Continuing Professional Development (CPD) for the dental profession in Australia: An approach and its implications

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Declaration of originality

Except where clearly acknowledged in footnotes, quotations and the references, I declare that I am the sole author of the thesis submitted today entitled:

Continuing Professional Development (CPD) for the dental profession in Australia:

An approach and its implications

Signed:

John Peterie Fricker

Date:
Acknowledgements

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Prior to submission, this thesis was proof read by a third party. However, I am responsible for all editorial content including the original drawings (©) in Figures 1 and 8.

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John Fricker
Abstract

In this thesis, I argue that in order to keep up to date with knowledge, technology and clinical procedures, professional practitioners need to continue to learn throughout life and build on their previous knowledge and experience. To this end, I have taken a range of responses from a sample of practising dentists in regional Australia. This study’s original contribution to the field of professional education is a newly gained understanding of attitudes of practising dentists to Continuing Professional Development (CPD), including more specifically these dentists’ attitudes towards CPD as a learning experience, and the incentives for and barriers to their engagement in this learning.

In addition, I have explored two related areas within the sample group against the background variables of sex, age of practitioner and type of practice. The first explored area was the range of associations between learning and incentives and barriers, and attitudes to the usefulness of, and extent of engagement in CPD. The second area related to the attitudes to mentoring, updating components of dental practice and accreditation of CPD. I question if these attitudes are possible predictors of effective CPD with this hypothesis: Those who prefer to learn through social interaction and/or collaboration with others are more likely to have a positive attitude to engagement in Continuing Professional Development (CPD).

I begin with an extensive review of the literature on the concepts of professions and professionalism. I follow with a review of existing research of CPD as professional learning throughout a lifetime of practice, alongside a review of existing research of professional learning through interaction and/or collaboration with others.

The study’s data on attitudes and behaviours to CPD were gathered through a self-managed questionnaire sent to a population of registered dentists in the ACT and surrounding regions. 325 practising dentists were invited to participate with a response rate of 44 percent. The results of the survey showed the most useful activities for CPD were hands-on workshops, which were effective for updating clinical and procedure skills; and lectures, which were effective for updating knowledge. Mentoring was strongly supported by the whole profession with older dentists prepared to act as
mentors and younger dentists willing to be mentored. The most significant incentives to engage in CPD were course content, quality of presenter and relevance to practice.

There were significant differences in attitudes to CPD between males and females and older and younger age groups. For example, females generally preferred more social learning environments than males. Costs related to CPD were more of a discouraging factor for younger dentists and motivational factors related to intellectual curiosity were strongest in younger males but modify with age such that older females were more self-motivated than other groups. Overall, differences in attitudes between specialists and general practitioners were small, except for intellectual curiosity and willingness to act as mentors where specialists dominated.

The results and implications of this study will be valuable to any future offering of CPD to professionals in Australia. It has built upon previous research by offering a new framework for effective CPD for all professions. This new CPD framework aligns course content with CPD activities that have been demonstrated as useful and which have been reported as actually engaged in, with the learning characteristics of the target demographics. The CPD framework has been developed within the Australian context and the rapidly changing demographics of Australian dental practice.
Publications arising from this research

Peer reviewed papers:


Invited lecturer:

Topic: Gaps in training that challenge the dental workforce. Pathways to CPD.

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One does not stand still in the practice of his profession but goes forward or backward; and the man [sic] who hibernates like a bear in his own home town and makes a hermit of himself does not go forward very fast, even though he does subscribe for a journal or two. (Bremner, 1922, p.10)

Dentistry is a vocational profession where university education prepares practitioners for a unique field of endeavour where the vast majority of practitioners remain for the whole of their working lives. However, the rapidly changing knowledge base occurring through research means that the period of initial training can no longer equip practitioners with all the skills and knowledge required throughout their years of professional practice.

Through my research, I argue that dentists have both a professional and a regulated responsibility to keep up-to-date and have the interests of the patient as a first priority. This responsibility has never been stronger as the practice of dentistry in Australia goes through a paradigm shift from the “drill, fill or extract” of a dental surgeon to prevention, minimum intervention and advisor of an oral health physician. To fulfil these responsibilities, the dental profession in Australia supports its members to engage in Continuing Professional Development (CPD).

Effective CPD is a learning experience leading to the development of knowledge and skills and the application of these to problems faced by practising professionals (du Boulay, 1999). However, a report from a UK review of CPD in dentistry concluded: “There is very little of any type of evidence to support the effectiveness of CPD in improving the performance of the oral health team”(Best, Eaton et al., 2005a, p.71). This rather alarming conclusion presents a challenge to CPD providers to offer effective CPD for dentistry as well as a consideration for other professions.

It is a curious imbalance in that although there are potentially vastly more dentists taking part in CPD than undergraduate training, very little research has taken place into dental CPD (Best, Eaton et al., 2005b). The aim of this (my) study is to gain an understanding of CPD as a learning experience within the dental profession with a view...
to improving its effectiveness. To do this I have surveyed a cohort of practising dentists for their own attitudes, behaviours and opinions regarding professional learning.

I assert that this has value in contributing to knowledge and to the betterment of the dental profession. Nonetheless, there were ethical considerations that needed to be taken into account following the fundamental guide of “first do no harm.” Tuckman (1988, pp.14-15) has outlined these considerations as:

The right to privacy or non-participation.

The right to remain anonymous.

The right to confidentiality.

The right to expect experimenter responsibility.

These considerations were addressed in the application for Human Ethics Approval at the Australian National University (ANU) which was granted with protocol number 2006/0323.

Arising from the analysis of the data collected from the questionnaire responses, I argue that learning within the context of social learning provides a framework for CPD to help dentists to learn as professionals throughout their careers. Social learning is presented in the literature as learning through human interaction and collaboration with others.

I begin with an outline of the purpose of this research followed by a background discourse on CPD within the context of the dental profession in Australia. This is followed by a statement of my personal stance and the organisation of this thesis.

**Purpose of research**

The aim of this research is to gain a greater understanding of how Australian dentists view CPD. In particular, I wanted to find out CPD might be made more effective as discussed below. This aim was based on the hypothesis:

*Those who prefer to learn through social interaction and/or collaboration with others are more likely to have a positive attitude to engagement in CPD.*
Educational programmes such as the delivery of CPD are often referred to as learning systems, “yet learning is not a necessary or inevitable consequence of such a programme” (Brookfield, 1995, p.7). Brookfield calls for more attention to:

…how making meaning, critical thinking and entering new cognitive and instrumental domains are viscerally experienced processes and adult learning needs to be understood much more as a socially embedded and socially constructed phenomenon. (Brookfield, 1995, p.8)

Brookfield also calls for more studies of how adults feel their way through learning episodes, recorded in their own words with their own interpretations and constructs (Brookfield, 1995). Eraut (1994) notes a remarkable ignorance about professional learning which he has later described as “changes over time in what professionals understand and what they are capable of doing” (Eraut, 2006, p.1). Professional learning has been reinforced more recently by Webster-Wright (2009) with a call to refocus on Professional Development (PD) as Continuing Professional Learning (CPL).

Through choosing to focus on understanding the experience of CPL, rather than evaluating the delivery of PD, and by using holistic, situated research approaches to investigate CPL, this reframing of PD challenges the problematic nature of much current research in this area. Such research seeks to understand professionals’ experiences of learning in a way that respects and retains the complexity and diversity of these experiences, with the aim of developing insights into better ways to support professions. (Webster-Wright, 2009, p.714)

There is a wealth of literature on the professions and their practices (Becher, 1999; Daley, B, 2001; Eraut, 2007; Higgs, Fish et al., 2010; Higgs & Titchen, 2001; Smith, Ajjawi et al., 2010; Webster-Wright, 2009); however, while they include the health professions, dentistry falls under the radar when it comes to researching professional practice and CPD as a learning experience. Indeed, Becher (1999) suggests further research on individual professions in addition to his study of the six professions of medicine, pharmacy, law, accounting, architecture and engineering. This research adds to the body of knowledge of CPD, specifically in reference to the profession of dentistry in Australia.
The terminology of CPD was used within this study as it is the terminology used by the Dental Board of Australia (DBA) and is familiar to the dental profession. Data collected from practising dentists via a questionnaire survey (see Appendix I) has been analysed and reported in Chapters 6 and 7. The theoretical underpinning of this research is adult learning as a social process described forthwith as “social learning”.

Social learning focuses on how knowledge and understanding is constructed through interaction with other learners and the environment (Crotty, 1998). The evidence from the literature (see Chapter 3) emphasises the importance of interaction and collaboration with others and supports these components of social learning as a framework for adult learning throughout one’s professional life. I argue this is congruent with an explanation of Continuing Professional Development (CPD) as professional learning throughout a lifetime of practice. The next section provides a background to this research and the terminology within the CPD literature.

**Background**

Dentistry in Australia as a health profession is regulated by the Australian Health Practitioner Regulation Agency (AHPRA) and from 1 July 2010 has had national registration overseen by the DBA. The national scheme for the regulation of health practitioners has been described by the CEO of AHPRA as:

> One of the most ambitious regulatory reforms undertaken anywhere in the world and places public and patient safety at the heart of health practitioner regulation. (Media release, 2011)

Prior to national registration, all states and territories in Australia had individual dental registration boards, with the Australian Capital Territory (ACT) and Victoria mandating CPD from 2005. The ACT also required annual review of cross-infection control procedures and cardio-pulmonary resuscitation (CPR) as a component of CPD.

