlying areas, where he or she may be a sole practitioner, it can become difficult to leave for a few days, as most employers will not employ or cannot find a locum to replace them for a short time only. Others are parents of small children who may have difficulty in finding suitable childcare for a few days. However, in spite of the difficulties, many sonographers do find the means to attend sonographer conferences.

The conferences are generally regarded by most as being good learning experiences and well run. They include workshops and many different speakers on a wide range of topics. They are a means to meet with old friends and colleagues and to ‘network’. The social occasions are usually good fun. But the question remains about the effectiveness of attending these conferences. A cynical view would be that it is quite easy to register attendance, pop in to a couple of talks that might be interesting and then spend the rest of the time socialising or shopping. On the other hand, a sonographer may go to every session of talks in a time frame and still choose a topic he or she is
conversant with already. She/he may enjoy the talk, but learn only that he/she is using the same techniques as the speaker, thus validating knowledge, which is useful when working alone, but not adding to overall knowledge. Indeed as Knight (2002) discussed, there is debate whether attendance at talks and lectures will increase knowledge and encourage change of practice.

The remaining activities on the list suggested by ASAR are more accessible for most sonographers and certainly cheaper. Workshops and seminars are common activities held by the ASA and ASUM State branches, sometimes jointly, at least twice and sometimes more, per year. These workshops and seminars are either held on a Saturday morning or a Tuesday evening. Presentation at these workshops is on a voluntary basis and usually it is a regular few volunteers who present material. These sonographer volunteers are dedicated and passionate about their work; however, the workshops can become somewhat repetitive, offering similar topics time and again. The topics are chosen by the State committees and the choice is a matter of what they would like to do and what they believe is necessary rather than being directed towards the immediate needs of the profession.

It is challenging to schedule a time for workshops that everyone is happy with, since family commitments and shift work can make it difficult to attend. There is thus a possibility that a sonographer may choose to attend a particular workshop because she/he just happens to be free, rather than actually needing to attend. The topics can be similar, so a choice may be made not to attend, however in not attending, any newly presented material or findings will be missed. Alternatively, if a sonographer has a particular interest in one topic, he or she may attend only workshops relating to that topic because of feeling comfortable with it, similar to the conference situation stated previously. As Revel and Yussuf (2003) discussed, attendance at activities that one knows the subject matter and is comfortable with is unlikely to have a positive impact on patient care. Rural and remote sonographers are disadvantaged from attending these workshops by time, distance and cost for travel. The implementation of a travelling workshop program did improve
availability to areas such as Tamworth and Alice Springs, however, this initiative has been curtailed due to financial restraints. ASA has also introduced mini one day conferences which are related to one topic only for special interest groups. These are gradually becoming more popular. As with the travelling workshops, the one day workshops were intended to visit more than just the eastern seaboard capitals, however, running costs have prevented this and the workshops will probably just be held in Melbourne or Sydney in the future (ASA, 2010).

Until recently, a sonographer could choose to gain all his/her credits through so-called ‘self-directed learning’. The activities undertaken could include article reading, where a short summary has to be made or reading an article and then submitting answers posed in relation to the article. Both these methods have merits and journal reading is widely used in other professions as a means of professional development (Cole & Glass, 2004). However, deficiencies can be found in this method. In order to gain full benefit from an article it is necessary to be able to appraise it correctly. Discussions with sonographers lead me to believe that many will read only the introduction and conclusion as they find the method and statistics sections uninteresting; however they still believe they have learnt from the article. Also, if one is conversant with a subject, it is possible to answer questions about an article, without actually reading it. Self-directed learning requires that an individual has a good insight into their own knowledge and requirements (Shannon, 2000). This is not always the case as evidenced in a study by Tracey, Arroll, Barham and Richmond (1997) of general practitioners (GPs) which discovered that the GP’s insight into their own educational needs was poor. Just prior to the research in this thesis being undertaken, the ASAR decided that credits from ‘self-directed’ activities would be limited to allow for more diversity in CPD (ASAR, 2010).

As noted earlier, in the ASAR model for CPD, ‘self-directed’ learning encompasses such activities as journal article reading as defined previously and would be more appropriately named independent study or self-education. As Knowles (1975) stated, in self-directed learning (SDL) the
learner must assume the responsibility for planning, carrying out and evaluating their learning. Further, this responsibility will mean that individuals must assume ownership of their own thoughts and actions and take control over their responses to a given situation. In a learning situation this means that the potential for self-direction is governed by an individual’s ability or willingness to direct their own learning (Brockett & Hiemstra, 1991). Chene (1983) further defined the self-directed learner as one who is autonomous with an ability to make choices and critical judgments. In addition, Candy (1991) believed that personal values and beliefs provided a learner with a strong foundation for planning goals, evaluating choices and accomplishing the goals through self-restraint and discipline. From the previously discussed use by the ASAR of the term ‘self-directed’ learning, it would seem possible that there is a lack of understanding in the profession as to the more generally accepted definition of self-direction in learning. It is equally possible that sonographers have an expectation that all their learning should be planned and organised for them.

Sonographers have a wide range of activities with which to fulfil their CPD. Because of this there is an opportunity for most to plan, carry out and evaluate their learning according to their learning needs should they so desire. What is unclear at the present time is whether this level of planning and analysis actually happens. In one of the basic tenets of adult education it is stated that adults will be more open to learning if they are independent and undertake that learning voluntarily with a clear understanding of the intended learning objectives (Knowles, 1975). In a situation where CPD is mandatory, it may be found that the mandatory nature may inhibit the voluntary and independent nature of learning for sonographers.

1.3 Medical Radiation Sciences
Sonography is one of a group of professions that is situated under the umbrella of medical radiation science (MRS). Other professions are radiography, nuclear medicine technology and radiation therapy. The latter three require an undergraduate degree, whilst an accredited sonographer in Australia undertakes a post-graduate diploma after completing an initial
undergraduate degree. Historically, sonographers mainly came from a background of radiography and nuclear medicine. Both these professional groups were already working in a medical imaging department and were thus handy to the newer modality of ultrasound. In recent years, a person with a degree in one of the health sciences may also become a sonographer as long as that person can obtain a training position. Nevertheless, in some domains sonographers are still described and classed as radiographers, whether they have this qualification or not. In the United Kingdom for instance, most sonographers have an undergraduate qualification as a radiographer, either diagnostic or therapeutic, however in the United States and Canada, sonographers do not generally have an initial training as a radiographer or any one of the other MRS professionals and indeed, sonography may be an initial qualification. In New Zealand the situation is somewhat similar to Australia.

Sonographers work under a variety of awards, each State being different and within each State there are differences between Public Service and Private Health, as such, there is no federal governing body to oversee the working conditions for sonographers. In general, over the past 10 to 15 years, there has been a large increase in the number of patients requiring ultrasound examinations, placing departments under a great deal of pressure to provide a prompt service for patients. In the private sector, this pressure is magnified by the medical imaging companies’ need to make good profits and to keep ahead of the competition. This has, in many ways, come at the detriment of working conditions for sonographers. There is a persistent shortage of sonographers due, in part, to the length of time and cost to train one and, anecdotally, the reluctance of some private practices to take on trainees because of this. In addition, it is often observed by non-sonographers that the study and work are hard, with an apparent lack of reward at the end and there is casual evidence that sonographers are leaving the profession because of this.

In the UK, it is now mandatory for radiographers to complete CPD in order to remain registered. In Australia, however, whilst CPD is encouraged for radiographers and radiation
therapists, it is only required of the members of the AIR. Non-compliance may lead to removal from the AIR membership. At this time, there is no federal registration and federally, no mandatory requirements for CPD. Sonographers, on the other hand, are required to undertake CPD to remain accredited and certified through the ASA. This has the potential to lead to conflict between sonographers and radiographers, especially when in some States radiographers may receive similar rates of pay as sonographers. Other countries, such as the UK, do have mandatory CPD requirements for health professionals in order for registration to remain current.

As can be seen from the following table (Table 1.1), most of the professional bodies cited use an input credit based system. Australian and New Zealand professional bodies allow their members/registrants to gather their credits from a wide range of activities, some of which can be portfolio based (NZIMRT, 2010). Canada and the USA tend to prefer more didactic regulated activities with which to gather credits. Only in the UK is an output system used whereby radiographers are not required to enter a set number of credits, but do need to demonstrate undertaking CPD appropriate to the scope and level of practice, by creating a CPD profile (SoR, 2010). The input and output CPD schemes will be discussed in more detail in Chapter 3. The following table, Table 1.1 demonstrates the basic CPD requirements for MRS in various countries.
Table 1.1: Continuing professional development/education requirements for MRS

<table>
<thead>
<tr>
<th>Country</th>
<th>Association/professional body</th>
<th>Mandatory?</th>
<th>Input/output</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>AIR</td>
<td>Yes, for continued membership</td>
<td>Input</td>
<td>36 credits/ 3 year cycle. Varied activities, mainly traditional credit system</td>
</tr>
<tr>
<td>New Zealand</td>
<td>NZIMRT</td>
<td>Yes, for continued certification</td>
<td>Input/output</td>
<td>30 credits/ 3 year cycle. Either traditional credit system or portfolio option gaining credits</td>
</tr>
<tr>
<td>Australia and New Zealand</td>
<td>ANZSNM</td>
<td>Yes, for revalidation of accreditation</td>
<td>Input</td>
<td>30 credits/ 3 year cycle. Varied activities.</td>
</tr>
<tr>
<td>Canada</td>
<td>CSDMS</td>
<td>Yes - if registered with American registry, otherwise provincial matter</td>
<td>Input</td>
<td>24 credits/ 2 year cycle. All courses need to be approved, mostly didactic.</td>
</tr>
<tr>
<td>USA</td>
<td>ARRT</td>
<td>Yes, for continued registration</td>
<td>Input</td>
<td>24 credits/ 2 year cycle – as above.</td>
</tr>
<tr>
<td>USA</td>
<td>ARDMS</td>
<td>Yes for continued registration</td>
<td>Input</td>
<td>30 credits/3 year cycle. All courses need to be approved. Mostly didactic.</td>
</tr>
<tr>
<td>USA</td>
<td>SDMS</td>
<td>As for ARDMS</td>
<td>Input</td>
<td>Points transferred to ARDMS</td>
</tr>
<tr>
<td>UK</td>
<td>SoR</td>
<td>Yes to maintain registration</td>
<td>Output</td>
<td>CPDNow – plan undertake and record CPD</td>
</tr>
</tbody>
</table>

Legend: AIR = Australian Institute of Radiographers; NZIMRT = New Zealand Institute of Medical Radiation Technology; ANZSNM = Australia and New Zealand Society of Nuclear Medicine; CSDMS = Canadian Society of Diagnostic Medical Sonographers; ARRT = The American Registry of Radiologic Technologists; ARDMS = American Registry of Diagnostic Medical Sonographers; SDMS = Society of Diagnostic Medical Sonographers; SoR = Society of Radiographers

At this point, it is relevant to describe the UK system in more detail because it is so different from all the other CPD schemes mentioned. The Health Professions Council of the UK (HPC) is the regulatory body for 15 allied health professional groups, including radiographers (HPC, 2010). One of the key functions of the HPC is to maintain a register of health professionals and ensure that they meet standards. It also ensures some of these professions, including
radiographers and physiotherapists, have protected titles, ensuring that unregistered persons cannot use the title.

Since 2006, all registrants have had to undergo CPD in order to maintain registration. The registrants must:

- Maintain a continuous up to date and accurate record of their CPD activities.
- Demonstrate that their CPD activities are a mixture of learning activities relevant to current or future practice.
- Seek to ensure that their CPD has contributed to the quality of their practice and service delivery.
- Seek to ensure that their CPD benefits the service user.
- Present a written profile containing evidence of their CPD upon request.

(HPC 2010)

There is a flexible approach so that CPD can take account of how the professional works, whether part time or full time or in management, education or research. The CPD activity can be planned to take account of changing needs as long as the CPD is at the correct standard as defined by HPC. Help is offered to maintain the CPD profile and personal development plans are recommended. Examples of evidence of planning and reflection are provided to help the professional. The CPD needs to cover a range of activities and evidence of how these activities have been utilised in service, but it is not prescriptive. The SoR fulfils these recommendations and provides extra help to radiographers on their website.

Although Australian sonographers regard themselves as professional and it is mandated that Australian sonographers practise CPD because of this, there is little evidence about the habits of Australian sonographers in regards to CPD and much is assumed. Therefore, it is timely that the area is researched. The quality of CPD may rest with the ability or motivation of the sonographer to voluntarily engage in self-direction in learning (e.g. Knowles, 1970; Brockett & Hiemstra, 1991).
However, there is a clear tension between self-direction in learning and voluntary learning and a mandatory input based CPD framework, such that sonographers may feel less motivated to pursue further professional development, consequently only fulfilling basic requirements. Further to this, it could be argued that CPD may not be undertaken in the spirit of self-direction whereby each sonographer would identify needs and goals, identify ways to achieve those goals and evaluate the outcomes. In addition, external factors such as family responsibilities, time and work constraints, may reduce the ability of sonographers to use self-direction in their CPD. Nevertheless, it has been suggested that mandatory CPD may still lead to empowerment and increased motivation of the participant as reported by Postler-Slattery and Foley (2003) in their study.

1.4 Aim of the study

The aim of this study is to explore the role of self-direction in the continuing professional development of sonographers; further it seeks to discover the contributors and inhibitors to self-direction in continuing professional development. The overarching research question for this study is:

*What is the role of self-direction in learning in the CPD of Australian sonographers?*

This research will inform the providers of CPD to sonographers in Australia and will aid the planning and implementation of CPD programs. Further, the research will add to the body of existing literature on CPD and self-direction in learning.

1.5 Contents of thesis

This thesis has been organised into eleven chapters:

This first chapter has introduced the background of sonography and sonographers in Australia and the history of accreditation and CPD.

Following this introductory chapter, *Chapter Two* examines literature with relevance to this study regarding adult learning, self-directed learning, workplace learning, communities of practice
and motivation. In particular, it looks at self-direction and the role of reflection and critical reflection in self-direction.

Chapter Three explores the literature on CPD. It provides a brief overview of CPD and describes current theories and understandings of professionals' attitudes to CPD. It also explores the literature on outcomes and evaluation of CPD; and models of CPD. Finally it reviews current literature on medical radiation science professionals' CPD, learning and workplace circumstances.

Chapters Two and Three identify gaps in the knowledge regarding sonographers and their CPD and reflective habits which will be addressed in this thesis.

Chapter Four explains the reasoning behind the methodological approach taken for the research process. It then goes on to explain how the methods and survey instrument were developed and administered. The chapter also discusses the validity, reliability and ethical aspects of the research.

Chapter Five reports on the demographic distribution of the survey respondents and summarises the frequencies of responses. It also describes and discusses the principal components analysis (PCA) conducted on the data. It details the production and choice of the four factors derived from the PCA.

Chapters Six to Nine present and discuss the results from the analyses of variance performed on data from the four factors extracted from the PCA: ‘Belief in the value of CPD’, ‘Barriers to participation’, ‘Reflection’ and ‘Motivators’. They also describe and analyse the comments pertaining to these factors that were submitted with the survey and discusses these findings in relation to the literature reviews.

Chapter Ten presents and discusses the analysis of the interviews conducted with sonographers who volunteered to be interviewed. These interviews covered a range of topics including the interviewees' thoughts on the value of CPD, thoughts about work environments and sonographers junior to them and management. The interviewees also offered a variety of
suggestions pertaining to CPD and how it could perhaps be improved. The findings were discussed in relation to the literature.

Finally, Chapter Eleven, the concluding chapter, will review the main findings of the study and will discuss them in the context of the literature and theory, in particular, the personal responsibility orientation (PRO) model. This chapter will offer several practical strategies drawn from this research that may be used to support self-direction. Finally, areas of research will be recommended to test the practicability and suitability of these strategies.
Chapter 2
Adult and Workplace Learning

2.1 Introduction

This chapter will examine relevant literature regarding adult learning, self-direction in learning and reflection, workplace learning, communities of practice and motivation which will complement the literature findings regarding CPD in the following chapter, Chapter 3, and serve to inform this research.

2.1 Motivation

Motivation has been cited as an important factor in whether people willingly become self-directed and involved in CPD (Field, 2004; Lester, 1999). Maslow (1970) defined motivation as a psychological process where a behaviour is directed towards a goal based on individual needs. According to Bye, Pushkar and Conway (2007), an intrinsically motivated person will display autonomy and initiative in their actions. In contrast, extrinsically motivated people seek approval and external signs of worth. Intrinsic motivation will promote psychological well-being through feelings of personal accomplishment and self-esteem. Although initially making the recipient feel good, extrinsic motivators may eventually stifle interest in learning and discourage feelings of well-being. Huitt (2001) considers that motivation may initially be begun by emotions, but once an activity has begun, other factors, such as reluctance to abandon a task, may initiate continuation. Although it is a multidimensional concept, it may be considered, although not without some reservations, that increased job competence, increasing professionalism and pay increases are prominent motivational factors (Furze & Pearcey, 1999; Ryan, 2003).

Motivational factors have been debated over the years with not all writers totally agreeing that such things as pay increases are necessarily a great motivator. Frederick Herzberg began this debate with his two factor theory of motivation. In 1959, Herzberg’s theory of motivation and hygiene factors was constructed as a two-dimensional paradigm of factors affecting peoples’
attitudes about work. Herzberg asserted that factors such as company policy, supervision, interpersonal relationships, working conditions and salary were hygiene factors rather than motivators. According to the theory, the absence of hygiene factors can contribute to job dissatisfaction, but their presence does not motivate or promote job satisfaction. Herzberg found that motivators were elements that enriched a person’s job, for instance, achievements, recognition, the work itself, responsibility and advancement. These motivators or satisfiers were associated with long-term positive effects in job performance whilst the hygiene factors or dissatisfiers consistently only produced short term changes in job attitudes and performance, which quickly returned to their previous level. Interestingly, the themes about satisfaction are not the same as the themes about dissatisfaction. For example, dissatisfaction involves bad company policies, but satisfaction does not involve good company policies. Satisfaction involves achievement, but dissatisfaction does not involve failure. In addition, most satisfying events involve high levels of self-direction and productivity (Gawel, 1997; Herzberg, 1966; Herzberg, Mausner & Snyderman, 1957).

Although there has been much discussion in the literature about Herzberg’s theory, 50 years later, research still produces results consistent with the original theory (Sachau, 2007). According to Sachau, Herzberg’s hygiene factors could otherwise be known as extrinsic motivators, but he warns that there may be a danger in giving out too many rewards. Hygiene factors tend to escalate, and as wages rise, people do not necessarily become happier. According to Sachau, managers should not use money to motivate employees if managers want them to be interested in their jobs. Focusing employees’ attention on pay will lead to rising expectations. If managers, instead, provide psychological growth opportunities they will increase intrinsic motivation and long-term job satisfaction.
Chapter 2: Adult and Workplace Learning

2.2 Adult learning

According to Smith (2002), most theories regarding self-directed learning have their roots in humanism and it was this which greatly influenced Knowles in his thinking about adult learning. Humanism recognises people as beings with feelings, attitudes and values and is concerned with growth, fulfilment and self drive (Smith, 2002). There is an association between self-directed learning and a humanistic approach. This was demonstrated by Rodgers (1969, cited by Rossi, 2002) when he commented that learning is facilitated when a student participates responsibly in a learning process. He also posited that self-initiated learning, involving the whole person, including feelings as well as intellect, was the most lasting and useful learning. True independence, self-reliance and creativity can only be present when self-criticism and self-evaluation occurs before evaluation of others.

Knowles spent a lifetime of work on adult education and differentiated initially between adult and child learning. His theory of andragogy was that adult learning would lead to the development of a self-directed learner. Between 1968 and 1970 he had published a set of characteristics that he believed the adult learner should possess. This became known as the theory of andragogy (Smith, 2002). These characteristics are as follows:

1. Self-concept – as a person matures, self-concept moves from one of being a dependent personality toward being a self-directed human being.

2. Experience – as a person matures, a growing reservoir of experience is accumulated that becomes an increasing resource for learning.

3. Readiness to learn – as a person matures, readiness to learn becomes oriented increasingly to the developmental tasks of social roles.

4. Orientation to learning – as a person matures time perspective changes from one of postponed application of knowledge to immediacy of application. Orientation towards learning then shifts from subject centredness to problem solving.
5. *Motivation to learn* – as a person matures the motivation to learn becomes more internalised.

(Knowles, Holton & Swanson, 1998)

Although named a ‘theory’ it is apparent that these characteristics are basically a set of assumptions which do not take any extrinsic or personality factors into account. As such, Knowles tends to be rather idealistic and optimistic in his view of adults. Nevertheless, his ‘theory’ set the scene for much research and debate over the ensuing decades (Merriam, 2001).

One of the main areas of debate concerned the theoretical nature of andragogy, focussing on whether, in fact, it was a theory. Eventually, by 1989, Knowles accepted and concurred that his assumptions served as a conceptual framework for an emerging theory (Knowles, 1989, cited by Merriam, 2001). In other criticisms of Knowles work it was debated that due to various life situations, barriers to learning may occur for adults. Children may also exhibit ‘adult’ like features such as curiosity and self-directedness both in and out of school. Again, Knowles revised his thinking and acknowledged that there was no clear division between pedagogy and andragogy, opting instead for a teacher directed to student directed model (Merriam, 2001).

Brookfield (1995) was another who challenged the assumptions of Knowles, repeating the argument made by Busher (1983 cited by Brookfield, 1995) that if adults are naturally self-directed, why should any effort be made to make provision for their education. Nevertheless, there still remains much support for the notion that adults learn differently from children (Rossi, 2002). Houle (1996, p. 30) believes that andragogy still remains the most learner-centred of all adult education programs and, more significantly, andragogy has alerted educators to the fact that learners should be involved in as many aspects of their education as possible and also be involved in the creation of a climate in which they can fruitfully learn.
Knowles (1975) devised his model for self-directed learning which was intended to help both educators and learners in their course development. This was a five-step linear process model which is prescriptive in intent and advises the following:

1. Diagnosis of learning needs.
2. Formulation of learning needs.
3. Identification of human material resources for learning.
4. Choice and implementation of appropriate learning strategies.
5. Evaluation of learning outcomes.

Once again, this does not take into account life circumstances that may halt one direction of learning and redirect it into another; neither does it take into account different types of personality (Merriam & Caffarella, 1999). However, it does form one basis for the CPD cycle which will be discussed in detail in Chapter 3. It has also been suggested that self-directed learners in an educational system may not pre-plan activities but, rather, select courses from a limited range of alternatives which occur in their own environment and this will then structure their learning strategies (Smith, 2002).

There are different ways of learning and different personalities which will affect this learning. Kolb’s work on learning styles demonstrates this to some extent. In an interpretation of Kolb’s learning styles, Chapman (2006) describes the four main learning styles of adults, these are

- Diverging – feeling and watching.
  Is able to look at things from different perspectives. Sensitive, tends to watch rather than do. Probably best in brainstorming situations. These people gather information, are interested in others and imaginative. Tend to like working in groups.

- Assimilating – watching and thinking.
  Concise, logical thinkers. Ideas and concepts are more important to these people. They need good explanations but can understand wide-ranging information and then
organise it logically. They are less focused on people, more on ideas and concepts. These learners are more effective in information technology and science careers. They prefer reading, lectures and analytical models.

- Converging – doing and thinking.
  These people use learning to solve problems. They prefer technical tasks and are less concerned with people and interpersonal aspects. They like to experiment with new ideas, with simulations and practical applications.

- Accommodating – doing and feeling.
  Hands on learners, relying much on intuition. Use others’ analyses and prefer practical experimentation. Are attracted to new challenges. Will be more likely to act on instinct rather than logic. This style of learning is more likely to be used by those in roles needing action and initiative.

More concisely, an **accommodator** uses active experimentation and concrete experience, a **diverger** uses concrete experience and reflective observation, an **assimilator** uses reflective observation and abstract conceptualisation and a **converger** uses abstract conceptualisation and active experimentation. Having said that, persons may move from one learning style to another, depending on the circumstances of the learning (Smith & Dalton, 2005). However, people will tend to learn more effectively if learning is oriented towards their preferences (Chapman, 2006).

According to Kolb’s learning cycle model (Figure 2.1), learners choose how to acquire information and process it. They can learn either concretely through the senses or abstractly by analysis. Process is by way of watching or doing, reflectively or actively.
Concrete experience

Accommodator

Active experimentation

Reflective observation

Converger

Abstract conceptualisation

Assimilator

Diverger

2.3 Communities of practice and workplace learning

In 2001, Billett wrote

… workers of all kinds are being asked to maintain the currency and quality of their vocational skills as expectations of lifelong learning are now being directed towards adults’ vocational practice. A key basis for this ongoing learning is to develop further vocational practice through work (Billett, 2001, p.176).

Billett suggested that in order for this to happen, workers would first need to be engaged and keen, but good organisational support and sponsorship was also necessary, along with experts willing to teach and guide. Some workplaces still do not consider staff development as particularly relevant, especially during work time. O’Sullivan (2003) suggested that having protected time for work-based learning could provide an opportunity to balance patient care with skills and knowledge development. She was speaking initially for the interest of physiotherapists but believed that the message should be brought to the attention of all health professions and employers that learning
during work time, as well as caring for patients, is both permissible and recommended. She believed that it would be in the best interests of the employer to allow for learning at work and it could be factored into costs. In this way, employers could become learning organisations, (as per Billett, 2001) with a structure in place for clinical supervision, peer review, journal clubs and staff meetings, which would all be aspects of CPD.

The Society of Radiographers in the UK also holds strong beliefs regarding the provision of time by employers for CPD and write on their website:

*The Society believes that all members have a right to protected study time and that the benefits of this include enhanced service provision and improved patient outcomes.*

*The Society’s long term aim is that all members should receive protected study time equivalent to 10% of contracted hours worked. This is for the moment unfeasible in the majority of clinical departments and current advice is that managers and union representatives should work to secure six days per annum protected study time for full time employees. Part time staff should receive a similar allocation on a pro-rata basis. ([http://www.sor.org/public/educpd/cpd_protected.htm](http://www.sor.org/public/educpd/cpd_protected.htm))*

### 2.3.1 Communities of practice

*Communities of practice are groups of people who share a concern or passion for something they do and learn how to do it better as they interact regularly* (Wenger 2006, [http://www.ewenger.com/theory/index.htm](http://www.ewenger.com/theory/index.htm)).

The concept that situated learning, where the learner and the task are central to overall learning in a social context, rather than a traditional view of learning as an end result of transmitted knowledge, was first posited by Jean Lavé in 1988 (Borthick, 2000). In the early 1990s, Lavé and Wenger were studying the learning activities of apprentices in the workplace and termed the community learning they witnessed as a community of practice. They soon realised, however, that the term could be applied in many situations and in all walks of life. Indeed, it encompasses all persons in a community and not only apprentices or learners (Wenger, 2006). The original theory of community of practice was that it was informal, with much situated learning occurring in social situations, such as informal discussions over lunch. The idea of a community of practice was originally developed as a learning theory that promoted self-empowerment and professional
development. More recently it has started to evolve and whereas once it was purely informal, some organisations and professional associations are realising the potential for their staff and members and are now introducing more formalised communities of practice (Li, Grimshaw, Nielsen, Judd, Coyte & Graham, 2009).

In Wenger’s (2006) introduction to communities of practice he cites three main characteristics that define a community:

1. The *domain* – the members of the domain value their collective competence and learn from each other, even though few people outside the group may recognise this expertise.

2. *Community* – members engage in joint activities and discussion, help each other out and share information. It is only a community of practice when members interact and learn together. They may not necessarily work together on a daily basis.

3. *The practice* – members are practitioners. They develop a shared repertoire of resources, experiences, tools and ways of addressing recurring problems.

Only if these three characteristics are cultivated in parallel will a community of practice exist (Wenger, 2006). Common activities within a community of practice are problem solving, requests for information, seeking experience, re-using assets, coordination and synergy, discussing developments, documentation projects, visits, mapping knowledge and identifying gaps in knowledge (Wenger, 2006).

Jonassen, Peck and Wilson (1999) suggested that being part of a community can lead to identity, motivation and engagement with the learning project and the community. Where CPD is concerned, if the emphasis of learning as a social process is considered, there may be several implications for practitioners, the professional community and the workplace. Learning will become a process of engaging and contributing to the practices of their community. One of the benefits of a community of practice is the modification and refinement of new practices. In this way, participating
and interacting in a community of practice becomes an effective form of professional development. In the communities of health professionals, creation and validation of clinical knowledge is based on discourse communities, social constructionism and reflection. As Penney (2010) defines, a discourse community is one which has its own common knowledge and language. Knowledge is further created and disseminated through social interactions. Further to this, reflective dialogue is regarded as one of the most effective methods of group reflection and it is through the community that learners learn, reflect and construct meaning (Bolton, 2001). Novices also encourage others to keep learning as they bring along with them new ideas and interests (Fuller, Hodkinson, Hodkinson & Unwin, 2005). Guglielmino (2008) further suggests that learning and teaching is the responsibility of each individual in a workplace,

_The key element in an effective learning organization is acceptance of responsibility by each individual for recognizing and addressing his or her own learning needs and then sharing that learning with appropriate others in the organisation (Guglielmino, 2008, p. 6)._  

### 2.3.2 Workplace learning

Eraut (2004) believes that most workplace learning is on the job and he terms this informal learning. Informal learning in the workplace results in the professional development of knowledge and skills. It may be planned or not, structured or unstructured. In a case study approach, Lohman (2000) interviewed 24 teachers and visited worksites, she found that activities such as talking and sharing between professionals will constitute informal learning. She also found that up to 90 per cent of new learning is acquired through informal learning in the workplace (Lohman, 2000). She believed that one approach to foster informal learning would be to create organisational environments that do not inhibit individuals and groups from learning. Lohman found there were four main inhibitors to this learning process in the workplace:

1. Lack of time for learning i.e. being too busy just doing the job.
2. Lack of proximity to learning resources e.g. library, computers, other staff members.
3. Lack of meaningful rewards e.g. not being given any recognition for mentoring or teaching; administrators rarely acknowledge this time and effort.

4. Finally, having limited latitude in decision making will adversely affect learning as it will narrow the focus and breadth of learning needs and thus, in a subtle way, inhibit it (Lohman, 2000).

In an early study, Cross (1981) outlined the concepts of barriers to participation in adult learning as being dispositional, pertaining to attitudes and belief; situational, pertaining to external influences beyond a person’s control; or institutional, that is workplace practices and procedures that inhibit learning.

On the other hand, Eraut (2004) found that there were four main factors that would initiate learning in the workplace:

1. Observation and listening to others whilst working in a group.
2. Audit, development or review of policies.
3. New and challenging job tasks.
4. Learning from clients.

For instance, working in a group will allow people to observe and listen to others and then participate and gain new skills and new perspectives. Also group activities such as audit or development or review of policies and practices will generate learning. As Fuller et al. (2005) suggested, working in a group allows for the transfer of different kinds of knowledge and expertise. A new challenging job task requires learning on the job and if it is well-supported and successful will lead to increased motivation and confidence. Learning from clients will happen by working with them, either from different aspects arising from the client’s problem or from new ideas that arise from problem solving. Eraut argues that support from available colleagues is possibly one of the most important aspects of informal learning. Many activities affect workplace learning and it will depend on the make-up of each group of workers, but management styles and workplace climates
will affect learning, retention and quality of work. Inadequate feedback from management can weaken motivation and reduce commitment to the organisation.

Participation in teaching in the workplace also encourages the professional to keep abreast of the latest skills and techniques, although Fuller et al. (2005) agree with Eraut that the way employers control and organise the workplace will have an effect on how the employees learn. The European Commission cited having few opportunities for lack of personal and professional development on the job. Lack of support for workers was regarded as one of the major contributors to workplace stress, along with other common stressors such as over work (The European Industrial Relations Observatory (EIRO) 2009). The Swedish Work Environment Authority (2006) also suggest that sufficient time at work for professional development reduces the stress risk and allows for greater self-esteem and self-confidence, finally resulting in a reduced risk of ill-health. This then results in employees that are more likely to be able to cope with new and more difficult tasks.

2.4 Mentoring

Distinct from teaching in the workplace, mentoring is a more complex issue. Described by the Technical and Further Education Department of New South Wales (TAFENSW) as a “mutually beneficial relationship which involves a more experienced person helping a less experienced person achieve their goals” (TAFENSW, 2008). It is usually on a one to one basis and can foster growth and development in both the mentor and mentee. A Chinese study which followed the lives of 512 mentors by Liu, Liu, Kwan and Mao (2009) found that mentoring positively benefits the mentor’s job performance and prospects and their social status. The study also found that mentors and their mentees may both learn from each other. It is not clear if this would be as applicable or more applicable in the Western world as China has a long history of using mentors in the workplace.
A Canadian study looked at mentoring from a different aspect. Heale, Mossey, Lafoley and Gorham (2009) wished to discover how confident clinical mentors felt in their roles. They surveyed a relatively small number (113) of clinical educators from various health professions and discovered that those surveyed consistently reported a moderate lack of confidence in their roles as mentors. Also reported were inhibitors to the role, one of which was lack of support from educational facilities and another lack of time, particularly in rural and remote communities which were already suffering from a lack of resources. The authors suggested that a mentoring and professional development program common to all professionals may assist mentors, although they recognised that one may not necessarily fit all professions.

One way of overcoming distance and remoteness could be e-mentoring, that is mentoring conducted using an online environment. Thompson, Jeffries and Topping (2010), embarked on a two year action research study to evaluate the implementation of an e-mentoring scheme which encompassed blended online and face to face mentoring. The project included ascertaining the benefits of mentoring and the needs of novice staff. Whilst the authors admitted that the project was still in its infancy and due to the low number of participants (8) would need some modification, certain conclusions were drawn about the benefits of mentoring, these included identifying skills, consultancy and counselling, socio-emotional support, goal setting and problem solving. None of these was considered to be exclusive to e-mentoring. Novice staff required work learning and organisational issues to be addressed, support with learning systems and socio-emotional support, including anxiety and isolation issues. They would also benefit from having an alternate perspective and a fast response to unexpected issues. Mentors involved found their involvement in e-mentoring satisfying and would participate in the future. However, the authors concluded that effective e-mentoring would only occur in conjunction with some face to face elements so that there was a systemic induction, needs analysis and mapping of all support channels (Thompson et al., 2010).
2.5 Critical reflection and transformational learning

The theory regarding reflective thinking was first defined by Dewey in 1910 and developed by him in 1933 (Smith 1996, 1998). His philosophy was further defined by Schön (1983, 1987) and by Boud, Keogh and Walker (1985). Reflective thinking was initially defined as active, persistent and careful consideration of any belief or supposed form of knowledge in light of the grounds that support it (Dewey (1933) cited in Smith, 1996). Boud and Fales (cited in Plack & Greenberg, 2005) further explained reflection as a process in which an experience which raises an issue of concern is examined. It is an internal process by which individuals may refine understanding of an experience and which may then lead to a change of perspective. Schön (1987) referred to reflection as having three distinct forms:

- Reflection – in – action refers to problems occurring in a work setting during which the worker must stop, think and solve the problem in the midst of the activity.

- Reflection – on – action refers to the revisiting of experiences after the event and analysis of the experiences with a view to improving skills in the future.

- Reflection – for – action in which the situations are anticipated and planned before they occur.

However, recent criticism of Schön’s theory states that it is too narrowly confined; not addressing structural, societal or cultural issues (Ng, 2009).

Over the years there have been many models of reflective practice, all of which have shown either limitations or concerns. One of these concerns is that reflection does not necessarily result in reflexive practice, whereby a person will get evidence about how effective or beneficial his or her actions are and change their actions according to this evidence. In an ideal world, reflective practice and reflexivity would come naturally, but for some professionals who are doers rather than thinkers (O’Sullivan, 2003), it is not quite this simple and they may need to be helped with the process (Karban & Smith, 2006). Evidence from a study by Gunn and Goding (2008) suggested
that physiotherapists have a poor engagement in reflection and lack skills in this area. Similarly, medical radiation science (MRS) professionals also have a poor usage of reflective practices, which, in part, may be due to lack of managerial encouragement and workplace culture (Sim & Radloff, 2008). Lockyer, Gondocz and Thivierge (2004) suggest that organisations have the ability to stimulate reflection through debriefing critical incidents and analysis of routine care. Another criticism of reflective practice refers to the possibility that it may lead the practitioner to rely heavily on an inward focus. This could be dangerous in one of two ways, either a weakness may be missed or not recognised, leading to an inflated self-esteem or the reverse may be true that the practitioner may only see weaknesses, leading to a deflated self-esteem (Ng, 2009). Such a situation may be overcome with mentoring or dialogue with peers.

The detractors of reflection most commonly cite lack of time as the major reason for it not being used. This could, perhaps, be challenged by promoting understanding of how important it is and what the benefits are. An ongoing process of critical reflection on current and past professional practice may improve future practices and increase knowledge (Lockyer, 2004). Nevertheless, this does not take into consideration that usually reflection is not planned and happens covertly when it is required, as evidenced by findings of research by Gustafsson and Fagerberg (2004) who conducted a study of reflection in nurses. Nurses reported being ‘caught up’ in routines which controlled their actions, nevertheless, it was implicit that those nurses use reflection all the time during their work but were not overtly aware of it. A similar situation to this may occur with other health professionals.

In a broad sense, critical reflection involves the analysis of everyday working practices with a view to improving competence and promoting professional development. It has been accepted as a key component of professional development in health and social care (Clouder, 2000; Karban & Smith, 2006). Mezirow (1990) began to study reflection in a more critical light and was able to distinguish between the process of reflection “critically assessing the content, process or premise(s)
of our efforts to interpret and give meaning to experience” and the process of critical reflection “the critique of assumptions about the content or process of problem solving….making a taken-for-granted situation problematic, raising questions about its validity” (p.104 -105). Critical reflection, therefore, focuses more on the systemic and societal conditions than Schön’s theory of reflection and seeks change and emancipation. Mezirow argued that critical reflection was the highest form of reflection and it would enable perspective transformation to occur. Perspective transformation is the process of understanding the assumptions of how and why we perceive, understand and feel about the world around and then being able to act upon this understanding (Mezirow, 1991). At a later date he went on to say:

Learning to think for oneself involves becoming critically reflective of assumptions and participating in discourse to validate intentions, values and feelings (Mezirow, 1998, p. 197).

Cranton (1996) applied the theory of critical thinking and perspective transformation to adult learning. Without critical reflection, transformational learning will not occur. Transformational learning occurs when reflection that focuses on premises (i.e. why is this important in the first place?) leads to transformed meaning, perspectives or changed ways of seeing the world. This will happen when an individual has reflected on assumptions or expectations about what will occur, has found faults or discrepancies in these and revised them. Transformational learning enables emancipatory learning, that is, learning which is free from any forces that have limited or biased learning options (Cranton, 1996). In short, it could be said that critical reflection is the key to learning from experience and when used in self-directed learning, the individual chooses to examine his or her practice and retains control over it.

Merriam (2005) argues that, while transformative learning leads to a more autonomous ‘developed’ level of thinking, engagement in transformative learning in the first place requires higher development. Both critical reflection and reflective discourse, necessary for transformative learning, need a higher level of cognitive development which does not usually appear until after the age of thirty. If this is the case, it could further be argued that full self-direction in learning in
practice may not be possible until later in life. However, in his study of Australian apprentices, Smith (2000) found that younger apprentices showed themselves to be more independent than the more mature (over thirty years old) apprentices. He suggested a possible reason for this finding in that Australian schools’ curricula changed in the mid to late 1980s. At that time, a change was made from teacher based learning to more student centred tasks. These involved more student research and less teacher input than had been previously required leading to more independent learners. This suggestion was supported by research into schools and students in the early 1990s by Williamson (1995) and Brown (1993) who both found a greater independence in student learning than prior to the curricula change. This would, therefore, support the case for increased education and coaching in the skills of planning and critical reflection. Nevertheless, as Hiemstra (1994) put it, it is still necessary to promote discourse in the working environment, whichever school era the workers grew up in. In a supportive environment, wherein the organisation recognises its responsibility to promote and facilitate critical reflection, the employees will become more self-actualised and more self-directed. The potential benefits of this to the organisation and the employee are many.

2.6 Self-direction in learning

It is generally recognised that professionals should be responsible for their own learning and self-directed learning is advocated (Kerka, n.d.; McPartland, 1990; O'Sullivan, 2004). Definitions and theories of self-directed learning are numerous. As Oddi (1987) illustrates by summarising the variety of terms that may be used such as self-education, independent study, self-learning, self-teaching and andragogical learning, to name a few. Although in recent times much research has been conducted on adult learning and self-directed learning, especially in the 1970s and 1980s (Brockett, 2000), these concepts of learning have been recognised for centuries, with Socrates having been cited as a believer in learner centred learning:
I shall only ask him, and not teach him, and he shall share the enquiry with me: and do you watch and see if you find me telling or explaining anything to him instead of eliciting his opinion (Socrates, cited by Rossi, 2002, p. 334).

Chene (1983) defined the autonomous learner as independent and able to make critical judgements and choices. Nevertheless, in order to make those choices, there needs to be a good knowledge of the available choices and the consequences leading from each choice. Without this knowledge, time may be spent on wasteful and useless activities that serve no real purpose in life. It has to be recognised however, that in real life, total understanding and knowledge of options is unlikely to occur (Brookfield, 1993). Candy (1991) held the opinion that autonomous learners have strong values and beliefs that provide a solid foundation from which to conceive goals and plans, make and evaluate choices, accomplish selected goals and exercise self-restraint and self-discipline. He also argued that learning was also a social activity and this social aspect was necessary for personal autonomy to occur. Brockett and Hiemstra (1991) concurred with this opinion that self-directed learning was part of a social construct. Candy (1991) warned that social and family background can and does strongly affect self-directedness in an adult. Brookfield (1993) agreed with this and further added that the "self" in a self-directed learner reflected the culture and political background from whence they came, with even the most enlightened and critically reflective person unlikely to be able to completely escape from his or her background. In addition to this, Brookfield believed that choices for self-directedness were also affected by the pressures of daily lives, hunger and tiredness, for example, and many other extrinsic factors. Candy (1991) outlined four distinct, but related characteristics involved in self-directed learning:

1. Self-direction as a personal attribute (personal autonomy).
2. Self-direction as the willingness and capacity to conduct one’s own education (self-management).
3. Self-direction as a model for organising instruction in formal settings (learner control).
4. Self-direction as the individual non-institutional pursuit of learning in a natural society setting (autodidaxy).

Candy believes that these characteristics may be classed into two main themes for self-direction in learning; personality encompassing (1) and (2) and process encompassing (3) and (4). In outlining these phenomena, Candy also recognised that there was a potential for dichotomy between self-direction as a process and self-direction as a goal. Previously, Oddi (1987) also differentiated between the process perspective and personality perspective of self-directed learning.

Over the years, the definitions and understanding of self-directed learning have evolved and undergone subtle, but definite, change as opinions and authors matured. Hiemstra’s initial definition of self-directed learning was, “self-planned learning – a learning activity that is self-directed, self-initiated and frequently carried out alone (Hiemstra, 1976 p. 39, cited by Brockett & Hiemstra, 1991). Whereas Brockett’s initial definition was, “Broadly defined, self-directed learning refers to activities where primary responsibility for planning, carrying out and evaluating a learning endeavour is assumed by the individual learner (Brockett 1983, p. 16, cited by Brockett & Hiemstra, 1991). Brockett and Hiemstra (1991) expanded their thinking, describing a concept of self-direction (as opposed to self-directed) which encompassed two dimensions. The first was a process where the learner assumes primary responsibility for the planning, application and evaluation of an endeavour, with an educator or educational agency often assuming a facilitating role. The second was referred to as learner self-direction which centres on the learner’s desire or preference for assuming responsibility for learning. Thus, self-direction in learning refers to both the external characteristics and internal characteristics of the learner.

To assist in conceptualising and explaining self-direction in learning, Brockett and Hiemstra (1991) designed the personal responsibility orientation model (PRO) of self-direction in adult learning (Figure 2.2).
As the corner stone of self-direction in learning, Brockett and Hiemstra used the definition of Chene (1983) to explain personal responsibility:

*Autonomy means that one can and does set one’s own rules and can choose for oneself the norms one will respect. In other words, autonomy refers to one’s ability to choose what has value, that is to say, to make choices in harmony with self-realisation* (Chene, 1983, p. 39).

Brockett and Hiemstra accepted that as all individuals are different, there would be different degrees in how much responsibility each individual would take. In addition, not all learners are likely to begin learning with a level of self-direction. However, they believed that for the learner to assume control over their own destiny, then assuming responsibility for one’s own learning was a desirable state of affairs.

In the PRO model, personal responsibility indicates that the learner has choices about the direction that can be pursued and also an awareness of the responsibility for accepting the consequences of such a choice. Self-directed learning refers to an instructional method, that is, it
centres on the planning, implementation and evaluation of learning. Activities which fall into this category are needs assessment, evaluation, learning resources, facilitating and independent study. In this manner, self-directed learning is an instructional process and has direct links back to Knowles’ original ideas on adult learning. Learner self-direction, in the view of Brockett and Hiemstra refers to the personality of a person. The personality of a person will predispose that person toward taking personal responsibility for personal learning. Again this reflects back to Knowles’ assumption that the self-concept of adult learners is characterised by self-direction. Self-direction in learning is a term which Brockett and Hiemstra (1991) used as an umbrella concept to show that there are both external and internal factors and the PRO model demonstrates this. It also describes the connection between self-directed learning and learner self-direction through personal responsibility.

Social context encompasses all of the elements as learning activities cannot be removed from the social context in which they occur. Brockett and Hiemstra admitted that the PRO model was unlikely to be the best way to learn in all circumstances, but it is ideal for many situations. Balance needs to be met between external and internal characteristics for separate individuals in order for a good learning situation to occur. It was also accepted by Brockett and Hiemstra that situational factors are also likely to impact on the PRO model to some extent and in some situations, self-directed learning may not necessarily be the best method for learning.

Other researchers (e.g. Cavaliere, 1992; Danis, 1992; Garrison, 1997) have suggested different interactive models for self-directed learning. In particular, Garrison suggested a three dimensional model of self-management, self-monitoring and motivation. This model focussed on both the personality and the cognitive abilities of the learner. According to Merriam and Caffarella (1999, citing Hammond & Collins, 1991), the most complete model was multi-faceted and included the concepts of critical reflection and personal and social learning goals. The goal of this model is
that learners will use their learning to improve the conditions under which they and those around them live and work.

Merriam and Caffarella (1999) discussed what they believed were the three main goals of self-directed learning. The first was the development of the ability of adult learners to be self-directed, the second was to encourage transformational learning as the component in self-directed learning and the third was to promote emancipatory learning and social action as an integral part of self-directed learning. Emancipatory learning, as per the Hammond and Collins model (1991), aims at improving conditions by developing strategies to help and change the circumstances of the under-privileged.

The great majority of research into self-directed learning took place in the 1970s and 80s and since that time the number of articles published on this subject has dropped dramatically (Brockett, 2000). Although this could be an indication that self-directed learning is no longer a popular theme, Brockett believes that instead it has become mainstream and accepted. At the time of his article, he praised the role that the surveys, Guglielmino’s self-directed learning readiness scale (SDLRS) (1977) and Oddi’s continuing learning inventory (OCLI) (1986), had played in quantifying self-directed learning. The SDLRS was based on the attitudes and values and abilities of a person, and the likelihood of those qualities creating self-directedness. The OCLI covered the need to distinguish between the personality characteristics of the SDLRS and the notion of self-directed learning as a process of self-instruction. Brockett felt that these surveys needed a further dimension and in 2003, Stockdale and he published the personal responsibility orientation – self-directed learning scale (PRO-SDLS) which added the further characteristic of personal responsibility.

Later reports and discussions around self-directed learning still tend to be based on the theories and assumptions raised many years earlier with a few additions and extra elements. Critical reflection has been described as being the key to transformational learning and self-
direction. Nevertheless, a study by Brookfield (1993) found that the most important measure of self-direction was the ability to act on critical reflection. Later it was commented that the key determinants may not be learning style or personality but the metacognitive process that determines both (Jennings 2007). The understanding of the meaning of self-directed learning or self-direction in learning still varies somewhat with the interpretation by each author. Jennings (2007), for instance, interpreted Candy’s concepts of self-direction into process and goals, rather than process and personality, fulfilling the suggestion by Candy (1991) that a dichotomy could arise. Jennings undertook a review of the literature to determine the evidence-base for using self-directed learning in GP’s personal development plans. His review cited 59 articles and although he gave no criteria for his choice of articles, his conclusions regarding self-directed learning based on his findings were:

- There is no evidence that self-directed learning leads to autonomy.
- Research conclusions are being applied erroneously.
- Learners’ experiences are key, not their results.
- Restricting learner-control has no part in self-directed learning.
- Doctors are incapable of accurately assessing their needs.
- There is no evidence that self-directed learning improves outcomes, but...
- Self-directed learning is high-quality learning.