The DBA publishes a code of conduct, which includes a duty on behalf of all practitioners to keep their skills and knowledge up-to-date. This is enforced under the National Law to undertake CPD with a minimum of 60 hours of CPD activities over a three-year period.
The literature demonstrates a confusing array of terminology covering the education of practitioners post-university. These include:

- Continuing Education (CE)
- Continuing Medical Education (CME)
- Continuing Professional Education (CPE)
- Human Resource Development (HRD)
- Continuing Professional Development (CPD)

CE is a traditional term for post-graduate education in the professions and was used in a similar vein as CME specifically for medicine. CE and CME usually relate to enhancement of skills and were generally in a more didactic format (Lewis, 1998; Van Harrison, 2004).

CPE programmes aim to improve an individual professional’s expertise while HRD aims to improve the professional and the organisation around him/her (Sleezer, Conti et al., 2004). Both CPE and HRD focus on learning in the workplace.

CPD was introduced in the 1990s to replace CME following the recommendation of the UK Standing Committee on Post Graduate Medical and Dental Education (SCOPME) (Oxley, 1999). This committee recognised that CME was not adequate to meet all the educational and career needs of doctors and dentists and recommended that CME should be set in the wider context of CPD. This wider context of CPD has been described by Gibbs, Brigden and Hellenberg (2005), to include skills beyond their own clinical skills, such as, management, teaching, social and personal skills.

The Dental Board of the ACT includes the wider context of CPD in defining it as:

study, training, courses, seminars, reading and various other activities that could reasonably be expected to advance professional development as a dentist. It is the means by which members of the profession can maintain, improve and broaden their knowledge and skills and develop the personal qualities required in their personal lives. (Dental Board of the ACT, 2004)

More recently, the DBA has provided an abbreviated but similar definition of CPD as:
The means by which members of the profession maintain, improve and broaden their knowledge, expertise and competence, and develop the personal qualities required throughout their professional lives. (Dental Board of Australia, 2010b, p.1)

These definitions recognise CPD as a process of lifelong learning and describe a shift in post-university learning from skills training to the holistic development of the professional within his or her own work (Daley, 2002; Peck, McCall et al., 2000).

From the time of Australia’s federation in 1901, dentistry has been a university-based programme. The University of Sydney graduated the first cohort of candidates to the degree of Bachelor of Dental Surgery in 1906 (Halliday, 1977, p.91) and there are now nine dental schools in Australia whose graduates are eligible for immediate registration by the DBA to practise direct to the public.

At the time of data collection for this research (2010), there were approximately 14,000 registered dentists in Australia with approximately 250 in the ACT. In the ACT, there is an eclectic profile of training and experience due to the fact that all dentists are “imported” as there is no dental school in the ACT. Personal communication with the Dental Board of the ACT (2007) indicates that approximately 100 to 150 of those registered regularly attend organised CPD activities such as study groups or lecture programmes. While independent activities, such as journal reading or listening to recorded lectures are valid activities for CPD as listed by the Dental Board of the ACT, the research on adult learning discussed later suggests that group interaction provides for more effective learning for particular areas of practice (Becher, 1996; Mann, 2005; Tillema & Orland-Barak, 2006). The next section is a statement of my stance and personal experience that has directed me towards this research.

**Personal Stance**

My own experience has been shaped by the extensive changes in dental practice that have occurred over the last 35 years or so and particularly by the rapid changes over the last 15-20 years. I graduated from the University of Sydney in 1974 when dental undergraduate training was geared to “stand-up” dentistry (with the patient seated upright rather than lying down and the dentist standing over them). The textbooks on
how to make dentures, fill and extract teeth had not changed in 30 years. Dental practice was still a drilling and filling exercise with lots of extractions and rarely using gloves. In contrast, modern dentistry is now patient-centred with the focus on prevention and minimum intervention.

Since graduation, I have experienced a wide variety of roles within professional practice, in private and public sectors, as a general dental practitioner and specialist dentist. I have taught in a university environment and been engaged in executive roles within professional organisations in dentistry. As part of my teaching experience, I completed a Graduate Diploma in Adult Education that opened my eyes to the expansive field of education and particularly enabled me to focus on the dental profession. I became mindful of the fact that traditionally the completion of dental studies in Australia had led to registration for life and “keeping up” was a personal choice–at least until CPD was mandated by the Dental Board of Australia (DBA) from 1 July 2010.

As a registered dentist, I am charged with the responsibility of keeping up-to-date with clinical knowledge and skills as well as continuing to provide safe competent treatment within my scope of practice. As a patient, I trust that the dentist does this. My concern is that mandating CPD has created a mindset of clocking up hours for a personal log, merely to satisfy the minimum requirements for CPD rather than being a positive force for professionalism in a holistic sense. This may sound rather cynical to my professional colleagues, however, I believe that from my own experience across a number of professional roles, I am in the position to explore CPD from a professional practice perspective, expanding on the fact that CPD is lifelong learning. In so doing, I am aware of my pre-conceptions of CPD, lifelong learning and being a professional and I will need to be open minded to the responses from the dentists who participated in this research.

I am motivated by the thought that the results of this research will make difference, both to the working lives of dentists and the quality of care to their patients. Indeed, the profession has a responsibility to provide a supportive environment for CPD of dentists as a vehicle for professionalism (Fricker, Kiley et al., 2011).
Organisation of this thesis

The next chapter (Chapter 2) reviews the relevant literature pertaining to the professions and particularly dentistry, with Chapter 3 providing a review of the principles of CPD and adult learning as a social process. Chapter 4 provides a review of the literature on learning in the professions, linking this to the principles of CPD.

Chapter 5 describes and justifies the methodological approach in the form of a self-completed questionnaire, and the framework for the analysis used in this project.

Chapter 6 reports part A of the findings from the analysis of the responses to the questionnaire. This chapter covers the findings of the associations demonstrated in the research design (Chapter 5). Chapter 7 reports part B of the findings from the questionnaire related to updating within CPD and accreditation of CPD activities.

Chapter 8 follows as a discussion of the implications of the findings with an understanding of CPD as adult learning through collaboration and interaction with others. The effectiveness of CPD is discussed as a product of the usefulness of and engagement in a CPD activity matched to the learning mode, characteristic, style or preference of the individual who is undertaking the CPD. The chapter continues with a discussion of the changes in the profile of dental practice in Australia, particularly related to the increasing proportion of females in the profession (feminisation). Chapter 9, the final chapter, provides a framework for the delivery of CPD to the professions with a case study to demonstrate how the principles within the framework can be put to practical use. I complete this thesis with personal reflections and comments on the limitations of this research as well as recommendations for future research.
"Man is nothing else but what he makes of himself”. Jean-Paul Sartre, from *Existentialism and Human Emotions* (Sartre, 1957, p.9).

This chapter provides a review of the literature related to the characteristics of a profession and the responsibilities of being a professional, defining these terms in response to Scanlon’s (2011 p.17) comments on the difficulties of finding a definitive definition of professions. The chapter begins with a discussion of what comprises a profession and then moves to an exploration of the concepts of professionalism and trust as components of being a professional practitioner. An overview of the profession of dentistry and particularly that of dentistry in Australia is then provided as a background to this study.

**Definition and Characteristics of a Profession**

What is a profession?

A profession is defined by the Australian Council of Professions as:

> a disciplined group of individuals who adhere to ethical standards and who hold themselves out as, and are accepted by the public as possessing special knowledge and skills in a widely recognised body of learning derived from research, education and training at a high level, and who are prepared to apply this knowledge and exercise these skills in the interests of others. (Professions, 1997)

This definition is clear and concise. Although nowadays it is common to describe anyone who is skilled at what they do or is paid for the work they do as belonging to a profession rather than an occupation, professional practice fundamentally involves judgment. Without an element of judgment, professional practice is only technical work (Coles, 2002). Furthermore, as Welie (2004a) argues, an occupation cannot simply claim professional status, only the public can grant such status.

A profession has been described as a “vocation or calling based on advanced learning or science” (Mathewson, 2007, p.365), which is not generally available to the public and is
gained by formal education (Glazer, 1974). Such advanced learning or science gives professions their powerbase and the control and exercise of this power provides the basic concept of a profession (Goodlad, 1984). This power makes those they serve vulnerable and demands a fiduciary relationship between the professions and others of trust, confidence and responsibility (Nash, 2007).

Some may ask “Why do we allow professions to act as monopolies?” Placing patients’ interests above one’s own is an exchange with society for the monopoly status and protectionism that a profession retains and sets the terms of the compact between it and the public (Cruess, Johnston et al., 2002). The monopoly also prohibits non-members the right to practise and gives a profession the authority to determine the requirements for entry to its own (Becher, 1999; Hilton & Slotnick, 2005). Thus a profession is by definition a public trust (Hensel & Dickey, 1998; Welie, 2004a) and involves a commitment to a key human good that enables us to live a humanly flourishing life (Oakley & Cocking, 2001 p.74; Welie, 2004a).

Furthermore, the compact between professions and society also defines the inherently ethical relationship between the profession and society (Gardner & Shulman, 2005). The ethical code, more stringent than a legal code, is paramount to professional practice. An ethical code in the health professions is a voluntary promise to employ one’s knowledge and skills in the pursuit of good health for all and demands that professionals place public interest ahead of self-interest (Nash, 2007). For example, members of the Royal Australian and New Zealand College of Ophthalmologists swear an oath incorporating this ethical code as follows:

Patients are my first concern, and in caring for them I undertake to use my knowledge and skill to the best of my ability.

I will seek actively to maintain my skills and abilities throughout my professional life, to practise within those abilities and to contribute wherever possible, to the science of ophthalmology.

I will seek to enhance the quality of patients’ lives, maintain their dignity, support their carers, and treat all people equitably.
I will strive at all times to be worthy of my patients’ respect and never abuse their trust or confidence. My clinical decisions will not be influenced by personal gain.

I extend these commitments beyond individuals to the health and well-being of the community.

I will treat with courtesy my colleagues and all who contribute to the well-being of my patients.