Despite this continuing debate over self-directed learning, Guglielmino (2008) discusses the acceptance and increasing use of self-directed learning in both formal and informal settings. She comments that whilst some people will be able to overcome all obstacles to continue their learning, others will need help in developing the skills and attitudes required for self-directed learning. Even though the times require that continuous learning should occur, she concedes that it will be impossible for educational institutions to deliver all education and human resource development departments and the educational institutions will need to program the development of
skills and attitudes for self-directed learning in their curricula. Although the debate over self-direction in learning still exists and refinements are still under way, the personal responsibility model that was put forward by Brockett and Hiemstra (1991) has stood the test of time and is still being used in some form today by such long-term self-direction advocates as Guglielmino (2008).

2.7 Conclusion

The importance of lifelong learning and critical reflection, which is implicit in self-directed learning, has been emphasised as being an integral part of the ongoing development of professionals. In addition, workplace and external situations may encroach upon and alter learning situations within a workplace, thus changing the nature of learning. Motivational factors will also affect workplace satisfaction and learning. Rewards, or extrinsic motivational factors may only allow temporary solutions and it has been suggested that psychological growth opportunities are more likely to raise intrinsic motivation and long term satisfaction.

Theories of adult learning recognise that self-evaluation and self-initiation are important in the learning process. Maturity and experience may also play a role. Other notable issues are the personality traits of individuals and external influences. It is recognised, however, that if learners are involved in planning their own education, the learning environment is likely to be more fruitful. Knowles (1975) developed a prescriptive model for self-directed learning which formed a good basis for discussion but did not take into account that personality and outside circumstances might play a significant role (Merriam and Caffarella, 1999). Kolb’s (1984) work on learning styles and learning cycle demonstrated the diversity of ways in which learning might occur.

Much learning will occur in the workplace, although there are still many workplaces which do not recognise this and allow extra time for learning to happen. Whilst communities of practice are common amongst workers and professionals, they do occur in all walks of life where people with like interests come together. Wenger (2006) suggested that people in communities of practice learn from each other and value their collective competencies, will engage in joint activities and
discussion and members of the community are practitioners sharing ways and means of addressing situations. It is recognised by Wenger (2006) that communities of practice will be of use in CPD situations where learning will become social and interactive.

Workplace learning occurs on the job and is largely informal. Inhibitors to the process have been suggested to be lack of time, lack of resources, lack of rewards and limitations to decisional latitude (Lohman, 2000). On the other hand, initiators of workplace learning are group activities, policy audit and development, new challenges and experience with clients (Eraut, Steadman, Fumer, Maillardet, Miller, Ali & Blackman, 2004). Teaching others encourages a professional to keep abreast of new advances, whilst mentoring has the possibility of developing both the mentor and mentee.

Reflective practice has been discussed over the years and whilst some authors may assume that all people are capable of this, others accept that it may not be quite so simple and the process of reflection may need to be coached (Karban & Smith, 2006; O’Sullivan, 2003). It has also been argued that without critical reflection, transformation of perspective and ultimately true learning will not occur (Cranton, 1996; Mezirow, 1998). Whilst there are schools of thought that suggest that critical reflection will not be possible until a mature age has been reached (Merriam, 2005), others posit that a change of school curricula in Australia has led to students becoming more independent of teachers at an earlier age (Smith, 2000).

There are many discussions and theories surrounding self-direction in learning. The seminal work of Brockett and Hiemstra (1991), in particular, recognised that the personality of the learner coupled with the social circumstances surrounding the learner and learning situation play an important part in self-direction. They also recognised that a balance needs to be met between these internal and external characteristics. There is some evidence (Jennings, 2007) that self-direction may not lead to autonomy and that medical practitioners may not be able to assess their learning needs. In addition, learning outcomes may not be improved, although learning that occurs is of
good quality. Guglielmino (2008) is another author with the belief that not all people will initially be capable of self-directed learning and may need coaching in this.

This chapter which has examined various learning and motivational theories, will enable the literature examined in the following chapter, Chapter 3, on continuing professional development, to be put into perspective and ultimately this thesis as a whole.
Chapter 3
Continuing Professional Development

3.1 Introduction

Since 2002, sonographers, working under Medicare, in Australia have had a mandatory requirement to undergo continuing professional development (CPD) in order to remain accredited. Nevertheless, few studies have been undertaken to discern sonographers’ attitudes towards CPD and the way they practise it. In order to better understand the impact of CPD on sonographers an overview of the literature was undertaken to gain an understanding of how other professionals view CPD and what the barriers and inhibitors to their participation in CPD are. Subsequent to this, literature pertaining to medical radiation science professionals (MRS), their workplace situations, CPD and learning styles was perused and reported on in this chapter. MRS professionals, that is, radiographers, radiation therapists and nuclear medicine technologists were chosen as they have a close professional alignment with sonographers, often working in the same department and with many sonographers having their initial training in one of these professions.

3.2 Overview of CPD

According to Cervero (2000), the first systems and concepts for continuing professional education/development began in the late 1960s. During the 1970s and 80s it became the basis for re-licensing for such professions as medicine, accountancy, engineering and law. Educational programs were developed largely using focussed processes such as study days and specific courses. Formal courses still play a large role in CPD, although there are many professions which now use different forms of education. Cervero (2000) has argued that it has become increasingly recognised that a professional needs more than the informational updates that formal programs provide if they wish to improve practice. As Cole and Glass (2004) assert, if professional development is understood to be only of a formal processed nature, then learning possibilities will become limited. A wide range of professional activities can now be accessed by many
professionals, for instance, teaching, writing articles, reading, research and attendance at workshops may all be considered as legitimate development activities along with more formal activities (Australian National Training Authority (ANTA), 2005; ASA, 2010).

The use of either of the terms CPD or CPE (continuing professional education) seems to be largely a matter of choice by a professional body. According to Ferguson (1994), some authors limit the definition of CPE to the provision of study days and courses, placing emphasis on externalised formal education. Others, such as Shannon (2000), maintain that CPE is moving closer to a self-directed model, in that professional development depends on an independent pursuit of learning and self-management of learning activities. Friedman and Phillips (2004) discuss the ambiguity in the definitions of CPD and suggest these conflicts reflect the different interests and objectives of each profession. Some professions use CPD as a mode of education or learning while others as an activity in itself. Some use CPD as an individual responsibility and others as a means of measurement. As a means of measurement, CPD can include lifelong learning and personal development thus ensuring a measure of control and security in the workplace. Given the evident ambiguity, the term CPD will be used throughout this study and will encompass both CPE and CPD.

3.3 Definition of CPD

Definitions of CPD for different professionals have been put forward by many authors (Ferguson, 1994; McPartland, 1990; Postler-Slattery & Foley, 2003; White, 2004). Furze and Pearcey (1999) state that for nurses the most encompassing definition is:

...the lifelong process of active participation in learning activities to enhance practice (Furze & Pearcey, 1999, p. 356).

Further to that, White (2004) has a succinct definition for CPD for medical doctors which states:

The ongoing maintenance, acquisition and development of knowledge, skills and attitudes to enable a medical practitioner to constantly improve as a practising professional (White, 2004, p.187).
From their review of the literature, Fleet, Kirby, Cutler, Dunikowski, Nasmith and Shaughnessy (2008) suggest that a broader concept for CPD for health professionals must include the personal, social and political aspects of health care rather than education alone. Many definitions of CPD are quite narrow and they often focus solely on acquisition of knowledge and enhancement of practice. Fleet et al. further posit that learners need to see the relevance of learning to their situation so that approaches which encourage reflection, identification of learning needs and individual plans to meet those needs are more likely to be effective (Fleet et al., 2008, p.16).

Jones and Jenkins (2007) cite the definition of Madden and Mitchell (1993) as having a more common usage:

*Continuing professional development is the maintenance and enhancement of knowledge, expertise and competence of professionals throughout their careers according to a plan formulated with regard to the needs of the professional, the employer, the profession and society (Jones & Jenkins, 2007, p.1).*

This definition appears to encompass, in part, the theories of Knowles (1975), Candy (1991) and Brockett and Hiemstra (1991) which were discussed in Chapter 2, and that of Honey and Mumford (1992) who argue that planned learning is the most effective and will best serve CPD.

### 3.4 Reasons for CPD

A growing trend towards professionalism is one of the features of westernised societies (Cervero, 2000). Tobias (2003) defines several essential characteristics of a professional, including the use of skills underpinned by theoretical knowledge, education and competence in these skills, as deemed by examination and membership of a professional organisation which organises its members. Sim and Radloff (2008) believe autonomy of practice, altruism and having a code of professional conduct should be added to this list. CPD is implicit to being a professional and the general public and insurance bodies require proof of professional competence (Kerka n.d.); whilst Friedman and Phillips (2004) go further and suggest that CPD will verify that standards are being upheld and it will enable the employer to have a competent and adaptable workforce.
Chapter 3: Continuing Professional Development

Updating knowledge is necessary in order to keep abreast of changes as they occur. It has been estimated that as much as half of what was learnt in obtaining any professional qualification will have become obsolete in less than five years (McPartland, 1990). According to Eraut (2001, p. 27), professional knowledge learnt in an undergraduate degree course is largely theoretical and this knowledge will need to be replicated, applied, interpreted and associated within practice in order for it to become useful. It is not possible in most cases for a professional to develop and apply all the theoretical knowledge obtained in an original degree and the degree in turn will not be able to provide all the knowledge that will be required by the professional in their practice. Several authors (Cervero, 2000; Knight, 2002; Lester, 1999; Nasseh, 1996; Rushton, 2004) agree that much of professional practice is learnt by experience after initial training and consequently there is an inherent expectation of a requirement of lifelong learning. In addition, Friedman and Phillips (2004) are of the opinion that the other reasons for CPD, such as personal development and the production of a reflective, empowered and flexible professional will bring benefit to each individual.

Occupational groups such as nurses have used a requirement for CPD as part of their political struggle for status and recognition and to gain more control over their work environment and conditions (Tobias, 2003). It is, however, possible that this same process may lead to a tighter control, particularly by governing bodies, over the professional instead of increased independence. Nevertheless, it has been suggested that the introduction and inclusion of CPD into codes of practice may allow for more credibility and standing with the general public (Field, 2004; Lester, 1999).

3.5 Aims and Objectives of CPD

The seminal work defining the objectives of CPD was Houle's (1980) text *Continuing Learning in the Professions*. In this text, the objectives of CPD were to prepare professionals to use the best ideas and techniques and to be prepared for and willing to make modifications to these. In this manner CPD would be a part of lifelong learning. According to Knapper and Cropley (2000, p.
lifelong learners have the ability to plan and assess their own learning and are active rather than passive learners. They also learn in both formal and informal settings from peers, teachers and mentors. They will be able to integrate knowledge from different areas when required and use different strategies for different occasions. Houle’s objectives for CPD included clarifying the functions of the profession, theoretical knowledge, self-enhancement, credentialing, training and ethical practice, creation of a subculture and acceptance by the public.

Aims and objectives for CPD have been discussed at length by several authors (Gould, Kelly, White & Chidgey, 2004; McPartland, 1998; Nolan, Glyn-Owen & Nolan, 1995). These authors included in their discussions suggestions that CPD should be a facilitation of practice and used for an exchange of ideas. It was further recommended that CPD should be there so that clients’ needs could be met and that it should be used as a basis for re-licensure and re-accreditation. A warning note was introduced by Lester (1999) who argued that professional bodies may take advantage of re-licensure to force their members into undertaking CPD unwillingly, rather than allowing CPD to be undertaken voluntarily thus empowering and helping the professional. However, Postler-Slattery and Foley (2003) countered this idea as the nurses in a reported implementation of an internal mandatory CPD program in a Wisconsin hospital reported a greater satisfaction with learning. There was also a reported boost in morale and a significant drop in staff turnover. After a critical review of the literature on CPD for health professionals, Fleet et al. (2008) formed the opinion that the aims of CPD should be to allow health professionals to satisfy their personal and professional needs and to meet career goals and maintain competence in their particular field, whilst being socially accountable. The updated knowledge and training may then enable increased skills and job satisfaction to translate into improved care for their patients. The literature review was limited to the English language and the authors recognised that the review was limited in that the literature regarding pharmacists had not been available to them.
The purpose or aim of CPD may differ according to which country the professional group is situated in. Major surveys conducted of professional bodies by Friedman and Mason for the Professional Associations Research Network (PARN) (2007) revealed that in Canada and Australia the purpose for CPD is generally to keep the professional up-to-date with the latest thinking and techniques in the field. This was in contrast to the UK and Ireland where CPD leans towards supporting the personal and professional development of the professional, which has a broader base. This point will be discussed in greater detail later in this chapter under the sub-heading of ‘Models of CPD’.

3.6 Provision of CPD

Universities and colleges have a history of providing continuing education in the form of specialist courses (Clegg, 2003) and they also have the benefit of having the pedagogical experience to run such courses (Nasseh, 1996). However, there are financial constraints in today’s market and often courses will not be organised unless there is a benefit to the university, either financial or via a business collaboration. Workplaces often take on the responsibility for the CPD of their workers and it may be of some financial and competitive benefit for some to do this (Cervero, 2000; Lester, 1999). Frequently though, it is the professional organisations that now support and provide the CPD of their members. It has been reported that between 70 per cent and 90 per cent of professional organisations in the UK have a policy of mandatory CPD or obligatory CPD. Many of them use this as a condition or benefit of membership (Cervero, 2000; Gold, Rodgers & Smith, 2002).

As with the aims and objectives of CPD, policies may vary according to country of origin. According to the 2006/7 PARN surveys, 71 per cent of the 49 Australian professions surveyed had a CPD policy, which was greater than Canada at 66 per cent and Ireland at 67 per cent. These percentages were all less than the UK professional bodies which had 85 per cent of professions having CPD policies. From the same surveys, it was reported that Australian professional bodies
are less likely to collect evidence of planning (17 per cent as compared with 32 to 47 per cent in the other surveyed countries) and reflection (26 per cent compared with 29 to 89 per cent). Online facilities were used by more than half of Australian professional associations to deliver CPD which is more than Canada and much more than UK and Ireland (Friedman & Mason, 2007).

3.7 Attitudes and deterrents to CPD

The attitudes of dietetics professionals using a portfolio process for CPD, reported by Keim, Gates and Johnson (2001) yielded mainly positive attitudes, in particular, they believed it would maintain competence. There were also some negative findings such as cost, lack of resources and inappropriate resources, especially for rurally based practitioners. Physiotherapists practising in remote areas in Australia identified several deterrents to CPD. These deterrents included lack of personal time, lack of access, travel costs and loss of income when travelling and also, inappropriate CPD activities. On the other hand, they could also foresee problems such as cost of equipment and lack of technical knowledge when a web-based distance CPD network was suggested to them (McCormick, 2003). In another study, this time by Saidi and Weindling (2003), 49 paediatricians separated into nine groups were involved in focus group interviews with the primary focus being the extent to which CPD impacted on their clinical practice, professional role and responsibilities. These paediatricians were positive in their belief that taking part in CPD had resulted in a change in their clinical practice. In addition, they reported benefits to their personal lives and usefulness of CPD in further planning of educational needs. The negative aspects they reported included lack of resources, cost, work commitments and CPD activities of uncertain quality.

A study of radiographers’ attitudes to CPD in the United Kingdom and New Zealand was conducted by Henwood, Yelder and Flinton in 2004. CPD was not mandatory at the time and participation in CPD was low. Comments from respondents indicated some negativity and apathy about outcomes and again, cost, lack of support, staff shortages and also lack of time were
Chapter 3: Continuing Professional Development

reported as deterrents. Also in 2004, Friedman and Phillips conducted a study of a mixed group of professionals and their opinions about CPD and what it meant to them. Although respondents were generally positive about CPD, it was of note that many respondents thought they were unique amongst their peers. According to one, “I think I am keener than the average’, and another, “I've spoken about CPD to lots of people and very few of them take it seriously” (Friedman & Phillips, 2004, p. 368). Some of the participants were cynical about other professionals’ involvement in CPD, believing that deception, for instance logging in points where none was due, was commonplace. Few believed that CPD was good for competence and the example was given of a certificate of attendance at a course being only an indication of physical presence and not necessarily of learning.

Attitudes towards and deterrents for CPD in athletics trainers were identified by Hughes (2005) using a survey instrument. The most notable finding from the data collected from a group of trainers (256) was that his participants had a strong willingness to learn. The perceived benefits of CPD for this group of people included moving towards being a more self-directed person, internalised motivation and application of knowledge. Main deterrents emerged as lack of course relevance, lack of time and cost. However, a low 22 per cent return rate for this survey could indicate some bias toward the positive. Perry (1995) identified several obstacles that hindered uptake of CPD in a group of nurses. These included lack of interest from the managers, lack of self-value, lack of good development programs and inadequate funding. Perry suggested there might be some resistance to change due to cultural norms but reported that family responsibilities was the main obstacle. In spite of this, the nurses had a feeling of camaraderie with their colleagues and empowerment during and after participating in CPD activities.

Occupational therapists in Canada were hampered in their CPD by workplace policies which do not address gender issues (Townsend, Sheffield, Stadnyk & Beagan, 2006). Although the profession is female dominated, allowances were not made for other commitments which are
primarily female. CPD was seen to compete with family commitments, with CPD activities completed largely in the occupational therapists’ own time. Cost is an issue often on top of child care and eldercare, homemaking and other family responsibilities. In addition, heavy workloads, low salary, lack of workplace policies for CPD and a lack of support from management were all seen to be major barriers. These issues are all compounded for the occupational therapist situated in a smaller remote community. The deterring effect of lack of management support for CPD was also discussed by Tran, Hall, Davis, Landy, Burnett, Berg and Jaglai (2008) who considered that the most powerful deterrent for CPD was a lack of support from management. This supports the writing of Billet (2001) and O’Sullivan (2003) and the opinion of the Society of Radiographers, previously discussed in Chapter 2.3, who believe that structures should be in place in the workplace to allow for CPD.

Emergency medical practitioners in Australia acknowledged that the main deterrents for CPD for them were lack of time, too many other things to do and too busy to leave work. These deterrents were often intensified for those who worked in rural and remote areas. Other factors included family commitments and distance, although cost was not an issue for these professionals, some admitted lack of motivation or plain disinterest (Dent, Weiland, & Paltridge, 2008).

Rothwell and Arnold (2005) undertook a survey study focussed on the CPD attitudes of professionals with the Chartered Institute of Personnel and Development. They had a 24 per cent response rate to their survey which they reported as powerful enough to allow statistical analysis to be confidently conducted. Men and women replied to the survey in almost equal numbers, however, men who replied were generally in higher ranking positions, which could relate to the findings. They found that women had more positive attitudes towards CPD than did male respondents. However, according to the authors, valuing CPD did not necessarily translate into participation in it and the value attached to CPD was actually quite low. Record keeping was seen as a chore and these employees also felt that the employer was the beneficiary and not
themselves. These findings are echoed, in part, by a small number (23) of pharmacists interviewed by Gifford, Murphy and Anderson (2008) who reported being generally in favour of CPD, although many were discouraged and put off by having to record their own CPD. Some of these pharmacists felt that since having to record the activities they actually did less. The authors concluded from their findings that whilst pharmacists acknowledged the importance of CPD, many do not record their learning and so there may be a disjunction between what is actually done and what is on record.

### 3.8 Perceptions

Nurses interviewed in focus groups by Bahn (2006) reported being surprised by the gains they had achieved from study. They found they had become more critical in their thinking, more assertive and more knowledgeable even though they had expected to have no benefits at all. Nevertheless, none of them believed that the human element of caring for patients could be learnt. In another study of nurses by Gould, Drey and Berridge (2006), CPD was considered to be important for maintaining staff and patient safety, improvement of safety and also for promoting career progression.

There have been many studies conducted over the years that have looked at different perceptions of CPD and these have demonstrated a wide range of opinions and attitudes to CPD. Although it has been stated frequently that there is little empirical evidence of the beneficial aspects of CPD, there are themes which thread through the studies. There are several benefits stated, with one or two in each study, although few directly relate to outcomes of CPD regarding better client service. On the other hand, in regards to deterrents, several themes recur frequently. This could be explained by a couple of reasons, one is that the study methods are different, but more importantly each profession has different aims; but no matter how different the professions, the deterrents mentioned mainly affect all professions and are more frequently stated for each study.
The literature indicates that the positive aspects of CPD may be seen as:

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomy</td>
<td>Improved knowledge</td>
</tr>
<tr>
<td>Assertiveness</td>
<td>Improved communication skills</td>
</tr>
<tr>
<td>Camaraderie</td>
<td>Increased confidence</td>
</tr>
<tr>
<td>Benefits to service</td>
<td>Increased professionalism</td>
</tr>
<tr>
<td>Change in practice</td>
<td>Internalisation of motivation</td>
</tr>
<tr>
<td>Competence</td>
<td>Knowledge application</td>
</tr>
<tr>
<td>Development of learning plans</td>
<td>Movement towards self-directedness</td>
</tr>
<tr>
<td>Empowerment</td>
<td>Personal growth/morale</td>
</tr>
<tr>
<td>Individual benefits</td>
<td>Planning educational needs</td>
</tr>
<tr>
<td>Reflection</td>
<td>Research</td>
</tr>
</tbody>
</table>

The literature indicates that the negative aspects of or deterrents for CPD are:

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Deterrents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td>Staff shortages</td>
</tr>
<tr>
<td>Cost</td>
<td>Work load</td>
</tr>
<tr>
<td>Lack of course relevance</td>
<td>Remoteness</td>
</tr>
<tr>
<td>Lack of quality of courses</td>
<td>Lack of resources</td>
</tr>
<tr>
<td>Lack of opportunity</td>
<td>Have to use own time</td>
</tr>
<tr>
<td>Not interested</td>
<td>Paperwork</td>
</tr>
<tr>
<td>Not required (generally by more experienced professionals)</td>
<td></td>
</tr>
<tr>
<td>Enthusiasm squashed on return to workplace after course or conference</td>
<td></td>
</tr>
<tr>
<td>Lack of encouragement from management or peers</td>
<td></td>
</tr>
</tbody>
</table>

### 3.9 Outcomes and Evaluation of CPD

#### 3.9.1 Evaluation of outcomes

Evaluation of the outcomes of CPD is very difficult as it involves the complexities of learning and human subjects. It also involves the linkage of performance improvement to CPD as a direct outcome. Empirical methods may not be the best way to evaluate outcomes (Ellis, 2003) and, indeed, most evaluations that have been undertaken usually centre on the satisfaction of the individual with the course and perceived rather than actual benefits (Tennant & Field, 2004). There is, in addition, the possibility that reliance on self-assessment by the individual may lead to false
assumptions of the efficacy of a course or activity due to over- or under-evaluation by the participant (Smith & Topping, 2001; Tennant & Field, 2004). As Perry (1995) asserted, if evaluation is more concerned with organisation, management, staff and assessment results rather than outcomes, then none of these things can give an indication about the effect the CPD had on the individual and his or her practice.

Swankin, LeBuhm and Morrison (2006) undertook a critical review of the literature and held conversations with stakeholders for the American Association of Retired Persons (AARP) Public Policy Institute. Whilst acknowledging the challenges of implementation, they advocated that CPD should be evaluated and examined in various ways so that competency and outcomes of the CPD could be assessed. Their recommendations were to use such methods as the following:

- Written or oral examinations
- Peer review
- Consumer satisfaction survey
- Records review
- Self-reflection leading to self-directed learning program portfolio
- Evaluation by standardised patients
- Onsite practice review
- Performance evaluation
- Continuing education based on needs-assessment and followed by a test or other verification that the course material had been absorbed.

Recognising that it is difficult to measure outcomes of CPD and the value of these prompted Friedman and Woodward (2008) to devise a model of CPD measurement, based on the CPD cycle (discussed later in this chapter) and a review of the literature. This scaled model appreciates that there are several facets to outcomes, including knowledge change, behaviour change and overall results of these changes, which is then the true measure of outcomes, not
individual outputs along the way (Friedman & Woodward, 2008). Several cases were tested using this model to demonstrate the variations in outcomes from different schemes used by professional bodies.

### 3.9.2 Outcomes

Debate still lingers as to whether a main outcome of CPD is an improvement in client service. There appears to have been few research projects undertaken on the impact of CPD on patient care and quality of service and therefore there is little concrete evidence that there is an improvement of service after CPD (Postle, Edwards, Moon, Rumsay & Thomas, 2002; Smith & Topping, 2001; Tennant & Field, 2004; Wood, 1998). Self-reported improvement of clinical skills and patient care, along with increased self-confidence, was reported by Johnson (2008) and Gunn and Goding (2008); Cervero (2001) also argued strongly that CPD can and does improve service. Nevertheless, Friedman and Phillips (2004) reported from their research that there were few professionals who actually believed that competence was improved following CPD.

The effects of one CPD program on nursing staff were researched by Nolan, Glyn-Owen, and Nolan (1995). They focussed their attention on the outcomes of CPD and the structure and process variables governing success of the program. They noted that theirs was one of the few empirical studies conducted on the impact of CPD on practice. Their study involved managers, educators and the nurses enrolled in the program. There were several perceived advantages reported; updating knowledge was placed first with 24 per cent of the nurse respondents, facilitation of change and better patient care were placed second and third with 14 per cent and 13 per cent of respondents respectively. Managers placed change as the most important and, notably, only the educators placed better patient care first. Other reported lesser benefits included personal development and self-confidence. Perhaps not surprisingly, managers and educators were more in favour of the nurses using their own time and money for training than were the nurses themselves (Nolan et al., 1995).
Although it may be difficult to prove that CPD has a direct bearing on practice (Wood, 1998), areas that could indirectly be affected by CPD have been reported as being improved communication skills, enhanced individualised care and increased use of evidenced based practice. Library staff interviewed by Doney (1998) felt that some of the positive aspects of CPD included increased ability, job satisfaction and job promotion. Major deterrents for these workers were staff shortages and lack of personal time. Although for this group cost was not a problem, the author felt that findings could not be definitive of the whole profession due to a small sample size (n=17), highlighting a need for more work in this area.

Over the past decade, there have been three Cochrane reviews undertaken to assess professional practice and health care outcomes after continuing education meetings and workshops. The latest review in 2009 was conducted by Forsetlund, Bjorndal, Rashidian, Jamtvedt, O’Brien, Wolf et al. They examined 81 trials involving over 11,000 professionals. 20 reports were discarded due to inadequate methods descriptions and thus the possibility of bias. Even so, they still reported that reporting methods were generally quite poor and so firm conclusions were difficult to draw. However, they did write in their conclusion:

*Educational meetings alone or combined with other interventions, can improve professional practice and healthcare outcomes for the patients. The effect is most likely to be small and similar to other types of continuing medical education, such as audit and feedback, and educational outreach visits. Strategies to increase attendance at educational meetings, using mixed interactive and didactic formats, and focusing on outcomes that are likely to be perceived as serious may increase the effectiveness of educational meetings. Educational meetings alone are not likely to be effective for changing complex behaviours.*

(Forsetlund, Bjorndal, Rashidian et al., 2009, conclusion to Cochrane review).

### 3.10 The CPD process

As was discussed in Chapter 2, there are various theories underlying adult learning and reflective practice, these theories underpin the theory of the CPD process or cycle. Jones and Jenkins (2007) outlined the principles of this in their book, *Developing the Allied Health Professional*;
• The individual learner is responsible for managing and undertaking the CPD activity. An effective learner knows what he or she needs to learn.

• The learning process is continuous in a systematic cycle of analysis action and review.
  (See Figure 3.1)

• Learning objectives should be clear and should serve organisational needs and patient needs as well as goals.

• The process is planned and based on identifiable outcomes of learning achieved.
  (Jones & Jenkins, 2007, p.4)

As can be seen, this is similar to Knowles’ theory of adult learning and similar to that does not take into account the personality or life circumstances of the individual; but it does emphasise the need for self-direction and reflection.

![Figure 3.1 The CPD Cycle (http://www.nes.scot.nhs.uk/)](http://www.nes.scot.nhs.uk/)

The diagram above can be seen to strongly echo the learning cycle formulated by Kolb as discussed in Chapter 2 and seen in the diagram below:
3.11 Models of CPD

There are various systems in common practice and they can be complex but argument generally ranges between an inputs versus outputs system, and mandatory (compulsory), obligatory or voluntary systems (Jones & Jenkins, 2007; Friedman & Mason, 2007). Inputs based models specify how much CPD activity should be undertaken, whether it is by hours or points/credits. These credits are usually linked to recognised learning activities. Outputs based models place more responsibility on the individual, in that they need to demonstrate that they are following the CPD cycle; individuals also need to demonstrate improved performance. Which model is used varies in different countries. USA, for instance, tends to use inputs based models and according to Friedman and Mason, Canada and, more in particular, the UK have moved to adopt outputs based systems. Notably using the outputs model for professions in the UK is the Health Professions Council (HPC) which sets the standards and monitors the CPD of 15 health professions (at this time) in the UK, including radiographers (HPC 2010). Their model follows the CPD cycle, as outlined above, and gathers evidence of planning, reflection and implementation. In Australia, at this time, there are no CPD models for professions which are purely based on outputs, although most employ mixed methods where individuals can demonstrate their planning and reflection. Participants can also be involved in self-directed learning, however, these activities are
still awarded credits or points. For instance, physiotherapists and radiographers may both use a portfolio system but a set number of points is still required to be obtained to satisfy their professional requirements (APA, 2010; AIR, 2010).

Friedman and Woodward (2008), in their work Approaches to CPD measurement, recommend the use of outputs based CPD over inputs, but warn that because of the complexities and varying requirements of CPD, too much may be expected from this method until it has been refined and more research has been taken into measuring outcomes. Nevertheless, they provided a comprehensive review of the advantages and disadvantages of inputs and outputs based CPD which has been summarised below in Table 3.1:

Table 3.1 Advantages and disadvantages of inputs and outputs based CPD schemes.

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input approach</strong></td>
<td></td>
</tr>
<tr>
<td>Simple, easy to understand</td>
<td>Not always well-monitored, has poor reputation</td>
</tr>
<tr>
<td>Easy to implement and monitor</td>
<td>Can be abused contributing to impression that CPD not taken seriously</td>
</tr>
<tr>
<td>Not a cost burden</td>
<td>Ingrained in modern thinking that attendance is not a good proxy for learning</td>
</tr>
<tr>
<td>Ability to compare with other professions</td>
<td>Everything done under the scheme is thought to be useful and of good quality</td>
</tr>
<tr>
<td>Allows individual to monitor how they are doing</td>
<td>Participants need to be receptive</td>
</tr>
<tr>
<td><strong>Output approach</strong></td>
<td></td>
</tr>
<tr>
<td>Attempts to measure what the CPD is intended to achieve</td>
<td>Difficult to provide verifiable measurement of the value of professional development achieved</td>
</tr>
<tr>
<td>Individuals can monitor own progress and use as basis for further targets</td>
<td>May be confusing to individual profession</td>
</tr>
<tr>
<td>Allows the monitoring of progress by professional body for ethical competency requirements</td>
<td>Developing and evolving – may be difficult for others to keep up with the changes</td>
</tr>
<tr>
<td>Provides benchmarks for higher levels</td>
<td>Not an accurate measure as yet, but development will improve</td>
</tr>
<tr>
<td>Allows professionals to signal to stakeholders that maintenance and development of competencies is taken seriously</td>
<td>Higher cost, but costs will fall and techniques and standards are better established</td>
</tr>
<tr>
<td>Up to the professional to decide what has been of professional development value</td>
<td></td>
</tr>
</tbody>
</table>

Adapted from Friedman and Woodward (2008, pp87-88)
There are three main models of CPD policy, these are voluntary, which is not monitored and not linked to professionalism; obligatory, which is linked to the professionals code of conduct and, as such, it is expected, but not monitored; finally mandatory, or compulsory, which is monitored and linked to some sort of sanction if not fulfilled (Jones & Jenkins, 2007). Of course, even within these schemes, individuals may choose to complete more CPD to benefit themselves without recording it. It is the experience of Friedman and Mason (2007) that mandatory CPD is more likely to reflect that the CPD is primarily to maintain and support competence. They also report casual evidence that compulsory CPD is likely to be used to reassure the clients and employers that professionals are keeping up to date.

The question of whether or not CPD should be mandatory has been a much debated topic. Many registration and accreditation bodies and associations now require a certain amount of documented CPD activity in order for the professional to remain on its register. The amount of activity required differs between professional bodies, although a search of internet sites of professional organisations showed that many professions ask for a certain amount of credit points over a set time. Each point generally refers to approximately one hour of teaching or learning time. The arguments for and against mandatory CPD are interesting and both sides contain merit.

Proponents for mandatory CPD state that as many as 25 per cent of professionals will not participate in CPD unless required to do so (Furze & Pearcey, 1999; McPartland, 1990; Postler-Slattery & Foley, 2003). Making CPD mandatory may overcome this problem but opponents argue that mandatory CPD violates adult learning principles. That is, adults will not undertake learning activities unless they understand the purpose of them, see some benefit from learning and are willing to learn (Field, 2004; Kerka, n.d.; Postler-Slattery & Foley, 2003). In addition, Field believes there is not enough evidence of the benefits of CPD to justify making it mandatory:

*In the absence of good evidence, until the overall impact of CPE can be proven conclusively, it is premature to argue that mandatory CPE has a positive impact on professional performance* (Field, 2004, p.8).
She then goes on to say:

*It violates adult learning principles; we need to encourage the professionals to be motivated seekers of education* (Field, 2004, p. 8).

As they are of the opinion that professional competence is one of the main reasons for completing CPD, Kerka (n.d.) and McPartland (1990) propose that mandatory CPD will protect the public from incompetent practice by keeping professionals current in their field of practice. They also comment that proponents of mandatory CPD believe that competency will increase through education and that there is evidence to show that well-designed programs can influence practice. Indeed, it would seem that this should be the case when one considers that most professionals learnt their practice originally from a well-designed program of learning, either in university or technical and further education (TAFE) college. Nevertheless, as discussed earlier in this chapter, there is still little evidence regarding the impact of CPD on practice (Field, 2004; Furze & Pearcey, 1999). In particular, the evidence showing that practice is improved through CPD is still somewhat lacking, as attendance at CPD activities has not been conclusively proven to bring about change in practice, attitudes, motivation or responsibility, although Forteslund et al (2009) did feel there was some evidence of improved outcomes when didactic educational meetings were held in conjunction with workshop meetings.

Concerns about the proliferation of inferior activities have been reported because mandatory CPD ensures a captive audience and it can be seen that the number of people attending activities increase when CPD is mandatory (McPartland, 1990; Perry, 1995). This may be a desired result in some professions, but Lester (1999) has other misgivings in that there is some indication that mandatory CPD will lead to a tighter control of the professional rather than increasing independence. It is noteworthy, then, that some nurses in 2007 felt that mandatory CPD was a self-protection measure for the employer and not at all related to personal development or improved patient care. They also felt that any extra learning they undertook was then taken advantage of by their management and doctors but was not rewarded (Bahn, 2007). Having
discussed this, it is noteworthy that the authors for and against mandatory systems wrote some years ago. With the emergence of more outputs based CPD systems it is interesting to speculate that this type of system would perhaps allow the professional the independence and autonomy they wish and therefore, negate some of the arguments against mandatory CPD.

3.12 Choice of CPD

The influences of choice on CPD do not appear to have been researched to any great extent. As McPartland (1990) pointed out, there is a concern that learners may choose totally irrelevant activities, often through time and cost considerations. Revel and Yusuf (2003) discuss the tenet that learners should be able to choose their own topics when continuing their studies. They found, however, that medical personnel in the United Arab Emirates tended to select subjects with which they were already comfortable. A learner ideally should be sufficiently self-directed to have insight into their own needs in order to plan their own learning. However, one's insights into educational needs may be flawed as was evidenced by a cross-sectional study of general practitioners by Tracey, Arroll, Barham and Richmond (1997) which was conducted to determine the validity of GPs' self-assessment of knowledge. This study found that their insight into their own needs was poor. This finding was supported by Jennings (2007) who stated there was ample evidence in the literature to prove that doctors are incapable of accurately assessing their own learning needs.

In other research, Gunn and Goding (2008) found that of the physiotherapists in their study, very few actually planned ahead and most CPD occurred opportunistically, even though they were apparently motivated to study. Additionally, Murray and Campbell (1997) showed that the choice of CPD activity could actually be governed more by financial gain than educational necessity. This point was reinforced by a newspaper article (The Australian 13/09/05) which suggested that Australian medical practitioners were gaining CPD credits from conferences sponsored by pharmaceutical companies. It was alleged that many of the activities offered at these
conferences had little relevance to increased medical knowledge and patient care. These results indicate that other issues or factors have a significant influence over choice of CPD activities which stand in the way of self-direction.

3.13 CPD activities

Activities offered to professionals for CPD were originally mainly process driven in the form of lectures and courses providing educational updates. These methods may be effective in closing knowledge gaps in early professional careers and in bringing knowledge up-to-date (Nasseh, 1996). It is, however, debatable whether the learning undertaken in these practices is transferable to everyday work practices (Cervero, 2000, 2001; Knight, 2002; Webster-Wright, 2009). However, it has been recognised that courses and lectures may not fulfil all requirements of CPD and many professional bodies now use alternative approaches to CPD, such as online activities and practical workshops (Evans, Ali, Singleton, Nolan & Bahrami, 2002).

3.13.1 Conferences

One of the most recognisable activities in recent years is conferences. They are seemingly a popular way of gaining CPD credits, with good attendances, especially at dedicated sonographer conferences (ASA 2010). Conferences are held in various formats and could be viewed as a good method for dissemination of new ideas and concepts. These may be presented in short or longer presentations, demonstration workshops and poster presentations. Not only are well-established speakers able to present but conferences also give an opportunity for newer members of a profession to contribute. Although not all researchers are of the opinion that attending a conference will lead to learning (Perry, 1995), O’Reilly (2004) is enthusiastic about the other benefits that they bring. He advocates conference attendance for the following benefits: renewal and rejuvenation, networking, collegial support and friendship, inspiration, perspective and vision. Leadership and giving back to the profession are also benefits. The benefits of networking are agreed with by Merchant (2007) who suggests:
Networking is a powerful way to bring together like minded professionals to share knowledge and provide a high standard of care to health on all levels. One important aspect of being professional is developing a network with likeminded people while striving to deliver the optimum in cancer care (Merchant, 2007, p.11).

### 3.13.2 Journals

Journal article reading has been a popular method of updating knowledge for many years. In particular, in the medical professions it is widely accepted as a good educational pursuit (Cole & Glass, 2004; King, Tenopi & Clarke, 2006). Journal reading can be undertaken at the reader’s leisure and does not require specific planning or travel. There are, however, some inherent difficulties with this practice. One concern is that it can be very time consuming and it has been suggested that it could take between three and five working days per month to read everything that is necessary to keep abreast of current trends (Jeffrey, 1992). As this was written almost 20 years ago, it is most likely that the number of journal articles available to be read would be much increased. With a busy schedule, this is clearly difficult to achieve. In addition, worthwhile articles may come from a variety of different journals and it would be cost prohibitive to subscribe to all of them, not only for an individual but also for libraries. Another concern with journal reading is the possible lack of statistical and methodological knowledge and expertise in appraising journal articles by the reader. A study by Saint, Christakis, Saha, Elmore, Welch, Baker and Koepsell (2000) of medical internists in the USA demonstrated that many relied heavily on reading abstracts and editor guides in selecting articles of interest. The authors suggested that it would be beneficial if more time was spent on teaching critical appraisal of articles to undergraduates.

Knowledge may be enhanced by reading articles, but it is unclear if this leads to a change in practice, although Cole and Glass (2004) did suggest that the reading of journals could influence practice based on self reported evidence in their study. Also the paediatricians who responded to a survey by King et al. (2006) indicated that while the principal purpose for reading journals was to keep current, other benefits included improved results, new ideas and broadening or narrowing...
focuses. Increasingly, professional journals are including one or two articles that have questions linked to them, answers to which can be submitted for marking and CPD credits (ASA, 2010; SDMS, 2010).

### 3.13.3 Electronic and Internet based learning

With the ongoing improvement in technology, newer methods of CPD are emerging. These include the use of inter-active CDs (Lockyer & Bennett, 2003) and on-line web-based activities (Cervero, 2001; Kanuka & Nocente, 2003; Sim & Radloff, 2008). Podcasting, wikis and blogs are another popular and effective method of relaying education and information and according to Boulos, Maramba and Wheeler (2006) can offer a different way to enhance learning if well used; podcasted lectures have also been shown to be effective in higher education (Evans 2008). These methods expand access to training and education; likewise they should improve the quality of learning and reduce costs (Kanuka & Nocente, 2003). Webinars are increasingly being used to aid in CPD (SDMS, 2009), although there is little literature at this time to support their use.

Web-based learning may not always be well accepted as it can be somewhat challenging, requiring the participant to assume a greater responsibility, i.e. utilise their self-direction, for their learning and the learner may have to battle the challenges of new (for them) technology (McCormick, 2003). However, the benefits of flexibility and convenience added to the reduction in need for travel for those in more remote areas would outweigh the disadvantages and will continue to do so as internet connections and computer skills improve (Kanuka & Nocente, 2003; McCormick, 2003). Sim & Radloff (2008) demonstrated the use of an online educational model. This model enabled radiation therapists to reflect more clearly on their practice and application of such. The participants felt more empowered by their learning and were able to continue effecting change after the cessation of the online course.

### 3.13.4 Performance management

Performance management plans adopted by some larger organisations focus on the varied circumstances that will influence professionals’ performance in the workplace. These include
competence, skills development, personal development, human relations and group interactions. Performance management encourages professionals to review their working life and actively plan for the future, which actions will in turn be reviewed (Nasseh, 1996). In essence, performance management undertakes a holistic view of professional development in that it encompasses all aspects of professionals’ working lives. In essence, this in itself is a model for CPD.

3.13.5 Personal education plans

Personal education plans have been encouraged for professionals such as general practitioners, physiotherapists and occupational therapists in the UK (Ryan, 2003), and, as such, are the basis for the outputs based CPD schemes which are usual in the UK health professions. Similar plans have been activated by diverse other professions such as chartered surveyors, the Museums Association and the Institute of Personnel and Development (Lester, 1999). According to Lester, the plans, which alternatively would be called learning cycles or action research cycles, are based on a process of identifying needs, planning action and implementing and reviewing these actions. These models for CPD which could also be defined as a form of reflective practice or self-directed learning, give recognition to informal and individual leaning. An evaluation of one such plan for GPs concluded that a high quality of education which led to improved patient care and personal development was provided. The respondents to the evaluation also reported being appreciative of the flexibility to plan their own education (Evans et al, 2002). It is likely that the CPD of workers and professionals is contributed to, to a large extent, by working alongside others and watching and listening to them with the help of in-house learning sessions (Bahn, 2007; French & Dowds, 2008; Jarvis, 2005; Rothwell & Arnold, 2005).

3.13.6 Other CPD activities

Depending on the needs of the profession, many professional bodies allow a wide range of activities to be classed as CPD and apart from those discussed above will include mentoring, discussed in Chapter 2, peer review of articles, writing journal articles, volunteer work with the organisation and attendance at didactic lectures and workshops. This wide range demonstrates an
acceptance by most professional bodies that more than just processed activities are necessary for good CPD.

3.14 Medical radiation sciences professionals: their CPD, learning and workplace circumstances

The preceding discussions of this chapter have been focused investigating CPD as understood by a variety of professionals; Australian sonographers have not been part of these studies and therefore their CPD habits are not well understood. As sonographers are usually connected with and considered to be part of a group of health workers known as medical radiation science (MRS) professionals a further review of literature pertaining to the CPD habits, workplace issues and critical reflection of this group of health professionals was undertaken.

In 2003, Sim noted that although CPD was lifelong learning in practice, the workplace and the workplace culture of medical imaging and radiation therapy departments did not encourage this, even though the universities teaching the MRS professionals encouraged it in their teaching and assessment. She found that in the workplace, radiologists\(^1\) do not encourage critical thinking from their staff, preferring subservience and rigid observance of protocol. Yielder (2006) also discussed medical dominance in the health sector. Medical practitioners tend to wield the power in administrative positions thus controlling policy. Sim (2003) also postulates that in an environment where critical thinkers are not encouraged and, in fact, are plainly discouraged, it is easy to understand why MRS professionals find it simpler to adhere to routines and protocols unquestioningly. In an atmosphere lacking support and reward from MRS employers for further development, Sim considers “We are historically constrained from lifelong learning” (Sim, 2003, p.106) and because of this it is possible that MRS professionals find little point in trying.

A study by Brown (2004) of radiographers in the UK, added some light to this comment. Even where radiographers have their role extended to allow interpretation and diagnosis of some

\(^1\) Radiologists are still generally in overall charge of public departments and often also own private medical imaging departments. Radiologists are classed as the overall supervisor for radiographers as they report on the images.
images, their expertise is often ignored by medical practitioners who would prefer to wait for a report from a radiologist, even if that means that some patients are sent home ill or injured. In the same study, Brown reported an increase in workloads which was making it increasingly more difficult for the radiographers to find time for reflection and CPD.

*The only time radiographers seem to be able to do CPD is around lunch time and after 5pm. We do not get any time for CPD involving reflection on practice* (Brown, 2004, p. 219).

The lack of time and access for CPD is seen as severely compromising the commitment of the radiographers to CPD. Sim and Radloff (2008) echo these sentiments by their conviction that productivity and fast pace do not allow for reflection and questioning.

Spalding (2003) in her study of therapy radiographers in the UK found that CPD had always been part and parcel for these professionals as they actually develop and learn through the nature of their practice. However, due to recruitment and retention problems leading to work-load increases, it was difficult enough to carry out normal duties without the added burden of CPD. For this group of radiographers, factors impacting negatively on their engagement in or motivation to engage in CPD were lack of time and finance and a lack of access to learning opportunities. In addition, it was perceived that different geographical locations unfairly discriminated against some of them. Wherever the location though, there was always a perceived negative impact on home life. Spalding commented that although little had been published, CPD was assumed to have a positive effect on health care delivery. In this study, however, she found that the main motivation for CPD was promotion rather than better patient care. This was echoed by a later study by Evans, Gallatin, Taylor and Brodnick (2008) of medical imaging professionals, mainly radiographers in the USA. Their results showed that the main motivation for CPD was to retain licensure requirements, clinical competencies and expansion of clinical practice with a view to promotion. In addition, the responses about self-management reflected a desire to choose courses with CPD credits, however, the responses also showed that they had a desire to think critically about innovations in their field.
Before mandatory CPD was introduced in the UK, Henwood *et al.* (2004) undertook a study of diagnostic and therapy radiographers in the UK and New Zealand in order to find out their attitudes to CPD. The larger number of participants was in New Zealand. CPD policies had been in place in the UK since 1997 and New Zealand since 2000 on a voluntary basis. The findings revealed ambivalence towards CPD in both countries, with New Zealanders being slightly more positive, which may have been attributable to the larger sample size. Qualitative comments, again mainly from New Zealand, demonstrated that the radiographers thought there were several barriers such as time, family commitments and lack of employer support (mirroring Sim’s 2003 study). It was noted at this time that unless radiographers became intrinsically motivated the general negativity and apathy evidenced would remain. An additional finding from the study by Henwood *et al.* (2004) was that radiographers tended to participate in CPD in a haphazard, unplanned way.

Radiographers in the UK and New Zealand also had had similar conception of CPD to Australian radiographers in that it should be competence and protocol based rather than have a holistic concept. A few radiographers in the study did, however realise that CPD may increase morale and confidence and may stimulate further learning, leading to a positive impact on the workplace.