May these affirmations guide and inspire me in practising the art and science of medicine as an ophthalmologist. (The Royal Australian and New Zealand College of Ophthalmologists, 2010)

The common characteristics of the traditional learned professions of medicine, law and clergy, set the model for the establishment of other professions including dentistry (Fricker, Kiley et al., 2011). In England before the Industrial Revolution, these professions, as well as the armed services, were regarded as occupations for gentlemen. A profession was seen as a passport to good society and was conditional upon the professional behaving like a gentleman, hence women were marginalised (Adams, 2010).

More recently, rather than females being marginalised, there has been a feminisation of the professions. The most frequent and general meaning of the term feminisation implies “a shift in the numerical gender composition of practitioners” (Riska, 2008, p.4) as more females enter the professions. There is a suggestion that a change in demographics within a male-dominated profession, such as medicine or law, will result in a resegregation of the profession and professional practice will become “women’s work.” Also, as some argue, as females approach a majority, the authority and prestige of the whole profession will inevitably decline (Riska, 2008). Furthermore, even as more women enter a profession the values of the profession will remain male because the men control the knowledge and power of the profession. The feminisation of dentistry in Australia is discussed in Chapter 8, particularly looking at the differences in learning characteristics between females and males and their relationships to CPD.
There is a lack of consensus in the literature on a list of characteristics of a profession. Jarvis (2010) cites Brennan (1990, p.8) in noting that there are up to 23 lists of characteristics of a profession from as many writers. The characteristics of a profession have been summarised more generically by Gardner and Shulman (2005) as:

A commitment to serve in the interests of clients in particular and the welfare of society in general.
A body of theory or special knowledge with its own principles of growth and reorganisation.
A specialised set of professional skills, practices, and performances unique to the profession.
The developed capacity to render judgments with integrity under conditions of both technical and ethical uncertainty.
An organised approach to learning from experience both individually and collectively and, thus, of growing new knowledge from the contexts of practice.
The development of a professional community responsible for the oversight and monitoring of quality in both practice and professional education.

Being part of a collegial/professional community (for example, the Australian Dental Association) is an essential feature of being a professional (Wynia, 2008). The professional community has a responsibility for critically reviewing new ideas and techniques and disseminating the worthy ones for both practice and professional education as practitioners cannot combine and judge the lessons of practice in isolation (Gardner & Shulman, 2005). Client/patient assumptions on which trust is based are mediated directly by the institutions of the professions and these assumptions are reflected in the behavioural expectations of the professional practitioner. These behavioural expectations are components of professionalism and will be explored in a later section.

Professions are identified by what they do (Squires, 2005) with a specialised set of professional skills, practices and performances unique to each profession. The established pattern of professional education is via years of formal tertiary education commencing with a combination of basic training and broad education to build a foundation of knowledge. This is followed by a narrowing of focus related to the specific profession for specialised content and the development of unique skills (Houle,
Chapter 2

For example, the European Union defines the characteristics of a profession for dentistry and nursing as:

individual characteristics of knowledge, skills and behaviour, that permit a person to practise his or her activity in an autonomous fashion, to continuously improve his or her practice and to be adapted to an environment of rapid change. (Matillon, Le Boef et al., 2005 p.294)

This definition incorporates continuous improvement and adaptation to change in agreement with the concept of CPD discussed in the next chapter. The concept of professionalism leads on from the characteristics of a profession and is discussed in the next section.

**Professionalism**

In its broadest sense, professionalism is defined as: “an image that promotes a successful relationship with the patient” (Brosky, Keefer et al., 2003 p.909). This image is what the patient sees in the professional practitioner and what the professional practitioner wishes to present to the patient.

In a report by the Royal College of Physicians (2005 p.45) on the medical profession, it was suggested that professionalism is: “a set of values, behaviours, and relationships that underpins the trust the public has in doctors”.

Colby and Sullivan (2008) summarise the characteristics of professionalism as:

- A deep engagement with the profession’s public purpose.
- A strong professional identity.
- A framing of complex situations in moral terms.
- Habitual patterns of behaviour in response to others that are well aligned to professional standards and ideals.
- The capacity and inclination to contribute to the ethical quality of the profession and its institutions.

From the above, professionalism is perceived as a characteristic of individuals and professional practice with competence also used as a synonym for professionalism.
However, there is a new perspective on professionalism that stems from professionals working within corporate groups or larger organisations. Employer companies are now stakeholders in the development of professions along with the regulators, practitioners and universities. More recently a new professionalism has been posited by Evetts (2011), that of organisational professionalism rather than occupational professionalism. As professions practise increasingly within larger organisations, professionalism is that of the professional’s relationship to the organisation rather than the relationship to the client/patient. This new concept of professionalism is occurring in dentistry in Australia. For example, over the last few years, corporate bodies have been buying out private practices in both general and specialist practice and increasing numbers of dentists are working as employed dentists rather than self-employed in private practice. The ramifications of this change in professional practice is discussed in Chapter 8.

Nonetheless, Evetts (2011) argues that professionalism as an occupational value rather than an organisational value should be retained. While the profession as a group has this responsibility, it is down to the individual practitioner to actually make the effort to protect and preserve the occupational value. This is consistent with Evans (2008), who comments that professionalism is a service-level agreement imposed from above and validated by professional action. As Evans (2008, p.30) states, “it is the individual practitioner who acts out professionalism” and an individual’s practice and behaviour may be under observation at any time (Cheetham & Chivers, 2001).

Thus, professionalism refers to behaviours that enhance the trust, as defined by the compact with society discussed earlier. Professionalism is action that demonstrates the characteristics of being a professional, that is; ethics, competence, knowledge, discretion and skill. In order to maintain professionalism, throughout a lifetime of practice, the professional is obliged to engage in a cyclic process of learning and reflection (Fricker, Kiley et al., 2011), discussed in the next chapter as Continuing Professional Development. Once demonstrated, the interpersonal relationship of trust between professionals and their clients/patients can consolidate from an assumed trust between the profession and the public (Welie, 2004b). Trust is thus a significant characteristic of professionalism and this notion is explored in the next section. For a further exploration of professionalism see Fricker, Kiley et al. (2011) in Appendix II.
Trust

The trust offered by society to professionals is vested in the profession at large, rather than the individual practitioner. The individual patient trusts the practitioner because they are a member of the profession (Welie, 2004b). The precondition for ideas about the trustworthiness of a profession is the social recognition both of the profession itself and the values it claims to mediate (di Lucio, 2006).

The relationship between the professional practitioner and the patient/client is also a relationship built on trust. The receiver of the service trusts that the advice is sound, contemporary and offers a range of options in the best interests of the client/patient. Professional services delivered in a competent, efficient manner contribute to this trusting relationship. In the case of health professionals, delivering services in a safe manner is also a major consideration in building trust with patients and is an ongoing challenge (Karseth & Nerland, 2007). Lay people demand proof of trustworthiness founded on information and evidence (Kuhlmann, 2006 p.614). Communicating these is the fabric of informed consent which is defined as:

…the voluntary and continuing permission of the patient to receive particular treatments and must be given by a patient who has the capacity to consent to the intervention in question, including the likelihood of its success and a discussion of any alternative to it. To be valid, consent must be given voluntarily and freely, without pressure or undue influence being exerted on the patient either to accept or refuse treatment. (D'Cruz, 2010b, p.70)

A ruling in the High Court of Australia, Rogers v Whitaker (1992), stressed that all medical treatment must be preceded by the patient’s choice to undergo it. This ruling represents a fundamental shift towards patient rights and concerns over medical paternalism. Even full clinical competency and practice in accordance to science and professional endorsement may leave a clinician open to litigation. Hence, it is essential to warn of all possible risks [italics added] with a focus on the severity of potential complications rather than the probability of these (Lam, 2014). Furthermore, relevant information and advice need to be communicated to patients in language they can understand (Dennett, 2012). The concept of risk is reviewed in the next section.
Risk
Risk has been defined as “uncertainty of outcome (whether positive opportunity or negative threat)” (D'Cruz, 2010a, p.22) and is a factor to be considered during any clinical care. The Dental Defence Advisory Service (DDAS) of the New South Wales (NSW) state branch of the ADA, strongly reinforces this as:

Essential to proper treatment is the formulation of an appropriate treatment plan and communicating the issues, problems, risks and alternative solutions to the patient in a way that they[sic] can understand. (Dennett, 2013, p.20)

Under the Health Practitioner Regulation National Law ("Health Practitioner Regulation National Law (ACT)," 2009) which came into effect in the ACT in 2012, all dental practitioners are now required to carry professional indemnity cover or be guaranteed indemnity cover by their employers. Professional indemnity insurance means:

Arrangements that secure for the practitioner insurance against civil liability incurred by, or loss arising from, a claim that is made as a result of a negligent act, error or omission in the conduct of the practitioner. (Dental Board of Australia Registration Standard 6220)

The purpose of professional indemnity insurance is to allow those patients who have been harmed by negligent treatment to be swiftly and justly compensated. Obviously professional indemnity insurance is an added cost to the provision of dental services and it is in the interests of all to minimise complaints and litigation. Indeed, ADA policy is that Professional Indemnity providers should “provide dentists with ongoing risk management advice including through the sponsorship or delivery of continuing professional development” (Australian Dental Association, 2013, p.2).

The review of the literature to this point has been related to general concepts of a profession and professionalism. The next section will argue these concepts more specifically for the dental profession.

The Dental Profession
Dentistry has traditionally been recognised as a profession, firstly as a specialty of medicine then, in its own right, as a unique domain of knowledge, skills and service to
society where oral health is a primary good. As Nash (2007) argues, the values of
dentistry of care and concern for all people, their oral health and the assumption of
dentistry as a societal good, legitimises its claim to professional privileges. Dentistry is
a clinical discipline based on sound scientific and technical principles, underpinned by
knowledge and understanding of the biological and clinical medical sciences (Quality

The dental profession can be defined as:

The collective of oral health care experts who have jointly and publicly
committed to altruistically provide their expertise in the service of all
patients with important oral health needs and are in turn trusted by the public
to do so. (Welie, 2004c p.678)

From the patient’s point of view, a patient’s needs go beyond that of treatment of
disease to include psychosocial, functional and preventive measures (Brand & Widmer,
1999 p.43). Welie (2004c) comments that dentistry does not qualify as a profession
when the interventions performed are purely elective. However, not every dental
procedure is aimed at relief of pain or threat to patients’ health as a result of dental
disease. Dentistry is concerned with the comprehensive management of oro-facial
structures and functions as they relate to the total health of the individual. Dentistry can
also contribute to the overall well-being of patients in promoting self-esteem and
confidence.

The culture of dentistry as a profession is in tension with the understanding of dentistry
as a business where the assumption is that private, personal good is to be maximised
within the marketplace (Nash, 2007). As the consumerist culture becomes more
prevalent, dentistry is increasingly moving to a business model with a dollar-driven
corporate greed focus (Mathison, 1988). An appropriate balance is needed between
satisfying the demands of the patient and recommending what is appropriate treatment
in the light of financial incentives (Trathen & Gallagher, 2009). Therefore, the
contemporary practising dentist has two roles, a health professional and an operator of a
small business.
Dentistry is only a business in the sense that good business practices must exist in support of professional practice (Nash, 2007) and modern professionalism is shaped by the dynamic interplay between commercialism and professionalism (Hafferty & Levinson, 2008). Commercialism has generated ethical concerns within the dental profession regarding under- or over-servicing and substandard practice. Porter and Grey (2002), in a survey of dentists in Queensland, Australia, reported that poor quality treatment confronted the majority of respondents and requires ethical practical knowledge to resolve or predict conflicts. Dentists develop their ethical values in the workplace as part of a dentist’s experience (Ardenghi, 2009) and in consultation with other dentists (Porter & Grey, 2002). This will be discussed in the next chapter as a component of mentoring and further in Chapter 4 under Learning in the Professions.

The three key tasks of the dentist are: Gathering clinical information, treatment planning and individual treatment procedures (Clark, Robertson et al., 2004). Gathering clinical information includes taking a full patient history, a comprehensive clinical examination of the patient, requesting, and interpreting appropriate diagnostic tests or investigations. Planning treatment involves determining a course of treatment in line with patients’ needs and wishes as well referral when appropriate. The diversity of tasks in dentistry means that each situation is unpredictable and the professional dentist must take ultimate responsibility for every outcome. These complex tasks need to be supported by well-developed skills and knowledge, maintained over a lifetime for contemporary evidence-based practice (Conrod, 2008).

By definition, the practice of dentistry is predominantly within the oral cavity and it is usually only the dental practitioner (rather than the patient), who gets to see the finished work. Therefore, in order to improve, dentists need to be effective self-assessors, not only of the finished product, but also of all the stages involved in carrying out the work. The delivery of complex health care in the context of the ageing population in Australia demands a team-based approach in collaboration with other health care professionals (Thistlethwaite, 2012). Dentists as oral health physicians will increasingly be called to work in partnership with other health care professionals for the overall health of the community.
In summary, the complexity of dental practice can lead to uncertainty of outcomes for patients. The management of oral health and the treatment of disease both involve biological systems which are unpredictable and vary widely between individuals. Engagement CPD with the objective of learning is a responsibility to honour the compact with society to provide skilled services based on up-to-date knowledge in exchange for professional status. Professionalism is the behaviour of the professional in demonstrating skills and knowledge in a relationship based on trust. This behaviour is reflected in all aspects of life, the dentist patient relationship, conducting the business of dentistry and within the community. CPD, as explored in the next chapter, is the mechanism of professionalism.

**The Dental Profession in Australia**
Dentistry in Australia is a relatively small profession with approximately 14,000 registered practitioners. The main professional body representing practising dentists in Australia is the Australian Dental Association (ADA). Other collegial communities affiliated with the ADA, such as the Australian Society of Orthodontists (ASO), represent individual specialist disciplines. The Royal Australasian College of Dental Surgeons (RACDS) is a community of dentists where membership is gained by examination. Members are mostly from Australia or New Zealand but membership is open to dentists from all over the world.

**Professional bodies**
The Dental Board of Australia (DBA) now operates with its full range of functions under the Health Practitioner National Law and includes the following functions:

- Registration of dentists, dental specialists, dental therapists, dental hygienists, oral health therapists and dental prosthetists.
- Development of dental profession standards.
- Handling of notifications and complaints in relation to the profession.

The registration of dentists, dental specialists, dental therapists, dental hygienists, oral health therapists and dental prosthetists is recognised in all states and territories in Australia (Dental Board of Australia, 2009) and there is mutual recognition of registration between the DBA and the registering authority in New Zealand.
The Australian Dental Council (ADC) is a registered corporation with membership drawn from the nominees of the:

- Dental Board of Australia (DBA).
- Committee of Dental Deans of Australia and New Zealand Dental Schools.
- Australian Dental Association Inc. (ADA).
- Royal Australasian College of Dental Surgeons (RACDS).
- Australian Dental Therapists Association (ADTA).
- Dental Hygienists Association of Australia (DHAA).
- Dental Council of New Zealand (DCNZ), (Observer status).

The ADA is a professional body with a membership representing approximately 95 percent of dentists in Australia and is a member of the Australian Council of Professions from which the definition of a profession was cited earlier. The ADA publishes *The Australian Dental Journal* with six issues per annum. This is a refereed journal covering original research, case reports and review articles. All members of the ADA receive a hard copy of each issue as part of their membership subscriptions. The ADA provides services to members in the event of litigation as well as advice on employment law and other matters. It is a major provider of CPD activities though State and National Conferences as well as short courses and seminars. While the DBA, the government regulator, has mandated CPD for all registered dentists as from 2010, the ADA does not support mandating of CPD and the policy published in 2006, quoted below remains current.

The ADA does not support the mandating through Dental Registration Acts of arbitrary levels of CPD for the dental profession generally. There is no evidence indicating that better health and safety outcomes arise from mandatory CPD as opposed to voluntary programmes of fostering, accreditation and recognition. The ADA encourages further research into the relationship between CPD and the quality of patient care. *(Australian Dental Association Inc, 2006, policy statement 4.1, p.1)*

In line with the above call and encouragement for further research, the research reported in this thesis addresses some of the issues related to CPD for dentists in Australia.
The Royal Australasian College of Dental Surgeons (RACDS) is a professional body independent of the ADA or the registration board and is an examining body for admission to the College as Fellows or Members in both general and specialist practice. With the exception of the Fellowship in Oral and Maxillo-Facial Surgery, such awards are not recognised in their own right as registrable qualifications to practise, but are recognition of engagement in CPD and accepted by the registration boards for post nominals. The RACDS stages convocations every two years with a strong scientific programme and encourages engagement in CPD.

The next section provides a background to the education of professions and follows with a section on educating dentists for registered practice in Australia.

Professional education

Background

Professional education dates back to the 11th century when the liberal arts and law were taught at the University of Bologna, Italy. Medicine and theology followed and were included in the 14th century. The learned professions of medicine, law and theology, were developed to address specific problems in society with dentistry recognised as a unique profession in 1699, when an edict was passed in France legalising the position of dentists and distinguishing them from physicians, surgeons and barber surgeons (Lindsay, 1933 p.47).

The basic structure for professional education in medicine began with a programme of the basic sciences in the field then progressed to the clinical phase of training (Boshhuizen, 2009). Degree preparation for other health professions follow a similar pattern with biomedical sciences as a knowledge base and involvement of professional practitioners in education (Smith, Aijawi et al., 2010).

The health professions are examples of the “caring professions” where the individual needs of the patient are significant (Barnett, Becher et al., 1987), yet are still based on special knowledge and skills. This is not to say other acknowledged professions do not care about the needs of their clients, it is just that the concept of care is fundamental to the health professions.
Professional knowledge will vary from profession to profession, for example, pharmacy is predominantly a theoretical understanding, with practical experience a key part of medicine, dentistry and nursing. Generally speaking, patients expect health professionals to diagnose and analyse a problem then act upon it with a view to offering relief or improvement in health. In so doing, health professionals must draw on their knowledge base which Higgs et al. (2001, p.5) suggest takes three forms:

1. Propositional, theoretical or scientific knowledge.
2. Professional craft, knowing how to do something.
3. Personal, knowledge about oneself as a person and in relation to others.

Propositional knowledge is formal and explicit and derived through research. Professional craft knowledge is a collective of case scenarios, examples and principles of practice developed through practice experience. Personal knowledge is accrued through life experience as individuals encounter new situations and develop expertise.

**Educating dentists for registered practice in Australia**

Professional education of dentists in Australia is university-based, following the above model for health professions leading to qualifications for registration upon graduation. Specialist programmes in dentistry are also university-based Masters or Doctorate degrees with both a research and clinical components. The exception is the specialty of Oral and Maxillo-Facial Surgery, which requires university-based education towards degrees in both medicine and dentistry, followed by specialty training conducted by the Royal Australasian College of Dental Surgeons. The Fellowship in Oral and Maxillofacial Surgery, FRACDS (OMS) is accredited by both the Australian Dental Council (ADC) and the Australian Medical Council (AMC) for specialist registration as an Oral and Maxillo-Facial Surgeon.