A study by Sim and Radloff (2008), undertook to examine the underlying nature of radiographers, their workplace attitude and attitude to CPD. Sim and Radloff (2008) reiterated Yelder’s (2006) feelings regarding the medical dominance over radiographers. In addition, they suggested that the role of the MRS professional was very poorly understood by the general public and also other health professionals. This lack of professional recognition can lead to a low self-esteem and widespread apathy and as a group, MRS professionals tend to harbour an inferiority complex. Sim and Radloff (2008) found that Australian radiographers viewed clinical competence and strict adherence to protocols as their main goal in CPD. Whilst it is imperative that examinations are competently and correctly undertaken so that the patient is well cared for, such strict adherence leaves little room for reflection and thus these people may become followers rather
than thinkers and, as stated earlier, increasing heavy workloads will not allow for reflection. Without the reflective process there can certainly be clinical competence, but there is no scope for empowerment or growth. As radiographers have low functional autonomy there is the possibility of an adverse effect on the willingness and motivation to learn. Henwood and Taket (2008) suggested also that a person who is poorly motivated in the first place is likely to become even more de-motivated with time if there is a lack of support in the workplace. They were in agreement that reflection is the key to good practice and CPD.

In 2002, Fowler conducted an exploratory study into how radiographers learn. This was undertaken using Kolb’s (1985) leaning style inventory. The study found that radiographers are generally strong in perceiving information or experience in a concrete manner and processing these actively. They tended to be weaker, though, in reflective observation. This may mean that radiographers potentially may miss out on a full learning experience and may need to be helped to develop the skills of reflective practice. On the other hand, radiographers have great strengths in the practical application of ideas and in the ability to create theoretical models. Medical radiation professionals, similar to other professions have a “doing culture, rather than a thinking, reflective and preparing culture” (O’Sullivan, 2003, p.115).

3.15 Conclusion

This chapter has highlighted the amount of literature that has been published about CPD over the years. Various discussions about the reasons for and the value of CPD, the barriers that people face in accessing CPD and the benefits that can be obtained have been put forward. It has been shown that measuring the outcomes of CPD can be problematic and suggestions about a model for this have been outlined. Two main CPD models predominate, one which is inputs based and the other outputs based. The advantages and disadvantages of each have been outlined and it is apparent that health professionals in the UK, in contrast to Australia, are opting more for the
benefits of an outputs base system for CPD, in which the professional is able to plan and evaluate their own development.

There appears to be little consensus on the value of mandatory CPD. Two arguments prevail, one in which CPD should be mandatory. The other says that a mandatory CPD would be in conflict with adult learning theories which dictate that adults should be free to choose the learning activities that they need. Consequently a mandatory CPD requirement would negate any self-direction in learning. However, a CPD scheme based on an outputs system would encourage people to exercise their independence and self-direction whether it was mandatory or not. On the other hand, it is also apparent that some people will not undertake any further development willingly and need to be 'forced' in to it, even though it is debateable if people will learn anything of value unless they see there is a good reason for it. Significantly, there is still little empirical evidence as to the outcomes that CPD produce and the effect of CPD on practice and competence.

It has been suggested that critical reflection is necessary for worthwhile CPD to occur and it is of interest that studies on health professionals have shown that some, e.g. nurses, physiotherapists and radiographers do not exercise much discretion in their choice of CPD and are not reflective in their work practices. This is indicative of these professions not being particularly self-directed in their CPD. Additionally, there are recurring themes that health professionals, particularly MRS, also have to battle with poor work conditions, lack of recognition and low self-esteem. All of which may act as de-motivators for CPD.

Chapter 2 discussed motivation, adult learning, reflection and critical reflection and self-direction in learning. Literature regarding the reflective practices of MRS professionals and other health professionals was discussed in both Chapters 2 and 3 and it was apparent that some of these professionals were not participating in reflection or active planning of CPD activities according to individual needs. The proposition was put forward that without reflection or indeed critical reflection, worthwhile CPD cannot occur.
It was also shown in some studies that MRS professionals could be considered to be less than enthusiastic about the value and benefits of CPD. Although technically sonographers belong to the group of MRS professionals, it would be improper to assume on the few studies undertaken on that group that sonographers have the same views and tendencies as other MRS and health professionals. There is, therefore, an apparent gap in the literature about sonographers which could be remedied by research into their CPD practices. Self-direction in learning, which is the connection between self-directed learning and learner self-direction through personal responsibility and encompassed by its social context, is an ideal theoretical model for examining the way sonographers go about their continuing professional development, especially in the context of an inputs based mandatory system.

Chapters 2 and 3 have identified specific areas in sonographer CPD which will benefit from further research. Chapter 4 will outline the aim of the study and research questions and will examine how these questions will be addressed in this research.
Chapter 4
Methodology and Research Design

4.1 Introduction

The literature review identified features in other professions which influence or affect choice in continuing professional development (CPD). Positive factors which have been shown to be perceived benefits or motivators include empowerment, personal growth, increased confidence and improved knowledge (Bahn, 2006; Keim et al., 2001; Johnson, 2008; Gunn & Goding, 2008). Negative or de-motivating features which may inhibit the participation in professional development include family responsibilities, lack of quality activities, lack of time, over work, cost and lack of resources (Perry, 1995; Henwood, Yelder & Flinton, 2004; Friedman & Phillips, 2004). Negative or de-motivating features such as work environments may also prevent self-direction in learning in medical radiation science (MRS) professionals by discouraging reflective thinking (Sim, 2003; Yelder, 2006; Sim & Radloff, 2008). However, reflective practices and work environments for sonographers have never been studied and it may be that sonographers are not affected by these influences and fully embrace self-direction in their CPD.

4.2 Aim of the study

The aim of this study is to explore the role of self-direction in the continuing professional development of Australian sonographers; further it seeks to discover the contributors and inhibitors to this process. The overarching research question for this study is:

What is the role of self-direction in learning in the CPD of Australian sonographers?

The subsidiary research questions that will guide this study are:

1. What are the attitudes and perceptions of Australian sonographers of the value of CPD?
2. What are the barriers and inhibitors for sonographers’ CPD?
3. What is the impact of CPD in a sonographer’s working and personal life?
4. How do management practices and conditions affect sonographers and their CPD?
5. Do sonographers engage in reflective practice?
6. Do sonographers exercise self-direction in learning when choosing CPD topics?

This chapter will describe the methodology and methods chosen to answer these research questions.

4.3 Methodology

4.3.1 Mixed-methods research

*Mixed-methods research is formally defined here as the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approach, concepts or language into a single study* (Burke Johnson and Onwuegbuzie, 2004 p.17).

Debate, notably the paradigm wars, has occurred over the compatibility of qualitative and quantitative research (Robson, 2002). Authors, such as Lincoln and Guba (1985), were adamant in their assertion that mixing qualitative and quantitative research methods was not only totally incompatible but also impossible. Others, for example, Patton (1990), Greene and Caracelli (1997) and Burke Johnson and Onwuegbuzie (2004) contend that both approaches may be combined successfully. As early as 1985, Howe argued that there was no incompatibility between quantitative and qualitative methods at any level and, therefore, there were no good reasons why educational researchers should not use whatever “works best” for them (Howe, 1985, p.10). Indeed, Burke Johnson and Onwuegbuzie (2004, p.15) believe that mixed-methods research has the aim of “maximising the strengths and minimising the weaknesses” of both methods. Petter and Gallivan (2004) agree with this opinion and also indicate that overlapping of methodologies, termed elaboration, will help with triangulation, where the weaknesses of each method must be countered by the strengths of the other.

Qualitative research is defined by Morgan (2007) as that which emphasises an inductive, subjective and contextual approach, whereas quantitative research emphasises a deductive and objective approach, capable of some generalisations. Nevertheless, Morgan warns that these characteristics should not be absolutely defining. As Burke Johnson and Onwuegbuzie (2004)
argue, quantitative studies which claim objectivity do have an element of subjectiveness, as all
decisions made during the research process are human decisions and by nature, subjective. They
believe that the relevant characteristics of quantitative research are a focus on deduction and
confirmation; hypothesis or theory testing; explanation and prediction; standardised data collection
and statistical analyses. On the other hand, qualitative research focuses on induction and
discovery, exploration, theory and hypothesis generation; the researcher is the primary instrument
of data collection and the analysis of the data is qualitative.

A pragmatic approach to research uses a methodological approach which is most suitable
for a particular problem (Robson, 2002). According to Morgan (2007) a pragmatic approach offers a
way to work with both methodologies because the emphasis lies with the abductive, intersubjective
and transferable aspects. Burke Johnson and Onwuegbuzie (2004, p.16) also note that mixed-
methods research offers a solution to the paradigm wars by offering a practical and logical
alternative, in addition, “research approaches should be mixed in ways that offer the best
opportunities for answering important research questions”.

There are several reasons why a combination of research methods may be chosen. Marsland, Wilson, Abeyasekera and Kleih (2001) contend that the trustworthiness of the
information collected will be greater if both quantitative and qualitative data are collected. Robson
(2002) agrees that one of the main advantages of a mixed-methods approach is triangulation
because error tends to average out when data from multiple sources and methods is used. Robson
also suggests that mixed-methods research allows different but complementary research questions
to be addressed within one study. For instance, the interpretation of statistical analyses may be
enhanced by a qualitative narrative account, or, a qualitative account may be supported by
quantitative data. However, it was Greene and Caracelli (1997) who highlighted five major
purposes for a mixed-methods approach to research. Along with other writers (Robson, 2002 and
Marsland et al., 2001), they contend that triangulation is the primary purpose, in order to test for
consistency of findings from different research instruments. Secondly, the different methods could be complementary, thus allowing for one method to clarify and illustrate the results from another method. Thirdly, the results from one method may inform subsequent methods. Fourth, it is feasible that the results from one method may initiate new research questions. Finally, a mixed-methods approach allows expansion of the study by providing greater depth and detail. Greene and Caracelli (1997) conclude that a research strategy which combines different methods is likely to produce better results in terms of quality and detail. Furthermore, it is argued that integration of different methodological paradigms will allow researchers to understand their subject better and may enhance credibility (Petter & Gallivan, 2004).

The research questions required to be answered by this study were complex and this real world research, that is, research conducted in an everyday natural setting, rather than in an experimental laboratory setting, utilised more than one method of data collection for several reasons. Firstly, there has been no research specifically into sonographers’ CPD habits in Australia to date and, indeed, very little in the world. Sonography in Australia is a developing profession and sonographers need and deserve creditable research into their CPD and self-direction. This research will inform their professional bodies and enable appropriate programs and activities to be scheduled and developed. Secondly, it will provide the sonographers some insight and understanding into themselves and their thinking. Thirdly, in utilising a large population survey with room for qualitative comments and followed by interviews there will be the opportunity to obtain a credible understanding and depth about how sonographers learn and their attitudes and perceptions of CPD, thereby reducing any “inappropriate certainty” (Robson, 2002, p.370) that may have occurred with just one method.
4.3.2 Method one – survey instrument

This study used a cross-sectional design of a non-randomised group of sonographers using a survey instrument. The cross-sectional approach was used so that differences between groups of sonographers could be examined during the same time frame (Salkind, 2000). Sampling of all accredited sonographers via the Australasian Sonographer Accreditation Registry database was not possible because confidentiality agreements would not allow access. It was thus decided that the whole group of Australian sonographer members of the Australian Sonographers Association residing in Australia, that is a non-randomised group, would be sampled by way of a written survey. Historically there had not been a large response rate to sonographer surveys previously, from 15-30 per cent was usual (Trevaskis, 2006). If a randomised sample from this group had been chosen, it was entirely possible that some of the groups, relating to, for instance age or gender, would not have had a large enough sample to allow testing for differences between groups. As a general rule of thumb, at least 30 are required for each group, with a larger number required when there is more variability or smaller differences (Salkind, 2000). Robson (2002) suggests that in the absence of a randomised population, comparison of the demographics of the first set of replies with the last will ensure that each set are typical of this particular population.

The research questions required a significant amount of information to be sought from sonographers and a postal survey was considered to be suitable to achieve this. As Cohen, Manion and Morrison (2005) discussed, a written survey would target a large group of participants at a relatively low cost. Statistical and demographic data provided by the survey would allow comparison of participants with the demographics of the actual membership. The data would also allow correlation between the independent and dependent variables in the survey. Inferential statistics could be performed to compare sub-groups within the participants. Some generalisations about this group of sonographers would also be possible. Other advantages of written surveys, according to Kidder (1986), are the anonymity afforded the respondents and less pressure on the
respondent for an immediate response, allowing for some thought to go into answering the questions. On the other hand, she acknowledged that the respondent had to be quite motivated in order to complete the questionnaire.

The survey utilised both quantitative and qualitative methodologies and was designed to yield descriptive, inferential and interpretive information, allowing an accurate profile of participating sonographers and their thoughts, attitudes and participation in CPD to be identified. The qualitative analysis of the survey’s comments sought to understand how sonographers felt about their CPD and also sought to analyse the ‘how and why’ of inequalities that were reflected in the research (Robson, 2002).

**4.3.3 Development of the survey**

A survey was needed to elicit information regarding self-direction in sonographers. Commonly used scales such as the self-directed learning readiness scale (SDLRS), developed by Guglielmino in 1976, are already in existence but would not allow for answers to research questions regarding hindrances to sonographer development and attitudes to sonographer development. Consequently, there were two choices for this study, either to adapt an existing survey or develop a new one. Adaptation of a previous survey with additional questions would have resulted in the survey becoming too long which may have impacted on the return rate, with this in mind, a survey specific to sonographers was designed. Previously published literature on CPD was used to inform the survey as it highlighted areas regarding sonographers and their CPD about which little is known. The process was aided by the researcher’s knowledge of the sonographer population.

The first section of the survey was devoted to demographic details of the participant. These details were necessary for two reasons. Firstly, so that respondents could be compared with the population of the Australian Sonographers Association (ASA) membership and secondly, to allow for groupings to be made, so that comparisons could be made between groups. Data requesting information about ethnicity or socio-economic status was not requested. In the first place this data
is not collected by the ASA and thus would not be able to be comparisons. In the second, in this survey, it could have been seen as an ethical dilemma. From personal knowledge, I know there are few sonographers of indigenous background and this information would tend to identify the respondent, as would certain ethnic backgrounds. Although it would have been interesting to see if socio-economic status would make a difference to attitudes and learning, again it may have been seen as ethically problematic.

Subsequent questions sought to elicit information regarding sonographers' opinions about CPD and the mandatory nature of CPD. Habits of sonographers in gaining CPD were considered important and questions were designed around how sonographers planned, sought out activities and reflected on their needs for CPD. Questions were also included which enquired about what sonographers considered to be important reasons for and outcomes of CPD. It was apparent from the literature that employer attitudes and support may have some effect on employee feelings toward CPD, and so, questions relating to this were included. In addition, much has been written on deterrents and inhibitory factors of pursuing CPD and questions relating to those factors identified in the literature were included. As little is known on the reflective practices of sonographers a suite of questions regarding these was also added. Questions were planned to be unambiguous and avoided being hypothetical, presumptuous or leading (Bell, 1999; Boynton & Greenhalgh, 2004). A comprehensive information sheet was written to accompany the survey (Appendix 1).

A Likert scale was used as it allowed for measurement of preferences and attitudes. The scale ranged from one to five, with one being strongly negative, five strongly positive and three neutral. A neutral position could allow respondents to be reluctant to make a judgement and choose too many neutrals. This is known as the 'error of central tendency' (Albaum & Murphy, 1988) and utilisation of an even number scale would have overcome this by forcing a negative or positive answer. However, this would not allow for those who genuinely had no opinion either way.
on a question (Robson, 2002). All questions were coded with a number according to response for example:

- Likert scales were coded from 1 – 5, where 1 indicated strongly disagree to 5 strongly agree, or 1 indicated affected very little to 5 indicating affecting greatly.
- Male – 1, female – 2.
- Urban – 1, rural/remote – 2.

Spaces were left following four separate sections of the survey where respondents were invited to write comments on the questions. Allowing for comments to be made ensured a greater depth of knowledge would be extracted as it allowed for more freedom of expression from the respondents. As Cohen et al. (2005) aptly commented:

*It is the open-ended responses that might contain 'gems' of information that might not be caught in the questionnaire* (Cohen et al., 2005, p. 255).

Finally, a list of common CPD activities derived from the Australasian Sonographer Accreditation Registry web site was included at the end of the survey requesting information as to which CPD activities had been undertaken during the previous two years.

### 4.3.5 Validity of the survey

The survey and information sheet were initially critically appraised and reviewed by six sonographer and radiographer academics and an experienced researcher. The reviewers were also provided with the research questions to ensure that the survey was addressing the questions adequately. This review allowed for wording ambiguities and inconsistencies of the questions to be corrected. Several of the questions were worded either ambiguously or tended to lead the respondent and these were changed accordingly. After revision, the survey was returned to the original six reviewers and also sent to a further ten sonographers (with their permission) from all states of Australia and two experienced researchers to review, along with the participant information sheet and research questions. The reviewers’ comments and suggestions were addressed where required and the survey was completed (see Appendix 2).
4.3.6 Participants
Sonographer members of the Australian Sonographers Association at the time of the study totalled 2100 and represented approximately 70 per cent of the accredited sonographer population in Australia (ASA; ASAR, 2006). All sonographer members of the Australian Sonographers Association residing in Australia at the time of the survey’s distribution were eligible to participate (approximately 1990).

4.3.7 Sample size
Previous reports state that 70 per cent to 80 per cent of the surveys in any study should be returned in order for the results to be generalised across the population (Kidder, 1988; Robson, 2002). However, as Kidder (1998) stated, even with a high response rate, if there was only a small sample size in the first place, the results may not necessarily be accurate. In addition, Salkind (2000) suggests that a sample size should be big enough to answer the research questions, but not so big that the process of sampling becomes unwieldy and uneconomical. For this sample population, a return of 323 surveys would allow for a 95 per cent confidence limit, with a 5 per cent margin for error (Survey System, 2006). However, a larger return than this would more accurately represent the views of this population group and further, decrease the chance of any Type II error; that is, making a conclusion that there are no differences between groups when in reality there are (Salkind, 2000).

4.3.8 Distribution of survey
The Australian Sonographers Association utilises a mailing house to distribute the journal and other correspondence to its members. The board of the Australian Sonographers Association agreed to allow the mailing house to use the Australian Sonographers Association’s database to send out the surveys to its members. The mailing house was supplied with the folded surveys and reply paid return addressed envelopes, which they posted to members on behalf of the researcher. Prior to this a return by date had been included on the survey and information sheet.
4.3.9 Data entry

On return, each survey was numbered to ensure that data were only entered once onto the spreadsheet. Data were entered into an Excel® spreadsheet prior to transferring to SPSS for analysis. Missing values were left as blank spaces. Data were double checked before analysis to detect and eliminate inaccuracies in data entry.

4.3.10 Internal consistency of the survey

On return of the surveys from the participants, internal consistency, one aspect of reliability, was tested using the Statistical Package for Social Sciences (SPSS) version 15. Internal consistency is to what degree the items which make up the scale measure the same attributes. Cronbach’s coefficient alpha is an indication of the average correlation among the items in the scale (Pallant, 2007). Negatively worded questions were reversed before undertaking reliability analysis. The scale had an excellent internal consistency with a Cronbach’s alpha coefficient of 0.91. Values above 0.7 are acceptable, whilst values above 0.8 are preferred (Pallant, 2007). It has been suggested that questions with a Cronbach’s alpha above the total alpha for the survey should be deleted (Pallant, 2007) as that would indicate inconsistency within that question. However, there were no questions in this survey to which this applied (see Appendix 3).

4.3.11 Statistical analysis

Statistical analysis was conducted using SPSS version 15. Descriptive statistics were performed on the demographic data to gain an overall view of the respondents. These statistics were compared with data from the Australian Sonographers Association database to demonstrate that the respondents were representative of the population. Comparison of the demographic characteristics between first set of surveys returned and the last was made to confirm that the participants came from similar backgrounds. Descriptive statistics were also conducted on the responses to the survey questions. These are reported in Chapter 5.
4.3.12 Principal components analysis

Principal components analysis (PCA) is frequently conducted on an initial survey as an aid to survey design to check that the included questions are relevant and necessary (Tabachnik & Fidell, 2001). In this study, the number of possible respondents was limited by membership of the ASA and so the numbers of people who might respond to an initial survey to test a survey and then another after completion of an exploratory PCA would be minimal; therefore an exploratory principal components analysis was conducted after the return of the survey. This was to test for underlying factors that could be used to explain and strengthen the data (Pallant, 2007). PCA will pick up patterns in the variables revealing the internal structure of the data, an intercorrelation pattern. This leads to newly identified variables being formed which are known as factors. In this way, PCA has the added benefit of strengthening and compounding the values of each variable and the maximum information, in terms of its variability, is retained in the smallest number of dimensions (Tabachnik & Fidell, 2001). In addition, the PCA would confirm the appropriateness of the survey for this study and indicate any irrelevance in the questions. Quantitative data in the form of factor scores are derived from the analysis and are amenable to statistical testing such as analysis of variance. Factor scores are obtained when each variable is weighted proportionally to its involvement in the pattern. The scores are standardised, which means that the mean is zero and about two thirds of the values lie between minus one and plus one. Scores which are higher or lower than this are unusual (Cattell, 1966). The principal components analysis is discussed and reported in detail in Chapter 5.

4.3.13 Two-way between groups analyses of variance

Each factor derived from the PCA was designated as a new dependent variable. Multiple regression analysis was considered; however, two-way between groups analyses of variance (ANOVA) was the method of choice as the independent variables were categorical (Pallant, 2007). ANOVA were performed to allow the individual and joint effects of two independent variables on
one dependent variable to be explored (Pallant, 2007). Factor scores for these new dependent variables (see Chapter 5) allowed the analysis to take place. With this type of analysis, it could be determined whether age group, gender or place of work or geographical location played any part in the way sonographers considered CPD or chose activities. Profile plots were generated to visually demonstrate these effects. Significance levels were set at 0.05 where applicable and 0.01 where greater stringency was required, such as cases where the test for homogeneity of variance proved to be statistically significantly different. Analysis of variance is a parametric test which assumes that variances are equal between the populations and that the variability of scores for each group tested is similar. SPSS performs Levene’s test for equality of variances when an ANOVA is performed. A non-significant level is above 0.05 and demonstrates that the variances are equal or similar. However, if the Levene’s test has a significance level below 0.05 the variances are unequal. If this is the case, the significance level for the ANOVA must be set at a more stringent level and 0.01 has been suggested (Pallant, 2007). The results from the ANOVA are presented in Chapters 6 to 9.

4.3.14 Analysis of types of activities undertaken

Respondents were asked to indicate which types of CPD activity each had undertaken within the past two years. The number of respondents responding positively to each type of activity was recorded in an Excel® spreadsheet and depicted by bar-graph.

4.3.15 Analysis of open-ended questions from survey

Responses to open-ended questions were typed into a separate Word® document initially. The responses were read through several times to get a ‘feel’ for the themes that were emerging from them. It was apparent that most of the comments could be slotted in to one of the main themes which emerged from the principal components analysis, with one additional group for extra comments and suggestions about the current process of CPD administration. Each comment for each major theme was ‘cut and pasted’ into separate word documents. Each document was printed out and the process of reading through the responses several times was repeated and utilising
comments and notes in the margins of the paper, several sub-themes emerged. Each sub-theme was colour coded on the document and finally rearranged so that all comments belonging to a sub-theme were grouped together, allowing a descriptive report to be made prior to analytical discussion.

Quantitative data regarding the number of responses for each designated code and whether the response was negatively or positively framed were also recorded to confirm that responses were received from a representative demographic sample of the population. Interpretation of the qualitative data allowed for opinions and the perceptions of the feelings of sonographers to be recorded. Comparison of the findings was made to the results from the Likert scales so that triangulation could occur. Report and discussion of these findings will be found in Chapters 6 to 9.

4.4 Method two – Interviews

Interviews were planned to allow for more in-depth discussion to take place between interested parties and the researcher. In other words, to explore concepts which may not have readily lent themselves to the written word and concepts that had become apparent during data transcription of the survey. Interviews may be defined as conversations between two people interested in a similar subject (Polgar, 2000), and, in fact, that is how the process was described to the people interviewed. However, there are different forms of interview which Robson (2002) and other writers (Cohen et al., 2005; Polgar, 2000) have discussed at length. Robson clearly distinguishes between the different types of interview ranging from a structured format where the interview has pre-determined set questions which do not vary, to the opposite end of the spectrum where the conversation between the interviewer and interviewee is allowed to develop at will.

A semi-structured interview format was chosen for this research. Each interviewee was given a list of set questions approximately one week prior to the interview to allow for preparation of thought. There was a risk of the interviewees discussing the questions with another sonographer;
however, this was thought likely to add more depth to the answer. The interviewees were encouraged to answer any or all of the questions according to their interest and to add whatever else he or she thought might be relevant during the interview.

Respondents to the survey were asked to contact the researcher if they were interested in adding further comment verbally. Interviews took place after the volunteer received and read a plain language statement and a sample set of questions. Participants also signed and returned a consent form. At the beginning of each interview the process was explained again and the interviewee was told that he or she could discontinue at this time or any time in the future. Interviews took place at a time of the participant’s choosing. Interviews took place both face to face and by telephone due to the fact that sonographers are spread across Australia. All interviews were recorded with the permission of the interviewee and hand written notes were made at the time of the interviews. Notes were transcribed immediately after the interviews and emailed to the participants for verification that their thoughts and meanings had been correctly conveyed. After receipt of confirmation that the notes had been transcribed accurately, all voice recordings were deleted.

The use of a semi-structured format allowed for some base to the interview but also allowed flexibility and an ability to clear up misunderstandings or probe further into meaning. There was also the possibility that an answer or comment could produce something unexpected and informative for the research. The interview questions are set out below, although interviewees were only required to answer those questions which were of interest to them:

- What do you think is the main reason for CPD?
- Do you think that CPD makes a difference to sonographers? How? Or Why not?
- What happens in your work place?
- Do you feel better about yourself because you are doing more study? If yes, in what way?
• What do you think your boss thinks about your extra study?
• What is good about CPD? What is bad?
• What kinds of problems have hindered you getting your CPD?
• Have you any suggestions for improving CPD?
• Who do you think should be providers of CPD?
• Many people indicated that CPD did not lead to a change of work practice and if reflection occurred it did not lead to CPD. Why do you think this is so?

4.4.1 Possible bias

As a sonographer myself, I was very aware of the opinions and perceptions I held about CPD, which, indeed, had led to the research in the first place. Because of this, I took great care to avoid voice inflections or body language that may have indicated agreement, or otherwise, to an answer; in addition, I refrained from commenting one way or another about an answer, other than to encourage further information or clarification regarding a particular point the interviewee had made. I was also aware that the people responding to my request for interview were likely to hold biases themselves, but considered that this would only add to the overall information.

4.4.2 Analysis of interview material

There are various ways to analyse qualitative data, these include content analysis, which uses word or phrase frequencies; template approaches where codes have been predetermined; editing approaches where the researcher assigns codes based on his/her interpretation of the data and the immersion approach which is unstructured and very interpretive (Robson, 2002). Miles and Huberman (1994) described common features of qualitative analysis which included recording impressions of the researcher with the interview field notes and sorting and shifting through the materials to identify similar phrases, themes and patterns, before finally elaborating on these themes and making generalisations that can be confirmed or confronted by a previously formalised body of knowledge. According to Miles and Huberman, care and self-awareness of the researcher
need to be taken in analysing the interview materials because of the ease with which the data can lend itself to researcher bias. One way this can be minimised is to use a framework analysis as described by Ritchie and Spencer (1994). This analytical process contains a number of distinct systematic sequential stages which aid in analysis and allow a trail of evidence to verify the findings (Rabiee, 2004). This system also allows for themes to develop from both the research questions and the data (Rabiee, 2004). This method detailed below was used in the analysis of the data from the interviews, because the interviews were quite freeform in that the interviewees were allowed to begin with the issues that interested them most and not all interviewees answered all questions. The process of analysis of the interviews began with the discussion between interviewer and interviewee. The interviewer made notes throughout the discussion and gently probed the interviewee to extend answers where possible. After the interview, whilst the notes were being thought about and typed up a sense of the interview began to emerge and themes began to form. This was repeated for each of the interviews.

The following stage involved identifying the themes which formed the framework. Each sentence of each interview was examined and sorted until the dominant themes and sub-themes emerged. These themes and sub-themes were charted and relevant portions of each interview were arranged according to the theme they related to. The categorised data were cross-checked for frequency of comments and differences of opinion and also how specific the comments made were, that is, if ideas came from personal experience or hearsay. In addition, the emotional intensity of the interviewee at the time of the comments was taken heed of. Comments or ideas pertaining to the present administration of CPD and peculiar to each interviewee were set aside to be dealt with separately at the end of the analysis. The findings were further validated by a colleague, an experienced researcher who is not a sonographer, to dispense with sonographer bias. She independently followed the same process of examination of the notes of all of the
interviews. Where a difference of opinion occurred, discussion and consensus ensured an accurate portrayal of findings (Smith, 2000).

4.5 Ethical considerations

Ethical clearance for this research was granted by Deakin University Human Research Ethics Committee (reference EC 224-2007, 8th October 2007).

4.5.1 Survey

The reasons for conducting the research were clearly explained in separate information sheets/plain language statements accompanying the survey. Participants were reminded not to divulge any identifying information when writing comments on the survey. The completion and return of the survey was entirely voluntary and not subject to any coercion as the researcher was not present at its delivery. No questions on the survey asked for identifying or sensitive information. The surveys were returned anonymously and return of the survey signified consent, in addition, the survey bore a university approved statement about anonymity.

4.5.2 Interviews

Personal interviews involve the exchange of personal information and perspectives. For this reason it is imperative that the rights of each individual are upheld. In the first instance, none of the researchers’ accredited sonographer students were recruited, as students are in a dependant position and this could be construed as coercion. Similarly, it was made clear that the research was not being conducted on behalf of the University of South Australia (the employer of the researcher) and that institution would receive no benefit from it. All intending participants received a plain language information sheet which outlined the researcher’s details, her supervisors and the reasons for the research. It clearly stated that interviews would be voice recorded. The recording of the interview would be destroyed after transcription, but the records would be kept securely for five years. The intending participants were assured that their identity would be kept confidential at all times. The intending participants were assured that participation was at their own volition and that at any time the research with them could be discontinued and all information relating to their
participation would be destroyed without any prejudice to them. There should be no harmful effects from the research as questions were not of a sensitive nature. All interviewees had the research and interview procedure explained again prior to signing an appropriate consent form.

Chapter 5 will present the descriptive data from the survey and the principal components analysis. Chapters 6 to 9 will provide the analysis and discussion of the data derived from the survey, grouped according to each component derived from the PCA. Chapter 10 will present the findings from the interviews.
Chapter 5
Survey Findings and Principal Components Analysis

5.1 Overview of chapter

Chapter 5 will report the demographic distribution of the survey respondents and compare these with the demographics available from the Australian Sonographers Association (ASA). The frequencies of responses for each question and the types of CPD activities undertaken during the previous two years will also be summarised. A principal components analysis that was conducted on the data from the returned surveys will be described and discussed.

5.2 Demographic data

One thousand nine hundred and ninety questionnaires were sent out. Six hundred and eighty two completed questionnaires were returned. All returned questionnaires were completed satisfactorily and details added to a data base. The return rate of 34.3 per cent indicates that the power of the survey is high with a confidence rate of 99 per cent and confidence interval of 4 per cent (Survey System, 2008). Internal consistency as discussed in Chapter 4.4.10 was excellent (see Appendix 3).

Demographic details were sought from respondents and demonstrated that a good relative mix of respondents had been achieved. Insights were also gained into their CPD habits as a function of differing demographics. Results of these, with comparisons to ASA membership where available, are tabulated in Table 5.1 below and graphically in Appendix 4.
Chapter 5: Survey Findings and Principal Components Analysis

Table 5.1: Demographic frequencies of respondents to survey

<table>
<thead>
<tr>
<th>Item</th>
<th>Survey return (%)</th>
<th>ASA membership (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age groups</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21-34</td>
<td>25.6</td>
<td>25.0</td>
</tr>
<tr>
<td>35-44</td>
<td>35.0</td>
<td>34.0</td>
</tr>
<tr>
<td>45+</td>
<td>39.4</td>
<td>40.0</td>
</tr>
<tr>
<td><strong>State</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSW</td>
<td>30.1</td>
<td>31.5</td>
</tr>
<tr>
<td>Vic</td>
<td>22.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Queensland</td>
<td>25.9</td>
<td>22.0</td>
</tr>
<tr>
<td>SA</td>
<td>8.1</td>
<td>8.5</td>
</tr>
<tr>
<td>WA</td>
<td>8.7</td>
<td>8.0</td>
</tr>
<tr>
<td>Tas</td>
<td>2.1</td>
<td>2.0</td>
</tr>
<tr>
<td>ACT</td>
<td>2.4</td>
<td>2.0</td>
</tr>
<tr>
<td>NT</td>
<td>0.8</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>17.5</td>
<td>21.5</td>
</tr>
<tr>
<td>Female</td>
<td>82.5</td>
<td>78.5</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>57.4</td>
<td>64.0</td>
</tr>
<tr>
<td>Rural/remote</td>
<td>42.6</td>
<td>35.0</td>
</tr>
<tr>
<td><strong>Prof. Quals</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None(grandfathered)*</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>Accredited/studying</td>
<td>2.6</td>
<td></td>
</tr>
<tr>
<td>DMU**</td>
<td>32.7</td>
<td></td>
</tr>
<tr>
<td>Grad. Diploma</td>
<td>53.7</td>
<td></td>
</tr>
<tr>
<td>Masters/PhD</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>PhD/Mast student</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>Other (overseas)</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td><strong>Sonography only</strong>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>74.0</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>26.0</td>
<td></td>
</tr>
<tr>
<td><strong>Years working</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-4</td>
<td>11.9</td>
<td></td>
</tr>
<tr>
<td>5-9</td>
<td>19.6</td>
<td></td>
</tr>
<tr>
<td>10-14</td>
<td>27.3</td>
<td></td>
</tr>
<tr>
<td>15+</td>
<td>40.8</td>
<td></td>
</tr>
<tr>
<td><strong>Days/week worked</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1+</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>2+</td>
<td>11.9</td>
<td></td>
</tr>
<tr>
<td>3+</td>
<td>19.2</td>
<td></td>
</tr>
<tr>
<td>4+</td>
<td>24.3</td>
<td></td>
</tr>
<tr>
<td>5+</td>
<td>39.0</td>
<td></td>
</tr>
<tr>
<td><strong>Work situation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private Practice</td>
<td>70.1</td>
<td></td>
</tr>
<tr>
<td>Public Hospital</td>
<td>22.9</td>
<td></td>
</tr>
<tr>
<td>****Other</td>
<td>6.9</td>
<td></td>
</tr>
</tbody>
</table>

---

*Grandfathered = At the outset of accreditation, sonographers who had been practising for more than five years continuously were 'grandfathered' i.e. granted accreditation whether a tertiary qualification had been gained or not. **DMU = Diploma of Medical Ultrasonography, a professional qualification. *** Sonographers who are not working in any other paid work. ****Other = this includes the self-employed, workers in Education and Sales & Marketing
Original age group designations had included 21 to 24 years and 55+ years, however, these yielded too few replies and thus the number of age categories was reduced to three from five and are now 21 to 34 years, 35 to 44 years and 45+ years. As can be seen, the proportion of different age groups responding is congruent with those age groups in the ASA membership database. The proportion of males responding to the survey was similar to the proportion of males who were ASA members at the time of the survey, although males were slightly under-represented in this survey. Respondents from the various states and locations were of similar proportions to these groups on the ASA membership base. The demographic frequencies of the responses are depicted by bar chart in Appendix 4. Comparison between the demographics of the first 100 surveys and the last was very favourable, with no significant difference noted, adding to the validity and power of the survey responses, as discussed in Chapter 4.4.2. Of the 26 per cent who indicated that they had another occupation in addition to sonography, 75 per cent of these were radiographers.

5.3 Frequency of responses for each individual dependent variable

The questions pertaining to demographics which were categorical data were designated as independent variables. The scaled questions in the survey were designated as dependent variables. In total there were 46 dependent variables and 12 independent variables. The frequencies of replies for each question have been tabulated and presented as bar charts in Appendix 5.

5.4 Summary of frequencies

Each of the questions was answered by between 98.1 and 100 per cent of respondents. Attitudes to CPD included the following:

- Sonographers appeared to be strongly in favour of mandatory CPD, with 90 per cent of respondents agreeing or strongly agreeing with the concept.
- 80 per cent would participate in CPD even if it was not mandatory.
Chapter 5: Survey Findings and Principal Components Analysis

- 86 per cent of respondents agreed or agreed strongly that CPD is necessary as a professional person.
- 88 per cent believed CPD was necessary for accreditation, either strongly or very strongly.
- 80 per cent either agreed or agreed strongly that there would be an improvement in practice.

Inhibitors or barriers to CPD were seen by the respondents as follows:

- 72 per cent of respondents were affected in their pursuit of CPD to some extent by family responsibilities.
- 78 per cent were affected by cost and
- 50 per cent were affected by remoteness.

Sonographers appear to be quite time poor with

- 79 per cent answered they were affected at least some of the time by lack of time.
- 64 per cent were affected by staff shortage; and
- 65 per cent were affected by workload.
- 40 per cent were hampered in their CPD by already knowing the topic presented at least some of the time and
- 37 per cent of people thought courses were of poor quality at times.

With respect to management and peer encouragement,

- Only 35 per cent felt more respected by their management as a result of participation in CPD.
- 43 per cent were encouraged by their management to participate in CPD.
- 52 per cent of all respondents received financial support for their CPD.
- 53 per cent of sonographers did feel more respected by their peers because of participation in CPD and
• 75 per cent had more confidence because of their involvement in CPD.

Regarding reflective practices,

• 46 per cent agreed or agreed strongly that they plan what they need for CPD in advance.
• 56 per cent agreed or agreed strongly that they reflect on their needs for CPD.
• 95 per cent of the respondents reported that they reflect on their practice at least some of the time; with 64 per cent saying often or always.
• Over 80 per cent never or seldom reflect in writing.
• Most sonographers discussed work with colleagues, 68 per cent often or always and 26 per cent sometimes.
• Only 30 per cent reported that reflective practice often or always lead to changed work practice and,
• 17 per cent answered that reflection often or always lead to increased CPD.

5.5 Participation in professional development activities

Respondents to the survey were asked to note which professional development activities they had undertaken during the past two years, not necessarily for CPD points. Respondents were also asked to indicate how often they had participated in each activity. Some respondents did as asked. However, many either just ticked the area or replied “lots” or “too many”. Following are the details of these activities, however, the amount of activities or reading undertaken by respondents cannot be totally relied on as valid as it would be difficult to determine numbers to compare with these.
Chapter 5: Survey Findings and Principal Components Analysis

Figure 5.1 CPD Activities undertaken in the two years prior to the survey

- Reading journal articles - 95 per cent of the respondents reported undertaking this activity. Journal articles are readily available both from professional societies and in departmental libraries and it is a popular method of gaining information. It is not always noted in the CPD activities however. This was the activity where many of the respondents also added “too many” or “lots” or “lost count”. Many respondents commented that they had read all issues of *soundeffects* (the quarterly publication of the ASA) for the past couple of years. They also reported these are read regardless of mandatory CPD.

- Conference attendance - 90 per cent of respondents had been to at least one conference in the previous two years. Some indicated between two and four attendances. Conferences for sonographers are run yearly by the ASA as are conferences in ultrasound by the Australasian Society for Ultrasound in Medicine (ASUM). In addition, there are smaller
conferences for vascular ultrasound and cardiac ultrasound and special interest group (e.g. obstetrics) one day conferences.

- Workshop - State branches of the ASA and ASUM individually, and occasionally together, hold small educational meetings, called workshops, focussing on one or perhaps two individual aspects of sonography. 84 per cent of respondents had attended at least one of these workshops.

- In-house education - 76 per cent of respondents had attended some form of in-house educational activity. Most hospitals and larger private practices will utilise some of the staff meetings to have presentations and educational activities for staff.

- Journal article questionnaires - Selected articles in journals have a questionnaire attached to them which can be answered and returned to gain a CPD point. 54 per cent of respondents had filled in at least one of these.

- Online activities - 54 per cent had engaged in some form of on-line activity, either online article questionnaires or online tutorials and searching the internet for information. It was also commented on that many times the Internet was used to check patient findings from a journal article during a normal days work.

- Formal education course/program - 29 per cent had undertaken some form of formal educational program during the past two years. These could include tertiary education, but also specialist scanning qualifications in early pregnancy monitoring or breast scanning.

- Presented at local meeting - 26 per cent of respondents had presented at a local meeting. This could include a full talk or lecture or a simple case study presentation.

- Examining within the profession - Qualified sonographers are often asked to help with practical examining by the universities and ASUM. This is classed as a CPD activity. 16 per cent of respondents had examined student sonographers.
• Research - 14 per cent of respondents replied that they had undertaken research. However, some people may refer to research as looking things up in books and journals, and so, it is unclear how much actual research had been undertaken.

• Presented at scanning workshop - 13 per cent demonstrated scanning skills and methods for other sonographers at scanning workshops.

• Literature review - Similar to the question about research, this question was possibly ambiguous as some people refer to literature review as having a look through different journals rather than an academic review. 13 per cent ticked this activity.

• Committee membership - 13 per cent of respondents were or had been members of a professional committee.

• Grand round - 12 per cent of respondents had been to a Grand Round. Grand rounds are held in larger hospitals and are an educational activity available for all staff during a lunch time about once a month. The activities can be case studies or lectures on any medical topic.

• Presented at conference - 10 per cent had presented at a conference, this could include an invited talk of about twenty minutes or a proffered paper of about ten minutes or a poster presentation.

• Peer review - 7 per cent ticked that they had been asked to peer review articles.

• Non-reviewed publication - 6 per cent advised that they had written a non reviewed paper.

• Peer reviewed paper - 5 per cent had written a peer reviewed paper.

Conferences and workshops are all well attended and this is confirmed by rising attendances at these during the past few years (ASA, 2010). Internet and online activities were appreciated by sonographers with young families and rural sonographers. This is evidenced by the following comments written in addition to this part of the questionnaire:
Chapter 5: Survey Findings and Principal Components Analysis

I have just completed my 40th CPD online. Almost all of my CPD have been accrued this way this triennium as I find this the easiest way to work with small children (for breast fed babies, conferences are a bit difficult)

I find articles and Internet helpful, juggling work and young family

More online activities would be helpful for those of us remote from capital cities.

5.6 Written responses

Two hundred and twenty six respondents provided written comments on the returned surveys in response to the question at each segment end “Do you have any comments on the above statements?” The number of comments provided on each survey ranged from one to six.

The comments were received from the following demographic areas and it can be seen from Table 5.3 that these are representative of the general demographic of ASA members.

Table 5.2: Written survey responses

<table>
<thead>
<tr>
<th>Item</th>
<th>Percentage of responses</th>
<th>ASA members.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age groups</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21-34</td>
<td>26%</td>
<td>25%</td>
</tr>
<tr>
<td>35-44</td>
<td>35%</td>
<td>34%</td>
</tr>
<tr>
<td>45+</td>
<td>39%</td>
<td>40%</td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>63%</td>
<td>65%</td>
</tr>
<tr>
<td>Rural</td>
<td>37%</td>
<td>35%</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>21%</td>
<td>21.5%</td>
</tr>
<tr>
<td>Female</td>
<td>79%</td>
<td>78.5%</td>
</tr>
</tbody>
</table>

The analysis and discussion around these comments will be presented in Chapters 6 to 9.

5.7 Principal components analysis

The data retrieved from this survey were extensive and were obtained from a large number of dependent variables. Principal components analysis (PCA) is used when there is sufficient data to reduce a large number of variables to a smaller number of components or factors. That is, principal components analysis discovers patterns in the relationships between variables and seeks
to discover if the observations of the variables can be explained completely or mostly in terms of a much smaller number of variables. It is useful in providing an empirical summary of the data set (Tabachnik & Fidell, 2001). In addition, as explained in Chapter 4, it allows for maximum information in terms of variability to be retained in the smallest number of dimensions (factors), thus strengthening the meaning of each factor. The data from the survey were suitable for principal components analysis as there were a total of 682 respondents, which far exceeded the minimum number of 300 suggested by Pallant (2007). In addition, there were in excess of ten cases for each item to be factor analysed as has been suggested by Nunally (1978 cited by Pallant, 2007).

The 46 questions answered by Likert scale were treated as dependent variables and were subjected to PCA using SPSS version 15. As suggested by Tabachnik and Fidell missing data were treated in the analysis by using a missing data, pair-wise correlation matrix, available in SPSS. The Kaiser-Meyer-Oklin value was 0.9 which exceeds the recommended value of 0.6 and Bartlett’s test of sphericity had statistical significance at <0.0001 (Pallant, 2007). The correlation matrix of the data revealed a large number of correlations above 0.3, further strengthening the case for factor analysis (Tabachnik & Fidell, 2007).

The method of deciding the number of components to retain has been discussed in the literature (e.g. Cattell, 1966; Tabachnik & Fidell, 2007; Nelson, 2005). There are basically three main methods. The Kaiser criterion suggests the retaining of all factors with eigenvalues over 1, an eigenvalue being the measure of variance explained by the factor, although this may result in the retention of too many factors (Pallant, 2007). Cattell devised the scree test in 1966 (Cattell, 1966), whereby the eigenvalues are plotted against the factor number and the resultant curve inspected for an abrupt change from vertical to horizontal. Also discussed is parallel analysis where comparison of the eigenvalues from the analysis is made with eigenvalues obtained from a randomly generated same size data set (Pallant, 2007). Initial principal components analysis of this data set revealed the presence of 12 factors with eigenvalues exceeding 1, which is explained by
the large number of variables (Tabachnik & Fidell, 2007). The scree plot (see Appendix 6) demonstrated a break at the fourth factor.

As discussed by Hayton, Allen and Scarpello (2004) a scree test may suffer from subjectivity and ambiguity, especially where there are no clear breaks, or two or more breaks. According to Tabachnik and Fidell (2007, p. 583) an important test of the analysis is interpretability, a good PCA “makes sense, a bad one does not”. They suggest that a factor is more easily interpreted when a minimum of three observed variables correlate highly with it and with no other factors, a structure they term simple. They further suggest that only factor loadings greater than 0.32 are interpreted. In addition, Santos and Clegg (1999) suggest criteria for interpretability should include a minimum of three variables loading per factor. They also contend that all variables loading on to a specific factor should display a one-way moderate to high loading (greater than 0.4) and a low complementary loading on other factors. Variables that load highly on each factor should be distinctly different from those loading on to other factors. Using these criteria as a guide, four factors were retained for further analysis.

The four factor solution explained a total of 41.39 per cent of the variance with factor one contributing 24.07 per cent, factor 2, 8.13 per cent, factor 3, 4.90 per cent and factor 4, 4.33 per cent. Oblique rotation was performed to aid in the interpretation of these components. Oblique rotation allows for a more interpretable simple structure to be arrived at. A simple structure presented itself with all factors showing a number of strong loadings and only one cross-loading. The structure matrix from this analysis is tabulated in Table 5.3 below (see Appendix 7 for full pattern and structure matrices).
Table 5.3 Structure matrix of PCA for sonographer CPD survey

<table>
<thead>
<tr>
<th>Item</th>
<th>Component 1</th>
<th>Component 2</th>
<th>Component 3</th>
<th>Component 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variance (total 41.39%)</strong></td>
<td>24.07%</td>
<td>8.13%</td>
<td>4.9%</td>
<td>4.3%</td>
</tr>
<tr>
<td><strong>Eigenvalue</strong></td>
<td>11.08</td>
<td>3.74</td>
<td>2.23</td>
<td>2.0</td>
</tr>
<tr>
<td>1 CPD should be mandatory</td>
<td>0.74</td>
<td>-0.22</td>
<td>0.10</td>
<td>0.13</td>
</tr>
<tr>
<td>2 Participate if not mandatory</td>
<td>0.50</td>
<td>-0.20</td>
<td>0.40</td>
<td>-0.01</td>
</tr>
<tr>
<td>3 Mandatory CPD is restrictive</td>
<td>-0.55</td>
<td>0.38</td>
<td>-0.15</td>
<td>-0.06</td>
</tr>
<tr>
<td>4 Mandatory CPD encouraged to learn more</td>
<td>0.56</td>
<td>0.03</td>
<td>-0.08</td>
<td>0.28</td>
</tr>
<tr>
<td>5 Have difficulty in choosing activity</td>
<td>-0.33</td>
<td><strong>0.43</strong></td>
<td>-0.11</td>
<td>-0.09</td>
</tr>
<tr>
<td>6 Plan activities in advance</td>
<td>0.31</td>
<td>0.16</td>
<td>0.17</td>
<td>0.20</td>
</tr>
<tr>
<td>7 I reflect on my needs for CPD</td>
<td><strong>0.48</strong></td>
<td>0.09</td>
<td>0.18</td>
<td>0.23</td>
</tr>
<tr>
<td>8 I seek out CPD activities to fulfil needs</td>
<td>0.32</td>
<td>0.20</td>
<td>-0.02</td>
<td>0.24</td>
</tr>
<tr>
<td>9 Participating in CPD makes me more confident at work</td>
<td>0.74</td>
<td>-0.06</td>
<td>0.16</td>
<td>0.38</td>
</tr>
<tr>
<td>10 Participating in CPD makes me feel better outside of work</td>
<td>0.62</td>
<td>-0.02</td>
<td>0.20</td>
<td>0.35</td>
</tr>
<tr>
<td>11 Actively encouraged by management</td>
<td>0.3</td>
<td>-0.15</td>
<td>0.11</td>
<td><strong>0.78</strong></td>
</tr>
<tr>
<td>12 I am supported by management</td>
<td>0.25</td>
<td>-0.20</td>
<td>0.10</td>
<td><strong>0.70</strong></td>
</tr>
<tr>
<td>13 Feel respected by management</td>
<td>0.41</td>
<td>-0.2</td>
<td>0.20</td>
<td><strong>0.70</strong></td>
</tr>
<tr>
<td>14 Feel more respected by peers</td>
<td>0.45</td>
<td>-0.11</td>
<td>0.22</td>
<td><strong>0.53</strong></td>
</tr>
<tr>
<td>15 CPD is important to me</td>
<td><strong>0.80</strong></td>
<td>-0.20</td>
<td>0.26</td>
<td>0.22</td>
</tr>
<tr>
<td>16 CPD is necessary for work practice</td>
<td><strong>0.68</strong></td>
<td>-0.12</td>
<td>0.09</td>
<td>0.22</td>
</tr>
<tr>
<td>17 CPD is necessary as a professional</td>
<td><strong>0.80</strong></td>
<td>-0.17</td>
<td>0.14</td>
<td>0.15</td>
</tr>
<tr>
<td>18 CPD improves practice</td>
<td><strong>0.80</strong></td>
<td>-0.18</td>
<td>0.11</td>
<td>0.24</td>
</tr>
<tr>
<td>19 CPD ensures better patient care</td>
<td><strong>0.80</strong></td>
<td>-0.22</td>
<td>0.14</td>
<td>0.28</td>
</tr>
<tr>
<td>20 CPD relevant to my practice</td>
<td><strong>0.77</strong></td>
<td>-0.26</td>
<td>0.16</td>
<td>0.31</td>
</tr>
<tr>
<td>21 I would practise CPD if non-mandatory</td>
<td><strong>0.45</strong></td>
<td>-0.22</td>
<td>0.38</td>
<td>0.03</td>
</tr>
<tr>
<td>22 It is important for CPD to be mandatory</td>
<td><strong>0.74</strong></td>
<td>-0.27</td>
<td>0.07</td>
<td>0.14</td>
</tr>
<tr>
<td>23 CPD is necessary to keep up to date</td>
<td><strong>0.73</strong></td>
<td>-0.08</td>
<td>-0.001</td>
<td>0.26</td>
</tr>
<tr>
<td>24 CPD contributes to an ethical workplace</td>
<td><strong>0.68</strong></td>
<td>-0.11</td>
<td>0.18</td>
<td>0.28</td>
</tr>
</tbody>
</table>
Chapter 5: Survey Findings and Principal Components Analysis

<table>
<thead>
<tr>
<th>Item</th>
<th>Component 1</th>
<th>Component 2</th>
<th>Component 3</th>
<th>Component 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 CPD contributes to a safer workplace</td>
<td>0.69</td>
<td>-0.073</td>
<td>0.18</td>
<td>0.29</td>
</tr>
<tr>
<td>26 CPD ensures credibility with public</td>
<td>0.63</td>
<td>-0.16</td>
<td>0.16</td>
<td>0.19</td>
</tr>
<tr>
<td>27 CPD is necessary for accreditation</td>
<td>0.65</td>
<td>-0.21</td>
<td>0.15</td>
<td>0.07</td>
</tr>
<tr>
<td>28 Family responsibilities</td>
<td>-0.06</td>
<td>0.45</td>
<td>-0.06</td>
<td>0.12</td>
</tr>
<tr>
<td>29 Lack of quality courses</td>
<td>-0.14</td>
<td>0.52</td>
<td>0.13</td>
<td>-0.15</td>
</tr>
<tr>
<td>30 Lack of time</td>
<td>-0.02</td>
<td>0.59</td>
<td>-0.20</td>
<td>0.04</td>
</tr>
<tr>
<td>31 Lack of opportunity</td>
<td>-0.18</td>
<td>0.71</td>
<td>-0.01</td>
<td>-0.18</td>
</tr>
<tr>
<td>32 Staff shortage</td>
<td>-0.13</td>
<td>0.64</td>
<td>0.15</td>
<td>-0.20</td>
</tr>
<tr>
<td>33 Workload</td>
<td>-0.06</td>
<td>0.60</td>
<td>0.18</td>
<td>-0.17</td>
</tr>
<tr>
<td>34 Lack of encouragement</td>
<td>-0.15</td>
<td>0.46</td>
<td>0.06</td>
<td>-0.67</td>
</tr>
<tr>
<td>35 Lack of course relevance</td>
<td>-0.16</td>
<td>0.43</td>
<td>0.15</td>
<td>-0.23</td>
</tr>
<tr>
<td>36 Cost</td>
<td>-0.09</td>
<td>0.44</td>
<td>0.02</td>
<td>-0.24</td>
</tr>
<tr>
<td>37 Remoteness</td>
<td>-0.05</td>
<td>0.46</td>
<td>0.04</td>
<td>0.00</td>
</tr>
<tr>
<td>38 Lack of resources</td>
<td>-0.13</td>
<td>0.50</td>
<td>-0.04</td>
<td>-0.15</td>
</tr>
<tr>
<td>39 Having to use own time</td>
<td>-0.21</td>
<td>0.52</td>
<td>-0.18</td>
<td>-0.10</td>
</tr>
<tr>
<td>40 Already know topic</td>
<td>-0.12</td>
<td>0.24</td>
<td>0.12</td>
<td>-0.22</td>
</tr>
<tr>
<td>41 How often do you reflect on work practice</td>
<td>0.11</td>
<td>0.01</td>
<td><strong>0.66</strong></td>
<td>0.03</td>
</tr>
<tr>
<td>42 Do you reflect in writing</td>
<td>0.13</td>
<td>0.04</td>
<td><strong>0.63</strong></td>
<td>-0.02</td>
</tr>
<tr>
<td>43 Do you reflect in thought only</td>
<td>-0.07</td>
<td>0.12</td>
<td>0.01</td>
<td>-0.05</td>
</tr>
<tr>
<td>44 Do you reflect in discussion with colleagues</td>
<td>0.09</td>
<td>0.05</td>
<td><strong>0.60</strong></td>
<td>0.01</td>
</tr>
<tr>
<td>45 Does your reflection lead to changed work practices</td>
<td>0.08</td>
<td>0.01</td>
<td><strong>0.64</strong></td>
<td>0.13</td>
</tr>
<tr>
<td>46 Does your reflection lead to increased CPD</td>
<td>0.41</td>
<td>0.06</td>
<td><strong>0.52</strong></td>
<td>0.25</td>
</tr>
</tbody>
</table>

Note: Major loading factors for each question in bold print. Shaded questions – no factor loaded.

There was weak correlation between the four factors (See Table 5.4) confirming that the four chosen factors are not strongly related.

Table 5.4: Component Correlation Matrix

<table>
<thead>
<tr>
<th>Component</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.00</td>
<td>-0.167</td>
<td>0.194</td>
<td>0.296</td>
</tr>
<tr>
<td>2</td>
<td>-0.167</td>
<td>1.000</td>
<td>0.016</td>
<td>-0.109</td>
</tr>
<tr>
<td>3</td>
<td>0.194</td>
<td>0.016</td>
<td>1.000</td>
<td>-0.005</td>
</tr>
<tr>
<td>4</td>
<td>0.296</td>
<td>-0.109</td>
<td>-0.005</td>
<td>1.000</td>
</tr>
</tbody>
</table>
5.8 Interpretation of the Factors

The questions on the survey were designed and intended to answer specific research questions. These questions pertained to the perceptions that sonographers had about the value of CPD, the deterrents or inhibitors they faced when gaining CPD, motivational issues such as support and encouragement from employers and peers, reflective practices of sonographers and whether this led to self-directive practices and finally some questions regarding self-direction in CPD were included. In interpreting the factors the aims of the questionnaire were kept foremost in mind. However, Cattell (1978) offered some very prudent advice which was to be aware of and take note of variables which do not load at all and also which variables were not included in the first place. As he stated, “… to understand A, we need to look also at what is designated not - A” (p. 231). This useful advice was heeded with this interpretation as will be discussed later. In this interpretation only loadings over 0.4 were considered for added stringency.

5.8.1 Factor 1

Factor 1 was responsible for 24 per cent of the variance out of the total of 41.3 per cent explained by the analysis. Several variables loaded moderately highly and highly, from 0.45 to 0.82. These encompassed questions 1 to 4, 7, 9 to 10 and 15 to 27 as can be seen in Table 5.4. Inspection of these variables demonstrated that these were all in relation to the importance and value of CPD and would serve to answer the research question about sonographer perceptions of the value of CPD. That this factor had the highest number of loadings can be explained by the fact that there were more questions regarding this research question on the importance and value of CPD than there were on other CPD issues. This factor was labelled ‘Belief in the Value of CPD’.

5.8.2 Factor 2

This factor accounted for 8.13 per cent of the variance. There were several moderate to high loadings, from 0.43 to 0.71 all pertaining to issues having a negative impact on CPD. Questions 5 and 28 to 39 were included in this factor as can be seen in Table 5.4. The highest loadings related to workload, lack of time, lack of opportunity and staff shortages. This factor would
serve to aid in answering the research question regarding barriers and hindrances to obtaining CPD and was labelled ‘Barriers to CPD’.

5.8.3 Factor 3

This factor accounted for a variance of 4.9 per cent. All variables loading strongly (0.52 to 0.64) on to this factor specifically contained the words reflect or reflection. Questions 41 and 42, 44 to 46 pertained to the research question regarding reflective practice and reflective practice being a part of self-direction in CPD. This factor was labelled ‘Reflective practice’.

5.8.4 Factor 4

The fourth factor explained 4.3 per cent of the variance. Variables loading strongly (0.53 to 0.78) on to it were in relation to motivational issues. The variables which loaded strongly, questions 11 to 14 concerned employer encouragement, support and respect. Interestingly a question which loaded highly negatively on this factor also loaded moderately highly on factor 2, the question regarded lack of encouragement as an impediment to CPD. This factor was labelled ‘Motivators’.

5.9 Factor Scores

Factor scores for each respondent on each factor were obtained using SPSS. Factor scores are estimates of the scores that each participant would have received on each of the factors if they had been measured directly. The factor scores are standardised, with a mean of 0 and standard deviation of 1. Factor scores are useful for performing other analyses such as ANOVA on the factors (Tabachnik & Fidell, 2007). Factor scores were used to conduct ANOVA on each of the four factors using each of the four factors as a new dependent variable. These will be reported in Chapters 6 to 9.

5.10 Non-loading variables

The question “Already know topic” (question 40) loaded weakly onto factor 2, but was not regarded as a useful question and disregarded for this study.

The question “Did you reflect in thought only?” did not load on any factors at all and was also discarded from the study.
Two questions which did not load strongly were “I plan in advance which activities I need to undertake” (question 6) and “I seek out activities which will fulfil my CPD needs” (question 8). A third question which loaded weakly was “I would practise CPD in a non-mandatory setting” (question 21). These questions all pertain to self-direction and were expected to be important for this study. In any further development of the questionnaire, attention would need to be paid to these questions to word them differently and perhaps achieve the expected higher loading.

The following Chapters 6 to 9 will analyse each factor separately in regards to the demographic of the survey respondents using ANOVAs and will add depth to these analyses with discussion around the comments made by sonographers to corresponding areas on the survey.
Chapter 6
Belief in the Value of CPD

6.1 Overview of chapter

Chapter 5 outlined the development of a four factor structure from the data obtained from the sonographer survey using principal components analysis. The first factor, accounting for 24 per cent of the variance, was interpreted as representing the belief that sonographers have in the value of CPD and was named ‘Belief in the Value of CPD’. In the generation of the factors, factor scores were also obtained for each respondent by the SPSS program. These factor scores are estimates of the scores that each participant would have received on each of the factors if they had been measured directly. Factor scores are standardised, with a mean of 0 and standard deviation of 1. The development of the factor scores enabled analyses of variance (ANOVA) to be performed using the factor scores as dependent variables. The results of these ANOVA are detailed in this chapter. Additionally, written comments on the returned surveys were grouped according to the different factors. The first group of comments regarding the perceptions of sonographers of the value of CPD is also outlined and discussed in this chapter.

6.2 ANOVA

Using the factor scores generated by the principal components analysis, two-way between groups analyses of variance (ANOVA) were performed to allow the individual and joint effects of two independent variables on one dependent variable to be explored (Pallant, 2007). In this manner, the impact of the independent variables ‘gender’, ‘age groups’, ‘urban/rural’, ‘years as a sonographer’ and ‘sonography as a sole occupation’ on ‘Belief in the Value of CPD’ could be explored. In addition, testing for differences in ‘Belief in the Value of CPD’ because of gender, age, experience, geographical location and whether sonography was the only work done could be undertaken.
Testing for interaction between independent variables also occurred, a significant interaction effect signalling that the effect of one variable differs at a different level for the second variable (Robson, 2002).

Sonographers who responded to the questionnaire were separated into various groupings according to demographic and for the purposes of the statistical analyses were labelled as follows:

- ‘urban’ – sonographers who reside in cities and their suburbs.
- ‘rural’ – sonographers who live outside of major cities.
- ‘age groups’ – sonographers were separated according to their age groups, that is, 21 to 34 years old, 35 to 44 years old and older than 45 years.
- ‘years as a sonographer’ – sonographers responding to the questionnaire were also separated according to experience, designated by years practised, from 0 to 4 years, 5 to 9 years, 10 to 14 years and over 15 years.
- ‘sonography as a sole occupation’ – not all sonographers work solely as such, some having other positions such as radiography or nuclear medicine, or something totally unrelated to health science. Respondents were asked to indicate which category they belonged to.

The testing was conducted as follows:

- ‘urban/rural’ with ‘gender’
  - ‘age groups’
  - ‘years as a sonographer’
  - ‘sonography as sole occupation’

- ‘gender’ with ‘age groups’
  - ‘years as a sonographer’
  - ‘sonography as sole occupation’
The independent variables ‘qualifications’ (post graduate qualifications such as graduate diploma, masters, diploma of medical ultrasonography or overseas qualifications), ‘number of days worked’ and ‘place of work’ (for instance, private practice or public hospital) were discarded from these analyses because of a lack of participants in one or more of the groupings (see Appendix 4). The analyses were conducted in the same manner for the remaining factors in Chapters 7 to 9. Analyses with significant findings in the factor ‘Belief in the Value of CPD’ are outlined in the following pages.

6.2.1 ‘urban/rural’ and ‘gender’

Levene’s test of equality of variance reached statistical significance ($p<0.001$); therefore the significance level for the analysis was set at 0.01. As discussed in Chapter 4, analysis of variance is a parametric test which assumes that variances are equal between the populations and that the variability of scores for each group tested is similar. SPSS performs Levene’s test for equality of variances when an ANOVA is performed. A non-significant level is above 0.05 and demonstrates that the variances are equal or similar. However, if the Levene’s test has a significance level below 0.05 the variances are unequal. If this is the case, the significance level for the ANOVA must be set at a more stringent level and 0.01 has been suggested (Pallant, 2007).

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>gender</td>
<td>1, 568</td>
<td>13.17</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>urban/rural</td>
<td>1, 568</td>
<td>3.41</td>
<td>0.07</td>
</tr>
<tr>
<td>gender x urban/rural</td>
<td>1, 568</td>
<td>0.06</td>
<td>0.08</td>
</tr>
</tbody>
</table>
This ANOVA indicates that:

- The main effect for gender reached statistical significance ($p<0.001$); females (mean = 0.08, SD = 0.89) have a more positive belief in the value of CPD than males (mean = –0.31, SD = 1.27) in both locations. The effect size is small (partial eta squared = 0.01).

- The main effect for urban/rural failed to reach statistical significance ($p=0.07$).

- The interaction effect between gender and urban/rural failed to reach statistical significance ($p=0.08$); therefore there is no statistically significant difference in the effect of geographical location on ‘Belief in the Value of CPD’ in either females or males.

Figure 6.1 ‘urban/rural’ and ‘gender’

6.2.2 ‘urban/rural’ and ‘age groups’

Levene’s test of equality of variance reached statistical significance ($p= 0.01$), therefore the significance level for the analysis was set at 0.01.
Chapter 7: ‘Barriers to Participation’

Table 6.2: ANOVA results of ‘urban/rural’ and ‘age groups’

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>age groups</td>
<td>2, 566</td>
<td>0.56</td>
<td>0.57</td>
</tr>
<tr>
<td>urban/rural</td>
<td>2, 566</td>
<td>4.56</td>
<td>0.03</td>
</tr>
<tr>
<td>urban/rural x age groups</td>
<td>2, 566</td>
<td>0.19</td>
<td>0.83</td>
</tr>
</tbody>
</table>

This ANOVA indicates that:

- The main effect for age groups failed to reach statistical significance ($p = 0.57$).
- The main effect for urban/rural failed to reach statistical significance using the more stringent $p$ value ($p = 0.03$), however, the mean score for urban dwellers (mean = 0.09, SD = 0.94) was different from the mean score for rural dwellers (mean = -0.01, SD = 1.02). The effect size is small (partial eta squared = 0.01).
- This indicates that urban dwellers are slightly more positive in their belief in the value of CPD.
- The interaction effect between age groups and urban/rural failed to reach statistical significance ($p = 0.83$). Therefore, there is no significant difference in the effect of geographical location in ‘Belief in the Value of CPD’ in any of the age groups.
6.2.3 ‘gender’ and ‘age groups’

Levene’s test of equality of variance reached statistical significance ($p<0.001$); therefore the significance level for the analysis was set at 0.01.

Table 6.3: ANOVA results of ‘gender’ and ‘age groups’

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>age groups</td>
<td>2, 577</td>
<td>0.84</td>
<td>0.43</td>
</tr>
<tr>
<td>gender</td>
<td>1, 577</td>
<td>13.93</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>gender x age groups</td>
<td>2,577</td>
<td>0.09</td>
<td>0.92</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- The main effect for age groups failed to reach statistical significance ($p = 0.43$).
- The main effect for gender reached statistical significance ($p < 0.001$). The mean score for females (mean = 0.08, SD = 0.89) was significantly different from the mean score for males (mean = -0.32, SD = 1.28). The effect size was small (partial eta squared = 0.02).
- This indicates that females have a more positive belief in CPD than males across all age groups.
- The interaction effect between gender and age groups failed to reach statistical significance. Therefore, there is no significant effect of gender on ‘Belief in the Value of CPD’ for different age groups.
Figure 6.3 ‘gender’ and ‘age groups’

6.2.4 ‘gender’ and ‘sonography as sole occupation’

Levene’s test of equality of variance reached statistical significance (p<0.001); therefore the significance level for the analysis was set at 0.01.

Table 6.4: ANOVA results of ‘gender’ and ‘sonography as sole occupation’

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>sonography as sole occupation</td>
<td>1, 578</td>
<td>0.07</td>
<td>0.79</td>
</tr>
<tr>
<td>gender</td>
<td>1, 578</td>
<td>8.33</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>gender x sonography as sole occupation</td>
<td>1, 578</td>
<td>3.04</td>
<td>0.08</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- The main effect for ‘sonography as sole occupation’ failed to reach statistical significance (p = 0.79).
- The main effect for ‘gender’ reached statistical significance (p< 0.001); the mean score for females (mean = 0.08, SD= 0.89) was significantly different from the mean score for males
(mean = -0.32, SD = 1.28). The effect size was small (partial eta squared = 0.01). This indicates that females have a more positive ‘Belief in the Value of CPD’ whether they worked solely as a sonographer or did not.

- Inspection of the below graph demonstrates that this difference is less in those who have another occupation besides sonography. However, the interaction effect between ‘gender’ and ‘sonography as sole occupation’ did not reach statistical significance ($p = 0.08$).

Therefore, there is no significant difference in the effect of gender on belief in value for those working solely in sonography and those with concomitant occupations.

**Figure 6.4 ‘gender’ and ‘sonography as sole occupation’**

### 6.2.5 ‘gender’ and ‘years as a sonographer’

Levene’s test of equality of variance reached statistical significance ($p<0.001$); therefore the significance level for the analysis was set at 0.01.
Table 6.5: ANOVA results of ‘gender’ and ‘years as a sonographer’

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years as a sonographer</td>
<td>3, 573</td>
<td>0.48</td>
<td>0.7</td>
</tr>
<tr>
<td>gender</td>
<td>1, 573</td>
<td>6.64</td>
<td>0.01</td>
</tr>
<tr>
<td>gender x years as a sonographer</td>
<td>3, 573</td>
<td>0.68</td>
<td>0.57</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- The main effect for ‘years as a sonographer’ failed to reach statistical significance ($p = 0.7$).
- The main effect for ‘gender’ reached statistical significance, the mean score for females (mean = 0.08, SD = 0.89) was significantly different from the mean score for males (mean = -0.32, SD = 1.28). The effect size was small (partial eta squared = 0.01).
- This indicates that females generally have a more positive ‘Belief in the Value of CPD’ than males, regardless of experience.
- There were only nine males in the category of early career sonographers (0-4 years) and therefore the results may not be truly indicative of the whole population.
- There was no significant interaction effect between ‘gender’ and ‘years as a sonographer’ ($p = 0.57$). Therefore, there is no significant difference in the effect of ‘gender’ on ‘Belief in the Value of CPD’, whatever the level of experience of the sonographers.
6.2.6 ‘age groups’ and ‘sonography as sole occupation’

Levene’s test of equality of variance reached statistical significance ($p < 0.001$); therefore the significance level for the analysis was set at 0.01.

**Table 6.6: ANOVA results of ‘age groups’ and ‘sonography as sole occupation’**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>age groups</td>
<td>2, 577</td>
<td>0.25</td>
<td>0.78</td>
</tr>
<tr>
<td>sonography as sole occupation</td>
<td>1, 577</td>
<td>1.4</td>
<td>0.24</td>
</tr>
<tr>
<td>age groups x sonography as sole occupation</td>
<td>2, 577</td>
<td>6.33</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- The main effect for ‘age groups’ failed to reach statistical significance ($p = 0.78$).
- The main effect for ‘sonography as sole occupation’ failed to reach statistical significance ($p = 0.24$).
The interaction effect between ‘age groups’ and ‘sonography as sole occupation’ reached statistical significance ($p<0.001$), however the effect size was small (partial eta squared = 0.02).

The graph below depicts this interaction, which is demonstrated by non-parallel lines with a mirror image effect; and it can be concluded that age and whether the sonographer has a sole occupation or not have an effect on each other in ‘Belief in the Value of CPD’.

![Graph showing interaction effect](image)

Figure 6.6 ‘age groups’ and ‘sonography as sole occupation’

No other effects, either main or interaction, were found to be statistically significant on any of the remaining analyses exploring ‘Belief in the Value of CPD’.

Mean scores and standard deviations for all the groups in the ‘Belief in the Value of CPD’ component are summarised in Appendix 8.

6.2.7 Summary of ANOVA for ‘Belief in the Value of CPD’

Gender appears to play the most pivotal role in ‘Belief in the Value of CPD’. From the analyses it is clear that females have a more positive attitude to CPD in the demographic categories of geographical location, age groups, length of experience and whether sonography is their sole occupation. However, the difference in attitude between females and males is not as
evident in those sonographers who have other occupations and the inexperienced (0 to 4 years) sonographer.

Although not statistically significant, city and suburban dwellers (mean = 0.09, SD = 0.94) appear to have a slightly more positive attitude to CPD than their rural and remote colleagues (mean = - 0.1, SD = 1.02). On inspection of the means and standard deviations, although males tend to be less positive about the value of CPD (mean = - 0.32, SD = 1.28 compared with mean = 0.08, SD = 0.89 for females), as do rural and remote sonographers, there seems to be a wide range, from negative to positive, in the ‘Belief in the Value of CPD’ across all demographic categories. Inspection of the comments regarding ‘Belief in the Value of CPD’ will help explain this range.

6.3 Responses to open-ended survey questions

Each comment on the open-ended questions on the survey was categorised in relation to the factors generated in the principal components analysis (PCA). Comments pertaining to ‘Belief in the Value of CPD’ were placed in a separate document. Each document was printed out and the process of repeated reading through the responses several times was carried out utilising comments and notes in the margins of the paper, eventually several sub-themes emerged. Each sub-theme was colour coded on the document and finally rearranged so that all comments belonging to a sub-theme were grouped together, allowing the following descriptive report to be made.

There were a total of 160 comments in the section referring to ‘Belief in the Value of CPD’; of these, 74 were positive comments, 73 negative. There were also 13 comments which began in a positive manner but were then qualified with the use of qualifiers such as ‘but’ and ‘however.’ The positive comments were arranged into general comments regarding CPD, that is, those with no particular focus other than commenting on CPD being worthwhile and good. Other positive
categories included comments relating to professionalism, why CPD is necessary and perceived positive outcomes arising from CPD.

The negative comments were similarly arranged into their various categories, including a general category which held comments that had no particular focus other than CPD was not good or worthwhile. Other comments related to the resentment that some sonographers felt because of the mandatory nature of CPD. Some believed it was only an exercise to gather points or make a profit for various organisations. Finally there was a section on negative or non-positive outcomes.

Table 6.7: Categorisation of ‘Belief in the Value of CPD’ component comments

<table>
<thead>
<tr>
<th>Component Comments</th>
<th>Positive Comments</th>
<th>Negative Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n=74, 13 qualified)</td>
<td>(n= 73)</td>
</tr>
<tr>
<td>General comments</td>
<td>(n=12)</td>
<td>General comments</td>
</tr>
<tr>
<td>Professionalism</td>
<td>(n=14)</td>
<td>Resentment</td>
</tr>
<tr>
<td>Reasons for CPD</td>
<td>(n=24)</td>
<td>Points gathering</td>
</tr>
<tr>
<td>Comments with qualifiers</td>
<td>(n=13)</td>
<td>Money matters</td>
</tr>
<tr>
<td>Perceived positive outcomes</td>
<td>(n=24)</td>
<td>Chore/busy life</td>
</tr>
</tbody>
</table>

Perceived negative outcomes (n=29)

Key: n = number of comments
The wide range in perceptions of sonographers regarding the value of CPD and the variations between various demographics, as seen in the ANOVA, is echoed in the written comments on the survey. There is little difference between men and women when comparing the percentage of positive and negative comments, although men were relatively overrepresented when compared with the survey return (21.25 per cent compared with 17.4 per cent of male respondents to the survey as a whole). In addition, older respondents were more prevalent in their commentating than younger ones. Younger commentators tended to voice more dissatisfaction than older ones, as did those with 5 to 9 years and 10 to 14 years of experience. Those with 15+ years of experience were more evenly split in their positive and negative comments, whilst those older than 45 years tended to write more positive comments (See Appendix 9). The percentages of responses according to demography are tabulated below.

Table 6.8: Frequencies of responses in the category ‘Belief in the Value of CPD’

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Positive</th>
<th>Negative</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of comments</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>54%</td>
<td>46%</td>
<td>100%</td>
</tr>
<tr>
<td>Female</td>
<td>22%</td>
<td>21.5%</td>
<td>21.25%</td>
</tr>
<tr>
<td>City/suburbs</td>
<td>54%</td>
<td>53%</td>
<td>52.5%</td>
</tr>
<tr>
<td>Rural/remote</td>
<td>43%</td>
<td>46%</td>
<td>42%</td>
</tr>
<tr>
<td>45+ years</td>
<td>52%</td>
<td>34%</td>
<td>43%</td>
</tr>
<tr>
<td>35-44 years</td>
<td>33.3%</td>
<td>44.5%</td>
<td>37.5%</td>
</tr>
<tr>
<td>21-34 years</td>
<td>13.7%</td>
<td>21%</td>
<td>17%</td>
</tr>
<tr>
<td>15 + years of experience</td>
<td>56%</td>
<td>54%</td>
<td>54%</td>
</tr>
<tr>
<td>10-14 years</td>
<td>20%</td>
<td>23%</td>
<td>21%</td>
</tr>
<tr>
<td>5-9 years</td>
<td>14%</td>
<td>20%</td>
<td>16.5%</td>
</tr>
<tr>
<td>0-4 years</td>
<td>9%</td>
<td>3%</td>
<td>6.5%</td>
</tr>
</tbody>
</table>
The following section will look at the themes and comments made by sonographers responding to the survey.

6.3.1 Positive perceptions in the ‘Belief in the Value of CPD’

"General comments"

Those with positive perceptions of CPD generally thought that making CPD mandatory was a good idea and necessary for all; in particular it was seen as a “great idea” and “fantastic”. One person welcomed the mandatory nature of it as a prompt for herself to fulfil CPD obligations.

*We all probably would like to believe we would practise CPD regardless of it being mandatory or otherwise. However, the nature of learning would likely be different, and, of course, life and other mandatory activities tend to override our good intentions.*

Another commented that once she started CPD her opinions changed.

*Initially mandatory CPD seemed like a burden. Once I had attended my first conference, I realised it was a necessary part of being a sonographer.*

Distrust of their peers’ ability to fulfil CPD obligations without a mandatory requirement lead quite a few respondents to be enthusiastic about having mandatory CPD, whilst being happy with their own ability to continue with CPD regardless.

*I would participate whether mandatory or not, not so everyone, perhaps?*

*If it wasn’t mandatory I would continue to attend meetings and conferences, but some colleagues I know would not.*

*If CPD was not mandatory, many sonographers would not make the effort to keep up with the latest techniques and research. Being mandatory means everyone must do it – good thing!*

Nevertheless, not all were quite so sure of themselves:

*As it is a mandatory requirement it takes a higher place of importance when prioritising an already busy lifestyle. I feel I would still do CPD if it was not mandatory, but perhaps it would fall by the wayside.*
Chapter 7: ‘Barriers to Participation’

**Professionalism**

Many responding sonographers believe themselves to be professionals and therefore acknowledge the need to participate in CPD to keep up to date. In addition, it was felt that through CPD sonographers may gain recognition from other health professionals as evidenced in the following statements:

*It ensures we are a profession, not just an occupation. CPD is important for professional development and recognition of the profession.*

*As a professional you need to demonstrate that you are up to date with new or current trends or concepts.*

There is a move towards allowing some role extension for sonographers and this was referred to in the following comment:

*If we want to be called professional and maybe become independent practitioners, we need to prove we are keeping up to date.*

Some recognised that the onus of fulfilling CPD requirements lay with the sonographer:

*I think as professionals, we should seek out our own professional development and peer review.*

*As a health professional, CPD is an essential part of my practice.*

One respondent wrote that she felt morally obligated to her patients and employers to keep her education current, but the majority of correspondents in this category felt that CPD was a necessary requirement to ensure that sonography is regarded as a profession.

**Positive Outcomes of CPD**

The main outcome of CPD noted was that of keeping up to date with new technology and practice. Only a few commentators mentioned public credibility and maintenance of standards and one mentioned that it might aid in motivating uncommitted or unenthusiastic sonographers. Only one person referred to improved patient care as an outcome.

*CPD is probably necessary from a public credibility aspect.*

*...standards and accreditation need to be maintained to achieve best practice and patient care.*
Keeps the standards of ultrasound practice high.

Hopefully those sonographers not totally committed or enthusiastic about CPD receive some consolidation of knowledge/ inspiration/ stimulation as a result of CPD.

A few commented about the benefits they had received from CPD, such as reminding and refreshing knowledge and information,

Have gained a lot from attendance at conferences. It’s easy to think that you know a topic well when you have been scanning for years, then you attend a conference and discover the US machine picks up more detail and you were not looking for it.

Although not commonly mentioned, public awareness in relation to sonographer professionalism was considered by this group to be a likely outcome:

Making the general public aware that as we are professionals, we are required to fulfil mandatory CPD would be beneficial to ‘awareness’ of our professional status.

Qualified comments

A sentence in the responses may have been prefaced with a positive aspect, but several responses were then followed up with a negative aspect. So while on the surface agreeing with CPD, there was a concurrent negative aspect, for instance cost of a conference or the current CPD guidelines. These comments would appear to indicate a level of dissatisfaction with CPD or the CPD process, as it stands.

I agree with CPD, but… (distance problems)

I think mandatory CPD is important, however… (points system)

Mandatory CPD is OK if your employer pays for it

CPD encourages you to continue learning but… you don’t necessarily learn a lot…

If other sonographers felt this way, without actually voicing an opinion, it may go some way to explaining the ambivalence about CPD seen in the ANOVA.

6.3.2 Negative perspectives of CPD

Almost half of the written comments regarding ‘Belief in the Value of CPD’ from respondents to the survey were of negative perceptions of both mandatory CPD and CPD as a
whole. Many of these responses were quite forceful in nature indicated by the use of capital lettering, exclamation marks and underlining. Occasionally the wording was forceful in itself such as “useless” and “childish”. The negative comments were subdivided into separate categories as were the positive comments and outlined below.

**General comments against mandatory CPD**

There was a perception that sonographers, especially ‘good’ sonographers, are disciplined enough to learn at their own pace and that most sonographers are doing enough in the workplace without making CPD a mandatory activity.

*I don’t think it should be mandatory. Most sonographers should be disciplined enough (without having to document everything) to learn at their own pace.*

*In my experience, good sonographers self-educate. They don’t need mandatory CPD.*

*Interest is a relevant factor to keeping up to date, not mandatory CPD.*

*I think continuing to work should be enough for accreditation.*

*CPD is just documenting what I normally do anyway.*

Two further comments illustrate that if the job is interesting and worth doing mandatory CPD is not necessary.

*...if a job’s worth doing, do it well!*

*If you are not keeping up to date without it being mandatory, it is time for a career change!*

**Points gathering**

Mandatory CPD is seen by some as having created a bureaucracy which leads to sonographers seeking points rather than seeking development and education.

*It is only a point gathering exercise.*

Indeed, others admit to going to an activity just to gain points, rather than knowledge which bears out the above statement somewhat.

*By the end of three years, I go to seminars not out of interest or professional benefit to me, just to get my points up.*
Sometimes I choose to undertake CPD in areas in which I am confident because ‘in need of points’ and the course is available. Will go to a conference etc. just for the points, don’t find much new, but no choice.

Others write of people who fake points:

I know of people who fake their CPD points, so, mandatory or not, some people will never progress or keep up with changing techniques or standards.

The need to obtain points adds stress to some sonographers’ lives:

I would normally read or study something of interest, CPD adds pressure and I feel I have to become more involved to ‘get the points’.

It also worried others that the quest to gain CPD points would not, in the end, improve sonographer competence or performance.

There is always the danger that CPD becomes just a tally of numbers, not a means to improve sonography.

**Resentment**

The mandatory nature of CPD elicited feelings of anger and resentment in several of the respondents. At least two felt that they were being held to ransom by a system which could take away their livelihood for non-conforming. Several mentioned feeling insulted.

I worked very hard to obtain my qualification and I strongly resent the threat to take it away if I don’t conform. My livelihood should not be held to ransom.

I feel insulted that the extra work that everyone does now has to be documented, triple time and records kept!

All the sonographers I have met are very driven to learn and do their best for the patient. They do not need to be forced into further training and I feel insulted that we have to be checked upon.

Mandatory CPD holds my job to ransom. It forces me to take time away from my family and spend thousands of dollars.

The extra cost involved as well as time from family life seems to make matters worse for this last person.
Money

Several responses came from sonographers who were concerned that the CPD process was unfairly skewed to those who could afford it and that the system was more concerned with making money than educating sonographers.

*I believe it is fuelled as a money making exercise, not a learning one.*

*CPD is a money making industry.*

*Continuing education is important, but, a mandatory regulated system where points are awarded and have to be tallied from separate areas and is linked to revenue raising from some organisations hardly seems fair.*

*CPD proves nothing, but money buys points!*

The expense compounded the issues for one person:

*Being forced to attend expensive conferences and listen to useless lectures does not make me a better sonographer!*

Clearly there is some resentment evidenced at the extra cost involved in undertaking CPD activities.

Outcomes

This collection of comments was written by sonographers who tended to be cynical about outcomes, or rather, non-outcomes. The main issue appeared to be that CPD would not facilitate change in sonographers or further learning. Importantly, it was not seen as improving competence or ability, as evidenced by:

*CPD does not facilitate further learning, in fact, sonographers find it is only a point gathering exercise.*

*Forcing people to do CPD does not necessarily improve their skills and knowledge CPD has very little effect on my workplace or practice. It’s something I do because I have to but doesn’t change what I do.*

*Does not improve the ability of the sonographer to physically perform scan to better quality.*

Some sonographers also believed that attendance at conferences or workshops would not guarantee either learning or competence.
Registration at conferences etc. does not always mean attendance. This is a ‘loophole’ for CPD.

CPD could lead to better work practices etc., but doesn't always since to go to a conference does not guarantee learning or competence.

They assume that CPD is the cause of increased knowledge when there are many confounders.

The survey questions regarding the awareness of the general public and credibility elicited more comments by the ‘negative’ group than from those sonographers who replied with positive comments. This group of respondents did not believe that CPD would have any effect on awareness by the general public of the role of sonographers.

I doubt that the public have any idea that sonographers even do CPD.

The general public is not aware of CPD; most don’t even know what a sonographer is.

The general public is unaware of CPD points system – it does not ensure credibility.

I don’t think the general public know we have to participate in CPD.

Ethics and safety were also cynically regarded as not being affected in the slightest by CPD, or even that sonographers could have influence on them.

The safety and ethics is governed by the reporting doctors/employers; sonographers are sometimes just a voice in the wilderness.

An ethical workplace is not influenced by CPD but by a practice manager and middle management. I am not sure that the general public are aware of sonographers undertaking CPD. Again, a safer workplace is determined by the policies and protocols set up by practice managers.

The last comments could certainly lead to much discussion between sonographers regarding the responsibilities of sonographers to themselves, their patients and workplace.

6.4 Discussion

This chapter has sought to depict the perceptions of sonographers in their ‘Belief in the Value of CPD’. Whilst the quantitative results obtained from the survey indicated a generally positive attitude towards CPD, ensuing ANOVA on the factor scores generated from the PCA has demonstrated that there were some differences of opinion between groups of sonographers. In
particular, these differences are most evident between males and females and to a lesser extent those from different geographical locations. These findings have demonstrated an underlying current of less positivity to CPD and also perhaps a dichotomy in belief. In evidence of this, whilst a majority of sonographers indicated a commitment to undertake CPD whether it was mandatory or not, these same sonographers did not believe their peers would do the same and opted for a mandatory system for CPD. This indicates a level of distrust amongst peers and perhaps an individual feeling of superiority from these respondents. Interestingly, a similar finding was found in the Friedman and Phillips (2004) survey. They similarly discovered that respondents to their study thought they were each unique in the amount of CPD they completed and tended also to be quite cynical about the level of commitment from their peers. It is possible that this phenomenon is a natural outcome as it is difficult to comprehend the amount of effort others are committing to a project or continuing development, but it may also indicate a level of over-confidence and self-deception in the matter of CPD from some sonographers.

The ANOVA also demonstrated that men were less enthusiastic about CPD than were women. The written comments did not reflect this, although Rothwell and Arnold (2004) found in their study that women had more positive attitudes than men. They also discovered, however, that this did not necessarily equate into participation rates. They suggested that perhaps women were just paying ‘lip-service’ to the concept of CPD. Our study did not gather information on the amount of CPD that was done by each person and as such the findings of Rothwell and Arnold cannot readily be applied, however, it would be worth bearing it in mind for future studies.

City sonographers may be a little more positive towards CPD than rural sonographers according to the results from the ANOVA. This may be due to a number of reasons. There are more sonographers working in city areas which may lead to the enthusiasm and benefits of CPD being more widely felt, as discussed by Jonassen et al. (1999) discussion between colleagues engenders more enthusiasm for learning and development. On the other hand, sonographers in rural areas
tend to have fewer, if any, work colleagues and therefore may have no one to share their thoughts with. More likely, however, there are considerably more barriers for rural and remote sonographers to overcome, as will be seen in Chapter 7. These barriers are likely to blur the benefits and good perceptions of the value of CPD.

As discussed by Lester (1999) and Field (2004), professionalism can be seen as a major driver for CPD and the push by sonographers for a recognised professional status brought about the introduction of mandatory CPD for accreditation. It was evidenced by many comments that sonographers do perceive themselves as professional and in the main, recognised that CPD is part of this. However, others felt that because they were professional there was no need to introduce a mandatory system. It has been recognised in the literature that professionals should be responsible for their own learning (Kerka, n.d.; McPartland, 1990; O’Sullivan, 2004). There was also some concern, however, that the mandatory nature of CPD had led to some over-regulation, as evidenced by comments regarding regulation and documentation; a concern which was addressed by Lester previously. Comments from some sonographers that they do enough CPD just by working and that working should be enough to retain accreditation may have some merit as a previous study by Spalding (2003) found that therapeutic radiographers did indeed learn enough at work and through work to continue development.

One of the major concerns is that many believed that attending CPD activities did not necessarily equate to increased knowledge or competence. Several previous studies (e.g. Ellis, 2003; Friedman & Phillips, 2004; Tennant & Field, 2004) have discussed the lack of empirical data about the efficacy of CPD. This study was not specifically designed to study outcomes empirically; however, several sonographers were hopeful that some knowledge would eventually be retained through a mandatory system and, in addition, enthusiasm for learning activated. It appears that the old saying may remain true – “You can take a horse to water, but you can’t make it drink!”

2 Radiation therapists in Australia are known as therapeutic radiographers in the U.K. and Ireland.
Throughout the comments made by those with positive and those with negative perceptions it is clear that there appears to be only one main outcome regarded for CPD and that is to keep up to date, based on education. This is a very narrow view of CPD, mainly process and protocol driven and takes little else into account such that CPD should be wider and encompass personal, social and political aspects of working life (Fleet et al., 2008). Interestingly, Sim and Radloff (2008) and Evans et al. (2008) discovered the same for other MRS professionals. This may be particularly significant because there is casual evidence that some sonographers feel they are different and more motivated than general MRS because of the extra education, but the general situation does not appear to be greatly different. No comment was made by anyone regarding increased self-confidence or greater perception and motivation as an outcome of CPD by any of the survey respondents. More disappointingly, patients were rarely mentioned especially as recipients of better care. Whether these respondents took it for granted that better patient care would be an outcome is unclear.

Several of the sonographers responding to this survey are aware that their profession is poorly recognised and understood by the general population. For this reason, many believed it was highly unlikely that CPD would have an effect on public opinion. Perhaps this should not be surprising. Sonographers are a small group of professionals in a very large health workforce in Australia. A Productivity Commission report on Australia’s Health Workforce (2005) indicated that the MRS professions made up only 1.8 per cent of the health workforce of over 450,000 at that time. Sonographers alone make up less than 0.6 per cent of the health professionals.

Cost and expense of courses and conferences was complained about with an inference by some that mandatory CPD was just a money-making exercise. It is very possible that these comments were submitted by cynical sonographers; although the cost could be considered by some to be quite high at times, these complainants perhaps do not understand the workings of professional associations. However, cost can be a major deterrent and barrier for CPD and will be
discussed in the following chapter ‘Barriers to Participation’. Underlying the cost of obtaining CPD is the perceived problem of ‘points gathering’. As the CPD model for Australian sonographers is purely inputs based, then the whole of CPD is founded on the collection of CPD credits or points. In a system where failure to attain the correct number of points will lead to sanctions against the professional, it would be reasonable to assume, perhaps, that some would worry unduly about this; and thus, care more about points than quality. In addition, it may lead to a misconception that some participants in CPD are, perhaps, not serious in their learning intentions.

This chapter has detailed and discussed the results of the first factor obtained from the PCA of the survey data, ‘Belief in the Value of CPD’. Although empirical data direct from the survey indicated sonographers are generally in favour of CPD, data analysis of the factor, ‘Belief in the Value of CPD’ has shown some ambivalence about the value of CPD. This finding was strengthened by a similar finding from the written comments. It appears that whilst being in favour of CPD on the surface, there may be side issues which affect the feelings about the value of CPD as a whole. In addition, it appears likely from some comments that whilst some commentators exercised a degree of self-directedness and self-direction through personal responsibility (as per Brockett & Hiemstra, 1991); many others do not, which will be discussed in greater depth in the concluding chapter. Chapter 7 will discuss the ‘Barriers to Participation’ in CPD as perceived by sonographers; Chapter 8 will discuss ‘Reflective practice’ and self-direction and Chapter 9 ‘Motivators’ of sonographers such as workplace and employer support.
Chapter 7

Barriers to Participation

7.1 Overview of chapter

Chapter 5 outlined the development of a four factor structure from the data obtained from the sonographer survey using principal components analysis. This chapter discusses the second factor, accounting for 8.13 per cent of the variance, which was interpreted as representing the ‘Barriers to Participation’ that sonographers responding to the survey perceived they had. Factor scores were obtained for each respondent during the generation of the factors. For factor 2, the higher the score, the greater the perception of ‘Barriers to Participation’. In addition, the written comments on the returned surveys were grouped relating to each factor. The second group of comments pertaining to perceived ‘Barriers to Participation’ by sonographers is also outlined and discussed in this chapter.

7.2 ANOVA

Using the factor scores generated by the principal components analysis, two-way between groups analyses of variance (ANOVA) were performed to allow the individual and joint effects of two independent variables on one dependent variable to be explored (Pallant, 2007). In this manner, the impact of the independent variables ‘gender’, ‘age groups’, ‘urban/rural’, ‘years as a sonographer’ and ‘sonography as a sole occupation’ on ‘Barriers to Participation’ could be explored. In addition, testing for differences in ‘Barriers to Participation’ because of gender, age, experience, geographical location and whether sonography was the only work done could be undertaken.

Testing for interaction between independent variables also occurred, a significant interaction effect signalling that the effect of one variable differed at a different level for the second variable (Robson, 2002).
Sonographers who responded to the questionnaire were separated into various groupings according to demographic for the purposes of the statistical analyses. These groupings were outlined in Chapter 6. Analyses with significant findings are outlined in the following pages.

7.2.1 ‘urban/rural’ with ‘gender’

Levene’s test of equality of error variance failed to reach statistical significance ($p = 0.1$); therefore the significance level for the analysis was set at 0.05.

**Table 7.1: ANOVA results of ‘urban/rural’ and ‘gender’**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>gender</td>
<td>1, 568</td>
<td>0.25</td>
<td>0.61</td>
</tr>
<tr>
<td>urban/rural</td>
<td>1, 568</td>
<td>6.09</td>
<td>0.01</td>
</tr>
<tr>
<td>gender x urban/rural</td>
<td>1, 568</td>
<td>7.36</td>
<td>0.01</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- The main effect for ‘gender’ failed to reach statistical significance ($p = 0.61$).
- The main effect for ‘urban/rural’ reached statistical significance ($p = 0.01$), the mean score for city and suburbs (mean = -0.21, SD = 1.01) was significantly different from the mean score of regional/rural (mean = 0.24, SD = 0.95). The effect size, however, was small (partial eta squared = 0.01).
- This indicates that it is possible that rural dwellers perceive significantly more ‘Barriers to Participation’ than urban dwellers in both males and females.
- There is also a significant interaction effect between these two independent variables ($p = 0.01$), indicating that the significant main effect for ‘urban/rural’ dwellers depends on which gender the sonographer is.
- The following means and error bar plots confirm this; indicating that female rural dwellers have the perception that they have significantly more barriers to CPD than their male counterparts, whereas their female colleagues in the city did not feel that way. In addition,
females from rural locations felt significantly more disadvantaged than females from urban locations, whilst males in rural locations did not feel more so than their city colleagues.