Traditionally, the implication has been that all learning required for a lifetime of practice is completed within a qualifying course, described as a front end model of education (Hager, 2004). Nowadays, however, according to recent research, it is suggested that newly graduated dentists are generally unprepared for independent practice and need support for at least the first three to four years after graduation.
Experience of professional practice is a necessary component in acquiring professional competence (Gonczi, 2004) and new graduates need to be motivated to seek appropriate CPD in order to develop this (Plasschaert, Holbrook et al., 2005). The introduction of problem-based learning (PBL, see Chapter 4) approaches into Australian dental schools aimed to promote these skills and develop lifelong learners (Greenwood, Mullins et al., 1999).

There are nine university faculties or schools of dentistry in Australia: In the early 1900s, dental schools were established within The University of Queensland (Brisbane), The University of Sydney, The University of Melbourne and The University of Adelaide. The University of Western Australia (Perth) established a dental school in the 1940s. A further school was established at Griffith University (Gold Coast, Queensland) in 2003 and more recently three new schools were established within regional universities at Charles Sturt (Wagga Wagga and Orange, NSW), La Trobe (Bendigo, Victoria) and James Cook (Cairns and Townsville, Queensland) with a view to encouraging graduates to work away from the major metropolitan areas (Figure:1). The map also shows the city of Canberra, the capital of Australia, situated in the Australian Capital Territory and enclosed within the State of NSW. There is no dental school in Canberra; however, Canberra is shown on the map as a reference to the location of the sample group of questionnaire respondents.
In addition to these schools, the Australian Dental Council (ADC) examines overseas-trained dentists. Successful candidates are able to register with the DBA to practise in all states and territories within Australia (Chrisopoulos & Teusner, 2008).

Dental schools in Australian universities offer either school-based entry or graduate entry programmes. School-based entry programmes are of five years duration leading to a degree in dentistry, which is registrable by the DBA for unsupervised practice. Alternatively, graduate entry requires a basic degree in any field prior to commencing a four-year programme in dentistry leading to the award from the respective university and registration with the DBA for unsupervised practice.

There are advantages and disadvantages to each of these programmes. One suggested advantage of graduate programmes is increased student motivation with more mature students (Smith, Ajjawi et al., 2010, p.301). This is possibly because the student has had
more time to consider career options, which is a particular concern in dentistry as there is little opportunity to change to another course during a dental programme with any credit for previous achievements. A disadvantage is that the overall time to educate a dentist is now a minimum of seven years for the graduate entry programmes compared with five years for school entry programmes, which contributes to significant debt for the student on graduation. Personal communication with employers (in both the private and public sectors) of recent graduates from four-year graduate programmes, reveals concerns as to the limited range of experience these dentists possess compared with those who completed a five-year programme.

Competence in providing appropriate patient care involves:

- Health promotion.
- Diagnosis and treatment planning.
- Treatment procedures.
- Ethics and professional responsibility.
- Communication (Kersten, Vervoorn et al., 2007).

The goal of university dental education in Australia is to develop dentists who are competent to practise safely and effectively and who have an appropriate foundation for professional growth and development so that they can respond to diverse and changing health needs throughout their professional lives (Australian Dental Council, 2010). Dentists must have an understanding of, and be responsive to, the oral health needs of Australian communities and individual citizens and apply dental knowledge, clinical and technical skills and professional attitudes to provide safe and effective patient-centred care (Australian Dental Council, 2010).

The ADC lists the range of personal qualities, cognitive abilities and applied skills expected of the newly qualified practitioner into the following six domains:

1. Professionalism.
2. Communication and social skills.
3. Critical thinking.
4. Health promotion.
5. Scientific and clinical knowledge.

6. Patient care (which has sub-domains of clinical information gathering, diagnosis and management planning, clinical treatment and evaluation).

These domains represent the broad categories of professional activity and concerns that occur in the general practice of dentistry. Effective professional performance requires the integration of multiple competencies (Australian Dental Council, 2010, p.6).

Once registered, dentists regulate their own practices (Greenwood, Mullins et al., 1999) and work with a high level of autonomy. However, studies from the UK (Honey, Lynch et al., 2011; Patel, Fox et al., 2006), Hong Kong (Yiu, McGrath et al., 2012) and Australia (Davidson, Smith et al., 2008) report that newly qualified dentists perceive that they have a lack of training to competently carry out endodontics, dento-alveolar surgery, orthodontics, crown and bridgework and implantology. I argue that these are core areas of general dental practice which require technical as well as diagnostic skills essential for safe, competent, unsupervised practice. Areas of need for updating that this (my) research identified from the respondents were analysed and are reported in Chapter 7.

However, CPD is not just for recent graduates but a process of lifelong learning as all practitioners need to accommodate change or risk becoming more incompetent within a short time (Welie, 2004c). I will explore lifelong learning in detail in the next chapter.

Demographics of Australian dental practice

Between 2003 and 2008, there were on average 230 dentists graduating per year from universities in Australia. In addition to these approximately 200 dentists per year came from overseas either through mutual recognition or by examinations administered by the ADC (Australian Research Centre for Population Oral Health, 2008). However, during this period there was still an overall shortage of dentists in Australia which had seen little change over the last fifty years (Dahlgaard, 2010). In partial response to this shortage and to encourage more dentists to practise away from the main metropolitan areas, four new dental schools were opened in regional areas (see Figure 1). The pendulum has now swung to a looming oversupply of dentists with 580 graduating in 2013 with an additional 200 (approximately) from overseas (Thomlinson, 2013).
The national figures for the July 2011 to June 2012 financial year recorded that solo general practitioners made up just over a third of all practices. Two-thirds of dentists were males with 88 percent of all dentists in general practice. The average annual income was generally higher for males than females. However, females on average worked fewer hours per week than males, which helps to explain the difference in income. Also, a higher proportion of females than males are employed in the public sector which has lower pay rates than private practice (Chrisopoulos, Beckwith et al., 2011). The proportion of females is forecast to increase to 40 per cent by 2020; however, if females of all ages are more likely than males to work part time and females supply fewer dental visits per hour (Schofield & Fletcher, 2007), this will distort the work force requirements.

As mentioned earlier, dental practice carries with it an element of risk and developing skills and expertise requires taking risks as discussed in Chapters 3 and 4. Sax (2005) argues from his work that females are inherently more risk-averse than males, which suggests that the increasing proportion of females in dental practice will influence attitudes to CPD and perhaps the incidence of complaints and litigation. This warrants further research and is discussed in Chapter 8.

The mean age of Australian Dental Association (ADA) members was 47.4 years with females 41.0 years and males 50.6 years (Thomlinson, 2013). Dental graduates are also getting older as more dental programmes in Australia are moving to graduate entry (see earlier section in this chapter, Educating dentists for registered practice in Australia).
Figure 2. Development of the research model. Sex, age of practitioner and type of practice as controlling variables in the associations of learning characteristics, incentives and barriers to CPD.

The demographics of dental practice, that is, sex, age of practitioner and type of practice make up the first segment of the full research model used for the study. This segment, as highlighted in Figure 2, is included in the research model as controlling influences in the associations of learning characteristics, incentives and barriers to CPD as well as the dependent variables within CPD of attitude to usefulness, extent of engagement and mentoring. The research model as a whole is explained in Chapter 5.

Summary

This chapter has reviewed the literature on the notion of “profession” and “professionalism”. Dentistry is recognised as a profession as a compact with society based on oral health as a common good. This compact is underpinned by trust. Professionalism includes the responsibilities that professionals take on as members of a profession, to themselves, their patients and the public in general.

The expression of professionalism continues throughout the working lives of professionals. It takes the form of behaviours and attitudes embedded in day-to-day activities rather than a list of characteristics and are enacted by the individual professional within the dentist/patient relationship. Professionalism then reflects on the profession as a whole to influence the standing that the profession has with society.
Professionalism carries with it an obligation to continue with one’s professional development to maintain and enhance that trust throughout professional practice.

Professional education is directed to ensuring fitness to practise. In dentistry, in contrast to medical graduates, entry to the profession is from the date of completion of an accredited degree programme without the requirement of an internship. Dental education purportedly prepares the dentist for registration to practise direct to the public in all facets of practice. However, while new graduates may have a solid theoretical knowledge base, the literature suggests that the range of practical experience is limited and new graduates require support to hone skills and develop expertise once in practice. This is an important area of investigation and is a component of this research.

The ageing of the Australian population and the increasing prevalence of chronic disease will change dental practice over time and drive a demand for interprofessional education. Thus CPD, as reviewed in the next chapter, needs to accommodate the needs of both new graduates and existing practitioners as well as accommodate a context of constant change in the delivery of oral health care.

The next chapter reviews the literature concerning adult, lifelong and professional learning, identifying the principles of learning relevant to Continuing Professional Development (CPD) for the professions and particularly dentistry.
CHAPTER 3: CONTINUING PROFESSIONAL DEVELOPMENT (CPD)

Experience, judgment and ethics are the key factors in professional practice. Legislation cannot enforce them. Technology cannot replace them. (Southwick, 2000, p.267)

This chapter reviews the literature on Continuing Professional Development (CPD). While a university-based professional education programme is the initial stage of preparing students for entry into the realm of regulated professional practice, it is important to ask: “What happens to graduates once they enter professional practice?” Here I continue from the previous chapter, expanding on the duty of professionals to keep up-to-date and exploring CPD as a mechanism for professionalism.

The concept of keeping up-to-date in professional practice, including dental practice, is not new. Indeed, in 1922 the editor of the Chicago USA dental magazine *Dental Facts* wrote:

In order to maintain his [sic] self-respect and merit the confidence reposed in him by his patients, it is in his duty to continually strive for self-improvement and to fit himself to deliver the super-service which this requires.

One does not stand still in the practice of his profession but goes forward or backward; and the man who hibernates like a bear in his own home town and makes a hermit of himself does not go forward very fast, even though he does subscribe for a journal or two.