Figure 7.1 ‘urban/rural’ and ‘gender’

Figure 7.2 Error bars demonstrating differences between males and females and between females in city and rural locations for the factor ‘Barriers to Participation’
7.2.2 ‘urban/rural’ and ‘age groups’

Levene’s test of equality of error variance failed to reach statistical significance ($p = 0.61$); therefore the significance level for the analysis was set at 0.05.

**Table 7.2: ANOVA results of ‘urban/rural’ and ‘age groups’**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>age groups</td>
<td>2,566</td>
<td>6.42</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>urban/rural</td>
<td>1, 566</td>
<td>29.16</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>urban/rural x age</td>
<td>2, 566</td>
<td>1.2</td>
<td>0.3</td>
</tr>
<tr>
<td>groups</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- The main effect for ‘urban/rural’ reached statistical significance ($p < 0.001$), the mean score for the regional/rural group (mean = 0.24, SD = 0.98) was significantly different from the mean score for the city and suburbs group (mean = -0.21, SD = 1.01). The effect size was moderate (partial eta squared = 0.05). This indicates that regional and rural sonographers feel they have more ‘Barriers to Participation’ than city and suburbs dwellers across all age groups.

- In addition to this, the main effect for ‘age groups’ also reached significance, although the effect size was small (partial eta squared = 0.02).

- Post-hoc comparisons using the Tukey honestly significantly different (HSD) test were conducted to compare the mean scores between the groups. Use of the Tukey HSD test guards against the possibility of increasing Type 1 errors though multiple comparisons and is commonly used where equal variances are assumed (Pallant, 2007).

- The mean score of the 45+ age group (mean = -0.22, SD = 1.05) was significantly different from both the 21 to 34 year age group (mean = 0.11, SD = 0.95) and the 35 to 44 year age group (mean = 0.1, SD = 0.97). The 21 to 34 year age group and the 35 to 44 year age group did not differ significantly from one another.
As can be seen from the graph, whilst rural dwellers perceived they had more barriers than those in the city across all age groups, those in the 45+ age group perceived fewer than their younger colleagues, from similar locations.

The interaction effect did not reach significance ($p = 0.3$). Therefore, there is no significant difference in the effect of location on ‘Barriers to Participation’ for sonographers with differences in ages.

Figure 7.3 ‘urban/rural’ and ‘age groups’

7.2.3 ‘urban/rural’ and ‘years as a sonographer’

Levene’s test of equality of error variance failed to reach statistical significance ($p = 0.14$); therefore the significance level for the analysis was set at 0.05.
Table 7.3: ANOVA results of ‘urban/rural’ and ‘years as a sonographer’

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>years as a sonographer</td>
<td>2, 566</td>
<td>5.11</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>urban/rural</td>
<td>1, 563</td>
<td>21.97</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>urban/rural x years as a sonographer</td>
<td>3, 563</td>
<td>0.89</td>
<td>0.45</td>
</tr>
</tbody>
</table>

This ANOVA shows:

- The main effect for ‘years as a sonographer’ reached statistical significance ($p < 0.001$). The effect size however was low to moderate (partial eta squared = 0.03).
- Post-hoc comparisons using the Tukey HSD test showed that the mean score for the 0 to 4 years experience group (mean = 0.09, SD = 1.04) was not statistically different from any of the other groups.
- The mean score for the 15+ years experience group (mean = -0.21, SD = 1.05) was significantly different from both the 5 to 9 year group (mean = 0.18, SD = 0.94) and the 10 to 14 year group (mean = 0.07, SD = 0.92).
- The difference between the mean scores of the 5 to 9 years experience group and the 10 to 14 years age group was not statistically significant.
- The main effect for ‘urban/rural’ reached statistical significance ($p < 0.001$). The mean score for the rural group (mean = 0.23, SD = 0.95) was significantly different from the mean score for the city and suburbs group (mean = -0.21, SD = 1.01). The effect size was moderate (partial eta squared = 0.04).
- These results indicate that the sonographers with more experience tend to perceive fewer barriers to CPD, especially in the city areas.
The interaction effect between the two groups failed to reach statistical significance \((p = 0.45)\). Therefore, location does not influence the effect of experience on ‘Barriers to Participation’.

![Figure 7.4 ‘urban/rural’ and ‘years as a sonographer’](image)

**7.2.4 ‘urban/rural’ and ‘sonography as sole occupation’**

Levene’s test of equality of error variance reached statistical significance \((p = 0.03)\); therefore the significance level for the analysis was set at 0.01.

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>sonography as sole occupation</td>
<td>1, 567</td>
<td>0.33</td>
<td>0.19</td>
</tr>
<tr>
<td>urban/rural</td>
<td>1, 567</td>
<td>28.47</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>urban/rural x sonography as sole occupation</td>
<td>3, 567</td>
<td>1.71</td>
<td>0.19</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- The main effect for the ‘sonography as sole occupation’ groups failed to reach statistical significance \((p = 0.19)\).
The main effect for ‘urban/rural’ reached statistical significance ($p<0.001$) the effect size was moderate to large (partial eta squared = 0.05). The difference between the mean score for the city and suburbs group (mean = -0.21, SD = 1.01) was significantly different from the mean score for the regional and rural group (mean = 0.24, SD = 0.95), regardless of whether the sonographer worked solely as a sonographer or had another occupation as well.

The interaction effect between the ‘urban/rural’ groups and ‘sonography as sole occupation’ groups failed to reach statistical significance ($p = 0.19$). Therefore, there was no significant difference in the effect of location on ‘Barriers to Participation’ between sonographers who practice solely sonography and those with another occupation.

Figure 7.5 ‘urban/rural’ and ‘sonography as sole occupation’

7.2.5 ‘gender and ‘age groups’
Levene’s test of equality of error variance failed to reach statistical significance ($p = 0.36$); therefore the significance level for the analysis was set at 0.05.
Table 7.5: ANOVA results of ‘gender and ‘age groups’

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age groups</td>
<td>2, 577</td>
<td>4.36</td>
<td>0.01</td>
</tr>
<tr>
<td>gender</td>
<td>1, 577</td>
<td>0.04</td>
<td>0.84</td>
</tr>
<tr>
<td>gender x age groups</td>
<td>2, 577</td>
<td>0.15</td>
<td>0.86</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- The main effect for age groups reached statistical significance ($p = 0.01$), however, the effect size was small (partial eta squared = 0.01).
- Post-hoc comparisons using the Tukey HSD test indicated the mean score for the 21 to 34 age group (mean = 0.11, SD = 0.95) was significantly different from the 45+ age group (mean = - 0.2, SD = 1.05), but not significantly different from the 35 to 44 year age group (mean = 0.11, SD = 0.96).
- The main effect for ‘gender’ failed to reach statistical significance ($p = 0.84$).
- There was no significant interaction effect between gender and age groups in their perception of ‘Barriers to Participation’ ($p = 0.86$).

![Figure 7.6 'gender and ‘age groups'](image-url)
7.2.6 ‘years as a sonographer’ and ‘sonography as sole occupation’

Levene’s test of equality of error variance failed to reach statistical significance ($p = 0.49$); therefore the significance level for the analysis was set at 0.05.

Table 7.6: ANOVA results of ‘years as a sonographer’ and ‘sonography as sole occupation’

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>years as a sonographer</td>
<td>3, 577</td>
<td>3.36</td>
<td>0.02</td>
</tr>
<tr>
<td>sonography as sole occupation</td>
<td>1, 574</td>
<td>0.13</td>
<td>0.84</td>
</tr>
<tr>
<td>years as a sonographer x sonography as sole occupation</td>
<td>3, 574</td>
<td>0.36</td>
<td>0.78</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- The main effect for ‘years as a sonographer’ reached statistical significance ($p = 0.02$). The effect size was small (partial eta squared = 0.02).
- Post-hoc comparisons using the Tukey HSD test showed that the mean score for 0 to 4 years of experience group (mean = 0.09, SD = 1.04) was not statistically different from any other group.
- The mean score for the 15+ years of experience group (mean = - 0.19, SD = 1.05) was significantly different from both the 5 to 9 years of experience group (mean = 0.18, SD = 0.93) and the 10 to 14 years of experience group (mean = 0.08, SD = - 0.91). This indicates that sonographers with the most experience perceived fewer barriers to CPD than their less experienced colleagues, whether they worked solely as a sonographer or had another occupation.
- The main effect for ‘sonography as sole occupation’ failed to reach statistical significance ($p = 0.84$).
The interaction effect between the two groups failed to reach statistical significance (\( p = 0.78 \)), therefore, experience had no influence on ‘Barriers to Participation’ in those who worked either fully as a sonographer or had a second occupation.

Mean scores and standard deviations for all the groups in the ‘Barriers to Participation’ component are summarised in Appendix 8.

### 7.3 Summary of ANOVA for ‘Barriers to Participation’

The ANOVA demonstrated that location had a significant impact on ‘Barriers to Participation’, with those in rural areas generally perceiving more barriers. There were also significant gender differences between those in rural and remote areas compared with those in the city. Whilst there was little difference between men from the two locations, women in city locations perceived fewer barriers than their male counterparts. Women in rural locations perceived more barriers than men in rural locations; however, the most significant difference was between women in city locations and women in rural locations. Inspection of the demographic numbers shows that the ratio of rural women to city women in the responses to this survey, in all age groups, remains
fairly constant at 0.74 per cent +/- 2.5. However, the ANOVA showed that female sonographers
over the age of 45 years who resided in a city perceived fewer ‘Barriers to Participation’. In addition,
more experienced sonographers, 15 + years, who had sonography as a sole occupation, also
perceived fewer ‘Barriers to Participation’ in CPD. Inspection of the comments regarding ‘Barriers to
Participation’ will provide further insight into these results.

7.4 Responses to open-ended survey questions

Each comment on the open-ended questions on the survey was categorised in relation to
the factors generated in the principal components analysis (PCA). Comments pertaining to ‘Barriers
to Participation’ were placed in a separate document. Each document was printed out and the
process of repeated reading through the responses several times was carried out utilising
comments and notes in the margins of the paper, eventually several sub-themes emerged. Each
sub-theme was colour coded on the document and finally rearranged so that all comments
belonging to a sub-theme were grouped together, allowing the following descriptive report to be
made.

Of the 158 comments received in this category, the most numerous pertained to the
difficulty of juggling CPD and family life, also numerous were comments pertaining to distance and
costs. Almost all comments (156) were from commentators who had a complaint about some
aspect of obtaining CPD which they perceived as a barrier. The remaining two comments were
positive in that the writers had had no problem obtaining their CPD.
Table 7.7: Categorisation of ‘Barriers to Participation’ component comments

Table 7.8: Frequencies of responses in the category ‘Barriers to Participation’

<table>
<thead>
<tr>
<th>Respondents</th>
<th>% of comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>12.5</td>
</tr>
<tr>
<td>Female</td>
<td>87.5</td>
</tr>
<tr>
<td>City/suburbs</td>
<td>42</td>
</tr>
<tr>
<td>Rural/remote</td>
<td>54</td>
</tr>
<tr>
<td>45+ years</td>
<td>38</td>
</tr>
<tr>
<td>35-44 years</td>
<td>31</td>
</tr>
<tr>
<td>21-34 years</td>
<td>31</td>
</tr>
<tr>
<td>15 + years of experience</td>
<td>37.5</td>
</tr>
<tr>
<td>10-14 years</td>
<td>23.5</td>
</tr>
<tr>
<td>5-9 years</td>
<td>25.5</td>
</tr>
<tr>
<td>0-4 years</td>
<td>11.5</td>
</tr>
</tbody>
</table>
The female proportion of commentators of 87.5 per cent, along with the proportion from those in rural locations of 54 per cent (see Appendix 9) reinforce the ANOVA results that rural sonographers and especially females perceive significantly more barriers to CPD. Interestingly, there was a greater proportion of commentators in the older age bracket than could have been expected from the survey response rate. The majority of older and more experienced sonographers writing comments on this section were writing about cost, workload and quality of courses. Younger, less experienced people tended to complain more about problems associated with family, childcare and maternity leave and CPD. Comments about distance were received from all age groups equally, whether rural or urban. Categories such as family, time, cost and distance were often seen to interlink and overlap and, as such, were relatively difficult to itemise.

**Family**

The competing demands of family life may be a significant factor in determining CPD participation. Many commentators remarked on the difficulty of juggling work and family, compounded for some by living in a rural location.

*For a young family juggling family commitments, work and CPD is difficult.*

*We all have a life outside of work and people with kids find it hard to attend all weekend.*

*Being a parent and working in a rural area does make attending conferences/workshops in capital cities more difficult.*

*I live in a rural community. Attending conferences means travelling away from my home, time off work and away from my young children.*

*Having young children affects my ability to attend conferences as I live in a remote area. Attending lectures in the evening is often impossible with young children.*

Lack of rural courses makes obtaining points difficult for one family in particular,

*Lack of rural courses makes obtaining points difficult, especially with a young family. Going to conferences either entails the cost of taking the whole family with me or my partner having to take annual leave from his work to look after the children.*

Cost of obtaining CPD can be an added burden to a family, as the previous commentator went on to say:
Also, as I am part-time, my work-place does not cover all expenses... so this is an extra burden on an already stretched budget.

Other women felt similarly stretched by the costs of CPD, as seen in the following comments:

As I’m only part time with small children at home, it costs me approximately half of my annual income to stay accredited. The major meetings are getting very costly.

When only working (paid work!) a few hours a week, it is difficult as a mum of 3 small children to a) get the time to do CPD and b) also to financially attend conferences.

Living in a rural area with a young family makes course attendance difficult and expensive.

Although all the previous comments were received from women, some men also felt affected by CPD commitments.

Conferences and seminars are becoming cost prohibitive especially for those with families and one income.

Family responsibilities make it difficult.

Having to attend meetings/conferences etc. greatly affects my family time.

Families do not always contain children but can still be the cause of concern as one sonographer commented,

Have difficulty due to elderly demented parent.

For some sonographers, maternity leave has proved to be problematic, as evidenced in the following comments,

Difficult to achieve necessary points when on maternity leave.

Maternity leave – it puts a lot of stress on you to get points in 2 rather than 3 years.

Distance

It is evident from this chapter, thus far, that for some sonographers, pursuing CPD from afar is especially difficult for those with children. Others without mentioning children also write about feeling limited and/or restricted by remoteness as evidenced by:

Being located in a rural area, I find it restrictive. I am unable to attend meetings etc. as I am 3 hours away (one way).

When working in remote areas, significant restriction.
Limited opportunities to obtain CPD points in FNQ.

People who are in rural practice find it difficult to acquire CPD points as they do not have access to the facilities that city sonographers do.

Not all distance problems are actually associated with remote living as can be seen in the following comments,

Most meetings are in the city and I have to drive 50kms to get to meetings after work. I’m tired, my husband has to get the kids’ dinners and I have to work next day. It would be better if meetings were held further out from the city.

In Sydney, you don’t have to be in the country to be remote from the course venue (especially after work). Travel time can be prohibitive.

An additional problem which sonographers in rural and remote communities may face is the lack of available staff to cover duties at weekends and evenings, as commented:

As a sonographer, I am not replaced when I go away so my community suffers while I’m away and I suffer when I get back!

We are in a remote area so distance makes it difficult, even more so because of shortage of staff.

Whilst praise was given to the innovation of the travelling workshops, whereby speakers visit various part of the country, these are only able to visit a limited number of areas and attendance places are limited, leading to some local sonographers not being able to attend one.

Cost

Again, distance was not the only problem facing rural and remote sonographers. Living further away from capital cities means that travel costs are also greater.

Rural people are definitely restricted and cost is a very big obstacle.

Issues are travel costs, accommodation and babysitters.

Conferences/seminars are very expensive for sonographers paying their own way. Expensive registration fees, expensive venues, airfares and accommodation.

Very expensive to travel to conferences.

However, remote sonographers were not the only ones to complain about the cost as the following comments from city sonographers show,
Cost of courses is becoming a factor.

Costs.

Poor funding.

The cost of national conferences makes the ability to attend very often extremely prohibitive.

**Workload**

Working hours were often long and arduous for those commentators in this section, in both city and rural areas. There seemed to be a shortage of staff in all areas, but more particularly in rural areas. It was commented more than once that too much work robs some of the incentive to seek further education.

*I often work 50 hours due to compulsory ‘on-call’, which leaves me tired and unenthusiastic about more work (study).*

*Heavy workload/staff shortages reduce my enthusiasm for spending my own time on CPD activities.*

*Workload is horrendous, last thing I want to do after work is study.*

The above comments are indicative of the general theme of the comments received in this section. The majority of the comments were supplied by female sonographers working in rural communities.

**Time**

Although workload presented significant issues for some sonographers, others also had comments to make about having to use their own time to pursue CPD commitments. This situation was not well-received by some of the commentators and the following comments are representative of the overall feeling.

*CPD is taken in my own time, which affects family life.*

*Have trouble getting time to attend.*

*Having to gain CPD points in my own time is a big factor.*

In fact, several commentators felt that CPD should be factored into workload, similar to other professions.
People who have a life outside of sonography don’t want to spend their ‘out-of-hours’ time chasing CPD because they have to. Teachers have ‘pupil-free’ days to get up to date with their skills. This should apply to sonography too. Why should we have to use weekends and after hours too?

I would prefer not to have to spend so much of my own ‘free’ time educating myself. I think that employers should factor it into workload.

While I believe CPD is an integral part of the profession, I think the undertaking of course/study should be incorporated into the working week and we should not have to take annual leave for it.

I think I should be paid to attend mandatory CPD activities which invariably occur during my spare time and often cost me financially as well.

Conferences are, in the main, held over weekends, ostensibly so more sonographers can attend.

This was not popular with some, with the following comment as an example:

I dislike how conferences are always at the weekend.

However, one sonographer admitted that she actually liked the chance to get away from the family for a couple of days a year to catch up with old friends and colleagues.

**Quality of courses**

The majority of comments in this section were received from older or more experienced sonographers. Several thought there was a certain amount of repetition in the available CPD activities.

Repetition of basics irritating considering experience of many members.

Lot of repetition in courses

Other commentators felt they were not well catered for:

There needs to be more relevant workshop/conferences available, especially for specific modalities.

Often courses not aimed at well-trained sonographers and therefore almost a waste of time, the last conference I went to afforded me no new information.

Many conferences and workshops don’t have a lot of content that I’m interested in at my level of experience.
Similarly, sonographers in specialist areas such as echocardiography and breast sonography felt there were limited choices for them compared with general categories,

*Choices limited for specialist qualification.*

A common theme was that conferences and courses changed little from one year to the next with the following plea from one sonographer:

*How many shoulder talks can you see before you go mad?!!!*

Overall it appeared that for some there was not enough variety and too much concentration on basic areas, leaving more experienced sonographers feeling frustrated by lack of interest.

**Comments on the present CPD system**

A common cause for complaint from the commentators was the difficulty in recording and reviewing activities in the ASAR system. The online entry appeared to be difficult and cumbersome to use for many.

*I find it a difficult system to use as I can't review activities I have entered and when.*

*The hardest part for me is recording my CPD.*

*My issue with CPD is the extra time required for administration of CPD i.e. finding time to enter at a computer...*

A change to the rules has limited the number of points that can be gained from specific activities each triennium, for instance, on line journal article quizzes. Some felt that this might restrict them.

*New rules very restrictive.*

*Latest labelling of what type of CPD needs to be done removes flexibility for those with a limited financial supportive environment and financial responsibilities.*

**Other comments**

Few people are now affected by lack of computer or resources such as text books or journal access, although one person did comment that until recently, when the family had acquired a computer, it had been more difficult to access on-line resources. Religious duties affected at least one commentator, making attendance on Saturdays impossible. Interestingly, there were several
comments from people who found it difficult to accrue the right amount of CPD points and thought it should be based on employment fraction.

*I would like to see a tiered point structure according to the number of days you work, ie 40 points for full time, 30 points for part time etc.*

*I believe that CPD acquisition should be based on the ratio of employment…*

*I think it’s difficult for those working just 1-2 days/week or in breast U/S only to accrue 40 points without attending a conference.*

? is 40 points necessary for part time sonographers. Ditto for sonographers who work only in limited fields e.g. vascular, musculoskeletal, cardiac?

### 7.5 Discussion

The quantitative results from the frequency of responses reported in Chapter 5 demonstrated that many sonographers perceived significant barriers and deterrents in the pursuit of their CPD. These barriers included family responsibilities, cost, distance, lack of time, staff shortages and workload. To a lesser extent were prior knowledge of a topic and poor quality of courses. The ANOVAs conducted on factor 2 derived from the PCA has confirmed the significance of these barriers and has enabled determination of which groups are more likely to be affected by them. These findings have been further validated by analysis of the qualitative comments volunteered by many of the respondents to the survey.

The most significant difference noted between any groups was that between rural women and city women, whereby rural women perceived the most barriers. For men, there was no significance between those in rural areas and those in city areas in the perception of 'Barriers to Participation'. There is no way of knowing the reason for this finding, although examination of the demographic data revealed a greater proportion of male sonographers older than 45 years in the rural areas. It is possible that older males have more free time once the family has grown and more disposable income due to having more seniority at work, therefore higher pay. They may have fewer family expenses and so feel less disadvantaged in those respects. The younger proportion of males in city areas would perhaps tend to have less disposable income and more family ties,
therefore balancing out any differences between rural and city men. Female respondents from the city perceived fewer 'Barriers to Participation' than their male counterparts and considerably fewer barriers than their female peers in rural areas. There could be several reasons for this, female rural sonographers tended to be of a younger age group and it is likely that many had young families to care for; the comments received certainly indicated this. It can be difficult to find child care at any time, but likely to be harder in a more remote area. In addition, many of these women worked part-time leading to a lower income bracket and greater burden for cost of CPD. The females responding from the city areas had a greater proportion in the older, 45+ years’ group and thus were more likely to have more free time and disposable income.

Long working hours and staff shortages can affect sonographers in all locations; those in rural areas are much more likely to be affected because many centres only employ one or two sonographers, leading to little or no back-up. Locum positions need to be advertised and organised several weeks, if not months, in advance and so it may be very difficult to go away for CPD activities at fairly short notice, even if employers agree to it. It is realistic to assume that travelling time and costs will be greater for those living in rural or remote areas and a greater time away would probably mean greater accommodation costs. One comment was received from a sonographer whose family lived on a farming property, years of drought had compounded the extra costs associated with rural living and CPD and she found it very difficult to comply. Nevertheless, comments revealed that even those sonographers living in city areas may have difficulty with distance and cost. The modern city boundaries have spread many kilometres wide and it can take a considerable amount of time to travel from an outer suburb to a more central area to attend a meeting. If meetings are held after work, the time it takes to travel to them may make it impossible to attend. Costs are still a factor as annual conferences are held in different capital cities each year and there are resultant costs of travelling from one city to another to attend.
Even though distance and cost were seen by many to create barriers to participating in CPD, the data showed that during the two years prior to the survey, ninety per cent of respondents had attended at least one conference and eighty four per cent an educational workshop. These figures indicate that even though distance and cost do play a major role, this may not be enough to prevent attendance at conferences. Whether this is because conferences are seen as worthwhile or that they are a way of amassing a large amount of CPD credits at one time will be debated later in this thesis. However, conferences can be seen as a good way to network and socialise with peers (Merchant, 2007).

Use of one’s own time to pursue CPD was seen as a detractor to CPD by several commentators. It may be seen as a ‘fairness’ issue, as other professions such as teaching and medicine have allotted times during the working weeks for professional development. For sonographers, this is a rare occurrence, probably due to staff shortage and workload and possibly due to management issues. As O’Sullivan (2003) suggested, it would likely be in the best interests of the employer to schedule time for learning at work.

The fact that over one third of respondents, in general, older, more experienced sonographers, considered that course and conference content was a little too basic or repetitious indicates that these people were willing to be challenged in their learning and possibly step outside of their comfort zone to seek new knowledge. This finding is in contrast to the study of doctors undertaken by Saidi et al. (2003) which found its participants were very reluctant to leave their comfort zone unless forced to do so. However, the information derived from this study should highlight to providers of CPD that there is a level of discontent about repetitious activities and there should be an endeavour to provide fresh and challenging activities. Several years ago, McPartland (1990) and Perry (1995), reported concerns regarding too many inferior activities being provided in a mandatory CPD system. At that time they were most likely referring to inputs based models and the basis of the CPD at that time was the provision of an activity which provided the required
number of points. In addition, Friedman and Woodward (2008) report that one of the disadvantages of an inputs based system is that everything done under the scheme is thought to be useful and of good quality. As I discussed in Chapter 1, activities provided to sonographers are generally accepted to be of good quality, but are not evaluated on the value and outcomes. Also of interest to providers should be the information that many rural and remote sonographers rely on on-line activities to boost their CPD and consideration of this should, perhaps, be taken into account.

Workload and overwork was possibly the most concerning with regards to disinclining sonographers from undertaking CPD. It was commented upon more than once that after a busy week at work with the prospect of ‘on-call’ as well, the last thought was of further work in the form of CPD. This situation has been well recognised in previous literature (Eraut, 2004; Field, 2004; Brown, 2004; Sim and Radloff, 2008).

The barriers to CPD indicated in this study were commonly mentioned in the literature as affecting other professionals also (e.g. Henwood et al., 2004; Hughes, 2005; Keim et al., 2001; Townsend et al., 2006). In particular, the findings echo in many respects those of Townsend et al. (2006), whose study of Canadian occupational therapists demonstrated that CPD can be seen to compete with family commitments as CPD is undertaken largely in the practitioners’ own time. As is the case of the occupational therapists, the sonographer profession is also female dominated but few allowances in work practices appear to have been made for this. In addition, heavy workloads and extra costs of childcare plus, in some cases, the care of older parents are compounded for rural workers.

From this study we can see that, although for many sonographers the barriers are quite extensive, there is still the ability to undertake CPD, often at quite a financial cost and for some, loss of family time. Certainly there were several calls for a reduced amount of CPD credits to be required, especially from part time workers, many of whom appeared not to understand the reason for CPD because of this. Again, it does come down to the question of points; for these part-time
people, being able to run and organise their own CPD may eliminate these feelings. Overall, in light of the findings it is commendable that such a high proportion do manage to fulfil CPD obligations. Whether this is due to self-direction leading the sonographer into professional development or to the mandatory necessity to undertake CPD in order to work is debateable and will be discussed further in the next chapter, Chapter 8.
Chapter 8
Reflective practice and self-direction

8.1 Overview of chapter

Chapter 5 outlined the development of a four factor structure from the data obtained from the sonographer survey using principal components analysis. This chapter discusses the third factor, accounting for 4.9 per cent of the variance, which was interpreted as representing the ‘Reflective practice’ habits of sonographers responding to the survey. This factor encompassed reflective practices and reflective practices that led to an increase in CPD or a change in work practices. The third group of comments pertaining to ‘Reflective practice’ by sonographers is also outlined and discussed in this chapter.

It was also reported in Chapter 5 that three questions relating to self-direction on the survey did not load strongly during the principal components analysis. These questions were: “I plan in advance which activities I need to undertake” (question 6); “I seek out activities which will fulfil my CPD needs” (question 8); and “I would practise CPD in a non-mandatory setting” (question 21). It was suggested that in any further development of the survey, the wording and placement of these questions could be addressed. Nevertheless, these questions did elicit over 50 related comments from respondents to the survey. Presentation and discussion of these comments is appropriate in this chapter due to the close links that self-direction has with reflective practice. During development of the questionnaire and plain language statement it was decided that no definition of ‘self-direction’ would be provided even though the phrase was included in both the study title and plain language statement. This decision was taken to reduce potential prejudice of the respondents and gain non-biased responses. Comments were sorted into separate sections according to topic, as previously described for factors 1 and 2.
**8.2 ANOVA**

Using the factor scores generated by the principal components analysis, two-way between groups analyses of variance (ANOVA) were performed to allow the individual and joint effects of two independent variables on one dependent variable to be explored (Pallant, 2007). As outlined in Chapter 6, the impact of the independent variables ‘gender’, ‘age groups’, ‘urban/rural’, ‘years as a sonographer’ and ‘sonography as sole occupation’ on the ‘Reflective practice’ factor were explored. In addition, testing for differences in ‘Reflective practice’ because of gender, age, experience, geographical location and whether sonography was the only work done was undertaken along with testing for interaction effects.

The ANOVAs demonstrated no interaction or main effects in any of the analyses completed, with the exception of ‘years as a sonographer’ in the analysis of ‘age groups’ with ‘years as a sonographer’. Nevertheless, inspection of the graphs generated by these analyses show definite differences between some of the demographic groupings and as such will be reported to present a complete picture.

**8.2.1 ‘urban/rural’ with ‘gender’**

Levene’s test of equality of error variance failed to reach statistical significance ($p = 0.29$); therefore the significance level for the analysis was set at 0.05.

**Table 8.1: ANOVA results of ‘urban/rural’ and ‘gender’**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>gender</td>
<td>1, 568</td>
<td>0.12</td>
<td>0.73</td>
</tr>
<tr>
<td>urban/rural</td>
<td>1, 568</td>
<td>1.43</td>
<td>0.23</td>
</tr>
<tr>
<td>gender x urban/rural</td>
<td>1, 568</td>
<td>1.28</td>
<td>0.26</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- There are no statistically significant effects.
Inspection of the figure below indicates that although there is little difference in the reflective practices of women in city areas or rural areas, there was a distinct difference between men in city areas and men in rural areas.

Difference was also noted between men and women in city locations with men tending to be more reflective, a trend which reversed in rural locations.

Figure 8.1 ‘urban/rural’ and ‘gender’

8.2.2 ‘urban/rural with ‘age groups’

Levene’s test of equality of error variance failed to reach statistical significance (p = 0.77); therefore the significance level for the analysis was set at 0.05.

Table 8.2: ANOVA results of ‘urban/rural’ and ‘age groups’

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>age groups</td>
<td>2, 566</td>
<td>0.81</td>
<td>0.45</td>
</tr>
<tr>
<td>urban/rural</td>
<td>1, 566</td>
<td>0.35</td>
<td>0.55</td>
</tr>
<tr>
<td>age groups x urban/rural</td>
<td>2, 568</td>
<td>0.19</td>
<td>0.83</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- There are no statistically significant effects.
Inspection of the figure below indicates that while there is little difference between locations, older sonographers tend to be a little more reflective.

![Figure 8.2 'urban/rural' and 'age groups']

8.2.3 ‘urban/rural’ with ‘years as a sonographer’

Levene’s test of equality of error variance failed to reach statistical significance ($p = 0.52$); therefore the significance level for the analysis was set at 0.05.

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>urban/rural</td>
<td>1, 563</td>
<td>1.52</td>
<td>0.22</td>
</tr>
<tr>
<td>years as a sonographer</td>
<td>3, 563</td>
<td>2.4</td>
<td>0.07</td>
</tr>
<tr>
<td>years as a sonographer groups x urban/rural</td>
<td>3, 563</td>
<td>0.79</td>
<td>0.5</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- There are no statistically significant effects.
- Inspection of the graph below indicates that, although for most levels of experience, as indicated by years of working, there is little difference in the reflective practices between those who live in a city and those rurally situated; in the 0 - 4 year experience bracket there appears to be an appreciable difference between the two locations, with those in the city tending to be more reflective.

- More experienced sonographers tend to be more reflective in both locations.

![Graph](image.png)

**Figure 8.3 ‘urban/rural’ and ‘years as a sonographer’**

### 8.2.4 ‘urban/rural’ with ‘sonography as sole occupation’

Levene’s test of equality of error variance failed to reach statistical significance ($p = 0.19$); therefore the significance level for the analysis was set at 0.05.
Table 8.4: ANOVA results of ‘urban/rural’ and ‘sonography as sole occupation’

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>urban/rural</td>
<td>1, 567</td>
<td>1.02</td>
<td>0.31</td>
</tr>
<tr>
<td>sonography as sole occupation</td>
<td>1, 567</td>
<td>0.04</td>
<td>0.84</td>
</tr>
<tr>
<td>sonography as sole occupation x urban/rural</td>
<td>1, 567</td>
<td>0.83</td>
<td>0.36</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- There are no statistically significant effects.
- Inspection of the graph below demonstrates that although there is no difference in the reflective practices of sonographers who work solely as sonographers in either location, sonographers who also have another occupation tend to be more reflective if they work in the city compared with rurally.

![Graph showing ANOVA results](image)

Figure 8.4 ‘urban/rural’ and ‘sonography as sole occupation’

8.2.5 ‘gender’ with ‘age groups’

Levene’s test of equality of error variance failed to reach statistical significance ($p = 0.84$); therefore the significance level for the analysis was set at 0.05.
Table 8.5: ANOVA results of ‘gender’ and ‘age groups’

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>gender</td>
<td>1, 577</td>
<td>0.92</td>
<td>0.34</td>
</tr>
<tr>
<td>age groups</td>
<td>2, 577</td>
<td>1.19</td>
<td>0.3</td>
</tr>
<tr>
<td>gender x age groups</td>
<td>2, 577</td>
<td>2.22</td>
<td>0.11</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- There are no statistically significant effects.
- Inspection of the graph below demonstrates that although there is no significant difference in the reflective practices of males and females in the 35 to 44 and 45+ age groups, men in the youngest bracket, 21 to 34 years group are quite markedly different from women and tend to be more reflective.

![Figure 8.5 'gender' and 'age groups']

8.2.6 ‘gender’ with ‘years as a sonographer’

Levene’s test of equality of error variance failed to reach statistical significance ($p = 0.84$); therefore the significance level for the analysis was set at 0.05.
Table 8.6: ANOVA results of ‘gender’ and ‘years as a sonographer’

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>gender</td>
<td>1,574</td>
<td>0.4</td>
<td>0.53</td>
</tr>
<tr>
<td>‘years as a sonographer’</td>
<td>3,574</td>
<td>2.11</td>
<td>0.1</td>
</tr>
<tr>
<td>gender x ‘years as a sonographer’</td>
<td>3,574</td>
<td>1.25</td>
<td>0.29</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- There are no statistically significant effects.
- Inspection of the graph below demonstrates the variability of reflective practice in males according to experience, with males in the 5 to 9 year experience group showing the highest level of reflective practice and males in the next group of 10 to 14 years of experience showing the lowest level. Only at the more experienced level of 15+ years of experience did men and women show similar levels of reflective practice.

Figure 8.6 ‘gender’ and ‘years as a sonographer’

![Graph showing the variability of reflective practice in males according to experience.](image)
8.2.7 ‘gender’ with ‘sonography as sole occupation’

Levene’s test of equality of error variance failed to reach statistical significance ($p = 0.23$); therefore the significance level for the analysis was set at $0.05$.

Table 8.7: ANOVA results of ‘gender’ and ‘sonography as sole occupation’

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>gender</td>
<td>1, 578</td>
<td>0.76</td>
<td>0.38</td>
</tr>
<tr>
<td>sonography as sole occupation</td>
<td>1, 578</td>
<td>0.81</td>
<td>0.37</td>
</tr>
<tr>
<td>sonography as sole occupation x gender</td>
<td>1, 578</td>
<td>1.44</td>
<td>0.23</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- There are no statistically significant effects.
- Inspection of the graph below demonstrates that whilst there is little difference between females who work solely as a sonographer and those who do not, there is a marked difference between men who work solely as a sonographer and those who do not. Men who do not work solely as a sonographer tend to be more reflective.

![Figure 8.7 'gender' and 'sonography as sole occupation'](image)

Figure 8.7 ‘gender’ and ‘sonography as sole occupation’
8.2.8 ‘age groups’ with ‘years as a sonographer’

Levene’s test of equality of error variance failed to reach statistical significance \((p = 0.59)\); therefore the significance level for the analysis was set at 0.05.

Table 8.8: ANOVA results of ‘age groups’ and ‘years as a sonographer’

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>age groups</td>
<td>2, 572</td>
<td>1.04</td>
<td>0.36</td>
</tr>
<tr>
<td>years as a sonographer</td>
<td>3, 572</td>
<td>2.63</td>
<td>0.05</td>
</tr>
<tr>
<td>age groups x years as a sonographer</td>
<td>5, 572</td>
<td>1.52</td>
<td>0.17</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- The main effect for ‘age groups’ failed to reach statistical significance \((p = 0.36)\).
- The main effect for ‘years as a sonographer’ reached statistical significance \((p = 0.05)\). The effect size was small (partial eta squared = 0.01). The Tukey HSD test did not demonstrate any statistically significant differences between individual groups in the ‘years as a sonographer’ variable.
- There is no interaction effect between the two groups, indicating that ‘gender’ has no influence on ‘years as a sonographer’.
- Inspection of the graph below does reveal some apparent differences between groups. Inexperienced sonographers (0 to 4 years) show the highest tendency to reflective practice in the 35 to 44 year age bracket. This falls sharply into the next age group (45+). The second least experienced group (5 to 9 years) also demonstrate a tendency to less reflection in the older age bracket. More experienced sonographers are more consistent in reflective practice throughout the age groups.
8.2.9 ‘age groups’ with ‘sonography as sole occupation’

Levene’s test of equality of error variance failed to reach statistical significance ($p = 0.59$); therefore the significance level for the analysis was set at 0.05.

Table 8.9: ANOVA results of ‘age groups’ and ‘sonography as sole occupation’

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>age groups</td>
<td>2, 577</td>
<td>0.2</td>
<td>0.82</td>
</tr>
<tr>
<td>sonography as sole occupation</td>
<td>1, 577</td>
<td>0.08</td>
<td>0.77</td>
</tr>
<tr>
<td>sonography as sole occupation x age groups</td>
<td>2, 577</td>
<td>0.86</td>
<td>0.42</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- There are no statistically significant effects.

- Inspection of the graph below demonstrates that the sonographers in the 35 to 44 years age group appeared to have differing reflective practices; those who are not practising sonography as a sole occupation are apparently more reflective.
8.2.10 ‘years as a sonographer’ and ‘sonography as sole occupation’

Levene’s test of equality of error variance failed to reach statistical significance \( p = 0.52 \); therefore the significance level for the analysis was set at 0.05.

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>years as a sonographer</td>
<td>3, 574</td>
<td>1.82</td>
<td>0.14</td>
</tr>
<tr>
<td>sonography as sole occupation</td>
<td>1, 574</td>
<td>0.24</td>
<td>0.63</td>
</tr>
<tr>
<td>sonography as sole occupation x years as a sonographer</td>
<td>3, 574</td>
<td>0.21</td>
<td>0.89</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- There are no statistically significant effects.
Inspection of the graph below shows that only the inexperienced (0 to 4 years) are different in their reflective practice if they work solely as a sonographer or not, with the former tending to show a more reflective approach.

There is a lack of statistical significance for most of these ANOVAs, however, the graphical differences are worthy of noting. It would appear from these graphs that men are generally more reflective in practice than women, especially in the city locations. It should be born in mind though that there were fewer male respondents than female, thus the results may be biased. Older, more experienced sonographers tended to be consistently reflective whatever their situation. Inexperienced sonographers reported more reflection and perhaps this is a result of the natural learning tendencies of the inexperienced. It is also possibly easier to be reflective working in a city location where there are generally larger working departments, with more peers to discuss problems and cases with. Nevertheless, even though some groups such as the more experienced, older sonographers and men who reside in a city tend to be more reflective, the mean scores for each group (Appendix 8) indicate that most sonographers are not positively inclined towards reflective practice.
8.3 Responses to open-ended survey questions

8.3.1 Reflective Practice

Comments relating to reflective practice were few. Indeed, only five comments relating specifically to reflective practice were submitted. All were from women who were experienced sonographers. One extra comment was received from a participant who answered none of the questions in the reflective practice section, that person queried:

*I have no idea what you are talking about here – what is reflective practice?*

One commentator believed that reflection was part of a professional approach.

*If we are a profession we should be keen to engage in active learning throughout our career and reflect on our practice.*

Another preferred to reflect on needs, but other things prevented that at times.

*I usually consider location and cost first, but then I try to plan reflecting on my needs for CPD.*

The three remaining comments pertained to discussion with work colleagues.

*Discussion with colleagues is very important to keep up good work practices, but a full day’s list of patients leaves little time to discuss individual cases, especially for less experienced sonographers.*

*Discussion with peers, reviewing literature, comparing work practices is something which happens continuously.*

*CPD is advantageous when in a setting where discussion occurs with other sonographers.*

8.3.2 Self-direction

Comments relating to self-direction were more numerous even though there was no specific factor for it. A selection of the comments is included below.
Chapter 8: Reflective practice and self-direction

**Attendance at CPD activities**

One key area of self-direction is the ability to recognise the need for and also the willingness to attend CPD activities that are of benefit to the individual. For some of the commentators it is clear that, at times, the need to collect the points is more important than the subject matter of the activity. Some will attend irrelevant activities solely for the points. Others will attend a conference because it is a good way to get a lot of points at once. However, this is not true for all the commentators. Some have a mixture of planning and convenience, others demonstrate some forward planning. Following is a selection of comments demonstrating these differing approaches:

*With mandatory CPD I find myself attending educational sessions which have no bearing on my work, but I need the points.*

*By the end of a 3 year period I go to seminars, not of any interest or professional benefit just to get my points up.*

*When you are compelled to read or attend something to gain CPD points it doesn’t mean you will get anything out of it. You are more likely to gain something from activities you want to do.*

*I have sometimes chosen quizzes that do not have anything to do with my field simply to get the points, although the articles and associated quizzes have been informative.*

*Often only travel when a large number of CPD points can be achieved.*

*I would voluntarily endeavour to educate myself in areas in which I am not confident, but sometimes I choose to undertake in areas in which I am confident because ‘in need of points’ and the course is available etc.*

*I undertake an activity that interests me to get my CPD points. I don’t just do an activity to get points.*

*I would normally read or study something, but CPD adds pressure and I feel I become involved just to get the points.*

*I will attend seminars/workshops/conferences of interest which may or may not equal points required for CPD.*
**Professionalism**

Several comments were received stating the importance of CPD and the professional. These commentators had a belief in the necessity of CPD and the responsibility of the professional to undertake it as evidenced in the following comments:

- **CPD mandatory or otherwise is irrelevant for me personally as I would fulfil it anyway. It is a part of being a professional and having standards.**

- **As a professional, I would undertake regular education seminars etc. regardless of CPD requirements, since the need to keep abreast of developments is necessary to remain competent and employed.**

- **As a professional I will ensure I have adequate knowledge and continue to learn and improve regardless of mandatory requirements.**

- **I feel it is every sonographer’s personal responsibility to actively participate in CPD.**

- **As a health professional, I would continue to attend lectures/conferences/read journals even if mandatory CPD did not exist.**

**Regarding CPD**

In keeping with the general tone of the previous comments, the following confirm that many sonographers are willing and prepared to complete CPD regardless of the mandatory nature,

- **I would keep up to date anyway.**

- **I believe learning is for life. I love to learn and it’s a natural part of life to be ever expanding your knowledge.**

- **I think most people keep up to date anyway.**

- **Most people I work with are committed to progression and standards regardless of CPD requirements.**

- **It is very rare to come across a ‘lazy’ sonographer, we have all had to work so hard to get where we are.**

- **To become a sonographer requires a large amount of study, so I think most sonographers want to learn and keep up to date so they don’t need to be forced.**

- **Before mandatory CPD I took on the responsibility for my own education.**

Only a few commentators were not totally committed to these concepts.

- **Most of us lead busy lives and it is tempting not to do anything after initial qualifications.**
I would engage in CPD activities even they were not mandatory as long as they were relevant to my current employment/skill development, but, perhaps not to the same degree.

CPD has very little effect on my workplace or work practice. It’s something I do because I have to but doesn’t change what I do.

This last comment was the only one of its type in this section, but serves to demonstrate that perhaps not all sonographers are totally committed to the concept of professional development.

8.4 Discussion

Reflection is said to be the key to good practice and CPD (Clouder, 2000; Karban & Smith, 2006). According to the survey results, many sonographers fulfil this, in part, by improving practice, although the reflection did not necessarily lead to increased CPD. Sonographers in the main appear to reflect at least some of the time, often in thought, the nature of the job lending itself to reflection-in-action (Schön, 1987). Responses that indicated that some change of work practices occurred after reflection may also indicate some level of critical reflection, leading to transformational learning in these individuals (Cranton, 1996; Mezirow, 1991). However, this does not appear to translate to an increase in CPD.

The paucity of comments in this section is interesting and it is also interesting to speculate on the reasons why. The first comment was especially worth noting in that the commentator purported not to know about reflective practice. If this person was asking honestly, it perhaps might indicate that others too, did not know, but did not like to admit this, even on an anonymous survey. If this is the case, then perhaps there was a lack of direction on the survey which would need to be addressed in later research. In addition, it could be that many people really do not understand the concept of reflective practice. The limited number of comments received regarding reflection limits the depth of discussion which can be achieved in this chapter. However, they do serve to give some indication of topics which may be pertinent. Sim and Radloff (2008) suggested increasing workloads would limit the capacity for reflection. This was highlighted in one of the comments. In
addition, one of Lohman’s (2000) inhibitors to learning in the workplace is the lack of time due to too much work.

The commentators highlighted the importance of discussion in sonographers’ lives. This was also evident in the quantitative results whereby only 5.3 per cent ‘seldom’ or ‘never’ reflected in discussion; and those sonographers who work in outlying areas as sole practitioners must also be born in mind here, as they seldom get the opportunity to discuss cases. Discussion of work cases with colleagues is an integral part of a sonographer’s working life, such that each department and practice tends to quickly develop its own small community of practice, as per Wenger’s (2006) guidelines outlined in Chapter 2. Discussion with colleagues will allow for reflection on cases and preparation for future cases. Reflective dialogue such as this is very effective and may aid in helping trainees also to learn, reflect and construct meaning (Bolton, 2001). In addition, as argued by Ng (2009), discussion with peers and mentors may prevent over- or under-confidence in abilities.

It is not possible to explain from this data why younger males in city areas are more reflective than males in country areas and females in both locations. However, it is a possibility that the data was skewed due to a relatively low number of male responses in the younger age group. It is also unclear why sonographers who have two occupations, one of them being sonography, tend to be more reflective, especially as the data revealed that 75 per cent with more than one role practised radiography. It has been discussed previously that radiographers are not particularly reflective in their practice (Sim, 2003; Fowler, 2002); perhaps the extra training in sonography has changed this perspective for this group.

It is of note that older and more experienced sonographers generally tend to be more reflective. This finding sits well with Merriam’s (2005) thinking that transformative learning, which requires a level of reflection, needs a higher level of cognitive development which does not appear until a later age. Until that time, it is suggested that discussion amongst colleagues in a supportive
environment will promote and assist in critical reflection to the benefit of the employer and employees (Hiemstra, 1994).

The quantitative results indicated that the sonographers responding to this survey often do not follow up reflection with increased CPD. This could be explained in a number of ways. It could be that there are no local CPD activities covering the topic required, or, as seen in Chapter 7, there may be barriers preventing such access. More likely, perhaps, sonographers may not consider reaching for the text books to follow up a query, or seeking information from the reporting physician or colleagues as CPD because these activities although providing knowledge and information, are not counted towards the ‘points’.

The mean factor score for ‘Reflection’ indicated a slightly negative perspective to reflection for sonographers. There is a possibility that this result may be skewed by the question which asked whether reflection was written. The overwhelming majority answered ‘no’. Written reflection is not part of the health professional culture even though they are exposed to it at an undergraduate level (Sim, Zadnik & Radloff, 2002) and in some post graduate courses (Phillips, 2006). Nevertheless, when faced with a heavy workload there is not the available time to sit and write a reflective journal and after a busy day, other things may take precedence. Having said that, the majority of sonographers write a preliminary report on each examination conducted which, in effect, could be considered a written reflection, without personal feelings. Each case will bring its own challenges and reflection during each one and during the reporting phase is essential in order for the examination to be completed successfully. It is thus likely that sonographers are more reflective than the mean factor score indicated.

Radiographers and MRS professionals in general are not active in reflective practice, often apparently due to the protocol and process driven nature of their work (Sim et al., 2002). Whilst not all sonographers claimed to use reflective techniques, and one or two may not know what reflective practice is, a good majority do participate in one form or another. Sonographers are allowed and
expected to utilise more latitude in their sonographic examinations than would be expected with taking an x-ray, for example. They need to consider each case carefully as they are ultimately responsible for a correct diagnosis; it is also accepted that sonography is a very operator dependent modality (Allen & Wilson, 2001). It could be because of this that they may seem to be more reflective than their other MRS professional colleagues. In addition, sonography is studied at post-graduate level and is as a result undertaken by a slightly more mature student cohort for the most part. Perhaps the added maturity allows a culture of reflection to become more embedded. However, this study was not designed to research this specifically and further research could be undertaken in the future to understand this area more fully.

One of the main arguments against mandatory CPD is that it will violate adult learning principles, in that adults benefit most from being able to be involved in learning that interests them most (Field, 2004), a comment made by a couple of commentators. On the other hand, it has also been argued that unless CPD is mandatory up to 25 per cent of professionals will not participate in it (Furze & Pearcey, 1999; McPartland, 1990; Postler-Slattery & Foley, 2003). Arguably, being willing to participate in CPD, without it being mandatory, indicates a level of self-direction in the participant. Several comments received did confirm that the commentators would undergo CPD regardless of it being mandatory. Indeed, the frequencies of responses to the survey indicated that 79.5 per cent of respondents would do likewise (see Appendix 5). It was commented upon that the nature of the CPD might be different if it was not mandatory. Comments also revealed that others would still choose activities that they felt would be of benefit to them rather than just because points were needed. Some others would prefer to do this, but found that they were unable to plan and choose activities they need and fill their mandatory quota as well. Several comments related to personal responsibility for one’s own self in regard to learning, these comments fitted well with Brockett and Hiemstra’s (1991) personal responsibility model.
The compelling nature of mandatory CPD seemed to inhibit some sonographers seeking the development they needed because they felt it was more important to fill their CPD points’ quota. There is an argument here that the mandatory nature of CPD will inhibit the self-direction of some sonographers. However, I believe that there is an even more compelling argument that the nature of the CPD process for Australian sonographers inhibits self-direction, rather than the mandatory nature of that program. The CPD program separates development activities into separate fields and restricts the number of points which may be earned from each field. In any one triennium, it could be argued that due to location, lack of money, family needs, lack of relevant course material etcetera, there would be at least some sonographers who, because of the field restrictions, could not fulfill the CPD requirements according to their needs. Because of this, they are likely to attend or complete whatever is available in order to fulfil their points’ quota. Following this, it could then be argued that these sonographers would benefit from a setting whereby they would be able to seek out and complete activities which would suit their learning needs, circumstances and learning styles best; as is described by an outputs based CPD model. It is clear from the comments that most are committed to their profession and wish to maintain standards.

It has been shown that, in effect, many people are unable to recognise what they know and what they need to know (Jennings, 2008). Knowles’ (1975) model for self-directed learning cited initially diagnosis of learning needs, eventually leading through to choice of learning activity and implementation of such. This may not always occur and it may be that, instead of planning needs, the easier way out of choosing from readily available activities may be adopted (Smith, 2002). There are differences between individuals in this group of sonographers, however few comments mention recognising needs for CPD and planning for those needs.

The frequency statistics showed that only 46.5 per cent of sonographers responding to the survey plan CPD activities in advance. In addition, it has been discussed previously in this chapter that critical reflection is the key to transformational learning. From the frequencies, it can be seen
that only 17.6 per cent of respondents agree that reflection often or always leads to increased CPD, for 38 per cent, this seldom or never happens (see Appendix 5). As Brookfield (1993) found, an important measure of self-direction is the ability to act on critical reflection. It would seem then, that for this group of sonographers, whilst most are willing for CPD to happen and most reflect in some form this does not always translate to increased relevant CPD, indicating, perhaps, a lack of self-direction. As Guiglielmino (2008) commented, there may sometimes be a need for helping people to develop the skills required to engage in fruitful self-direction in learning. Indeed, in a CPD system where evidence of planning and outcomes was a requirement, this would be necessary, but perhaps sonographers would be more inclined to this reflection if the choices for CPD were theirs.

A potential problem which may also arise, thus preventing time for reflection and planning, is increasing workloads and demands from employers. As it has been shown, this can detract from reflective practice and also act as a de-motivator for learning and CPD. The following chapter, Chapter 9, discusses the results from the fourth factor which pertains to ‘Motivators’.
Chapter 9
Motivators

9.1 Overview of chapter

Chapter 5 outlined the development of a four factor structure from the data obtained from the sonographer survey using principal components analysis. This chapter discusses the fourth factor, accounting for 4.3 per cent of the variance, which was interpreted as representing the motivational matters such as employer encouragement and financial support, management and public awareness, respect from others, confidence and empowerment that sonographers responding to the survey perceived they had or had not. In addition, the written comments on the returned surveys were grouped relating to each factor. The fourth group of comments from sonographers responding to the survey, pertaining to motivational issues and named ‘Motivators’ is also outlined and discussed in this chapter.

9.2 ANOVA

Using the factor scores generated by the principal components analysis, two-way between groups analyses of variance (ANOVA) were performed to allow the individual and joint effects of two independent variables on one dependent variable to be explored (Pallant, 2007). The manner in which this was performed was outlined in Chapter 6.

Analyses with significant findings are outlined in the following pages.
9.2.1 ‘urban/rural’ with ‘age groups’

Levene’s test of equality of error variance failed to reach statistical significance ($p = 0.77$); therefore the significance level for the analysis was set at 0.05.

Table 9.1: ANOVA results of ‘urban/rural’ and ‘age groups’

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>age groups</td>
<td>2,566</td>
<td>6.94</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>urban/rural</td>
<td>1, 566</td>
<td>1.1</td>
<td>0.3</td>
</tr>
<tr>
<td>urban/rural x age groups</td>
<td>2, 566</td>
<td>0.3</td>
<td>0.74</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- The main effect for ‘age groups’ reached statistical significance ($p<0.001$), although the effect size was small (partial eta squared = 0.02).
- The main effect for ‘urban/rural’ failed to reach statistical significance ($p = 0.3$).
- The interaction effect between the two groups failed to reach statistical significance ($p = 0.74$); therefore, there was no significant difference in the effect of location on motivational issues in any of the age groups.
- Post-hoc comparisons using the Tukey HSD test indicated the mean score for the 21 to 34 age group (mean = 0.33, SD = 0.93) was significantly different from the mean scores for the 34 to 44 age group (mean = -0.05, SD = 0.94) and the 45+ age group (mean = -0.08, SD = 1.03).
- The mean scores for the 34 to 44 age group and the 45+ age group were not statistically different from each other.
- The results indicate that older sonographers perceive that they are in receipt of fewer motivators in both city and rural areas.
9.2.2 ‘urban/rural’ with ‘years as a sonographer’

Levene’s test of equality of error variance failed to reach statistical significance ($p = 0.48$); therefore the significance level for the analysis was set at 0.05.

Table 9.2: ANOVA results of ‘urban/rural’ and ‘years as a sonographer’

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>years as a sonographer</td>
<td>3,563</td>
<td>7.32</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>urban/rural</td>
<td>1, 563</td>
<td>0.18</td>
<td>0.67</td>
</tr>
<tr>
<td>Urban/rural x years as a sonographer</td>
<td>3, 563</td>
<td>0.6</td>
<td>0.61</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- The main effect for ‘years as a sonographer’ reached statistical significance ($p< 0.001$). The effect size was moderate (partial eta squared = 0.04).

- Post-hoc comparisons using the Tukey HSD test showed that the mean score for the 0 to 4 year group (mean = 0.45, SD = 0.9) was significantly different from the 5 to 9 year group (mean= 0.17, SD = 0.95), the 10 to 14 year group (mean = - 0.14, SD = 1.02) and the 15+
year group (mean = -0.10, SD = 0.98). The latter three groups were not significantly different from each other.

- The main effect for ‘urban/rural’ failed to reach statistical significance ($p = 0.67$).
- The interaction effect between the two groups failed to reach statistical significance ($p = 0.61$), therefore, there was no significant difference in the effect of location on motivational issues for sonographers with different levels of experience.
- The results indicate the newly qualified sonographers (from 0 to 4 years) feel they receive significantly more motivators than do more experienced sonographers.

![Figure 9.2 ‘urban/rural’ and ‘years as a sonographer’](image)

Figure 9.2 ‘urban/rural’ and ‘years as a sonographer’

### 9.2.3 ‘gender’ with ‘years as a sonographer’

Levene’s test of equality of error variance failed to reach statistical significance ($p = 0.07$); therefore the significance level for the analysis was set at 0.05.
9.3: ANOVA results of ‘gender’ and ‘years as a sonographer’

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>years as a sonographer</td>
<td>3,574</td>
<td>2.57</td>
<td>0.05</td>
</tr>
<tr>
<td>gender</td>
<td>1, 574</td>
<td>0.16</td>
<td>0.69</td>
</tr>
<tr>
<td>gender x years as a sonographer</td>
<td>3, 574</td>
<td>1.13</td>
<td>0.34</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- The main effect for ‘years as a sonographer’ reached statistical significance ($p = 0.05$), the effect size, however, was very small (partial eta squared = 0.01).
- Post-hoc comparisons using the Tukey HSD test demonstrated that the mean score for the 0 to 4 year group (mean = 0.48, SD = 0.84) was significantly different from the mean scores for the 5 to 9 year group (mean = 0.1, SD = 0.96), the 10 to 14 year group (mean = -0.02, SD = 1.0) and the 15+ year group (mean = -0.15, SD = 0.99).
- The main effect for ‘gender’ failed to reach statistical significance ($p = 0.69$).
- The interaction effect between the two groups failed to reach statistical significance ($p = 0.34$).
- The results show that the more experienced sonographers felt they received fewer motivational incentives than less experienced sonographers.
- The graph also shows that more experienced males report more motivators than more experienced females.
9.2.4 ‘agegroups’ and ‘years as a sonographer’

As Levene’s test of Equality of error variances failed to reach statistical significance \((p = 0.13)\), the significance level for the analysis was set at 0.05.

Table 9.4: ANOVA results of ‘agegroups’ and ‘years as a sonographer’

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>(p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>years as a sonographer</td>
<td>3,572</td>
<td>3.65</td>
<td>0.01</td>
</tr>
<tr>
<td>age groups</td>
<td>1, 572</td>
<td>0.25</td>
<td>0.78</td>
</tr>
<tr>
<td>age groups x years as a sonographer</td>
<td>5, 572</td>
<td>1.05</td>
<td>0.34</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- The main effect for ‘years as a sonographer’ reached statistical significance \((p = 0.01)\). The effect size was low \((\text{partial eta squared} = 0.02)\).
- Post-hoc comparisons using the Tukey HSD test showed that the mean score for the 0 to 4 year group \((\text{mean} = 0.48, \text{SD} = 0.84)\) was significantly different from the mean scores for the 5 to 9 year group \((\text{mean} = 0.1, \text{SD} = 0.96)\), the 10 to 14 year group \((\text{mean} = -0.02, \text{SD} = 1.0)\) and the 15+ year group \((\text{mean} = -0.15, \text{SD} = 0.99)\).
• The main effect for ‘age groups’ failed to reach statistical significance ($p = 0.78$).
• There was no significant interaction effect between the two groups.
• The results show that the less experienced sonographers felt they received more motivational factors than more experienced sonographers, regardless of age, as is demonstrated in the following graph.

![Figure 9.4 'age groups' and 'years as a sonographer']

### 9.2.5 ‘age groups’ and ‘sonography as sole occupation’

Levene’s test of equality of error variance failed to reach statistical significance ($p = 0.36$); therefore the significance level for the analysis was set at 0.05.

**Table 9.5: ANOVA results of ‘agegroups’ and ‘sonography as sole occupation’**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>age groups</td>
<td>2, 577</td>
<td>4.98</td>
<td>0.01</td>
</tr>
<tr>
<td>sonography as sole occupation</td>
<td>1, 577</td>
<td>0.17</td>
<td>0.68</td>
</tr>
<tr>
<td>age groups x sonography as sole occupation</td>
<td>2, 577</td>
<td>0.8</td>
<td>0.45</td>
</tr>
</tbody>
</table>

This ANOVA shows that:
The main effect for ‘age groups’ Reached statistical significance ($p = 0.01$). The effect size was small (partial eta squared = 0.02).

Post-hoc comparisons using the Tukey HSD test demonstrated that the mean score for the 21 to 34 age group (mean = 0.27, SD = 0.92) was significantly different from the mean score for the 35 to 44 year age group (mean = -0.04, SD = 0.96) and the mean score for the 44+ years age group (mean = -0.12, SD = 1.02).

The main effect for ‘sonography as sole occupation’ failed to reach statistical significance ($p = 0.68$).

The interaction effect between the two groups failed to reach statistical significance ($p = 0.45$).

The results indicate that perception of motivators declines with age in both sonographers who work solely in sonography and those with other occupations.

Levene’s test of equality of error variance failed to reach statistical significance ($p = 0.67$); therefore the significance level for the analysis was set at 0.05.
Table 9.6: ANOVA results of ‘years as a sonographer’ and ‘sonography as sole occupation’

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>years as a sonographer</td>
<td>3,574</td>
<td>7.45</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>sonography as sole occupation</td>
<td>1,574</td>
<td>1.95</td>
<td>0.15</td>
</tr>
<tr>
<td>sonography as sole occupation x years as a sonographer</td>
<td>3,574</td>
<td>4.29</td>
<td>0.01</td>
</tr>
</tbody>
</table>

This ANOVA shows that:

- The main effect for ‘years as a sonographer’ reached statistical significance ($p < 0.001$).
  The effect size was moderate (partial eta squared = 0.04).

- Post-hoc comparisons using the Tukey HSD test showed that the mean score for the 0 to 4 year group (mean = 0.48, SD = 0.84) was significantly different from the mean scores for the 5 to 9 year group (mean = 0.1, SD = 0.95), the 10 to 14 year group (mean = -0.01, SD = 1.0) and the 15+ year group (mean = -0.15, SD = 0.99).

- The main effect for ‘sonography as sole occupation’ failed to reach statistical significance ($p = 0.15$).

- The interaction effect between the two groups reached statistical significance ($p = 0.01$).

- The interaction and main effects can be appreciated from the following graph:
No other main or interaction effects were evident in the remaining analyses. Mean scores and standard deviations for each set of groups in this component are summarised in Appendix 8. These ANOVA have shown that motivational incentives, such as encouragement and respect from management or payment whilst obtaining CPD, are more likely to be given to the younger or the less experienced sonographers, although more experienced males felt they received more benefits than the experienced females.

9.3 Responses to open-ended survey questions

The comments pertaining to the factor ‘Motivators’ were themed and sorted in the same manner as comments pertaining to the other factors and previously described. Fifty six comments regarding motivational aspects were received in total. The largest group of comments received were pertaining to management and employment conditions, many of these were negatively framed. The categories are tabled in Table 9.7 following.
Table 9.7: Categorisation of ‘Motivators’ component comments

![Diagram showing the categorisation of Motivators component comments.

Key: n = number of comments

Table 9.8: Frequencies of comments per demography in the category ‘Motivators’

<table>
<thead>
<tr>
<th>Respondents</th>
<th>% of comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>17.5</td>
</tr>
<tr>
<td>Female</td>
<td>82.5</td>
</tr>
<tr>
<td>City/suburbs</td>
<td>53</td>
</tr>
<tr>
<td>Rural/remote</td>
<td>43</td>
</tr>
<tr>
<td>45+ years</td>
<td>39.25</td>
</tr>
<tr>
<td>35-44 years</td>
<td>39.25</td>
</tr>
<tr>
<td>21-34 years</td>
<td>21.5</td>
</tr>
<tr>
<td>15 + years of experience</td>
<td>51</td>
</tr>
<tr>
<td>10-14 years</td>
<td>19.5</td>
</tr>
<tr>
<td>5-9 years</td>
<td>17.5</td>
</tr>
<tr>
<td>0-4 years</td>
<td>12</td>
</tr>
</tbody>
</table>

Similar to the results in Chapter 7, the greatest number of comments on this component was received from those sonographers who had more than 15 years experience (See Appendix 9).
Management and employers

The greatest number of replies for this section related to employers and management.

Lack of financial support for CPD seems to be an important issue for some of these commentators.

Comments were received from workers in the private and public systems. It appears that, to some, financial support for CPD is linked with respect and encouragement. The following comments illustrate this.

[CPD] Should be encouraged by the employer and should be funded by the employer.

In my experience private practice employers are not interested in paying the money or allowing time off for workers to attend CPD. This needs to change.

Private practice gives nothing and takes everything.

In all the practices I have worked for – no financial assistance given or encouragement to obtain CPD.

Getting financial assistance to attend conferences from private employers is like getting blood from a stone. Often there is discrimination i.e. some employees always get to attend an annual conference; others are at the whim of the employer.

All of my CPD collection happens in my own time and I have to pay for everything. The expense of this is not reflected in my wage or my job title.

Management should support all sonographers (management tends to support doctors only!!).

Up until recently, management have been happy to consider most applications for CPD financial assistance. A current cessation of such assistance has had a negative effect on staff morale.

Not all comments were totally negative, though. Some managements/employers paid for a proportion of costs.

Management occasionally makes part payment for CPD activities. I would like it if they covered the entire cost – this would encourage me to attend conferences and workshops more regularly.

Management funds one conference every three years. We get paid for half the CPD costs, petrol but no time payment by employer.

I am only occasionally supported financially by management.
Some sonographers were more fortunate in their place of employment as they had very supportive employers.

*Work focuses strongly on current registration and CPD points therefore they are happy for me to take time off to attend conferences etc. and assist financially.*

*Work pays for one conference/year and they put on some in house information and mini conferences.*

Other comments related to a perceived lack of respect and encouragement for sonographers from employers. Some comments were quite scathing and cynical about the employers’ intentions.

*Management only supports me because they need me to be employable.*

*Most radiologists in my experience make very little positive comment with respect to sonographers’ work. They expect appropriate qualification but do little to acknowledge/encourage sonographers.*

*As I work for [large corporate firm], they don’t give a rat’s arse so long as I am ASAR accredited.*

*…and no one cares on your return that you did it [CPD], except yourself.*

*Management doesn’t care about supporting us sufficiently to maintain CPD needs.*

*Previously when working in public system – no respect was shown by management and little support for CPD.*

*Support and encouragement from management to accumulate relevant CPD points would be beneficial to me, but it doesn’t happen.*

*Management are unaware of what sonographers are, what they do or what they need.*

*Management only tell us to do CPD so they can get the Medicare rebate.*

*My department is headed by […] who think sonographers are brainless and not to be trusted. There is NO support.*

*Never feel respected by management!!!*

These were a selection from the comments; there were quite a lot more, all of which were in a similar vein. Interestingly, negative comments were received equally from sonographers in both private and public practice indicating little difference between the two. Finally, on a more positive note, this comment from one sonographer:
Although management encourages and helps, I feel it is still the personal responsibility to actively participate in CPD.

**Suggestions**

Some suggestions or recommendations were made by a few commentators, a selection of these are presented below:

*Mandatory CPD should be coupled with mandatory employer support so that the expenses involved are not entirely the burden of the employee.*

*Companies/employers should be made to budget to send staff to conferences i.e. allocated budget per annum to help staff remain accredited.*

*I would like some national standard of study leave entitlement so that staff don’t have to ask for study time and fees. Some managers are more approachable than others.*

**Peers**

Respect from peers due to CPD was not really an issue as it was pointed out that as everyone did CPD there was a level playing field. On the whole, peer respect was thought to be irrelevant to CPD.

*As we all need to complete CPD, it is a level playing field, not, therefore, ‘special’. If it were not compulsory then there would be a greater recognition for achieving and completing.*

*As CPD is required, everyone does it so no one will respect you more for doing what they all do.*

**Self-confidence/empowerment**

Whilst there were only a few comments in regards to self-confidence and empowerment, it was interesting that most of the commentators felt they derived benefit from CPD and were happy to be able to pass on extra knowledge to others.

*It is a confidence issue among colleagues and peers to work well together disseminate knowledge among peers and get respect for it.*

*I attended a musculoskeletal workshop and then taught my co-workers and radiologist what I had learnt.*

*I still feel good when I learn something and can ‘step out of my comfort zone’ and take on something new.*

*CPD is essential in me maintaining my confidence and enthusiasm in my work.*
Increased knowledge gives you more confidence to perform your US to a higher degree.

One commentator did, however, point out that CPD made him realise just how little he actually knew.

**Public opinion**

An issue mentioned previously is that sonographers do not have a high profile in either the public arena or other health areas and were generally unknown and unrecognised. Because of this it was thought unlikely by some commentators that CPD would affect the perceptions of the general public.

*It is unfortunate that many other health professionals and even more disappointing that the general public are unaware of the profession and the qualifications required by us. CPD has nothing to do with our status.*

*I doubt that the general public are aware of CPD – most don’t even know what a sonographer is!!*

*I doubt that the general public have any idea what we do.*

**9.4 Discussion**

The ANOVAs demonstrated that there was little difference between any of the sonographer groups in their opinions on motivational factors such as workplace incentives, public opinion and confidence. It appeared that younger, less experienced people felt that they were in receipt of more motivators than more experienced sonographers. Reasons for this are not clear, however, it is possible that a keen enthusiastically enquiring young sonographer is likely to reveal a more encouraging side to a radiologist than a more experienced sonographer who no longer needs to ask as many questions and does not get quite as excited with the findings any more.

The ANOVAs also showed that of the more experienced sonographers, males tended to believe they were in receipt of more motivators. Again there were no clear findings why this should be so, however, it could be speculated that this was due to the fact that although sonography is a female dominated profession; from personal experience, there are proportionally more males than females in senior or management positions. This is a phenomenon which occurs in all walks of life.
and is beyond the scope of this discussion to pursue further. Nevertheless, those in positions of seniority often appear to be treated with more respect and usually are more financially and time supported to attend CPD activities. The senior position may itself make the holder of it feel more worthwhile and motivated (Gawel, 1997).

The frequencies of responses to the survey (Appendix 5) demonstrated that only 35 per cent of respondents felt more respected by their management because of their commitment to CPD. Similarly, just 43 per cent were encouraged by their management to participate in CPD and slightly more than 50 per cent were financially supported. The number of comments received confirms that many sonographers are not financially assisted for attendance at CPD activities. As was discussed in Chapter 7, cost is seen by many sonographers as a significant barrier to participation in CPD and more financial support from employers would be seen as beneficial by these. There is also a feeling of unfairness, perhaps, as some of these people see other professionals such as doctors and teachers being funded for CPD and given allotted times during work hours. In addition, some sonographers feel very undervalued and underappreciated in their workplace.

Although it has been discussed that an external motivator such as money may not necessarily make people happier in the long term or more motivated at work (Sachau, 2007), an absence of it, in this case as an aid to CPD and the benefit of the sonographer can lead to considerable dissatisfaction, as it could be construed as a lack of caring (Gawel, 1997). Coupled with a lack of recognition and appreciation for work done, there may be a situation which has a very de-motivating effect on the employee, this may have a run-on effect with CPD participation. As Sim (2003) pointed out, in an atmosphere devoid of support and reward, it may be little wonder that MRS professionals do not try too hard with CPD. Sonographers may not react in entirely the same way as other MRS professionals however, as there is evidence from this study that many gain satisfaction and confidence from increased knowledge gained through CPD. As Gawel (1997)
discussed this is regarded as one of the prime motivators for work and learning. In the presence of this motivational influence, the negative effects of poor management styles may be overcome. One comment summed this sentiment up quite nicely:

_I don’t care whether the doctors at work respect me or not, I do CPD to keep up my knowledge and deliver a high standard of service to the patients._

Several comments were received pertaining to the lack of recognition that sonographers had from the general public and other health professionals. It has been suggested that this lack of recognition may lead to a feeling of inferiority that will be compounded in a workplace situation where they are not appreciated (Sim & Radloff, 2008; Yielder, 2006). It is apparent that some sonographers do feel under-recognised by the public; however, the evidence from this study has not demonstrated that this affects participation in CPD. In addition, it also appears unlikely that this lack of recognition is seriously affecting the self-directedness of sonographers.
Chapter 10

10.1 Interview findings

Requests were placed at the end of the survey inviting willing participants to volunteer for interview. The intention of the interviews was to provide added depth and insight into the quantitative findings and, in addition, to aid in validating the findings, especially from the comments provided to the open-ended questions in the survey. This chapter will present the findings of interviews with sonographers who volunteered to be interviewed. Semi-structured interview questions were formed to answer the specific research questions. Interviews covered aspects of CPD that were of interest or of concern to the sonographers who were willing to be interviewed, the CPD habits of other sonographers and the reasons for and benefits of CPD. The chapter presents the volunteers’ opinions about reflective practice, self-direction and the potential for empowerment from CPD. It will also focus on management support, colleagues and work practices. The findings of the interviews will be discussed in relation to findings from the survey and literature. Finally, the chapter will present criticisms and suggestions of the present CPD programs and suggestions for the future from the interviewees.

10.2 Interview participants

Nine sonographers volunteered to participate in an interview with the researcher. There were seven females and two males. Six of the participants resided in a major city from a range of cities around Australia. Interviews were conducted either in person or by telephone between January 2008 and June 2008. Three interviews were conducted face-to-face, the others by telephone, due to cost and distance constraints. No further participants were sought as these volunteers provided data sufficiently rich to enhance both the quantitative and qualitative findings from the survey. In addition, personal recruitment of interviewees may have added additional bias to the findings. All interviewees had been qualified for more than twenty years at time of interview and all had worked in a charge position or educational capacity, either presently or in the past.
Although the potential bias of this seniority was noted, the benefits to the interview data were considered to be more important. Participating sonographers were asked their opinion on a range of questions as follows:

- What do you think is the main reason for CPD?
- Do you think that CPD makes a difference to sonographers? How? Or Why not?
- What happens in your work place?
- Do you feel better about yourself because you are doing more study? If yes, in what way?
- What do you think your boss thinks about your extra study?
- What is good about CPD? What is bad?
- What kinds of problems have hindered you getting your CPD?
- Have you any suggestions for improving CPD?
- Who do you think should be providers of CPD?
- Many people indicated that CPD did not lead to a change of work practice and if reflection occurred it did not lead to CPD. Why do you think this is so?

All interviewees were provided with the initial list within the week prior to interview, to allow them time to consider which questions or issues were most important to them and to think about a suitable reply. As was acknowledged in Chapter 4, this could potentially lead to discussion with other sonographers about the questions, but I felt that this would only add to the depth of information coming from the interviews. Because of the flexibility, not all participants answered all questions and not all questions were put to the interviewee in the same order. Answers given by some participants led to further questioning about the planning of CPD and the need for encouragement, both for others and for self.

The interviews were recorded with each participant’s permission, however, notes from all interviews were also written during the interview. During interview, care was taken not to unduly lead the interviewee in their answers and not to comment negatively or positively on their views.
Where necessary, to fill out an answer, the interviewee was gently encouraged to offer more information by leading words such as ‘how’, ‘in what way’ and similar. Interviews had a duration of between 35 minutes and one hour. The written interview notes were typed out immediately, the recording was used for verification of small sections in the notes. After typing, the transcription was emailed to the participant for confirmation that the true meaning of the dialogue had been captured. On receipt of this confirmation the recording was erased. The interviews were quite freeform, in that they were allowed to follow the path of whichever issue concerned the interviewee most. For this reason, the interview notes from all participants were not collated according to question, rather they were studied intensively and repeatedly until major topics emerged, however these topics did follow the questions quite closely. The findings were validated by a non-sonographer colleague who independently followed the same process of examination of the notes of the interviews. Where a difference of opinion occurred, discussion and consensus ensured an accurate portrayal of findings (Smith, 2000). Each interviewee is referred to by a pseudonym.

10.3 Reasons for CPD and mandatory CPD

The nine sonographers who were interviewed had a fairly narrow view about the reasons for CPD. Most consistently recorded was the opinion that CPD was necessary to keep up to date, which was couched in various terms. One participant described it as ‘keeping abreast of the field’ whilst another thought it ‘important to keep up’ because of rapid changes in the workplace and sonographers were relied upon for interpretation. Four of the participants were of the belief that mandatory CPD was worthwhile and necessary for being accountable as a professional. In the opinion of one participant, however, sonographers were the most professional of the health professions.

*Mandatory CPD is not a bad thing; professionals need to be professional, keeping abreast of their field, although there were possibly political reasons for registration and legislation.*

(Ann)
Sonographers can be very quick to call themselves professional...sonographers need to be accountable for themselves.
(Bob)

In the end, mandatory CPD is the only way to keep people up to date.
(Deidre)

The main reason is to keep a professional current in the area of work…it is very important to make people undergo CPD in order to work.
(Gloria)

One of the rural participants had different thoughts about why it was important to keep up to date:

I am in favour of CPD, sonography is always changing and we need to keep up to date. Especially being in a rural area as patients may go on to a tertiary referral centre and we wouldn't want to appear to be lagging behind.
(Celia)

There were opinions that the recording of CPD may be a useful part of a CPD program, albeit with a proviso from one person:

The main reason for CPD is to provide a record of keeping up to date with current techniques and equipment and making sure that all people are doing this.
(Jan)

The good point about a CPD program is that it gives people a structure to record and achieve. The bad part is that this can be restrictive.
(Fred)

Jan also considered that CPD created a ‘level playing field’ for sonographers, to make them all equal. Only one participant felt that CPD was broader than a keeping up to date definition:

The main reason for CPD is to keep a professional current in the area of work, although that includes any issues that might influence work, like, um, everything, so it’s a bit broader really.
(Gloria)

---

3 A tertiary referral centre is generally a major hospital in a city with specialist services, for example, a Women’s and Children’s hospital. If an abnormality or anomaly is found on a sonographic examination the patient may be referred on to a tertiary centre.
Only one of the participants was not impressed with the need for CPD throughout a sonographer’s working life, as may be seen from her comment:

_The main reason for CPD is to make sure you stay in touch with the changes. CPD is very important to start with, but it really depends on how long you’ve been qualified for. As we go along it gets a bit old-hat._

(Ellen)

In summary, the main reasons for CPD as seen by this group of sonographers were keeping up to date and keeping professional standards. It was also seen as a structure for recording achievements and included a monitoring system and accountability. The comments about CPD and the main reasons for it from the interviewees appear to be in keeping with many of the comments received from respondents to the survey, also it has been acknowledged in previous literature that for professionals, CPD is a necessity and it will ensure standards are maintained (Friedman & Phillips, 2004). It has been discussed in the literature that it is necessary to keep on learning in a profession long after initial qualification, as conditions can change quite rapidly (McPartland, 1990). Most of the interviewees have recognised this fact and the element of lifelong learning that is required to maintain current learning. The possible necessity for a broader base for CPD rather than as an update alone was only recognised by one person. It could perhaps be surmised from this that many sonographers could be omitting a more fulfilling professional development experience from their lives because of this, or perhaps by not recognising some of their activities as CPD. In addition, another felt that mandatory CPD as it stands in Australia at the time could be restrictive, whilst another felt it was a little ‘old-hat’.

One of the participants recognised the political move that brought about the introduction of mandatory CPD for sonographers, a recognised occurrence in professions (Tobias, 2003). However, as Lester (1999) suggested it may have led to a tighter control of the profession, although these interviewees appeared to be of the opinion that such control was warranted. One of the participants, Ellen, voiced some displeasure with mandatory CPD, in her view it was rather a waste of time for experienced sonographers, although she recognised it was worthwhile for newly
qualified people. Unfortunately, she failed to recognise that practices will keep on changing even if you are experienced. This person had moved into a very unsatisfactory working situation and she was deeply unhappy about it. Her attitudes could possibly be explained by or confirm the findings of Henwood and Taket (2008) who suggested that a person in an unsatisfactory work situation with little support may become de-motivated about CPD.

10.4 CPD and other sonographers

Seven of the nine interviewees had comments to make about other sonographers’ practice of CPD, people who were either known to them or by hearsay. All seven stated they were aware of people who, they believed, did not wish to comply with CPD requirements. One interviewee recalled his time in management with the following:

*From a manager’s point of view it was sometimes difficult to get staff to do anything even though they were encouraged. Some people just want to go to work and go home without any input.*

(Bob)

Similarly,

*There will always be people who do not see the need for CPD, they think it is just a matter of bureaucracy and these people will always go for the simplest easiest way out, which may not go down well with colleagues. There is one type of sonographer who just plods along doing the daily basic work, follows protocols etc., and just doesn’t see the need for it [CPD] and doesn’t see or feel the need to do better.*

(Deidre)

Both of these interviewees discussed how difficult and frustrating they found it to try and encourage unwilling sonographers to complete CPD. In the opinion of these participants, CPD was good for some people; however, others just wanted to stay in their own comfort zone.

*It is frustrating working with people who are like this who don’t want to get out of their comfort zone.*

(Deidre)

And from another,

*There are two types of people, those who want to know answers and reasons; these are the ones who will do CPD anyway, and those who wouldn’t. Some people really enjoy learning but others just do the bare minimum.*

(Fred)
Sonographers were viewed as being quite highly motivated as a general rule, but…

...as always within a group, there are those who won’t fit the mould and need to be directed or encouraged to follow the pathway of best practice.
(Jan)

One of the participants had heard from other sonographers that there were some who did not practise CPD with the result that their quality of work was poor.

It is human nature that there will always be some people who won’t comply with learning and just aren’t interested. Work and patients suffer.
(Gloria)

Some thought that it was possible that extra workloads, management attitudes and stress may have a bearing on willingness to participate in CPD. One felt that CPD may make the job less stressful, but that was not the general feeling.

When people are busy at work and stressed they may not want to bother learning any more, but this may make the job less stressful.
(Deidre)

Lots of people feel the extra workload...it’s [CPD] just an extra burden as there is so much to do anyway. CPD is right down at the bottom of the pile. Shortage of staff makes CPD harder, lack of time and tiredness.
(Fred, speaking about his work colleagues)

Another, in a management position, commented that some staff grumbled frequently about CPD, but not necessarily sonographers,

Some staff grumble about doing CPD, so the main task is to encourage them, radiographers4 are worse offenders than sonographers.
(Celia)

Nevertheless, there was still a level of optimism shown that non-compliant sonographers may eventually be encouraged to see the value of CPD, as is evidenced by:

Not everyone can be enthusiastic and top notch, but with encouragement, the value of CPD may come out, and what the contribution of CPD is to a good working life.
(Helen)

---

4 Sonographers and radiographers tend to work in medical imaging departments or practices together, but with separate roles. Some work as both, but there is some tension between the two at times due to differing levels of qualifications and possible pay and workload inequities. It is thought by some sonographers that radiographers have a chip on their shoulder because sonographers play a more active role in patient diagnosis and have a closer working relationship with radiologists.
There is always the chance that exposure to learning may just trigger something in this person and they will become interested. People are capable of change.

(Gloria)

Deidre who at the time of interview was a tutor sonographer had several other points to add which were not brought up by the other interviewees. She was concerned that although some people may do extra study, it may not necessarily be in the right areas. She was of the opinion that some sonographers may look for the cheapest option, although she did acknowledge that this may be out of necessity:

Some look for activities which will give them the most points at one go and also the cheapest. This could be a relevant point with some, especially those with families who are not funded by their workplace. Some people refuse to spend money on their own education, which I find difficult to understand.

(Deidre)

Another worry for this interviewee came from young graduates. From her point of view most of them want to get to the top without putting any effort in. She was concerned that if a subject did not seem relevant, a young person may not see the point of learning about it. A final worry for her was that the sonographers who had been grandfathered\(^5\) into accreditation may not be serious about continuing education as they had not initiated any during their career so far.

In summary, the interviewees were of the general opinion that some, but by no means all, sonographers were unwilling to continue learning after qualifying, perhaps because they could not see the need for it. It was thought that perhaps some sonographers may need to be coerced into extra study. In the opinion of most of the interviewees, it is inevitable that in any group of professionals there will always be those who think they know all there is to know, but, in the main, most agreed that CPD was worthy enough to continue encouraging change amongst the unwilling. An interesting point was that several of the interviewees recognised that different personalities respond in different ways to learning and not all people think in the same way. These comments

---

\(^5\) At the outset of accreditation, sonographers who had been practising for more than five years continuously were ‘grandfathered’ i.e. granted accreditation whether a tertiary qualification had been gained or not. This gave rise to much discussion and concern at the time, and continues to do so.
fitted in well with the theories of Kolb (1984) and Merriam and Caffarella (1999) who suggest that there are different personalities that need to be taken into account when learning and also different styles of learning.

Several points covered in this section are worthy of discussion. The first being that there were comments made which were based on hearsay and, as such, may not be entirely reliable. It is possible that the interviewee did not know who was being discussed in relation to the non-compliance and, as such, would not know if there had been an element of exaggeration in the story. So whilst gossip and hearsay are common ways of passing on information, it may not necessarily be totally factual. That being said, several of the interviewees stated that they did know people who did not comply with CPD, or were unwilling to do so. There are no known figures in relation to sonographers, but it has been stated in the literature that as many as 25 per cent of professionals will not practise CPD willingly (Furze & Pearcey, 1999; Postler-Slattery & Foley, 2003). In relation to this, the comments from these interviewees that a number of non-compliant sonographers could be expected are perhaps quite accurate. The results of the survey, however, revealed that the number of non-compliant sonographers is likely to be less than this, with only 8 per cent saying they would not participate in CPD if it was not mandatory, although 12 per cent were not sure.

Excessive workload and poor management style were cited as having an adverse effect in the uptake of CPD for sonographers other than the interviewees. This will be discussed in greater detail later in the chapter; however, it has been shown that overwork and poor management will have a detrimental effect on learning (Eraut, 2004; Cross, 1981). The optimists amongst the interviewees who believe that encouragement for CPD will eventually persuade staff to become more involved in CPD may succeed, as an encouraging and supportive atmosphere will aid in motivation of staff and the promotion of CPD to staff (Gawel, 1999; Huitt, 2001; O’Sullivan, 2003).
Comments regarding sonographers willing to participate in CPD, but apparently not in appropriate areas, can be looked at in a number of ways. It has been discussed that it can be difficult for a professional to know exactly what they need to know (Jennings, 2007) and in such a case guidance from a colleague, senior or tutor would be helpful. Whilst the activity may seem inappropriate from an outsider’s point of view, however, the sonographer in question may have a very good reason for undertaking the activity such as thoughts of transferring to another specialty, or just plain interest in the subject. On the other hand, as one interviewee mentioned, the comfort zone can have a strong hold, as discussed by Revel and Yusuf (2003), some people feel safer in a learning environment in which they are familiar with the contents. In addition, as was seen in Chapter 8, some sonographers may find it difficult to access appropriate activities at appropriate times and find themselves completing whatever is available, even though some did comment that they were still interesting and gave some extra knowledge.

Comments from Deidre about young people were interesting as they echo popular community beliefs that are seen and heard almost daily in the news media and from other older generations. This so called Generation Y group of people are often portrayed as opportunistic and wanting to run before they can walk in their careers. It is quite unrealistic to place all individuals in one generation in the same basket. Clearly not all young people act the same and whilst they may have some different traits or opinions than the older generations, young sonographers have still had to work hard to qualify and keep working. In fact, a recently published report by Square Holes Pty Ltd. (2007) has highlighted that despite the myths, young people are hard workers who are ambitious but are prepared to wait for financial rewards and success. Further to this, if one of these young sonographers seeks out learning activities that are of interest then this would fit well with adult learning theory which states that adults will learn best if the subject is something that interests them and has a worthwhile outcome. This applies to all adults.
Finally, the ‘grandfather’ debate needs a little more clarification in light of this study. Many sonographers began their sonography career as an extension to radiography, some before formal training was readily available. The main point of contention has always been that if during their career to date they did not seek out a formal qualification, then they would be unlikely to enter into much professional development after accreditation. This argument does have a good point; however, the survey results showed that those who responded who were ‘grandfathered’ were just as adamant about the necessity of mandatory CPD as those who were not. There could have been a number of reasons for the lack of formal qualification and not all of them based on lack of interest.

10.5 Regarding barriers or inhibitors to CPD

Whilst most of the interviewees stated that they had no major problems with the access and accumulation of CPD points, there were several recurrent themes regarding what could be seen as ‘Barriers to Participation’. Just prior to the survey and interviews, the rules for accumulation of points changed so that some activities such as internet quizzes, journal article reading and in-house meetings had a limit applied as to the number of points that could be accumulated from each. The reasoning behind this was understood and generally agreed with by the interviewees, but it was suggested that this change could affect those who lived in rural areas and those with children.

*Capping of points for certain activities will disadvantage those in country areas – especially if the staff of a department are making a good effort to do a variety of talks, case studies etc.*

(Celia)

Rural areas were highlighted as a disadvantaged area.

*There is not much done in rural areas. The travelling workshops are good, but there is a limit on numbers and it can be very frustrating if there are not enough places for all, especially locals. Also cost is an issue in country areas. Even though my employer helps out quite a bit there are still considerable out of pocket expenses.*

(Celia)

---

6 A popular way of dissemination of knowledge is to present an interesting sonographic case, complete with history, pathophysiology, images and outcomes to colleagues. It was argued by the accreditation registry that the quality of these presentations was often lacking and therefore not worthy of much consideration for CPD.

7 Both the ASA and ASUM fund lecturers and workshop presenters to travel to different centres around the county several times a year, but, of course, the number of places that can be visited is limited.
Another of the interviewees did not live in a rural area but still felt disadvantaged:

> Living in the outer suburbs it is difficult to go to a workshop in the evenings as it takes time to get into and out of the city and then there's child minding fees. Weekends are also bad because that is the time for the kids.
> (Ellen)

Whilst this next interviewee did not have any difficulty gaining CPD points, she did comment:

> Time is a huge factor especially for family life, even if you have no children. It does affect home life.
> (Gloria)

Although family commitments and personal time were also considered a barrier by the following, Helen acknowledged the role of a supportive partner in her CPD. This highlighted the difficulties that the sole parents who commented on the survey may have had.

> There are barriers to obtaining CPD, especially in rural communities. Family commitments are also important and it really depends so much on the support of a partner (if there is one). It can also be difficult in cities as it takes a long time to get across town, especially in Sydney. I have been lucky to have a good partner to help out while I am away.
> (Helen)

Apart from personal time, increasing workloads, staff shortages and tiredness were all seen as significant barriers. The following typifies the feeling amongst the interviewees:

> The problem is that the workloads are increasing dramatically all the time and the expectations are extremely high, so there is little time at work for meetings and a big problem is that after a full day’s work, you go home exhausted and too tired to even think about CPD.
> (Jan)

She also commented as an aside that this level of work could lead to workplace injuries and went on to say:

> … and other important things such as exercise and yoga which are necessary for my well-being may clash with evening meetings, and health comes first.
> (Jan)

One of the interviewees, who was not much in favour of CPD for more experienced sonographers, found there were other deterrents for her:

> After 20 years you've had enough…
> Let's improve the quality and let's get some more honesty in it.
> (Ellen)
In summary, the main points which were brought out as barriers and inhibitors to CPD for this group of sonographers were, lack of flexibility due to capping of points in certain categories, distance, time, cost and tiredness due to excessive workloads. These themes echoed those presented in the comments to the survey, flexibility to a lesser extent. It has been acknowledged even by those living in the city that rural sonographers are more disadvantaged due to distance, cost and time. Capping of points in some categories has limited those in rural areas to a certain extent by preventing them from fully utilising activities which are readily and easily available. Whilst some of the interviewees felt that perhaps some in-house CPD activities did lack rigour, as Celia commented, many departments like hers had put time and effort into the activities to make them worthwhile. In Celia’s opinion, better guidelines could be issued for different activities so that a good standard can be attained. However, she also queried whether the regulators could possibly have visited every worksite in-house education (and indeed probably visited none but their own) and due to this could not have had a good understanding of what the standard was.

Workplace concerns again came into the conversations, tiredness due to overload being the main barrier to participation in CPD. Almost as an aside the added risk of workplace injury was mentioned. Sonographer workplace injuries are thought to be very prevalent due to the nature of the job (The National Institute for Occupational Safety and Health (NIOSH) 2006; The Society of Diagnostic Medical Sonographers (SDMS) 2009). Sonographers are encouraged to keep fit and healthy to counteract the body stresses caused by scanning all day, which Jan preferred to do even if it meant missing a CPD activity.

10.6 Regarding conferences

Several suggestions were made in the written comments on the survey that conferences were perhaps a waste of time and money; that sonographers could attend to gain points but learn nothing. Because of this, a question asking for an opinion of this was put to several of the
interviewees if an appropriate opportunity presented itself. In the opinion of one of the interviewees, there is a broad spectrum of needs when it comes to learning issues.

... new people need the nuts and bolts, whereas experienced people will often learn by themselves. But conferences are not all about learning...
(Ann)

Along with Bob and Deidre, she felt that conferences had the added benefits of looking at new equipment, talking with peers, networking and getting a ‘feel’ for the profession and, of course, benchmarking oneself.

...stop people being isolated and insular and keep people up to date with equipment, if they want to. It is difficult to know how to quantify the added benefit that these areas bring.
(Deidre)

Jan also had a positive regard for conferences, believing that apart from interaction and expanded knowledge, attendance was also good for extending a peer support network.

Attending meetings is not only good for interaction and expanding knowledge, it’s also good for social and peer support network, so that you get to know who to ring and discuss things with if you have a problem.
(Jan)

Only one interviewee mentioned the benefit of receiving a large amount of points for just one activity, with the added bonus of it being tax deductible. However, she was not impressed overall with conferences:

Conferences are generally all the same. Let’s improve the quality and let’s get some more honesty in it. Instead of talking about scanning weird things that ultrasound is no good for, accept the limitations that it has.
(Ellen)

Except for this one interviewee, all the others who talked about conferences thought they were useful for things beyond pure learning, including peer support and networking. A few commentators on the survey had similar feelings to Ellen and some mentioned that conferences would not automatically lead to learning which is an opinion subscribed to in some literature (Perry 1995). Nevertheless, the comments here attest that conferences have a greater importance than just learning. This is supported in the literature by both O’Reilly (2004) and Merchant (2007) who
also espouse similar opinions. In reality, conferences add breadth to CPD so that it is not only 'keeping up to date', but also adding a range of other dimensions for the sonographer's development.

10.7 On CPD making a difference in the lives of sonographers

For all interviewees except one, Ellen, CPD made a definite difference in their lives and also, they believed in the lives of many other of the sonographers who participated in CPD. One of the main benefits talked about was the new knowledge that was brought back from meetings and the wish to share this knowledge.

*It’s wonderful to see the enthusiasm of some people on their return from a lecture, workshop etc., wondering how they can effect change, organise things etc. It is refreshing when this happens.*

(Deidre)

She went on to remark that she felt this motivation was empowering and led to feeling good about oneself.

*… it’s great really and makes you realise what you do and you become more interested in general things around you too.*

(Deidre)

She also felt that CPD acted as reinforcement:

*We all need reinforcement about how well we are doing, especially part time people who can become quite stressed about keeping current. Further education and development can be a reinforcement.*

(Deidre)

Another of the interviewees felt that CPD improved him:

*In the workplace it makes me a better sonographer, open to change and potentially updated.*

(Bob)

He also felt practices could change after CPD:

*Things sometimes change after conferences. People come back and talk about it, just need to get it through to the boss though*. 

(Bob)

---

8 This participant had a manager who was not a sonographer and who, apparently, did not understand the value of CPD in the first place and the value of sonographer input in the second.
Jan felt similar to Deidre about the effect of CPD,

*CPD does make a difference in that it encourages you to look at what you do and where you’re going.*

(Jan)

Ellen was more disillusioned and did not expect to gain anything from CPD:

*Have come back and tried different ways of doing things, but in the end the results are the same and all we’re doing really is repetitive.*

(Ellen)

Nevertheless, she was alone in this opinion and the terms empowering and empowerment were used several times in regards to CPD as evidenced in the following quotes:

*Confidence and empowerment come from extra study – yes, because then you feel as though you are doing the best you can and doing it well.*

(Gloria)

*Personally, CPD is empowering. Having grown up with the technology, it is fulfilling to take new ideas back to work and evaluate them, or taking back short cuts etc. It’s good to pick up pearls of wisdom.*

(Helen)

*CPD is definitely empowering in that there is a better feeling about self and more confidence in the workplace.*

(Jan)

In summary, these interviewees, with one exception, were of the opinion that CPD made a definite difference to their lives because of improvement in work practice, realisation of their own ability and value, dissemination of knowledge to the rest of the staff at work and improvement of self-confidence. In fact, these interviewees spoke enthusiastically and it was evident at the time that they really did feel their lives were improved. Several studies have discussed the perceived benefits of CPD; these included a feeling of empowerment and greater self-confidence as demonstrated by these interviewees (Hughes, 2005; Nolan *et al.*, 1995). This confirms the findings of the survey which showed that 75 per cent of the respondents felt more confident at work, with 13 per cent neither feeling more nor less. The interviewee, Ellen, may represent the remaining 12 per cent who did not feel more confident because of CPD. As has been mentioned previously, she worked in an unsatisfactory environment and it is possible this affected her whole outlook. According to Tran *et
al. (2008), one of the most powerful deterents for CPD is lack of management support. Nevertheless, the management factor alone possibly may not account totally for this attitude from Ellen and other factors may well be involved. The survey showed that the majority of the respondents actually received no encouragement from management, yet these sonographers overcame or overlooked this, demonstrating a level of self-direction and self-determination, and were still able to feel the benefits of CPD.