But he may progress by coming into contact with other men in his profession and profiting by the exchange of ideas; by learning their methods and becoming stimulated by their successes to achieve greater success for himself. (Bremner, 1922, p.10)

Later in this chapter, I present an overview of current literature on CPD in all of the professions and argue that CPD can be conceptualised as a combination of lifelong learning and self-directed learning and support the notions as described by Eraut (2006)
and Webster-Wright (2009) of CPD as Lifelong Professional Learning and Continuing Professional Learning. I follow this with an overview of CPD in dentistry and why we need it and explore the models of CPD and the activities available for CPD. It is important to understand these notions in order to envision the ideal learning outcomes of any CPD approach or framework.

One aspect of CPD is mentoring. I explore mentoring in a later section as a specific CPD activity as well as the concept of the effectiveness of CPD. These are linked to the research model described in Chapter 5, where attitude to usefulness of CPD activities, extent of engagement in CPD activities and mentoring are prescribed as dependent variables for the analysis of the responses to the questionnaire (see Appendix I).

What is Continuing Professional Development (CPD)?

CPD in its widest sense has been defined as “the purposive maintenance, improvement and broadening of your knowledge, skills and personal qualities in order to perform your professional activities successfully throughout your working life.” (Watkins, 1999, p.70). CPD includes updating knowledge and skills in both existing and new areas of practice and increasing competence in a broader context of professional roles (Schostak, Davis et al., 2010b).

CPD as a holistic development of professionals is guided by the way in which professionals understand and perform their practice (Dall’Alba & Sandberg, 2006). Therefore CPD is different between professions as defined by the skill set required. For example, as discussed in the previous chapter, dentistry is different from medicine and the other professions, with a unique skill set that defines the profession of dentistry. Furthermore, dentistry is a vocational profession where the vast majority of graduates enter private practice as self-employed practitioners and remain as dentists rather than changing careers. CPD in dentistry will be discussed in more detail in a later section in this chapter.

In summary, CPD is not just a question of specifying taught courses for defined core skills but a matter of developing the all-round potential of the individuals concerned as a process of lifelong learning (Belfield, Morris et al., 2001). Furthermore, CPD is learning
for adults where learners are active in the learning process (Webster-Wright, 2009).

Smith (1983, p.35) offers the following general principles of adult learning:

Learning continues through life. We learn much from socialising.
Learning is a personal and natural process. No one can learn for you.
Learning involves change, something added or taken away and may involve unlearning.
Learning is bound up with human development.
Learning pertains to experience and experiencing. To learn is to interact with the environment and includes a process of reaffirming, reorganising and reintegrating one’s previous experiences.
Learning has an intuitive side.

These principles of learning throughout life (lifelong learning) and personal (self-directed) learning particularly apply to CPD and are discussed further in the next sections. The social nature of learning is explored in the next chapter.

Lifelong learning

The focus of education is shifting to the development of critical thinking and self-directed learning abilities that can serve the individual over a lifetime. The desired outcome of education, then, becomes the construction of coherent knowledge structures that accommodate further learning, not the assimilation of specific bits of information. Ultimately, education must prepare students to be continuous learners—once the rhetoric of higher education but now the hallmark of the knowledge age. (Kember, 2007, p.12)

In today’s competitive and fast-moving economy the body of knowledge which forms the basis of professional work is continually developing and expanding such that the knowledge and experience with which professionals begins their careers has a limited “shelf-life.” Lifelong learning is a deliberate process of continuous change and reflection in order to build on one’s practice throughout one’s working life (Frost, 2006; Karseth & Nerland, 2007; Teunissen & Dorman, 2008). Adherence to lifelong learning is necessary for ongoing legitimisation by society as a profession as discussed in the previous chapter (Brownwell & Cote, 2001; Hafferty, 2006).
Lifelong learners have the following characteristics:

- Are strongly aware of the relationship between learning and real life.
- Are aware of the need for lifelong learning.
- Are motivated to carry on lifelong learning.
- Possess a self-concept and are favourable to lifelong learning.
- Possess the skills necessary for lifelong learning (Knapper & Cropley, 1985).

Lifelong learning and interaction with colleagues via a mentor/mentee relationship (see later section on mentoring), supports the professional and personal development of another by sharing life experiences, influence, and expertise. Lifelong learning can also be beneficial for overall health. Puriene, Janulyte et al. (2007, p.17) offer the following advice to maintain good physical and mental health as a dentist. “It is important to enjoy their lives, exercise physically, have a hobby, create a harmonious family, communicate with colleagues and keep learning all their lives”. Lifelong learning earlier defined as a deliberate process, has an essential element of self-directed learning.

**Self-directed learning**

Self-directed learning (SDL) refers to the degree of choice that learners have with an instructional situation (Grow, 1991). In this context, individuals take the initiative in diagnosing their own learning needs and formulating their own goals to direct their learning (Hendricson, Andrieu et al., 2006). Understanding these needs through reflecting on one’s own practice is a key component in CPD (Redwood, Winning et al., 2010) and is explored in this research.

SDL also has to manage obstacles or barriers to engagement in the learning process. Commonly cited barriers by medical practitioners to engagement in CPD activities are time constraints related to work or family commitments and lack of personal interest (Bradley, Nordheim et al., 2005). An exploration of incentives and barriers for dentists to engagement in CPD are included in this research.

Informal SDL includes journal reading, *ad hoc* conversations, interactions with supply company representatives, and possible attendance at regular events like departmental or practice conferences. Semi-structured SDL is linked to immediate patient problems. Its focus is decision-oriented, finding the best way to manage a patient and learning is
incidental to that prime purpose. It may take the form of consultation with immediate colleagues or experts with whom they have some contact, or of literature searches and reading. This type of learning is closely tied to individual patients and their progress and therefore cannot be planned.

Models of CPD
Models of CPD come in two broad categories, that of an input model and that of an output model. An input model comprises a credit system where recognition is given to the number of hours spent on a CPD activity or number of course points are awarded for attending an approved event (Lester, 1999). An input system is most commonly used throughout the European Union (EU) for medical practitioners (Horsley, Grimshaw et al., 2010). A credit system is built on the assumptions that practitioners are able to assess their own learning needs and are capable of directing their learning to meet these needs. It also assumes that formal CPD, such as lectures or conferences, is able to maintain and increase professional competence as standalone activities (Davis, 2009, p.189). The problem with measuring CPD in this way is that it does not indicate how much learning, if any, has taken place (Becher, 1999, p.168).

Output approaches recognise that merely participating in an activity and acquiring credits does not guarantee that learning has taken place (Friedman & Phillips, 2002). In order to gauge the extent to which CPD has been of value, an output approach to CPD seeks evidence of the impact of CPD on personal and/or professional development. However, there are practical obstacles to measuring CPD on the basis of outputs. The time and resources required can be challenging and there are inherent difficulties to measuring soft skills such as communication (Chrisopoulos, Beckwith et al., 2011). Even so, a recent report on the organisation of CPD for the European dentist argues for assessment of learning and the application of learning (Suomalainen, Karaharju-Suvanto et al., 2013). Methods suggested for assessment include pre and post testing or assessments over time as well as;

- Structured observation of performance.
- Peer review.
- Structured self-reflection.
- Multiple-choice questions.
Written essays or short answers.
Computer-based interactive systems.
The submission of case reports based on practice.
Logbooks (Suomalainen, Karaharju-Suvanto et al., 2013).

**CPD activities**

CPD activities take a variety of forms that range from the formal to informal. Formal activities include away from the workplace activities. These activities cover a spectrum from short one-off lectures on a particular aspect of practice to structured university-based programmes leading to formal postgraduate qualifications such as Graduate Diplomas or Masters degrees (Becher, 1999, pp.155-156).

Conferences, congresses and seminars also fall within the collective of formal activities. These activities have similarities to formal lectures and courses but are unique in that the content is usually regulated by the professional bodies organising them. Prospective presenters are asked to submit an abstract to a panel of selectors who decide on the programme. Conferences and congresses usually run for three or more days and often have a central theme which loosely connects the selected lecture topics, hands-on workshops, and poster presentations. Such meetings can have thousands of delegates over the three or more days, offering ample opportunity to catch up with colleagues and network, which can rejuvenate practitioners (Merchant, 2007). Seminars are generally half day or full day programmes with fewer delegates and offer participants the opportunity for input into any discussion rather than just remaining passive receivers of audio visual material typical of the lecture (Becher, 1999, p.168).

Informal activities include a variety of implicit, unintended, opportunistic and unstructured learning in the absence of a formal teacher. Less formal activities include journal reading, using information technology and work-based learning (Eraut, 2004)

Informal learning is mostly invisible as it is often taken for granted as part of a person’s general capability. Alternatively, the knowledge constructed is recognised as tacit (personal) rather than new learning. Informal workplace activities account for between 70-90 percent of ongoing and professional learning and comprises social learning from others in the workplace and in the spaces surrounding CPD activities (Eraut, 2011).
Scrutiny of programmes for CPD in dentistry demonstrates a range of activities such as conferences, courses and on-line activities on offer. In addition to these, scientific journals as the traditional source of information are still published by professional organisations such as the Australian Dental Association (ADA).

Coles (2002) has noted the following guiding principles for successful CPD programmes for dental practitioners that are compatible with the needs and realities of dental practice.

Learner driven and learner centred where learners are allowed a high degree of flexibility in determining the content and objectives of their own education.

Flexible instruction such as utilising information and communication technology and the internet to break down geographical barriers.

Education which is linked to the learners’ professional environment, utilising work-based learning. Any educational intervention will have a much greater impact if it is closely related to the actual professional settings of the learner.

Sustainable improvements through continuity. CPD education should be of sufficient duration in order to support clinicians throughout an extensive implementation period, as well as including major interactive and feedback component.

Workplace learning

Workplace learning is the transfer of skills from one practitioner to another in the workplace. According to Eraut (2004), skills transfer takes place when practitioners are able to take ideas or procedures into the workplace community that have been learnt off the job and requires:

The extraction of potentially relevant knowledge from the context(s) of its acquisition and previous use.

Understanding the new situation—a process that often depends on informal social learning.

Recognising what knowledge and skills are relevant.

Transforming them to fit the new situation.
Integrating them with other knowledge and skills in order to think/act/communicate in the new situation.

The rapid and continuous change in society and working life have made learning in the workplace essential for organisations, individuals and nations (Tynjälä, 2008). Working and learning are often seen as separate activities with learning being associated with formal education and training. However, work practices and the learning that accompanies them are processes where productive learning involves the social, cultural and political construction of individual identities (Hager, 2004). Learning is a matter of developing social relationships and hence identities within different communities of practice. Culture is a learned value system for problem solving that is passed down from old members to new members (Bierema & Eraut, 2004). Cultural knowledge that has not been codified plays a key role in most work-based practices and activities. Much uncodified cultural knowledge is acquired informally through participation in working practices; and much is often so ‘taken for granted’ that people are unaware of its influence on their behaviour.

Knowledge and understanding may come from conversations with colleagues or mentally reviewing a procedure that had a poor outcome and determining alternative ways to improve outcomes (Nahrwold, 2005). Such personal episodes of learning are a component of professional learning within CPD and do improve patient care (Nahrwold, 2005). Learning in the professions is discussed in more detail in the next chapter.

Learning is stimulated by workplace activities that engage the learner in discussion and debate with colleagues (Manley, Titchen et al., 2009). This situation has important implications when considering the working environment of a solo dental practitioner. Learning depends on members within a workplace sharing knowledge and creating new solutions. Good interpersonal relationships are therefore critical to encouraging engagement in learning behaviours that have the potential to create positive change. People in high quality relationships have a sense of psychological safety to speak up and have open conversations as well as being more willing to engage in learning behaviours (Carmeli, Brueller et al., 2009).
The defining features of conversation distinguish it from talk and make it conducive to professional learning through interaction with others. These features have been identified by Haigh (2005) and are listed as follows: (Haigh, 2005, p.4)

- Often serendipitous, rather than anticipated or planned.
- Topics are improvised on the spot rather than being prescribed or pre-scripted.
- All participants can influence the topics, moment-by-moment. As a result, it is not one-sided in terms of whose agenda gains status as topic.
- Often focused on personal, local and immediate matters.
- Story telling is a common and accepted ingredient of conversation.
- Generally perceived/experienced as non-threatening events and the openness of the agenda can encourage permissiveness and risk-taking.

Conversation within organisations without any formal teaching or coaching can lead to implicit learning when the learner is not aware of it (Eraut & Hirsh, 2007, p.5). While conversation can be seen as a positive for professional learning, the last comment from Haigh above, “Can encourage permissiveness and risk-taking,” warns of the negative aspect of workplace learning. Individuals learn continually through their work as they engage in the ongoing process of remaking their work practices. However, while the day-to-day experiences of work are key sources of learning and remaking of practice, not all learning and remaking of practices are effective or appropriately focused. Bad habits or unsafe practices can be learnt as well as those attributes which can enhance professional practice (Billett & Newton, 2010 p.56).

Experiential learning is an element of workplace learning separate from conversation and coaching. Experiential learning, or learning from experience, can be described as more conscious learning from the events around you, or from the results of your own actions (Eraut & Hirsh, 2007, p.5). Experiential knowledge is enhanced through learning by doing and reflective learning (de Jong, Wierstra et al., 2006). However, what is learned can be forgotten and the combination of forgetting and a work environment in constant change means that professional learning is not a one-off episode as occurs with a structured course over a set time frame, but is continuous over a lifetime of practice.
What not to do will emerge from errors that are experienced and analysed through reflection and is referred to as negative knowledge (Gartmeier, Bauer et al., 2008). Outreach teaching programmes provide situated learning environments to broaden student experiences and provide opportunities to experience authentic errors in the workplace (Smith, Lennon et al., 2010). The importance of collegial support is important in these clinical placements and is discussed further in a later section under mentoring and in Chapter 8 as a component of a new approach to CPD.

Avoiding errors or unsafe practices are important qualities of professional expertise explored in the next section. A disadvantage of the rapid advances in modern dentistry is that treatment options have never been more varied or confusing (Lam, 2014). In recent times there has been an increase in litigation against health practitioners, which contributes to the need for CPD to keep up-to-date (Lam, 2014), discussed later in this chapter.

**Expertise in the workplace**

Clinical expertise is a continuum from a sound knowledge base and includes attributes such as professional judgment, clinical reasoning, technical/clinical skills, communication and interpersonal skills. Communication and interpersonal skills are necessary to involve patients and others in the decision-making process towards a positive outcome (Higgs & Bithell, 2001, p.66).

Expertise is characterised by extensive procedural knowledge acquired through interaction with the world and copying the actions of others. It is a product of interdependence between the individual acting and the social practice in which they present (Billett, 2001). St George (2006) in a survey of New Zealand physicians, reinforces the significance of interaction with the world in suggesting that the professional isolation of solo and rural practice, aging and non-membership of professional groups may stifle professional growth and perpetuates professional ignorance.

Experts are able to work in complex situations of competing interests as well as being able to prioritise actions (Parton, 2003). Being embedded within these situations facilitates developing know-how and professional skill including when and how to use a
new practice and adapt these to individual patients (Dall’Alba & Barnacle, 2005; Dall’Alba & Sandberg, 2006; Eraut, 2001a). However, extensive practice is required to achieve expertise and develop practical wisdom discussed later as *phronesis*.

Professional expertise develops within a specific domain of knowledge and can be defined as:

> The ability to combine domain knowledge with appropriate professional tools and strategies to solve problems within the socio-cultural context of the profession. (Pillay & McCrindle, 2005 p.67)

Professional practice is the application of the thought processes in critical thinking and problem solving. In the health professions these are the cornerstones of diagnosing the problem, offering appropriate options for treatment then following up with evaluation of the outcomes of treatment and self-assessment of performance. A trainee for a professional role moves through stages from a beginner to a competent professional. Capacities are progressively enhanced to that of a safe practitioner in which the individual can carry out the core tasks and solve commonly encountered problems independently (Hendricson, Andrieu *et al.*, 2006).

Experts are reflective practitioners who process their experiences into personal knowledge. Tennant and Melville (1999) describe the development of expertise as “a lifelong learning project in which the person incorporates experiences and events into an ongoing narrative about the self”. For dentists, this is summed up as:

> A combination of a knowledge base, reasoning skills and an accumulation of experiences with patients. (Crespo, Torres *et al.*, 2004 p.1235)

As discussed earlier, dentistry is a procedure-based profession and I argue that expertise in dentistry includes enhanced procedure-based skills. This is differentiated from knowledge as follows:

> Skills can only be demonstrated through their application in performance (doing something) while knowledge can be elicited through the more abstract means of conversation, questioning or talking. (Winch, 2009, p.88)
Eraut (2000) defines personal knowledge as the cognitive resource which a person brings to a situation that enables them to think and perform. This incorporates codified knowledge (written or proposed) in its personalised form, together with procedural knowledge, process knowledge and experiential knowledge. The development of expertise in dentistry has similarities with engineering where “only practice performed with the intention of improving a skill will lead to the development of expertise” (du Boulay, 1999, p.125). The intention to improve is referred to as “deliberate practice” and requires the individual to be motivated to develop individual skills then practise these skills on authentic tasks. Expertise is the integrated application of knowledge and skills to address more challenging and complex problems (du Boulay, 1999). du Boulay identifies two key processes in deliberate practice as:

1. Defining which knowledge and/or skills need to be improved.
2. Selecting the learning approach that will lead to the desired improvements.

This (my) study asked dentists which areas of dental practice need to be improved (updated) and explores the associations of these with various learning approaches within CPD. The results are reported in Chapter 7 and discussed in Chapter 8.

Mentoring
Mentoring has been defined as:

A reciprocal learning relationship characterised by trust, respect, and commitment, in which a mentor supports the professional and personal development of another by sharing his or her life experiences, influence, and expertise. (Zellers, Howard et al., 2008, p.555)

The mentor/mentee relationship as a form of CPD is a multifaceted one between senior (mentor) and junior (mentee) professionals which aims to extend and strengthen characteristics and qualities integral to professional development within the junior professional (Barondess, 1997). This relationship is mutually beneficial where mentors value their investment of time and mentees gain from a person who can impart implicit professionalism, ethics and values. Essentially, the mentee learns from someone (the mentor) who has a wealth of professional experience and is in the position to be a champion for the less experienced person. Alternatively, remedial mentoring can take
the form of providing guidance and support for the more experienced practitioner who has been identified as having deficits in knowledge, skills or performance (Holt & Ladwa, 2010).

Within the mentor/mentee relationship, mentors gain by being personally involved in the development of another person. Mentors also have an opportunity to reflect on their own knowledge, skills and practices and to grow from the experience (Kelleher, 2012).

A facet of the mentor/mentee relationship is that of the mentor as a role model. A role model has been described by Bolton (1980) as one who:

- Demonstrates how required activities are to be performed in an understandable way.
- Can demonstrate complex behaviours.
- Provides a faster way of learning than experience.

Through vocational support and role modelling, mentors provide opportunities for employees to develop competencies. Mentoring sets up a dialogue between mentors and mentees, and the process of learning through interaction with others can be the key element through which mentoring translates into learning outcomes (Lankau & Scandura, 2002). Role modelling and the mentor/mentee relationship are consistent with social learning theory reviewed in the next chapter.