10.8 Self-direction

Most of the interviewees reported that little encouragement was needed for them to seek further study. One of the interviewees, Ann, felt that she was quite opportunistic though, when it came to choosing activities. Because she was involved in so many activities associated with the profession she had no real need to plan for anything. Bob, on the other hand, believed that sonographers should be accountable and plan for their own learning, but acknowledged that motivation was required for this. This motivation was considered to be lacking in some:

> When it comes to education there are many people who just sit back and say “I’m ready to be educated – who’s coming to get me?” Rather than seeking things out for themselves. (Gloria)

One of the interviewees, in particular, had reflected deeply on self-direction and CPD as is shown by the following statement which considers planning of CPD:

> People need help with managing CPD. They need encouragement to think about what they need to do, so they can choose things that are suitable for themselves. Especially those that ask about what they need to do. It is difficult to push people, but people may be steered in the right direction. This may lead to a change of attitude from some people in that they may find that they actually enjoy learning relevant things and will continue in the future. It is important to try and steer sonographers into 1) planning ahead, 2) make what they are planning useful and enjoyable and 3) plan more for themselves. Of course, not all will change. (Deidre)

When asked if she thought education on planning for CPD during their undergraduate years or sonography training would help, her reply was:

> People don’t need to be spoon-fed too much as then they will not develop. Students need to learn to develop, to learn effectively and investigate and perceive what the needs are. Some
of this may be in how a person is taught, but some depends on the type of person. If a person really cares about what they are doing, they will investigate and learn anyway. (Deidre)

Deirdre recognised that learning can be dependent on the personality and learning style in individuals and also that not all are capable of being able to plan ahead without some initial guidance. In summary, there is a belief that planning ahead is necessary or worthwhile for CPD even though not all accomplished this. There was a feeling that some sonographers did not plan well and waited for education to be brought to them. It has been suggested that because health professionals have a ‘doing’ culture rather than a ‘thinking’ culture that they may not plan for their needs (O’Sullivan, 2003). In fact, this was demonstrated in the response to the survey whereby less than 50 per cent of respondents reported planning for CPD needs. When Knowles (1975) devised his model for self-directed learning which included finding out needs and planning for those needs for learning, he failed to take extraneous circumstances or personality traits into account. These circumstances, as has been demonstrated, include family commitments, cost and time and these may prevent forward planning to some extent.

The CPD programs and educational programs devised by the various professional associations could be classed as an educational system. It has been suggested that in an educational system, students may not pre-plan but select from a range of available alternatives (Smith, 2002). It would be feasible to suspect that sonographers who are provided with a large range of activities to choose from may act in a similar way. In addition, pre-planning does not take into account those people who are interested in learning about everything they can and will attend an activity regardless. It may be concluded, perhaps, that self-direction, based on pre-planning, in sonographers is limited, but not totally lacking. The reasons for this limitation could be either from not knowing how to plan, or it is also quite likely that due to a plethora of activities being provided, there is no need to plan.
10.9 Reflective practice

There was a general opinion amongst the interviewees that reflective practice was a natural occurrence in everyday working life. Reflective practice happened frequently, either collectively as a group with other sonographers, with another sonographer or individually on a personal basis.

Reflective practice is important: a recalling practice that is accepted as an ordinary everyday practice. For instance, we discuss cases and get textbooks out all the time, so it happens anyway, naturally.

(Fred)

Reflection was regarded as an important part of working life, but it was noted that during a busy day there may not be time to be totally reflective. In addition, even though reflection was important, at times care was needed:

… too much – you will never get on with job, too little is dangerous. Without reflection we will never learn the broader picture, but there are many things that could be reflected on in a day, so not all will be reflected on.

(Ann)

Ann went on to comment that there is the possibility of reflecting too much and then it may not have a positive effect, as was confirmed by Bob’s remark,

I reflect all the time in a variety of ways. Asking new people what they do, compare others with myself. I change things regularly because of this. I look for reasons why. Self-confidence can be affected by this though, because you start to wonder if you look like an idiot because of all the enquiries.

(Bob)

The most usual form of reflection for this group was group or collective reflection. These were either formal or informal in nature, but informal chats about cases tended to be a common form of group reflection.

Reflection is something that should done, but sometimes there is little time during the day. One of the best times is during informal chats and then staff do reflect. Also students will instigate reflection by querying different things leading to discussion.

(Celia)

---

9 Once a patient has been scanned, images are checked in a central ‘sorting-room’ and preliminary reports written up. There is often more than one sonographer present in this area and it is common to discuss findings and ask opinions of others and check with text books if necessary. The discussions are often continued at break times and even at drinks after work.
When asked why sonographers did not tend to reflect in writing:

... ideas are bounced between individuals and the whole group both in informal and formal settings. Ideas are discussed and perhaps tried out, evaluated and then maybe used or not. (Gloria)

...there is teamwork in practices with more than one sonographer in that each can discuss cases with each other. (Jan)

When asked why sonographers may not change practice after reflection on CPD:

... could be that they are actually happy with their practice and so are comfortable with just the reinforcement that CPD offers. Or perhaps they haven’t taken it on board, but more likely the former. (Jan)

Sometimes when we have been doing the job for a while we need to find time [to reflect] as we get stuck in habits, always done it this way and we need to think outside the square sometimes. (Celia)

In summary, the interview participants displayed and discussed a natural tendency towards reflection. These findings are congruent with those of the survey and again, demonstrated that although sonographers do not tend to reflect in writing, they actively reflect daily. With this they appear to differ from colleagues in other health professions and with their radiographer colleagues (O’Sullivan, 2004; Sim et al., 2002). Eraut (2004) and Fuller et al. (2000) all discussed the benefits of group discussions for transference of learning and increasing motivation and confidence. Reflection in such a form may also encourage sonographers to keep abreast of the latest skills and techniques. The practice of group reflection will also enable the sonographers to remain grounded, neither becoming over- or under-confident (Ng, 2009). According to Hiemstra (2004), this type of reflection will also allow the sonographer to become more self-directed. Whilst the reflection may not always lead to change it is clear that it did reinforce practice, and in addition, ideas are discussed between sonographers, finally being used or rejected as required.
10.10 Management financial support

Funding for CPD was an issue that was frequently alluded to in the comments within the survey. With this group of interviewees, the general feeling was that sonographers needed to take some of responsibility for payment for their own learning. However, because CPD was mandatory, it was quite reasonable to expect some sort of financial support.

*There should be shared responsibility between the sonographer and the boss; they need to take responsibility for their own learning.*
(Ann)

*It is reasonable to expect a certain amount of study leave and financial support as it is mandatory.*
(Bob)

*Some people refuse to spend money on their own education.*
(Deidre)

*Bosses are usually happy as long as the study is not too intrusive on the working day, not too much time off work and is not paying for it!*  
(Deidre)

*It would look good if employers did support sonographers in some way, especially those who are not well paid. It would be especially nice if we were supported if we present something [at a conference]. Funding is getting scarce though, there has to be some give and take.*  
(Gloria)

10.11 Management, work satisfaction and CPD

Aside from funding, other issues with supervisors and management appear more problematic for this group. Three of the interviewees had concerns with managers or supervisors who were radiographers. Radiographers once qualified and licensed, do not need to undergo mandatory CPD in order to work at this time. Members of the Australian Institute of Radiography (AIR) do need to complete CPD in order to remain members, but non-compliance would not result in job loss. These interviewees suggested that radiographers they know have a negative attitude about the need for CPD and what CPD entails and do not appear to understand that it is essential for accreditation.
My manager, being a radiographer, doesn’t understand CPD as such. He thinks that giving Internet access is all the support that is needed for CPD. So we’re not really supported at all. (Bob)

It is also difficult if the supervisor is not a sonographer, for example, it could be a radiographer with a chip on their shoulder about sonographers, who really do not see the big picture or understand how important CPD is and therefore there is no willingness to help. (Deidre)

The supervisor, if they are a radiographer, can introduce negative issues as they have no idea [about CPD or sonographers] and it’s difficult to make them aware. (Ellen)

From Deidre’s point of view most of her bosses (doctors) had been quite supportive of CPD, apart from one memorable radiologist who bluntly told her not to expect any more pay because of it.

There was generally a feeling that support, encouragement and recognition were essential if sonographers were not to feel valueless and question their ongoing commitment to work and to CPD, and also their ability to care for patients. They felt that support and encouragement for CPD added to job satisfaction, however, management misunderstanding of the effects of an excessive work load was a concern.

It seems that doctors have more support…people may lose the will to work [without ongoing support and encouragement]. (Bob)

Some of the radiologists are supportive, others are not. The bad attitude may be changing because they (the radiologists are getting younger and possibly more family oriented. But shortage of staff does make it harder. (Fred)

…it [CPD] also requires the boss to be encouraging as well. There needs to be extra encouragement given in the job, as churning out patients may turn some sonographers off their jobs. They then begin to wonder how valuable they are and how valuable is their job and then feel very negative about the whole thing and wonder what the point is [of CPD]. (Helen)

I would say overall patient care is decreased, but that is not directly related to CPD, in fact CPD would raise awareness about patient care. But I don’t see it as a dominant factor. I think patient lists, length of appointment times; daily demands and sonographer fatigue are more responsible for decrease in patient care. (Ann)

In many cases, sonographers are just work horses; we are expected to work harder, quicker and longer. Other staff members e.g. radiographers don’t understand at all. … the hierarchy
don’t care as long as the work gets done. One of the main things is that if there is a good employer with good conditions, all would feel a lot better. A bad employer spoils the lot. (Ellen)

The problem is that workloads are increasing dramatically all the time and the expectations are extremely high. (Jan)

In contrast with the foregoing comments and partly confirming Ellen’s comment

The boss is very supportive and programs are run actively in the department, everyone is very enthusiastic and he (the employer) is totally supportive. (Gloria)

Gloria made a point of mentioning that her employer was not a radiologist or a corporate body, but a cardiologist who was also an academic and queried if this might have been the reason as radiologists and corporate bodies have somewhat of a reputation amongst sonographers for being non-supportive.

Finally, two of the interviewees commented that the main source of work satisfaction came from the patients in spite of not really having much support from management.

Job satisfaction – patient thanks and providing accurate pictures and findings is rewarding. (Bob)

In summary, when these interviewees discussed CPD, it was apparent that CPD was inextricably linked with work; so much so that one would not exist without the other. In this manner, working conditions become very important in the discussion of CPD. A similar impression was gained from those who commented on the survey. It was an opinion of the interviewees that lack of encouragement from an employer or supervisor may lead to loss of work enjoyment and consequent lack of will to improve with CPD. On the other hand, in a fully supportive workplace enthusiasm for CPD and learning could be achieved.

10 Sonographers work in different environments, in hospitals they generally work for radiologists, with a departmental manager as middle management. In private medical imaging departments the head of the business is often a radiologist or partnership of radiologists, or the whole may be run as part of a large corporation which has a CEO and various levels of management. Some other sonographers may work for vascular surgeons or obstetricians and gynaecologists.
If we consider work and CPD as co-existing entities then an explanation for these findings may be found in Herzberg’s hygiene factor theory. According to the theory, working conditions such as work load, interpersonal relationships, salary and company policies are hygiene factors (Herzberg et al., 1957). An absence of any or all of the hygiene factors may lead to job dissatisfaction, further to that a lack of motivation to participate in CPD can occur. The circumstances previously described would be classed as hygiene factors and the interviewees have recognised the problems that the lack of these factors might bring.

As a point of interest, the most disaffected of the interviewees had moved to a new position, which promised better salary for fewer hours, although the fewer hours did not eventuate. Unfortunately, from her point of view, there were no other hygiene factors present in that the work load was large, there was no support from management and she did not feel respected or appreciated for what she did. She was unhappy in her work and had reached the stage where she was totally unmotivated towards CPD. Interestingly, she did still find that the patients were her only source of satisfaction during the day.

As Sachau (2007) discussed, if managers wish to increase motivation and job satisfaction, they need to provide psychological growth opportunities. These would include recognition and encouragement in work and CPD. Lohman (2000) also found that inhibitors to workplace learning included being too busy and non-recognition of services. In addition, the SWEA (2006) suggested that sufficient time at work for professional development would reduce work stress and promote self-confidence and self-esteem.

10.12 Comments, criticisms, suggestions

The interviewees volunteered a variety of comments and suggestions relevant to CPD and the current CPD management program at the time of interview. These encompassed capping of CPD points and the general flexibility of the administrative system. Several suggestions were made
about extra resources for CPD that could be provided and suggestions about the most appropriate provider and finally a variety of comments on a range of issues.

**Capping of points**

The capping of CPD points allowable for certain activities and therefore restricting some activities elicited some comment, again some for and some against.

*There needs to be limitations set on gaining all CPD from one source, e.g. online as we need checks and balances from peers. But I can see there is a problem with country people.*  
(Ann)

*It is reasonable that there is a cap on certain activities so as to ensure a variety of things are done.*  
(Bob)

*Capping of points for certain activities will disadvantage those in country areas. Especially if the staff of a department are making a good effort to do a variety of talks, case studies etc.*  
(Celia)

Similar comments were received in comments on the survey and, again, there were comments for and comments against the capping of points for some activities. Clearly there are two sides to this story. Whilst the reasoning behind the capping was to ensure that each sonographer gained a variety of points from all sources, it is likely to disadvantage others. One of the interviewees suggested that the CPD provider should look at the content of an activity before allowing it, or disallowing it. Such a suggestion does have merit and other providers such as the Royal Australian College of General Practitioners and the Australian College of Rural and Remote Medicine require that provision of activity is worthy of CPD credits and also has had a needs assessment.

**Flexibility**

Lack of flexibility in the CPD system was noted by several of the interviewees, in particular that it was a little too rigid.

*CPD needs to be adjusted to cater for different attitudes and circumstances. The mechanism needs to fit to what sonographers are doing, so they are not left without CPD points.*  
(Ann)
There is no leeway for extenuating circumstances in the obtaining of CPD points e.g. pregnancy or looking after a sick relative. It can become very problematic, therefore we need more flexibility.
(Celia)

One problem is that while ASAR allows reciprocal points from AIR, the reverse is not true and so it can be awkward when you are an AIR member and need CPD points for them too, so there needs to be more flexibility in this.
(Celia)

CPD is not really tailored for academics or those who not working much in the clinical setting anymore. The structure doesn’t fit with odd people. The structure is too formal and we need to go outside the square. It’s a bit too rigid and needs more flexibility. It can be restrictive.
(Fred)

……there is quite a good range to achieve CPD. Except that it is very narrow in some categories, for instance, the only higher degree that counts is a Masters by course work, which is not good when we are trying to influence people to do more research. There is a need to think outside the square.
(Glora)

Recently the rules have changed for ASAR points accumulation …this will lead to great difficulties for some people, especially rural and remote. There really needs to be more flexibility.
(Jan)

Again, these comments mirrored several on the survey. It is apparent that for quite a few sonographers, more flexibility and less rigidity would be welcomed. The multiple usage of the term, think outside the square, demonstrates that the system may be a little too conventional and orthodox and perhaps the time would be ripe for a different approach. This would especially be of benefit for rural and remote sonographers, those on maternity leave and others who do not quite fit into the defined box for CPD. For these people the time might be appropriate to start considering a variation to the CPD system and look at those currently in use for health professionals in, for instance, the UK.

Resources

Two of the interviewees provided suggestions for resources to help with reinforcing CPD.

A post-activity discussion/resources to help would be good. When people come back from an activity and need help there should be resources available to help these people. For people who do not have help at hand, external mentors perhaps, through ASA or employer.
It would be difficult to work out the system though.
(Deidre)

If people can’t attend, ask if the slides from the talk can be passed on to these so that at least they will get the benefit from them. Online things are good and also journal questionnaires. The American Society of echocardiography for example offers good online education.
(Gloria)

Comments on the survey echoed these comments, especially from those who did not have ‘help at hand’. In rural and remote communities there are many sonographers who work on their own and as such have few human resources to turn to. Several suggestions came from those such as ‘youtube’ and podcasts of talks and lectures. More give away resources at talks would be useful too; because as one person put it, there is so much new information at one time it is difficult to remember it all.

Provider

At the time of the survey and interviews there were three administration points for CPD, these were ASAR, AIR and ASUM\(^\text{11}\). Two associations mainly provided CPD activities for sonographers, ASA and ASUM, with a few provided by AIR. Other activities could be provided by workplace or universities. Points entered onto the AIR and ASUM systems were transferred to ASAR, the accreditation registry responsible for audit and renewal of accreditation. Points from non-members of ASUM or AIR are entered directly onto the ASAR site. A complex system at times, several of the interviewees had ideas about who should be the provider and how CPD should be administered in the future.

There is a challenge to provide a clear and standardised program, simplified and broadened at its base. With regards to having just one body to administer CPD, it is a matter for all stakeholders who would need representatives. Would have to be careful about bias, though.
(Ann)

A central provider for all CPD would be a good idea, limit the number of passwords and logins.
(Celia)

\(^\text{11}\) Since that time the ASA has recently introduced its own CPD system.
Chapter 10: Interview Findings

Whoever provides for CPD needs to keep the process efficient and simple and be aware that sonographers come from all types of backgrounds and not just radiography. It doesn't really matter who provides as long as the guidelines are appropriate. For instance, it appears that in the AIR, the CPD is just tacked on for sonographers as they do not appreciate who a sonographer is. So, whoever provides CPD should be supportive, recognised and well-regarded by sonographers. ASAR incorporates the whole spectrum. All stakeholders need to be involved, not just one group, so that it is fair.

(Deidre)

A good provider would be ASA because they are the professional body for sonographers. There would need to be an independent body running the CPD. The current system is not ideal because the membership of the ASAR board appears to be biased.

(Gloria)

Whoever looks after CPD in the future really needs to be very approachable and understanding in case mistakes in point entry are made, as they do happen.

(Jan)

There is a range of views represented here, but it may be concluded that no matter who provides the CPD vehicle, there is a need for simplicity and a non-biased approachable administration.

Other comments

Obtaining points for teaching is a relevant issue, depending on what level of teaching

(Celia)

This is an interesting point also brought up several times in the comments on the survey. It is a point which has been discussed in detail at committee meetings and general meetings. As a general rule, though, teaching at work has always been considered as part of the job and as such is not eligible for CPD points. Unpaid teaching, for example, at workshops or overseas is eligible for CPD points. However, it has been acknowledged in the literature that teaching in the workplace definitely aids in the teacher's professional development (Fuller et al., 2005). Indeed it has been suggested that the very nature of teaching could lead to professional development (Spalding, 2003).

As discussed in an earlier chapter, sonographers are not well-recognised in the community and these two interviewees felt that this was an important issue for them.

Sonographers need more recognition from governments and in the public arena.

(Gloria)
… whole profile needs lifting.
(Bob)

Two of the interviewees were of the opinion that provision of different activities would be useful:

… for more experienced people, perhaps we could encompass other skills, e.g. learn how to write better, phrase reports better. Also it would be good to know what specialists really want from sonographers.
(Ellen)

Although the internet is now widely available, some people are still reluctant to use it, either to get access or use it if they have it. There are quite a lot of people who are still computer illiterate or lack confidence in the use of it. A suggestion would be to have some more training for sonographers.
(Jan)

Finally, Ellen who was the least happy in her work and CPD had the following suggestions to improve working conditions for sonographers:

A code of practice\(^{12}\) should be introduced, outlining amongst other things how long each patient should be given for an examination. We need educating on assertiveness, on the legal rights of an employer over employee. We need to learn what work conditions should be and learn how to negotiate these work conditions. We need to stop the bullying by learning how to be assertive and empowered so that we can then enjoy the work with the patients, who are good and the only reason you keep going.
(Ellen)

These last suggestions for activities would surely broaden the scope and depth of a CPD program and allow it to become more than just an up-dating facility. The previous five chapters and this chapter have presented and discussed the findings from the survey, the survey comments and interviews. The final chapter will review these findings and discuss them in light of the theoretical framework and literature. It will also suggest strategies for CPD for Australian sonographers in the future.

---

\(^{12}\) A code of practice has recently been introduced by the ASA.
Chapter 11
The role of self-direction in Australian sonographers’ CPD

11.1 Introduction

This study sought to identify and describe the opinions of Australian sonographers regarding their CPD and their motivation and barriers to obtaining CPD. Overall, it sought to find the role that self-direction had in their CPD. A survey was devised to determine empirical details and commentary on the survey by participants and interviews provided added depth. A principal components analysis conducted on the survey answers identified four main factors which had a substantial influence on sonographer CPD. The findings from this study have demonstrated positive aspects of sonographer CPD, such as a belief in the value of CPD and a commonly held tendency towards reflective thinking. The findings have, however, also highlighted several shortcomings in the way that CPD is usually provided to sonographers in Australia. Most important among these is the apparent inequity between rural and remotely based female sonographers and their male rural and city counterparts and also their female colleagues in the city. In addition, there is often a lack of financial and supportive encouragement from many employers and supervisors.

In a mandatory environment for CPD, sonographers may overcome many barriers and complete CPD but the evidence in this study shows that there is a lack of self-direction in completing it, with little evidence of planning and evaluation demonstrated. The CPD system for sonographers in Australia is an inputs based scheme which may have arguably inhibited self-direction and planning in a desire to achieve points. Increasingly, in countries such as the UK, professional bodies, in particularly health professionals, are turning to outputs based schemes to try to engender self-direction and planning into the CPD of these professionals (Friedman & Woodward, 2008).
This concluding chapter will review the main findings of the study and will discuss them in the context of the literature and theory, in particular, the personal responsibility orientation (PRO) model. This chapter will offer several practical strategies drawn from this research that may be used to support self-direction. Finally, areas of research will be recommended to test the practicability and suitability of these strategies.

11.2 Belief in the value of CPD

The sonographers who took part in this study were, in the main, in favour of CPD. Most responding sonographers also believed that it was necessary for CPD to remain mandatory, which was an interesting finding considering that over eighty per cent of respondents believed that they would participate in CPD without it being mandatory. This appears to indicate a level of mistrust or misunderstanding with their peers. It is likely that this apparent mistrust or misunderstanding also occurs in other professions besides sonographers, as similar findings were found in the study by Friedman and Phillips (2004). In addition, one of the disadvantages of an inputs only based CPD system is the possibility of an impression that CPD may be underused and not taken seriously (Friedman and Woodward, 2008). Nevertheless, CPD was considered by many sonographers to be very important for maintenance of knowledge and encouragement of learning. Sonographers participating in the survey wrote of CPD encouraging sonographers to maintain interest in their jobs and of CPD encouraging sonographers to keep up with their ongoing education. One commentator felt that it was likely to standardise and improve sonography across Australia.

Professionalism and the need to appear professional came to the fore in many of the comments, with some feeling that not only was CPD necessary to keep up with developments but also to achieve recognition with the general public and also other health professionals. This was in keeping with the opinion of Cervero (2000), who believed that professionalism was one of the main drivers for CPD. Tobias (2003) also was of the belief that one of the characteristics of a professional was to complete ongoing education. Other survey respondents, however, thought the
Chapter 11: The role of self-direction in Australian sonographers’ CPD

responsibility for conducting CPD lay with the professional and not a mandatory body. It was clear throughout the study that sonographers in general were keen to behave as professionals and to be regarded as professional by the wider community, although many felt that, at this time, the wider community were not really aware of their existence. Some authors, e.g. Field (2004) and Lester (1999) felt that codes of practice may allow for more credibility and standing with the general public.

As was highlighted in Chapter 3, over the years there has been much discussion and debate about the effect of CPD on the competence and knowledge of professionals. Authors such as Postle et al. (2002) and Tennant and Field (2004) have noted a lack of empirical evidence about any positive effects that CPD may have on competence; however, several Cochrane reviews have concluded that CPD can have an effect on work practice, especially after workshop type learning. Nevertheless, many of the responding sonographers were of the opinion that CPD would have little, or no, effect on the ability, competence or knowledge of sonographers. Other concerns included the threat of losing one’s job if a certain amount of CPD credits were not accounted for. In addition, there was the suggestion that having to gain CPD points added pressure and worry to some, whilst other respondents admitted that activities were sometimes attended, not out of a desire to learn something new, but because points were needed. The restrictive and inflexible nature of the CPD system as it stands was remarked upon, although it was also recognised that it could give a good structure for some sonographers.

There were comments made about reluctance of people to complete CPD and of apparent faking of points. Interviews gave extra insight into the apparent reluctance of some sonographers to involve themselves fully in CPD. There was opinion that not all sonographers are the same in nature or learning patterns, and so, whilst not fitting the mould, it was felt by some that many would still benefit from and learn the contribution CPD can make to working life. However, some respondents still felt that there will always be some people who do not want to do more work or study than they have to.
There was little difference between men and women in their belief in the value of CPD, although women appeared to be slightly more positive. City living sonographers also appeared to be more positive in their belief, although, as discussed in Chapter 6, this is possibly due to the circumstances surrounding the barriers to CPD. Overall the main concerns in this area, belief in the value of CPD, would appear to be the view of many that CPD is not being whole heartedly embraced by everyone; that CPD does not necessarily improve practice; and that the CPD system, as it is now, promotes points gathering, rather than learning and that it may cause added stress due to its restrictiveness. However, most sonographers in the study appear proud of their profession and wish to improve and promote it; and most report they would willingly undertake it regardless of its mandatory status. CPD is undertaken, in general, with a very narrow viewpoint; that it is only to update the professional’s knowledge, rather than to develop the professional as a whole. This viewpoint is not unusual, especially in the health professions (White 2004); however, it has been suggested by Fleet et al. (2008) that CPD should have a broader base than this, encompassing personal, social and political aspects as well as the educational aspects. They further suggested that approaches to CPD which encouraged reflection and identification of learning needs are more likely to be effective.

11.3 Barriers to participation

In common with many other professionals, as discussed in Chapter 3.7, sonographers reported being affected by barriers and inhibitors to their participation in CPD. Most respondents to the survey reported being affected by more than one circumstance and these were often interlinked, for instance, distance and cost, or time and family. Cost of attending workshops was cited as a major concern, especially to those with young families and on a single income. Lack of time for CPD, both personal time and work time, was also of concern to many. Employers were reported as rarely allowing time during a work day for CPD and time spent out of work for CPD was
seen as encroaching heavily on family life. Tiredness due to working long hours and overtime, along with staff shortages, were also seen as significant barriers.

It was a significant finding that over one third of respondents were not satisfied with the quality of activities on offer. Many of these remarked that they were too repetitious or too basic for more experienced sonographers. In Chapter 1, I discussed the fact that activities for sonographer CPD are generally not vetted for suitability prior to offering them. In addition, Chapter 3 discussed the plethora of activities that may become available once CPD becomes mandatory, with the risk that they are of poor quality. More importantly, it has been suggested that one of the faults of an inputs only based CPD scheme is the assumption that everything offered and done under such a scheme is worthwhile (Friedman & Woodward, 2008). Apparently, approximately one third of responding sonographers are not of this opinion.

Perhaps the most significant finding was the great difference between the perceptions of female sonographers working in rural areas and all other sonographers. For this group of sonographers, costs, distance and family and life disruption are all seen as important barriers or inhibitors to CPD. Particularly notable is the difficulty faced if there is not a good family support mechanism. However, in addition to these, lack of flexibility in the scheme is also a problem. There are fewer activities presented in rural areas and the limitation placed on the amount of CPD done through the internet and self-directed learning is an added burden to rural sonographers. It is interesting to note the similarities between these Australian sonographers and Canadian female occupational therapists, who also faced extra difficulties by living in rural areas (Townsend et al., 2006).

11.4 Motivators

Many sonographers responding to this study reported satisfaction from caring for their patients and knowing they had done the best examination possible. Sonographers reported feeling ‘good’ about learning new things and being able to pass these things on to colleagues. Confidence
and enthusiasm were seen as positive by products of CPD and ‘empowerment’ was a term used several times at interview to describe the feeling that came with extra study and CPD. This is in keeping with the studies by Johnson (2008) and Gunn and Goding (2008), who all reported that CPD can lead to increased self-confidence in the participant.

The main concern for sonographers was the lack of supportive encouragement from their employers or radiologists, predominantly, the lack of financial support to aid in obtaining CPD. Only about one third of responding sonographers felt respected by their employers/radiologists. Comments were made along the lines that all the boss cared about was churning out patients and that sonographers were treated as workhorses. It was recognised by sonographers, regardless of the level of their employer support, that respect and support both financial and by encouragement, from the employer is beneficial to the well-being of the sonographer. Whilst agreeing that the ‘boss’ should play some part in the support of CPD, it was also seen by some as a shared responsibility between sonographers and their employer. Work conditions were also commented about frequently; overwork and fatigue were seen as detrimental to obtaining CPD, with some sonographers reporting feeling too tired to ‘bother’ with CPD. As was discussed in Chapter 2.1 and 2.3.2, difficult workplace situations can affect learning and motivation and it is clear from this study that these do affect some sonographers.

Other than financial support for CPD, financial reward was only mentioned once in relation to this study and then in a tongue-in-cheek manner. Sonographers often reported feeling under-recognised by the general public and other health professionals. In particular, there appears to be a situation between sonographers and radiographers working in the same department; with the former claiming that the latter do not ‘have a clue’ about how sonographers work or how much they have to do to keep up.

An underlying theme throughout commentary and interviews was the belief that sonographers who did not appear to want to participate in CPD could perhaps be motivated by
encouragement and exposure to learning. It was felt that continuing exposure to CPD may just ‘trigger’ a response in less motivated people, allowing them to become interested and enthusiastic towards CPD.

11.5 Reflection

This study has shown that sonographers are reflective by nature in that they think about and discuss their work practices with colleagues. In keeping with other health professionals, for example, physiotherapists, sonographers are more of a ‘doing’ profession (O’Sullivan, 2003) and tend to reflect whilst in action, as is necessary for their practice. In keeping with other busy professionals, there is often little time during the day to reflect, but sonographers noted that informal chats between staff often formed the best reflective times. Sonographers working in a single-handed situation are at a disadvantage as they have no one to discuss matters with. Reflection through discussion is a form of CPD, in that discussion can lead to an update in knowledge or practice, or confirmation of that knowledge. However, after reflecting on CPD activities, sonographers admitted to rarely changing their practice.

Young males working in city areas were reportedly more reflective than their rural colleagues and more reflective than females. Sonographers who had another job as well as sonography reported more reflection. Overall, older, more experienced sonographers appeared to be consistently reflective.

11.6 The role of self-direction in Australian sonographers’ CPD

The results of the survey indicated that an overwhelming majority of respondents would participate in CPD regardless of it being mandatory or not. This is an indication that there is some measure of self-direction and willingness to fulfil CPD obligations. Often cited during this study was the need to maintain a quota of points, rather than follow-up on CPD that would have more use to an individual. Also frequently mentioned was the inflexibility of the present system, especially where female, rural sonographers are concerned. This study showed that not all sonographers are
Chapter 11: The role of self-direction in Australian sonographers’ CPD

motivated to learn or take responsibility. There could be two reasons why this is so; the first is that sonographers have a mandatory system, which opponents say challenges the nature of self-direction, as the compulsory nature may inhibit the freedom of the participant to choose what best suits their needs (Field, 2004; Kerka, n.d.; Postler-Slattery & Foley, 2003). This may be the case, however, sonographers have indicated that they are strongly in favour of a mandatory system and there appears to be plenty of choice for sonographers. The second reason is, perhaps, more plausible in that it is the nature of the CPD system, that is, an inputs only based system, that sonographers find more inhibiting to self-direction. In either circumstance, sonographers may be governed by external circumstances, such as, working conditions and lack of time.

In the Brockett and Hiemstra (1991) PRO model for self-direction in learning (repeated below in Figure 11.1), there is a framework provided for self-direction in learning; this is comprised of both an instructional process and personality characteristics. In the instructional process, the learners assume responsibility for planning, implementing and evaluating learning experiences, which may or may not have been facilitated by an outside agency or resource. The second process is centred on the learner’s desire, learning preferences or personality traits for assuming responsibility in learning. Brockett and Hiemstra accept that this is not a perfect model as there will always be variations to the theme; however, they believed that responsibility for self was desirable. Knowles (1998) suggested further that adults will only become ready to learn when they need to know how to cope effectively (for example, at one’s work). The adults can then take ownership (or responsibility) for their own thoughts and actions and can take control of the situation.
This study has shown that sonographers belong to a category of professionals which does not quite fit the above model. This is mainly because of the evident lack in the planning that is an essential part of self-direction in learning. The research identified four main elements which are applicable in the self-direction of sonographers in their CPD. Recognition of these elements within the PRO model would allow strategies to be developed to help maximise self-direction in learning.

From the diagram seen below in Figure 11.2, we can see that personal responsibility is found within the element Belief in the Value of CPD. Characteristics of the teaching/learning transaction, negative and positive, are included with the elements, Barriers to Participation, Motivators and Reflective practice. Characteristics of the learner can be found within the elements belief in the Value of CPD and Motivators. If strategies are employed to utilise the findings of the research, then
it is possible that self-direction in learning may be maximised in sonographers, within a framework that recognises external influences and circumstances.

**Figure 11.2 The Personal Responsibility Orientation Model Adapted for Australian Sonographers**
11.7 Recommendations for practice

Based on the work of previous authors (e.g. Brockett & Hiemstra, 1991; Brookfield, 1995; Cranton, 1996; Merriam & Caffarella, 1999; Houle, 2001; Merriam, 2005; Jones & Jennings, 2007) and on the findings from this study; sonographers should display the following qualities in relation to their CPD in order for the CPD to be most effective:

- Motivation and desire to learn and enhance professional practice.
- Responsibility for own learning.
- Reflection/critical reflection on needs for learning.
- Planning of learning.
- Participation in learning activity.
- Evaluation and review of learning activity.
- Passing on new found knowledge to others.
- Enhancement of personal practice.
- Reflection.

This study found that, whilst some desirable elements for CPD are present at the moment in sonographers’ CPD habits, such as a desire to learn and enhance the profession and the passing of new found knowledge on to others, other elements are missing or limited, such as reflection, critical reflection and planning. Another factor, responsibility for learning, was understood by some participants to be a part of CPD. This study also found that common complaints about the Australian sonographer CPD system included having to collect points rather than choose appropriate activities, inflexibility of the scheme and a tendency towards inappropriate activities. Pertinent comments came from two of the interviewees, whereby they felt that CPD needed to be adjusted so that it catered for different needs and circumstances, so that the mechanism of the CPD actually fitted the sonographers’ circumstances. In addition, one felt that the structure didn’t fit in with differing circumstances in a sonographer’s profession, for example, if one was an educator.
or in a management position. He felt that the structure was too formal and needed more flexibility and thinking ‘beyond the square’. With these findings in mind, a compelling argument could be put forward to revise the CPD scheme for Australian sonographers.

At no time have any professional bodies in Australia used an outputs based CPD scheme (Friedman & Mason, 2007). Whilst some have elements of one, for instance, the use of portfolios, these are used as part of the points quota. Mandatory schemes, using an inputs base, were primarily designed and introduced to keep professionals up to date with practice (Cervero, 2000). However, it is suggested and recommended by some that, in fact, CPD should have a broader base than to just keep current with practice alone (Fleet et al., 2008; Friedman & Phillips, 2004, 2008; Jones & Jenkins, 2007). According to these authors, CPD can include the personal, social and political aspects of the profession; also, CPD should encourage reflection and identification of needs.

In the UK there has been a marked trend towards outputs based CPD schemes, which is evident in the health professions. Chapter 1 described the CPD model currently used for radiographers and other allied health professionals. This UK model utilises virtually all the same activities or types of activities for CPD that are included in the Australian sonographers’ scheme. The main difference is that the responsibility of the choice of activity lies with the professional and it is up to that professional to plan and evaluate each learning activity; showing what value has been gained from each activity and how it has contributed to practice. The professional is not required to demonstrate collection of a set quota of points from CPD activities; rather, they do need to demonstrate and document a well-rounded approach to CPD which has demonstrable outcomes. At this time, according to Friedman and Woodford (2008), this CPD model is still in relative infancy and, generally speaking, greater resources are needed than for an inputs based scheme. In addition, they feel it may be difficult to judge if the outcomes of the CPD really do impact on patient care. However, the same could be said regarding outcomes with inputs based schemes.
This UK model would, I feel, help to address some of the main drawbacks of the current CPD scheme for Australian sonographers. In the first place, sonographers would need to reflect and plan for their learning. Secondly, they would need to reflect on their learning and demonstrate outcomes of their learning. These are lacking at the present time and are unlikely to be addressed in the current system. As has been shown, the present CPD system for sonographers in Australia can be quite rigid and lacking in flexibility. It does not allow for different circumstances and career paths to be taken into account fully and perhaps has allowed the burgeoning of too many activities that have little benefit to a proportion of sonographers.

Findings from this study, both from commentary on the survey and from interviewees identified several other strategies for the support of self-direction in CPD. These strategies have been identified in each appropriate chapter according to element and are tabulated below in Table 11.1.

**Table 11.1: Strategies for Australian sonographer CPD**

<table>
<thead>
<tr>
<th>Element - Belief in the value of CPD</th>
<th>Strategies to support CPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Mandatory CPD</td>
<td>• Education regarding the reason for mandatory CPD i.e. regulatory and motivational reasons</td>
</tr>
<tr>
<td>• Professionalism</td>
<td>• Education on the meaning and value of professionalism and CPD’s role in this.</td>
</tr>
<tr>
<td>• Poor recognition of profession</td>
<td>• Code of ethics</td>
</tr>
<tr>
<td>• Necessity of keeping up to date</td>
<td>• Self-promotion and promotion by professional associations</td>
</tr>
<tr>
<td>• Necessity of broadening horizons</td>
<td>• Education on the value of new knowledge</td>
</tr>
<tr>
<td>• Bureaucratic agencies</td>
<td>• Education about the benefits of broadening the CPD base</td>
</tr>
<tr>
<td>• Outcomes of CPD</td>
<td>• Simplify and improve the official procedures</td>
</tr>
</tbody>
</table>


### Element - Barriers to Participation

- Rural and remote – distance – cost
- Rural and remote – female
- Work load
- Lack of personal time
- Lack of flexibility/points capping
- Lack of quality courses, repetitive

### Strategies to support CPD

- Use of outcomes based CPD
- More funding from government agencies for CPD, possible scholarships, provision of more mobile CPD activities (travelling workshops)
- Recognition of (usually) female family responsibilities by management – allows scheduled work time for CPD
- Reduce work load by employment of more staff, may need government sponsorship to entice personnel to rural areas
- Allow suitable appointment scheduling
- Sonographers encouraged/taught to plan ahead using calendars
- Introduction of internet based interactive activities
- Monitoring and regulation of work place training – accreditation of work places as training centres
- Introduction of peer reviewed conferences and seminars
- Encouragement of disengaged sonographers to engage in planning for activities and presenting at activities
- Introduce courses that teach, encourage broader base

### Element – Reflection – self-direction

- Reflective
- Non-planning of activities
- Work load, too busy for reflective practice
- Planning and evaluation
- Critical reflection
- Mandatory CPD
- Rural, remote single-handed sonographers

### Strategies to support CPD

- Promote critical reflection by use of outcomes based professional development
- Management recognition of responsibilities - allowing time for CPD
- Training by trained personnel
- Promotion and coaching in critical reflection
- Teach sonographers planning strategies
- More online activities in the form of virtual chat rooms
- Interactive activities such as webinars
- Mentoring
### Element – Motivators
- Job satisfaction.
- Patient well being.
- Lack of work place recognition and support.
- Unmotivated sonographers.
- Lack of professional recognition
- Lack of confidence.
- Constrained

### Strategies to support CPD
- Sustain by encouragement and support from management, peers and tutors
- Management recognition of the benefits of a supportive work environment structure.
- Management understand the underlying principles of CPD
- Fair rewards
- Fairer attainable workloads
- Encouragement from tutors and seniors and management
- Demonstrate the benefits of CPD, such as confidence and empowerment
- Marketing of profession
- Learning and sharing with other professionals
- Encourage to present and write about cases or research
- Education to broaden horizons and knowledge base

### 11.8 Opportunities for further research

This study has identified several possible strategies that could assist in sonographer CPD containing more self-direction. At this time, these are possibilities, but are as yet untested and practicality and feasibility for each is unknown. It may be that significant funding would be required for a particular project, which may not be readily available. This has opened up several opportunities for continuing research that will further inform the CPD of Australian sonographers and may also be useful for other MRS professionals.

**The survey**

The survey served this study well and provided valuable information regarding sonographers and their CPD. With added changes as outlined in the limitations to the survey in
11.9, it could be used again in the future, perhaps after changes have been made to the present system of CPD, to compare findings with those now. In addition, this survey could be further modified to be used for a similar study of medical radiation sciences professionals in Australia, or in other parts of the world.

**Inputs versus outputs CPD models**

Running the two CPD models, inputs and outputs, in tandem initially would provide a unique opportunity to compare, contrast and evaluate the benefits and problems of each model. As outputs models are not at this stage utilised in Australia, other professions would benefit from this research by being able to determine the value it has been to Australian sonographers before implementation by them.

**Activities from a distance**

Several suggestions were forthcoming from sonographers responding to this survey regarding activities and modes of learning. Podcasts and webinars were suggested by commentators and interviewees. There is no proof, however, that these types of learning are beneficial and change outcomes. In fact, there is anecdotal information that a webinar can run on the computer with no one to watch. To test the effectiveness of this type of learning, a research situation could be formulated which could include the teaching of new practical techniques over a webinar or podcast. Testing could be performed before and after to gauge improvement in practice or knowledge.

**e-Mentoring**

Some respondents to the survey felt that mentors for remote sonographers would be beneficial. The research study by Thompson et al. (2010) into e-mentoring could provide a basis for similar research in Australia, whereby a mix of face to face and distance mentoring could be evaluated. On the other hand, a purely distance mentorship could be evaluated to test its effectiveness and value.
Discussion groups by teleconference or ‘facebook’

Sole sonographers in remote locations lack companionship and peer mentoring and review. These sonographers find it difficult to review their findings and have no opportunity for group reflection, putting them at a disadvantage to others in larger departments. An interesting project would be to set up discussion groups between these sonographers whereby they would be working in similar situations and be able to discuss cases and experiences between themselves. This would also depend on the hospital or clinic being able to provide the technical back up for this. Alternatively, the same group may be able to interface using one of the social networking sites such as ‘facebook’, in this way they would also be able to upload images and discuss these. After a certain time frame, the involved sonographers could provide feedback regarding the benefits, or otherwise, of this scheme.

11.9 Limitations of the study

This study has several limitations that should be mentioned. In the first place, as a senior sonographer with an interest in education, I acknowledge that my own opinions and bias may have influenced this research, even though I have endeavoured to minimise this.

The data collection was restricted to members of the Australian Sonographers Association (ASA) due to access difficulties with the Australasian Sonographer Accreditation Registry (ASAR) database of sonographers, which has a complete list of all Australian accredited sonographers. Whilst the members of ASA comprise roughly two thirds of all accredited sonographers and the results from this research could possibly be generalised to all, it is recognised that the majority of cardiac sonographers are not members of ASA and, therefore, their views may not be adequately represented. Further research with this group of sonographers may be necessary at a later stage to ensure their opinions and circumstances are adequately captured.

A new survey instrument was devised for this research. Although the content was validated by academics and sonographers and the PCA helped confirm the appropriateness of the questions,
no reliability testing was undertaken by test – re-test, although statistical reliability (Cronbach’s Alpha) was conducted and showed good reliability. Future researchers using this instrument may wish to further test the reliability of the survey before using the instrument. The PCA discarded three redundant questions, questions 6, 8 and 21. In any further study using this questionnaire, it is recommended that these be re-written. Questions pertaining to reflection could also be reworded as there may be an assumption taken in these questions that reflection does occur. In addition, a brief explanation of reflection may have been worthwhile, although, as with self-direction, I did not want to bias the answers by forwarding my beliefs. The factors from the PCA only account for 41.39 per cent of the variance.

The interviews were a mixture of telephone and face-to face due to distance problems. There could have been a difference in rapport with the interviewees between the two modes; however, it seemed that there was a good rapport with all interviewees at the time of interview. It has been suggested that the questions were a little too rigid; however, this study sought to answer very specific questions based on findings and theories in the literature and was not seeking to propose new theories, thus I believe the style in which the questions were written and asked and ultimately analysed was appropriate for this study. The volunteer interviewees were all older, more experienced sonographers. It could be argued that this gave an added age bias to the study; however, I believe this added richness by giving a unique perspective of these experienced sonographers of the system as a whole.

11.10 Summary

The main aim of this study was to describe the role of self-direction in the CPD of Australian sonographers. In addition, information was sought regarding the opinions of sonographers about the value and benefits of CPD, the barriers they faced when doing their CPD and the motivational factors. This study has answered these questions well and supplied a rich amount of data. The research will serve to inform the greater body of knowledge on self-direction in
learning, but, in addition, it will inform the providers of CPD and employers of sonographers of their opinions of and of the drawbacks they encounter with their CPD.

This study has shown that most sonographers believe in their profession and are willing to undertake CPD; however, self-direction is lacking in that planning and evaluation are not in much evidence. Many employers do not support or encourage sonographers in their CPD; in addition, distance is considered a problem for sonographers, in particularly female sonographers. Coupled with this is a CPD scheme which is rigid in nature and does not allow for flexibility or full planning for learning needs. In comparing the CPD scheme in Australia with that in the UK, it appears that a scheme similar to that in the UK may benefit many sonographers by allowing them the flexibility to plan for their own learning as it suits their circumstances and by encouraging reflection and evaluation.

If providers of CPD were to adopt this CPD model, it is conceivable that many sonographers in Australia would benefit, as would the employers, but more importantly, the patients would be the main beneficiaries of any improved outcomes.
References


Kanuka, H. and Nocente, N. (2003). Exploring the effects of personality type on perceived satisfaction with web-based learning in continuing professional development. Distance Education 24(2 October).


McCormick, G. (2003). *An evaluation of the Australian Physiotherapy Association's model for the effective delivery of education and training services to rural and remote physiotherapists*. Distance Education, University of South Australia.


Appendix 1: Information sheets

DEAKIN UNIVERSITY HUMAN RESEARCH ETHICS COMMITTEE
PLAIN LANGUAGE STATEMENT (interview)
The role of self-direction in Australian sonographers’ professional development

Dear sonographer

My name is Maureen Phillips and I am currently undertaking a research project at Deakin University. My supervisor is Assoc. Professor Peter Smith who is a senior lecturer in the Faculty of Education, Geelong Campus and my associate supervisor is Dr Damian Blake, also a lecturer at the Geelong Campus.

Thank you for your interest in our research project.

The Australian Sonographer Accreditation Registry describes CPD thus:

Continuing Professional Development (CPD) provides the mechanism by which the Accredited Sonographer may expand his or her knowledge base and skills to keep abreast of the rapidly changing face of diagnostic medical ultrasound. It is the belief of the Australasian Sonographer Accreditation Registry (ASAR) that learning does not end with the attainment of a qualification and participation in an approved CPD program encourages, develops and supports lifelong learning skills (ASAR 2007).

I am seeking to ascertain the types of activities that sonographers choose for their CPD, or would prefer to choose. In particular, I am interested in the reasons for these choices and how you make the choice. For instance, is the choice a matter of cost, availability or your interest in a particular topic? How does the mandatory nature of CPD affect you? And how does it benefit you? This research is important as it will inform employers, legislators and education providers of the needs and requirements of sonographers regarding professional development.

I would like to talk with you to seek a fuller understanding of the feelings of sonographers regarding CPD. I will be seeking to talk to sonographers from a wide range of backgrounds and experience so that I will have a good range of opinions. I will be conducting interviews in the first half of 2008. The interview would take place at a mutually convenient time and place, it could be face to face or by telephone, and I expect it to last about one hour. I have attached a sample of possible questions that you may like to discuss. I will be recording the interview and also taking notes to ensure I report your opinions accurately. I will summarise our interview from these notes and ask you to look
at the summary and confirm that it conveys your opinions correctly. I will assign you a number at this point so that I know who to send the summary back to.

All information collected will be aggregated and no identifying material will be published.

Participation in this project is voluntary. Should you wish to withdraw from the study at any time, you may do so without consequence.

You will not be paid for this interview and whilst you may not directly benefit from participating in this interview, you will be providing valuable information which will help us understand the issues associated with CPD and this may be of benefit in the future. In addition, participation may allow you to further reflect on your own CPD.

Results of this study will be published once the data has been analysed.

If you wish to participate could you please telephone me on, or email mwilki@deakin.edu.au. Could you please signify your agreement to participate by signing the attached consent form and returning to me either in person, email or mail?

Thank you for your interest in this project

If you wish to speak to my supervisor please contact

Assoc. Professor Peter Smith
pjbs@deakin.edu.au
(03) 5227 1452

Should you have any concerns about the conduct of this research project, please contact the Secretary, Deakin University Human Research Ethics Committee, Research Services, Deakin University, 221 Burwood Highway, Burwood VIC 3125. Tel: (03) 9251 7123 (International +61 3 9251 7123) E-mail: research-ethics@deakin.edu.au

Please quote project no. EC224-2007

M Phillips
DEAKIN UNIVERSITY HUMAN RESEARCH ETHICS COMMITTEE
CONSENT FORM
The role of self-direction in Australian sonographers’ professional development

Researcher’s name……Maureen Phillips

- I have read the Participant Information Sheet and the nature and purpose of the research project has been explained to me. I understand and agree to take part.

- I understand the purpose of the research project and my involvement in it.

- I understand that I may withdraw from the research project at any stage and that this will not affect my status now or in the future.

- I understand that while information gained during the study may be published, I will not be identified and my personal results will remain confidential.

- I understand that my answers will be electronically recorded during the interview.

- I understand that the recording will be cleared as soon as the notes from the interview have been verified by me.

Name of participant………………………………………………………………………………

Signed…………………………………………………………..Date…………………………

I have provided information about the research to the research participant and believe that he/she understands what is involved.

Researcher’s signature and date…………………………………………………………..
Samples of Interview questions

These can be delivered in any order and questions may depend on previous answers.
You may also talk about any aspect of CPD which interests you and is not mentioned below.

- What do you think is the main reason for CPD?
- Do you think that CPD makes a difference to sonographers? How or Why not? What about your workplace?
- How do you feel about being made to undergo CPD just to work?
- Do you feel better about yourself because you are doing more study? In what way?
- What do you think your boss feels about your extra study?
- What is good about CPD? And what is bad?
- What kind of problems have you found that hindered you getting your CPD?
- Have you got any suggestions for improving CPD?
- Who would you like to see as provider(s) for CPD
- Many respondents to the questionnaire indicated they would do CPD regardless of it being mandatory, however, most of these people also indicated that it was important for CPD to be mandatory – why do you think these respondents could trust themselves to keep up the development but not others?
- Many people indicated that CPD did not lead to a change of work practice, and if reflection occurred it did not lead to CPD. If this is the case, what do you think is the point of CPD?
Dear sonographer

My name is Maureen Phillips and I am currently undertaking a research project at Deakin University. My supervisor is Assoc. Professor Peter Smith who is a senior lecturer in the Faculty of Education, Geelong Campus and my associate supervisor is Dr Damian Blake, also a lecturer at the Geelong Campus.

I am inviting all members of the Australian Sonographers Association to participate and I would like to invite you to help me in my research.

I have been a sonographer for many years and have always taken an interest in sonographer education.

As you know, it is mandatory to undertake a certain amount of continuing professional development (CPD) in order to remain an accredited sonographer.

The Australian Sonographer Accreditation Registry describes CPD thus:

Continuing Professional Development (CPD) provides the mechanism by which the Accredited Sonographer may expand his or her knowledge base and skills to keep abreast of the rapidly changing face of diagnostic medical ultrasound. It is the belief of the Australasian Sonographer Accreditation Registry (ASAR) that learning does not end with the attainment of a qualification and participation in an approved CPD program encourages, develops and supports lifelong learning skills (ASAR 2007).

I am seeking to ascertain the types of activities that sonographers choose for their CPD, or would prefer to choose. In particular, I am interested in the reasons for these choices and how you make the choice. For instance, is the choice a matter of cost, availability or your interest in a particular topic? How does the mandatory nature of CPD affect you? And how does it benefit you? The aim of the research is to inform employers, legislators and education providers of the needs and requirements of sonographers regarding professional development.

Accompanying this information sheet is a questionnaire which has been designed to help me find out some answers to the above questions. No identifying information is asked for or required by this questionnaire, and it, therefore is anonymous. Nevertheless, if commenting on a question, please take care not to divulge any identifying information. Return of the questionnaire to me will signify your consent to participate. The completion and return of the questionnaire is solely at your
discretion, and there will be no consequences for any sonographer who decides not to participate. The questionnaire should take about twenty minutes to complete. Whilst you may not directly benefit from participating, by completing this questionnaire you will be providing valuable information which will help us understand the issues associated with CPD and this may be of benefit in the future. In addition, participation may allow you to further reflect on your own CPD.

Results of this questionnaire will be published in *soundeffects* once the data has been analysed. Questionnaires will be stored in a locked cabinet in my locked office for a period of not less that 7 years, they will then be shredded. Data collected from the questionnaires will be stored on my computer which is password protected and also on CD which will be also stored in my locked office. After this time, the CD will be destroyed and the computer files deleted.

Could you please return the completed questionnaire in the reply paid envelope to UniSA, where I work, by 31st January 2008.

As you know, a questionnaire may not provide a space or opportunity for you to express your feelings about a particular area that you may have opinions about. For this reason I will be conducting interviews with people who are interested in talking further to me about professional development. If you are interested please contact me on (…), or mwilki@deakin.edu.au and I will be happy to provide you with more information.

Thank you very much for participating in this survey.

If you wish to speak to my supervisor please contact
Assoc. Prof. Peter Smith
pjbs@deakin.edu.au

Should you have any concerns about the conduct of this research project, please contact the Secretary, Deakin University Human Research Ethics Committee, Research Services, Deakin University; 221 Burwood Highway, Burwood VIC 3125. Tel: (03) 9251 7123 (International +61 3 9251 7123) E-mail: research-ethics@deakin.edu.au

Please quote project no. EC 224-2007

*M Phillips*
Appendix 2: Survey

Self-direction in continuing professional development for sonographers

NOTE: BEFORE FILLING OUT THIS QUESTIONNAIRE

I have read the Plain Language Statement describing the research. By filling out this questionnaire I am acknowledging my willingness to participate in the research by anonymously completing the questionnaire. I understand that the questionnaire I am filling out will not be made available to any person other than the research team.

Could you please return (free of postage) in the supplied envelope?
No later than 31st January 2008

Background Information
1. Age (please circle one) - 21-24 25-34 35-44 45-54 55+
2. Home address postcode ........................................
3. Sex (please circle one) Male Female
4. How many years have you been practising sonography? (Please circle one)
   0-4 5-9 10-14 15 +
5. How many days a week do you work as a sonographer (Please circle one): 1 2 3 4 5
6. Is sonography your sole occupation (please circle one) Yes No
   If not, what else do you practise? ......................
7. What academic qualification(s) do you hold in regards to sonography? (Please circle those which apply)
   • None
   • I am accredited, but studying for a formal qualification
   • Diploma of Medical Ultrasonography
   • Post graduate Diploma in Medical Sonography
   • Masters Degree or PhD
   • I am studying for a Masters Degree or PhD
   • Other (in case of overseas qualification)
7. Principal work situation (s) (please circle those that apply)
Private Practice .......Public Hospital....... Self- employed ........Education....... Sales & Marketing ..........

Please turn the page to continue.
Part two

Please comment on the following statements with a (√) or (x) in the space which best depicts your opinion.

*SD = strongly disagree; D = disagree; N = neither agree nor disagree; A = agree; SA = strongly agree*

<table>
<thead>
<tr>
<th></th>
<th>SD</th>
<th>D</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CPD should be mandatory for all sonographers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I would participate in CPD even if it was not mandatory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Mandatory CPD is restrictive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Mandatory CPD has encouraged me to learn more</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I have difficulty in choosing an appropriate activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do you have any comments you would like to make on the topic of mandatory CPD?

<table>
<thead>
<tr>
<th></th>
<th>SD</th>
<th>D</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. I plan in advance which activities I need to undertake</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I reflect on my needs for CPD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. I seek out activities which will fulfil my CPD needs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Participating in CPD makes me more confident in my work practise?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Participating in CPD activities makes me feel better about myself in my life away from work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. I am actively encouraged by management to undertake CPD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. I am financially supported by management to undertake CPD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. I feel more respected by management because of my increased knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. I feel more respected by my peers because of my increased knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do you have any comments you would like to make on the above statements?
<table>
<thead>
<tr>
<th></th>
<th>SD</th>
<th>D</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. CPD is important to me</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. CPD is necessary for me to maintain my work practices</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. CPD is necessary as I am a professional</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. CPD improves practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. CPD ensures better care for the patient</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. CPD activities are very relevant to my practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. I would practise CPD in a non-mandatory setting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. It is important to make CPD mandatory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. CPD is necessary for me to keep ‘up-to-date’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. CPD contributes to an ethical workplace</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. CPD contributes to a safer workplace</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. CPD will ensure credibility with the general public</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27. CPD is necessary for accreditation and registration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do you have any comments on the above statements?
Several factors can have a negative impact on attendance at or completion of CPD activities.

Please answer how the following might affect you, in the past, present or future:
1 = never affects; 2 = seldom affects; 3 = not applicable to me; 4 = affects sometimes; 5 = often affects, or affects greatly

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>28. Family responsibilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29. Lack of quality of courses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30. Lack of time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31. Lack of opportunity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32. Staff shortage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33. Workload</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34. Lack of encouragement from management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35. Lack of course relevance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36. Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37. Remoteness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38. Lack of resources (eg computer)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39. Having to use own time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40. Already know about the topic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do you have any comments on the above statements?

The next few questions are about reflective practice:

1 = never; 2 = seldom; 3 = sometimes; 4 = often; 5 = always

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>41. How often do you reflect on your work practice?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42. Do you reflect in writing?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43. Do you reflect in thought only?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44. Do you reflect in discussion with colleagues?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45. Does your reflection lead to changed work practice?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46. Does your reflection lead to increased CPD activity?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Following is a comprehensive list of CPD activities; please indicate which you have participated in during the past two years, and the number of times (if applicable).

<table>
<thead>
<tr>
<th>Activity</th>
<th>YES</th>
<th>NO</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conference</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workshop</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In house seminar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grand round</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presenting at local meeting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presented at conference</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presented at scanning workshop</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading journal articles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Journal article questionnaires</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>‘On-line’ activities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Literature review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Publications (peer reviewed)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Publications (non peer-reviewed)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examining within the profession</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Committee memberships</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal education program/course</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please list any other...

Thank you very much for taking the time to answer this questionnaire.
Please return it me in the envelope supplied by 31st January 2008

I will be extending this research with personal interviews.
If you would like to participate, could you please email me at:

mwilki@deakin.edu.au
## Appendix 3: Survey reliability

### Reliability Statistics

<table>
<thead>
<tr>
<th>Cronbach's Alpha Based on Standardized Items</th>
<th>N of Items</th>
<th>Cronbach's Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cronbach's Alpha Based on Standardized Items</td>
<td>.91</td>
<td>.91</td>
</tr>
<tr>
<td>N of Items</td>
<td>46</td>
<td></td>
</tr>
</tbody>
</table>

### Item-Total Statistics

<table>
<thead>
<tr>
<th></th>
<th>Scale Mean if Item Deleted</th>
<th>Scale Variance if Item Deleted</th>
<th>Corrected Item-Total Correlation</th>
<th>Squared Multiple Correlation</th>
<th>Cronbach's Alpha if Item Deleted</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPD should be mandatory</td>
<td>148.55</td>
<td>381.18</td>
<td>.62</td>
<td>.66</td>
<td>.90</td>
</tr>
<tr>
<td>Participate if not mandatory</td>
<td>148.98</td>
<td>384.11</td>
<td>.47</td>
<td>.63</td>
<td>.90</td>
</tr>
<tr>
<td>Mandatory CPD encouraged to learn more</td>
<td>149.30</td>
<td>384.04</td>
<td>.41</td>
<td>.41</td>
<td>.90</td>
</tr>
<tr>
<td>Plan activities in advance</td>
<td>149.77</td>
<td>391.04</td>
<td>.24</td>
<td>.25</td>
<td>.91</td>
</tr>
<tr>
<td>I reflect on my needs for CPD</td>
<td>149.61</td>
<td>386.98</td>
<td>.37</td>
<td>.38</td>
<td>.90</td>
</tr>
<tr>
<td>I seek out CPD activities to fulfil needs</td>
<td>149.10</td>
<td>395.98</td>
<td>.16</td>
<td>.33</td>
<td>.91</td>
</tr>
<tr>
<td>Participating in CPD makes me more confident at work</td>
<td>149.15</td>
<td>378.50</td>
<td>.62</td>
<td>.59</td>
<td>.90</td>
</tr>
<tr>
<td>Participating in CPD makes me feel better outside of work</td>
<td>149.93</td>
<td>379.84</td>
<td>.52</td>
<td>.46</td>
<td>.90</td>
</tr>
<tr>
<td>Actively encouraged by management</td>
<td>149.85</td>
<td>380.36</td>
<td>.44</td>
<td>.56</td>
<td>.90</td>
</tr>
<tr>
<td>Item</td>
<td>Scale Mean if Item Deleted</td>
<td>Scale Variance if Item Deleted</td>
<td>Corrected Item-Total Correlation</td>
<td>Squared Multiple Correlation</td>
<td>Cronbach's Alpha if Item Deleted</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>---------------------------</td>
<td>--------------------------------</td>
<td>---------------------------------</td>
<td>------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>I am financially supported</td>
<td>149.81</td>
<td>381.99</td>
<td>.39</td>
<td>.47</td>
<td>.90</td>
</tr>
<tr>
<td>Feel more respected by management</td>
<td>149.96</td>
<td>379.13</td>
<td>.50</td>
<td>.59</td>
<td>.90</td>
</tr>
<tr>
<td>Feel more respected by peers</td>
<td>149.54</td>
<td>382.84</td>
<td>.48</td>
<td>.52</td>
<td>.90</td>
</tr>
<tr>
<td>CPD is important to me</td>
<td>149.16</td>
<td>377.25</td>
<td>.69</td>
<td>.66</td>
<td>.90</td>
</tr>
<tr>
<td>CPD necessary for work practices</td>
<td>149.02</td>
<td>383.23</td>
<td>.53</td>
<td>.50</td>
<td>.90</td>
</tr>
<tr>
<td>CPD is necessary as professional</td>
<td>148.82</td>
<td>382.01</td>
<td>.63</td>
<td>.68</td>
<td>.90</td>
</tr>
<tr>
<td>CPD improves practice</td>
<td>148.86</td>
<td>381.69</td>
<td>.66</td>
<td>.71</td>
<td>.90</td>
</tr>
<tr>
<td>CPD ensures better patient care</td>
<td>149.13</td>
<td>374.84</td>
<td>.68</td>
<td>.71</td>
<td>.90</td>
</tr>
<tr>
<td>CPD relevant to my practice</td>
<td>149.08</td>
<td>377.83</td>
<td>.70</td>
<td>.67</td>
<td>.90</td>
</tr>
<tr>
<td>I would practise CPD if non-mandatory</td>
<td>149.11</td>
<td>385.73</td>
<td>.45</td>
<td>.59</td>
<td>.90</td>
</tr>
<tr>
<td>It is important for CPD to be mandatory</td>
<td>149.04</td>
<td>377.84</td>
<td>.61</td>
<td>.66</td>
<td>.90</td>
</tr>
<tr>
<td>CPD necessary to keep up to date</td>
<td>149.01</td>
<td>381.39</td>
<td>.56</td>
<td>.55</td>
<td>.90</td>
</tr>
<tr>
<td>CPD contributes to ethical workplace</td>
<td>149.40</td>
<td>380.19</td>
<td>.57</td>
<td>.73</td>
<td>.90</td>
</tr>
<tr>
<td>CPD contributes to a safer workplace</td>
<td>149.44</td>
<td>380.45</td>
<td>.55</td>
<td>.72</td>
<td>.90</td>
</tr>
<tr>
<td>CPD ensures credibility with public</td>
<td>149.21</td>
<td>381.38</td>
<td>.52</td>
<td>.46</td>
<td>.90</td>
</tr>
<tr>
<td>CPD is necessary for accreditation</td>
<td>148.77</td>
<td>386.78</td>
<td>.52</td>
<td>.50</td>
<td>.90</td>
</tr>
<tr>
<td>Item</td>
<td>Scale Mean if Item Deleted</td>
<td>Scale Variance if Item Deleted</td>
<td>Corrected Item-Total Correlation</td>
<td>Squared Multiple Correlation</td>
<td>Cronbach's Alpha if Item Deleted</td>
</tr>
<tr>
<td>------</td>
<td>-----------------------------</td>
<td>-------------------------------</td>
<td>--------------------------------</td>
<td>----------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>How often do you reflect on work practice</td>
<td>149.26</td>
<td>396.04</td>
<td>.15</td>
<td>.39</td>
<td>.91</td>
</tr>
<tr>
<td>Do you reflect in writing</td>
<td>151.20</td>
<td>394.95</td>
<td>.17</td>
<td>.36</td>
<td>.91</td>
</tr>
<tr>
<td>Do you reflect in discussion with colleagues</td>
<td>149.21</td>
<td>397.46</td>
<td>.12</td>
<td>.31</td>
<td>.91</td>
</tr>
<tr>
<td>Does your reflection lead to changed work practices</td>
<td>149.82</td>
<td>395.98</td>
<td>.15</td>
<td>.34</td>
<td>.91</td>
</tr>
<tr>
<td>Does your reflection lead to increased CPD</td>
<td>150.24</td>
<td>388.73</td>
<td>.34</td>
<td>.37</td>
<td>.90</td>
</tr>
<tr>
<td>(Rev) CPD is restrictive</td>
<td>149.44</td>
<td>377.94</td>
<td>.55</td>
<td>.43</td>
<td>.90</td>
</tr>
<tr>
<td>(Rev) I have difficulty choosing an activity</td>
<td>149.19</td>
<td>385.95</td>
<td>.42</td>
<td>.31</td>
<td>.90</td>
</tr>
<tr>
<td>(Rev) Family responsibilities</td>
<td>150.69</td>
<td>391.17</td>
<td>.18</td>
<td>.31</td>
<td>.91</td>
</tr>
<tr>
<td>(Rev) Lack of quality of courses</td>
<td>149.72</td>
<td>387.49</td>
<td>.28</td>
<td>.37</td>
<td>.90</td>
</tr>
<tr>
<td>(Rev) Lack of time</td>
<td>150.79</td>
<td>387.72</td>
<td>.31</td>
<td>.39</td>
<td>.90</td>
</tr>
<tr>
<td>(Rev) Lack of opportunity</td>
<td>150.09</td>
<td>378.98</td>
<td>.43</td>
<td>.51</td>
<td>.90</td>
</tr>
<tr>
<td>(Rev) Staff shortages</td>
<td>150.48</td>
<td>384.52</td>
<td>.33</td>
<td>.64</td>
<td>.90</td>
</tr>
<tr>
<td>(Rev) Workload</td>
<td>150.52</td>
<td>387.78</td>
<td>.27</td>
<td>.63</td>
<td>.90</td>
</tr>
<tr>
<td>(Rev) Lack of encouragement</td>
<td>149.79</td>
<td>378.06</td>
<td>.42</td>
<td>.56</td>
<td>.90</td>
</tr>
<tr>
<td>(Rev) Lack of course relevance</td>
<td>149.72</td>
<td>386.44</td>
<td>.31</td>
<td>.42</td>
<td>.90</td>
</tr>
<tr>
<td>(Rev) Cost</td>
<td>150.82</td>
<td>388.01</td>
<td>.27</td>
<td>.24</td>
<td>.90</td>
</tr>
<tr>
<td>(Rev) Remoteness</td>
<td>150.22</td>
<td>388.49</td>
<td>.21</td>
<td>.32</td>
<td>.91</td>
</tr>
<tr>
<td>Item Description</td>
<td>Scale Mean if Item Deleted</td>
<td>Scale Variance if Item Deleted</td>
<td>Corrected Item-Total Correlation</td>
<td>Squared Multiple Correlation</td>
<td>Cronbach's Alpha if Item Deleted</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------------------</td>
<td>-------------------------------</td>
<td>---------------------------------</td>
<td>------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>(Rev) Lack of resources</td>
<td>149.07</td>
<td>388.51</td>
<td>.27</td>
<td>.27</td>
<td>.90</td>
</tr>
<tr>
<td>(Rev) Have to use own time</td>
<td>150.35</td>
<td>381.71</td>
<td>.35</td>
<td>.34</td>
<td>.90</td>
</tr>
<tr>
<td>(Rev) Already know topic</td>
<td>149.81</td>
<td>390.80</td>
<td>.21</td>
<td>.19</td>
<td>.91</td>
</tr>
<tr>
<td>(Rev) I reflect in thought only</td>
<td>150.59</td>
<td>397.75</td>
<td>.09</td>
<td>.21</td>
<td>.91</td>
</tr>
</tbody>
</table>
## Appendix 5: Frequency of responses for each dependent variable

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly disagree %</th>
<th>Disagree %</th>
<th>Neither agree nor disagree %</th>
<th>Agree %</th>
<th>Strongly agree %</th>
<th>Total of Survey responses %</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPD should be mandatory</td>
<td>1.3</td>
<td>3.4</td>
<td>5.1</td>
<td>34.5</td>
<td>55.6</td>
<td>99.9</td>
</tr>
<tr>
<td>I would participate if not mandatory</td>
<td>1.8</td>
<td>6.5</td>
<td>11.9</td>
<td>50.6</td>
<td>29.2</td>
<td>99.9</td>
</tr>
<tr>
<td>Mandatory CPD is restrictive</td>
<td>16.3</td>
<td>38.9</td>
<td>23.5</td>
<td>16.3</td>
<td>3.4</td>
<td>98.4</td>
</tr>
<tr>
<td>Mandatory CPD has encouraged me to learn more</td>
<td>2.9</td>
<td>14.8</td>
<td>17</td>
<td>44.4</td>
<td>19.8</td>
<td>99</td>
</tr>
<tr>
<td>I have difficulty in choosing an activity</td>
<td>18</td>
<td>49.7</td>
<td>20.2</td>
<td>8.4</td>
<td>1.5</td>
<td>97.8</td>
</tr>
<tr>
<td>I plan activities in advance</td>
<td>2.9</td>
<td>27.1</td>
<td>22.7</td>
<td>39.7</td>
<td>6.2</td>
<td>98.7</td>
</tr>
<tr>
<td>I reflect on my needs for CPD</td>
<td>2.9</td>
<td>17.2</td>
<td>25.5</td>
<td>46.9</td>
<td>6</td>
<td>98.5</td>
</tr>
<tr>
<td>I seek out activities to fulfil my needs</td>
<td>1.5</td>
<td>6.3</td>
<td>12</td>
<td>66</td>
<td>13.3</td>
<td>99.1</td>
</tr>
<tr>
<td>Participating in CPD makes me more confident at work</td>
<td>2.2</td>
<td>9.8</td>
<td>13</td>
<td>55</td>
<td>19.4</td>
<td>99.4</td>
</tr>
<tr>
<td>Participating in CPD makes me feel better outside of work</td>
<td>6.5</td>
<td>25.1</td>
<td>34.9</td>
<td>26.4</td>
<td>7</td>
<td>99.9</td>
</tr>
<tr>
<td>I am actively encouraged by management</td>
<td>9.8</td>
<td>23.6</td>
<td>22.6</td>
<td>35.8</td>
<td>7.8</td>
<td>99.6</td>
</tr>
<tr>
<td>I am financially supported</td>
<td>14.1</td>
<td>19.1</td>
<td>14.7</td>
<td>45</td>
<td>6.9</td>
<td>99.7</td>
</tr>
<tr>
<td>I feel more respected by management</td>
<td>11.1</td>
<td>20.2</td>
<td>33.9</td>
<td>28</td>
<td>6.6</td>
<td>99.9</td>
</tr>
<tr>
<td>I feel more respected by my peers</td>
<td>4.5</td>
<td>12</td>
<td>29.9</td>
<td>45.2</td>
<td>8.1</td>
<td>99.7</td>
</tr>
<tr>
<td>CPD is important to me</td>
<td>1.9</td>
<td>6</td>
<td>20.7</td>
<td>52.6</td>
<td>18.8</td>
<td>100</td>
</tr>
<tr>
<td>CPD is necessary for work practices</td>
<td>1.9</td>
<td>6.0</td>
<td>11.7</td>
<td>58.8</td>
<td>21.4</td>
<td>99.9</td>
</tr>
<tr>
<td>CPD is necessary as a</td>
<td>1.2</td>
<td>3.2</td>
<td>8.9</td>
<td>56</td>
<td>30.6</td>
<td>100</td>
</tr>
<tr>
<td>Question</td>
<td>Strongly disagree %</td>
<td>Disagree %</td>
<td>Neither agree nor disagree %</td>
<td>Agree %</td>
<td>Strongly agree %</td>
<td>Total of Survey responses %</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>---------------------</td>
<td>------------</td>
<td>-----------------------------</td>
<td>---------</td>
<td>-----------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>CPD improves practice</td>
<td>1.2</td>
<td>2.9</td>
<td>9.5</td>
<td>59.2</td>
<td>27.1</td>
<td>100</td>
</tr>
<tr>
<td>CPD ensures better patient care</td>
<td>2.8</td>
<td>10</td>
<td>15</td>
<td>48.4</td>
<td>23.9</td>
<td>100</td>
</tr>
<tr>
<td>CPD is relevant to my practice</td>
<td>1.3</td>
<td>6.5</td>
<td>17</td>
<td>55.4</td>
<td>19.8</td>
<td>100</td>
</tr>
<tr>
<td>I would practice CPD if it was non mandatory</td>
<td>1.3</td>
<td>7.8</td>
<td>13</td>
<td>59.7</td>
<td>17.9</td>
<td>99.7</td>
</tr>
<tr>
<td>It is important for CPD to be mandatory</td>
<td>2.5</td>
<td>6.6</td>
<td>16.4</td>
<td>46.8</td>
<td>27.1</td>
<td>99.4</td>
</tr>
<tr>
<td>CPD is necessary to keep up to date</td>
<td>1.3</td>
<td>8.7</td>
<td>9.1</td>
<td>56.5</td>
<td>24.3</td>
<td>99.9</td>
</tr>
<tr>
<td>CPD contributes to an ethical workplace</td>
<td>2.6</td>
<td>11</td>
<td>27.7</td>
<td>44.9</td>
<td>13.2</td>
<td>99.4</td>
</tr>
<tr>
<td>CPD contributes to a safer workplace</td>
<td>2.2</td>
<td>14.1</td>
<td>27.9</td>
<td>42.1</td>
<td>13.3</td>
<td>99.6</td>
</tr>
<tr>
<td>CPD ensures credibility with the public</td>
<td>2.8</td>
<td>8.4</td>
<td>19.1</td>
<td>50.6</td>
<td>18.8</td>
<td>99.6</td>
</tr>
<tr>
<td>CPD is necessary for accreditation</td>
<td>.9</td>
<td>2.8</td>
<td>6.5</td>
<td>57.9</td>
<td>30.9</td>
<td>99</td>
</tr>
<tr>
<td>Family responsibilities</td>
<td>6.2</td>
<td>15.8</td>
<td>5.7</td>
<td>41.3</td>
<td>30.6</td>
<td>99.7</td>
</tr>
<tr>
<td>Lack of quality courses</td>
<td>11.7</td>
<td>41.5</td>
<td>8.5</td>
<td>32.1</td>
<td>5.1</td>
<td>99</td>
</tr>
<tr>
<td>Lack of time</td>
<td>3.4</td>
<td>13.2</td>
<td>4.1</td>
<td>55.1</td>
<td>24.2</td>
<td>100</td>
</tr>
<tr>
<td>Lack of opportunity</td>
<td>9.7</td>
<td>28.7</td>
<td>11.6</td>
<td>37.1</td>
<td>12.2</td>
<td>100</td>
</tr>
<tr>
<td>Staff shortage</td>
<td>5.9</td>
<td>20.2</td>
<td>10</td>
<td>42.5</td>
<td>21.3</td>
<td>99.9</td>
</tr>
<tr>
<td>Workload</td>
<td>4.4</td>
<td>20.5</td>
<td>9.1</td>
<td>45.5</td>
<td>20.4</td>
<td>99.9</td>
</tr>
<tr>
<td>Lack of encouragement</td>
<td>17.2</td>
<td>29.3</td>
<td>16.1</td>
<td>24.9</td>
<td>12.5</td>
<td>100</td>
</tr>
<tr>
<td>Lack of course relevance</td>
<td>10.1</td>
<td>42.2</td>
<td>10.6</td>
<td>32.6</td>
<td>4.4</td>
<td>99.9</td>
</tr>
<tr>
<td>Cost</td>
<td>4.5</td>
<td>12</td>
<td>5.9</td>
<td>45</td>
<td>32.6</td>
<td>100</td>
</tr>
<tr>
<td>Remoteness</td>
<td>14.2</td>
<td>19.2</td>
<td>16.1</td>
<td>28.9</td>
<td>21.4</td>
<td>99.9</td>
</tr>
<tr>
<td>Lack of resources</td>
<td>36.2</td>
<td>29.9</td>
<td>20.7</td>
<td>10.1</td>
<td>3.1</td>
<td>99.9</td>
</tr>
<tr>
<td>Having to use own time</td>
<td>10.3</td>
<td>21</td>
<td>6.3</td>
<td>40.8</td>
<td>21.7</td>
<td>100</td>
</tr>
<tr>
<td>------------------------</td>
<td>------</td>
<td>----</td>
<td>-----</td>
<td>------</td>
<td>------</td>
<td>-----</td>
</tr>
<tr>
<td>Already know topic</td>
<td>11</td>
<td>35.3</td>
<td>12.6</td>
<td>35.8</td>
<td>4</td>
<td>98.7</td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>Seldom</td>
<td>Sometimes</td>
<td>Often</td>
<td>Always</td>
<td></td>
</tr>
<tr>
<td>How often do you reflect on work practice</td>
<td>.4</td>
<td>5.1</td>
<td>30.1</td>
<td>49.9</td>
<td>13.8</td>
<td>99.3</td>
</tr>
<tr>
<td>Do you reflect in writing</td>
<td>46.9</td>
<td>34.9</td>
<td>12.6</td>
<td>4.1</td>
<td>.6</td>
<td>99.1</td>
</tr>
<tr>
<td>Do you reflect in thought only</td>
<td>1</td>
<td>8.2</td>
<td>30.9</td>
<td>43.8</td>
<td>14.5</td>
<td>98.5</td>
</tr>
<tr>
<td>Do you reflect in discussion with colleagues</td>
<td>.6</td>
<td>4.7</td>
<td>25.8</td>
<td>56.5</td>
<td>11.6</td>
<td>99.1</td>
</tr>
<tr>
<td>Does your reflection lead to changed work practices</td>
<td>2.8</td>
<td>13.9</td>
<td>52.5</td>
<td>26.1</td>
<td>3.8</td>
<td>99.1</td>
</tr>
<tr>
<td>Does your reflection lead to increased CPD</td>
<td>8.8</td>
<td>28.7</td>
<td>43.3</td>
<td>15.7</td>
<td>1.6</td>
<td>98.1</td>
</tr>
</tbody>
</table>
Appendix 5

Frequencies – bar charts

- Cpd should be mandatory
- I would participate in CPD even if it was not mandatory
- Mandatory CPD is restrictive
- Mandatory CPD encouraged me to learn more
- Have difficulty in choosing activity
- Plan activities in advance
- I reflect on my needs for CPD
- I seek out CPD activities to fulfil needs
Appendix 6: Scree Plot
### Appendix 7:

Structure and Pattern matrix of PCA for sonographer CPD survey

<table>
<thead>
<tr>
<th>Item</th>
<th>Structure Coefficients</th>
<th>Pattern Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Comp 1</td>
<td>Comp 2</td>
</tr>
<tr>
<td><strong>Variance (total 41.39%)</strong></td>
<td>24.07%</td>
<td>8.13%</td>
</tr>
<tr>
<td><strong>Eigenvalue</strong></td>
<td>11.08</td>
<td>3.74</td>
</tr>
<tr>
<td>1 CPD should be mandatory</td>
<td>.74</td>
<td>-.216</td>
</tr>
<tr>
<td>2 Participate if not mandatory</td>
<td>.50</td>
<td>-.20</td>
</tr>
<tr>
<td>3 Mandatory CPD is restrictive</td>
<td>-.55</td>
<td>.38</td>
</tr>
<tr>
<td>4 Mandatory CPD encouraged to learn more</td>
<td>.56</td>
<td>.03</td>
</tr>
<tr>
<td>Item</td>
<td>Structure Coefficients</td>
<td>Pattern Coefficients</td>
</tr>
<tr>
<td>------</td>
<td>------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td></td>
<td>Comp 1</td>
<td>Comp 2</td>
</tr>
<tr>
<td>5 Have difficulty in choosing activity</td>
<td>-.33</td>
<td>.43</td>
</tr>
<tr>
<td>6 Plan activities in advance</td>
<td>.31</td>
<td>.16</td>
</tr>
<tr>
<td>7 I reflect on my needs for CPD</td>
<td>.48</td>
<td>.09</td>
</tr>
<tr>
<td>8 I seek out CPD activities to fulfil needs</td>
<td>.32</td>
<td>.20</td>
</tr>
<tr>
<td>9 Participating in CPD makes me more confident at work</td>
<td>.74</td>
<td>-.06</td>
</tr>
<tr>
<td>10 Participating in CPD makes me feel better outside of work</td>
<td>.62</td>
<td>-.02</td>
</tr>
<tr>
<td>11 Actively encouraged by management</td>
<td>.3</td>
<td>-.15</td>
</tr>
<tr>
<td>12 I am supported by management</td>
<td>.25</td>
<td>-.20</td>
</tr>
<tr>
<td>13 Feel respected by mgt</td>
<td>.41</td>
<td>-.2</td>
</tr>
<tr>
<td>Item</td>
<td>Structure Coefficients</td>
<td>Pattern Coefficients</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td></td>
<td>Comp 1</td>
<td>Comp 2</td>
</tr>
<tr>
<td>14 Feel more respected by peers</td>
<td>.45</td>
<td>-.11</td>
</tr>
<tr>
<td>15 CPD is important to me</td>
<td>.80</td>
<td>-.20</td>
</tr>
<tr>
<td>16 CPD is necessary for work practice</td>
<td>.68</td>
<td>-.12</td>
</tr>
<tr>
<td>17 CPD is necessary as a professional</td>
<td>.80</td>
<td>-.17</td>
</tr>
<tr>
<td>18 CPD improves practice</td>
<td>.80</td>
<td>-.175</td>
</tr>
<tr>
<td>19 CPD ensures better patient care</td>
<td>.80</td>
<td>-.216</td>
</tr>
<tr>
<td>20 CPD relevant to my practice</td>
<td>.77</td>
<td>-.26</td>
</tr>
<tr>
<td>21 I would practise CPD if non-mandatory</td>
<td>.45</td>
<td>-.22</td>
</tr>
<tr>
<td>22 It is important for CPD to be mandatory</td>
<td>.74</td>
<td>-.27</td>
</tr>
<tr>
<td>23 CPD is necessary to keep up to date</td>
<td>.73</td>
<td>-.08</td>
</tr>
<tr>
<td>24 CPD contributes to an</td>
<td>.68</td>
<td>-.11</td>
</tr>
</tbody>
</table>
ethical workplace

25 CPD contributes to a safer workplace

<table>
<thead>
<tr>
<th>Item</th>
<th>Structure Coefficients</th>
<th>Pattern Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Comp 1</td>
<td>Comp 2</td>
</tr>
<tr>
<td>26 CPD ensures credibility with public</td>
<td>.63</td>
<td>-.16</td>
</tr>
<tr>
<td>27 CPD is necessary for accreditation</td>
<td>.65</td>
<td>-.21</td>
</tr>
<tr>
<td>28 Family responsibilities</td>
<td>-.06</td>
<td>.45</td>
</tr>
<tr>
<td>29 Lack of quality courses</td>
<td>-.14</td>
<td>.52</td>
</tr>
<tr>
<td>30 Lack of time</td>
<td>-.02</td>
<td>.59</td>
</tr>
<tr>
<td>31 Lack of opportunity</td>
<td>-.18</td>
<td>.71</td>
</tr>
<tr>
<td>32 Staff shortage</td>
<td>-.13</td>
<td>.64</td>
</tr>
<tr>
<td>33 Workload</td>
<td>-.06</td>
<td>.60</td>
</tr>
<tr>
<td>34 Lack of encouragement</td>
<td>-.15</td>
<td>.46</td>
</tr>
<tr>
<td>35 Lack of course relevance</td>
<td>-.16</td>
<td>.43</td>
</tr>
<tr>
<td>Item</td>
<td>Structure Coefficients</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------------</td>
<td>------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td></td>
<td>Comp 1</td>
<td>Comp 2</td>
</tr>
<tr>
<td>36 Cost</td>
<td>-.09</td>
<td>.44</td>
</tr>
<tr>
<td>37 Remoteness</td>
<td>-.05</td>
<td>.46</td>
</tr>
<tr>
<td>38 Lack of resources</td>
<td>-.13</td>
<td>.50</td>
</tr>
<tr>
<td>39 Having to use own time</td>
<td>-.21</td>
<td>.52</td>
</tr>
<tr>
<td>40 Already know topic</td>
<td>-.12</td>
<td>.24</td>
</tr>
<tr>
<td>41 How often do you reflect on work practice</td>
<td>.11</td>
<td>.01</td>
</tr>
<tr>
<td>42 Do you reflect in writing</td>
<td>.13</td>
<td>.04</td>
</tr>
<tr>
<td>43 Do you reflect in thought only</td>
<td>-.07</td>
<td>.12</td>
</tr>
<tr>
<td>44 Do you reflect in discussion with colleagues</td>
<td>.09</td>
<td>.05</td>
</tr>
<tr>
<td>45 Does your reflection lead to changed work practices</td>
<td>.08</td>
<td>.01</td>
</tr>
<tr>
<td>46 Does your reflection lead to increased CPD</td>
<td>.41</td>
<td>.06</td>
</tr>
</tbody>
</table>
### Appendix 8: Means of Scores from PCA

Mean scores for each group in Belief on the value of CPD component

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>City &amp; Suburbs</td>
<td>0.09</td>
<td>0.94</td>
</tr>
<tr>
<td>Regional/rural</td>
<td>-0.1</td>
<td>1.02</td>
</tr>
<tr>
<td>Male</td>
<td>-0.32</td>
<td>1.28</td>
</tr>
<tr>
<td>Female</td>
<td>0.08</td>
<td>0.89</td>
</tr>
<tr>
<td>21-34</td>
<td>0.03</td>
<td>0.8</td>
</tr>
<tr>
<td>35-44</td>
<td>-0.05</td>
<td>1.09</td>
</tr>
<tr>
<td>45+</td>
<td>0.04</td>
<td>0.99</td>
</tr>
<tr>
<td>0-4 years</td>
<td>-0.01</td>
<td>0.79</td>
</tr>
<tr>
<td>5-9 years</td>
<td>0.02</td>
<td>0.84</td>
</tr>
<tr>
<td>10-14 years</td>
<td>-0.04</td>
<td>1.06</td>
</tr>
<tr>
<td>15+ years</td>
<td>0.03</td>
<td>1.05</td>
</tr>
<tr>
<td>Sole occupation-yes</td>
<td>0.03</td>
<td>1.0</td>
</tr>
<tr>
<td>No</td>
<td>-0.08</td>
<td>0.89</td>
</tr>
</tbody>
</table>
Mean scores for each group in the barriers to participation component

Mean scores and standard deviations for all the groups in the Barriers to participation component are summarised below:

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>City suburbs</td>
<td>-0.21</td>
<td>1.01</td>
</tr>
<tr>
<td>Regional/rural</td>
<td>0.23</td>
<td>0.95</td>
</tr>
<tr>
<td>Male</td>
<td>-0.04</td>
<td>0.91</td>
</tr>
<tr>
<td>Female</td>
<td>-0.01</td>
<td>1.03</td>
</tr>
<tr>
<td>21-34</td>
<td>0.11</td>
<td>0.95</td>
</tr>
<tr>
<td>35-44</td>
<td>0.1</td>
<td>0.97</td>
</tr>
<tr>
<td>45+</td>
<td>-0.22</td>
<td>1.05</td>
</tr>
<tr>
<td>0-4 years</td>
<td>0.08</td>
<td>1.04</td>
</tr>
<tr>
<td>5-9 years</td>
<td>0.18</td>
<td>0.94</td>
</tr>
<tr>
<td>10-14 years</td>
<td>0.07</td>
<td>0.92</td>
</tr>
<tr>
<td>15+ years</td>
<td>-0.2</td>
<td>1.06</td>
</tr>
<tr>
<td>Sole occupation - yes</td>
<td>-0.03</td>
<td>0.99</td>
</tr>
<tr>
<td>No</td>
<td>0.04</td>
<td>1.04</td>
</tr>
</tbody>
</table>
Mean scores for each group in reflective practice

Mean scores and standard deviations for all the groups in the self-direction/reflective practice component are summarised below:

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>City suburbs</td>
<td>0.00</td>
<td>0.96</td>
</tr>
<tr>
<td>Regional/rural</td>
<td>-0.06</td>
<td>1.04</td>
</tr>
<tr>
<td>Male</td>
<td>0.00</td>
<td>1.09</td>
</tr>
<tr>
<td>Female</td>
<td>-0.03</td>
<td>0.97</td>
</tr>
<tr>
<td>21-34</td>
<td>-0.07</td>
<td>0.96</td>
</tr>
<tr>
<td>35-44</td>
<td>-0.06</td>
<td>0.97</td>
</tr>
<tr>
<td>45+</td>
<td>0.04</td>
<td>1.04</td>
</tr>
<tr>
<td>0-4 years</td>
<td>-0.13</td>
<td>0.96</td>
</tr>
<tr>
<td>5-9 years</td>
<td>-0.11</td>
<td>1.03</td>
</tr>
<tr>
<td>10-14 years</td>
<td>-0.1</td>
<td>0.95</td>
</tr>
<tr>
<td>15+ years</td>
<td>0.1</td>
<td>1.01</td>
</tr>
<tr>
<td>Sole occupation - yes</td>
<td>-0.04</td>
<td>1.03</td>
</tr>
<tr>
<td>No</td>
<td>-0.02</td>
<td>0.9</td>
</tr>
</tbody>
</table>
Mean scores for each group in motivational issues component

Mean scores and standard deviations for all the groups in the motivational issues component are summarised below:

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>City suburbs</td>
<td>0.05</td>
<td>0.99</td>
</tr>
<tr>
<td>Regional/rural</td>
<td>-0.04</td>
<td>1.0</td>
</tr>
<tr>
<td>Male</td>
<td>0.01</td>
<td>1.07</td>
</tr>
<tr>
<td>Female</td>
<td>0.02</td>
<td>0.98</td>
</tr>
<tr>
<td>21-34</td>
<td>0.26</td>
<td>0.93</td>
</tr>
<tr>
<td>35-44</td>
<td>-0.05</td>
<td>0.98</td>
</tr>
<tr>
<td>45+</td>
<td>-0.11</td>
<td>1.02</td>
</tr>
<tr>
<td>0-4 years</td>
<td>0.48</td>
<td>0.84</td>
</tr>
<tr>
<td>5-9 years</td>
<td>0.09</td>
<td>0.97</td>
</tr>
<tr>
<td>10-14 years</td>
<td>0.00</td>
<td>1.01</td>
</tr>
<tr>
<td>15+ years</td>
<td>-0.16</td>
<td>0.99</td>
</tr>
<tr>
<td>Sole occupation - yes</td>
<td>0.01</td>
<td>0.99</td>
</tr>
<tr>
<td>No</td>
<td>0.01</td>
<td>1.01</td>
</tr>
</tbody>
</table>
## Appendix 9: Demographic frequencies of survey commentaries

### Belief in the Value of CPD

<table>
<thead>
<tr>
<th>Positive comments</th>
<th>percentage</th>
<th>Negative comments</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>22</td>
<td>Female</td>
<td>78</td>
</tr>
<tr>
<td>Female</td>
<td>21.5</td>
<td>Female</td>
<td>78.5</td>
</tr>
<tr>
<td>Urban</td>
<td>54</td>
<td>Rural</td>
<td>43</td>
</tr>
<tr>
<td>Rural</td>
<td>53</td>
<td>Rural</td>
<td>46</td>
</tr>
<tr>
<td>45+ years</td>
<td>52</td>
<td>35-44 years</td>
<td>33.3</td>
</tr>
<tr>
<td>35-44 years</td>
<td>34</td>
<td>21-34 years</td>
<td>21</td>
</tr>
<tr>
<td>21-34 years</td>
<td>21</td>
<td>15+ years experience</td>
<td>56</td>
</tr>
<tr>
<td>15+ years experience</td>
<td>54</td>
<td>10-14 years experience</td>
<td>20</td>
</tr>
<tr>
<td>10-14 years experience</td>
<td>23</td>
<td>5-9 years experience</td>
<td>20</td>
</tr>
<tr>
<td>5-9 years experience</td>
<td>20</td>
<td>0-4 years experience</td>
<td>3</td>
</tr>
<tr>
<td>0-4 years experience</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Barriers to Participation

<table>
<thead>
<tr>
<th>Demographic</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>12.5</td>
</tr>
<tr>
<td>Female</td>
<td>87.5</td>
</tr>
<tr>
<td>Urban</td>
<td>42</td>
</tr>
<tr>
<td>Rural</td>
<td>54</td>
</tr>
<tr>
<td>45+ years</td>
<td>38.5</td>
</tr>
<tr>
<td>35-44 years</td>
<td>31.5</td>
</tr>
<tr>
<td>21-34 years</td>
<td>31</td>
</tr>
<tr>
<td>15+ years experience</td>
<td>37.5</td>
</tr>
<tr>
<td>10-14 years experience</td>
<td>23.5</td>
</tr>
<tr>
<td>5-9 years experience</td>
<td>20</td>
</tr>
<tr>
<td>0-4 years experience</td>
<td>3</td>
</tr>
</tbody>
</table>
### Motivators

<table>
<thead>
<tr>
<th>Demographic</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>15.5</td>
</tr>
<tr>
<td>Female</td>
<td>82.3</td>
</tr>
<tr>
<td>Urban</td>
<td>53</td>
</tr>
<tr>
<td>Rural</td>
<td>43</td>
</tr>
<tr>
<td>45+ years</td>
<td>39.25</td>
</tr>
<tr>
<td>35-44 years</td>
<td>39.25</td>
</tr>
<tr>
<td>21-34 years</td>
<td>21.5</td>
</tr>
<tr>
<td>15+ years experience</td>
<td>51</td>
</tr>
<tr>
<td>10-14 years experience</td>
<td>19.5</td>
</tr>
<tr>
<td>5-9 years experience</td>
<td>17.5</td>
</tr>
<tr>
<td>0-4 years experience</td>
<td>12</td>
</tr>
</tbody>
</table>

### Reflective practice/self-direction

<table>
<thead>
<tr>
<th>Demographic</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>13</td>
</tr>
<tr>
<td>Female</td>
<td>87</td>
</tr>
<tr>
<td>Urban</td>
<td>50</td>
</tr>
<tr>
<td>Rural</td>
<td>48</td>
</tr>
<tr>
<td>45+ years</td>
<td>48</td>
</tr>
<tr>
<td>35-44 years</td>
<td>41</td>
</tr>
<tr>
<td>21-34 years</td>
<td>11</td>
</tr>
<tr>
<td>15+ years experience</td>
<td>63</td>
</tr>
<tr>
<td>10-14 years experience</td>
<td>16.5</td>
</tr>
<tr>
<td>5-9 years experience</td>
<td>15</td>
</tr>
<tr>
<td>0-4 years experience</td>
<td>3.5</td>
</tr>
</tbody>
</table>