Working alongside a colleague enables someone to learn by asking questions and receiving feedback as and when events happen. It also allows the learner to see how a colleague reads situations, monitors them and takes decisions. However, there needs to be an appropriate disposition for CPD as the quality of support and feedback “is critically important for confidence, learning, retention and commitment” (Eraut, 2011, p.9). Confidence arises from successfully meeting challenges in the workplace yet the individual learner needs support within the workplace to take on the challenge in the first place.

Holt & Ladwa (2009b) describe a contemporary approach to mentoring where the focus moved from the mentor to the mentee. It is the mentee who knows what will motivate them relevant to their own learning styles and what areas of professional practice need attention. In the contemporary model, the mentor takes on the role of a facilitator to help
mentees learn for themselves to discover their own direction, style and destiny as well as the learning they need (Holt & Ladwa, 2010). The mentor/mentee relationship can be an informal framework for the development of professional judgment drawing on the experience of conversations with respected peers (Coles, 2002). Alternatively, a strong structured mentor programme will provide training for both mentors and mentees and set goals for the mentees (Hamilton & Brabbit, 2007). The quality of care given to the patient improves as dentists as mentees develop their integrated qualities of practical wisdom or *phronesis* (see next chapter).

Holt and Ladwa list qualities appropriate to a good mentor as:

- Likes/cares for people
- Wants to help
- Has listening/communication skills
- Is non-judgmental
- Empathises
- Assures confidentiality
- Has problem-solving skills
- Has credibility
- Has confidence to share mistakes, experiences, vulnerabilities
- Possesses up-to-date knowledge/clinical skills
- Has resources/contacts
- Is enthusiastic
- Is unquestionably honest. (Holt & Ladwa, 2009b, p.20)

The process of mentoring does not require seniority. Emotional intelligence and psychological maturity are more important than age and anybody who is interested in supporting others can be a mentor (Holt & Ladwa, 2010).

Many dentists work in isolation without the support of professional colleagues. While this is obvious for solo practitioners, isolation also occurs in larger group practices. Dentists essentially work in isolation in making judgments and carrying out procedures one on one with the patient without the support of a professional colleague. This can lead to burnout (emotional exhaustion) and disenchantment for a profession which
initially excited them. Mentoring can help to lift practitioners away from this disenchanted towards a greater sense of satisfaction and reward in their professional lives (Holt & Ladwa, 2009c).

Lankau & Scandura (2002) suggest that it may be beneficial to place less emphasis on particular mentor/mentee pairings in future mentoring research and practice and instead to focus more on what is learned and how it is learned through the relationship. This emphasis on learning within mentor/mentee relationships may help to clarify the role of mentoring at work. However, a cautionary note from Bolton (1980) that is still valid, is the potential sexual aspect of the male-female mentor relationship. Males may feel reluctant to become mentors to young females for fear of having their motives suspected by their peers or because the interest is already present and a closer relationship with a female mentee might develop into something other than a professional relationship.

Friedman and Phillips (2002) have suggested that mentoring as part of CPD is also positioned within the concept of lifelong learning described earlier in this chapter, and the understanding of what it means to be a professional. These authors have also called for a better understanding of when and how learning occurs in these relationships. McKimm, Jollie et al. (2007), following an enquiry into mentoring in medicine and dentistry, concluded that mentoring could be a valuable part of the framework of support for doctors and dentists, which is personal, professional and educational. This report recommended that “mentoring should be made available within medicine and dentistry but not imposed” (McKimm, Jollie et al., 2007, p.16). Mentoring has been included in the research model (see Chapter 5) as a dependent variable to explore this as a CPD activity for practising dentists.

**Effectiveness of Continuing Professional Development (CPD)**
In medicine, effective CPD is related to measures that stimulate behaviour change and the implementation of research findings and guidelines for good practice (Trojan, Suter et al., 2009). Effective CPD is facilitated by interaction of practitioner learners with opportunities to practise the learned skills (Mazmanian & Davis, 2002). An example of this is the mentor/mentee relationship discussed in the previous section. Skills transfer as evidence of learning refers to whether practitioners are able to take ideas or procedures into the workplace that have been learnt off the job. However, because one
cannot assume that learning has occurred at a CPD event, the responsibility for the effectiveness of CPD lies with the learner.

Effective CPD involves learning both the why and the how and putting these into practice and can be seen as multi-dimensional arising from the need to improve practice and develop professionally (Schostak, Davis et al., 2010a). This is consistent with the perspective of CPD as an existential process (see next chapter) that continues through the whole of life (Eraut, 2001b).

CPD may improve knowledge and skills but not necessarily attitudes and behaviours (Best, Eaton et al., 2005a). Motivation for learning as well as the ability to learn are crucial prerequisites if one is to engage in CPD as a lifelong learner (Cartney, 2000; Knapper & Cropley, 1985). Indeed, one trait of an effective practitioner is one who actively seeks out opportunities for new learning and the ability to learn characterises the successful practitioner (Candy & Matthews, 1998). However, to monitor effectiveness, one requires assessment and the current state of play of dentistry in Australia has no audit or assessment of CPD beyond recording participation. Again, the responsibility for the effectiveness of CPD lies with the learner (Eraut, 2001a).

There is a vast array of topics available for verifiable CPD as determined by the DBA (see earlier in this chapter), and the professional person is de facto the ultimate judge of his/her own needs for updating or up-skilling. The missing link is the ability of practitioners to determine their own gaps between best and current practice and assess their ongoing requirements for CPD (Davis, 2009; Redwood, Winning et al., 2010).

It has proven difficult to measure to effectiveness of CPD. In the current research effectiveness has only been measured in survey responses from professionals. The educational outcomes of CPD are rarely tangible, let alone measurable (World Federation for Medical Education, 2003, p.8). Existing literature relies on positive or negative survey of responses from professionals suggesting that future work in this area is critical given the focus on CPD across a range of professions.

Cantillon and Jones (1999) conducted a systematic review of the educational literature in medicine and reported the most effective methods include learning linked to clinical
practice, interactive educational meetings, outreach events, and strategies that involve multiple educational interventions. The least effective methods are lecture format teaching and unsolicited printed material. Positive outcomes leading to useful changes in clinical practice have been linked to increased opportunity for active participation through small groups (De Villiers, Bresick et al., 2003). Interaction between colleagues during unstructured time breaks in formal CPD activities have also been shown to be crucial in aiding the process of applying knowledge to practice (Tipping, Donahue et al., 2001).

More recently the results from a report by the UK College of Emergency Medicine (Schostak, Davis et al., 2010a), recorded the highest scores for positive CPD experiences as conference attendance, local events and reading journals. The majority of respondents in this report agreed that the greatest impacts of CPD were changes in clinical practice, knowledge acquisition and learner satisfaction. This is apparently at odds with an often cited paper by Davis, O’Brien et al. (1999), who report that while traditional educational methods such as conferences, meetings and lectures may have a necessary role in improving factual knowledge acquisition, didactic sessions have little impact on actual practice or changing the performance of physicians. However, the interpretation of the language within any self-reporting can be ambiguous. As mentioned earlier, conferences, congresses and seminars can be classified as formal activities with a strong didactic component, but these events also offer ample opportunity to interact with colleagues and should not be regarded as ineffective CPD activities.

In nursing, interactive workshops rather than lectures have been reported as the best way to influence changes in professional practice (Griscti & Jacono, 2006; Lawton & Wimpenny, 2003). The General Dental Council in the UK followed this with a survey to practising dentists asking opinions on the effectiveness of CPD activities (Davidson, Smith et al., 2008). The key findings from the survey reporting the percentages in agreement were: reading journals, 93 percent; lectures, 89 percent; and hands-on courses, 88 percent. Hands-on courses are of particular interest for dental practitioners as it is consistent with the need to maintain and develop procedural skills. Interaction with others either within formal workshop sessions, or informally as per discussion with
colleagues, were reported as good and/or valuable ways of learning. Hands-on sessions were described by dentists in the UK as a “really super way of learning” (Oxley, 1999, p.75).

The effectiveness of reading journals is supported by Tredwin et al. (2005). These authors reported that the vast majority of respondents had improved their knowledge base and two-thirds reported that some element of their practice had changed as a result of the journal reading.

A review of national conferences of the ADA and RACDS over the last ten years shows that the majority of CPD for dentists in Australia is delivered in a didactic way with lectures as the preferred delivery method (see Appendix XLIV). White, Michaud et al. (2004) describe a traditional didactic session for the medical profession as an audience sitting in a lecture theatre format with minimal time at the end of the presentation for questions to be asked. This has been also described as a one-way transmission of information and a passive teaching mode where the student is a spectator (Rutel, 2011). Content is limited to the lecturer’s choice of topic and any deviation from the topic through questions from the audience is limited in order to cover the planned material within the allotted time (Rutel, 2011). However, lectures do have the potential to clarify concepts, promote problem solving and challenge attitudes when the lecture is restructured from a one way transmission to engage learners (Di Leonardo, 2007).

Olson & Tooman (2012) also support lectures and caution that while lecture-based formats still predominate in education within the health professions, to say that didactic sessions in CPD “do not directly lead to change in clinical competency or practice is not the same as saying it has no value.” Formal didactic sessions can play an important role in facilitating change in clinical practice (Olson & Tooman, 2012, p.6).

On the other hand, a review of 81 trials that evaluated the effects of educational meetings in Continuing Medical Education, including, courses, conferences, lectures, workshops, seminars, and symposia concluded “the effect on professional practice tended to be small but varied between studies, and the effect on patient outcomes was generally less” (Forsetlund, Bjorndal et al., 2009). A further review of CPD in dentistry had a similar conclusion: “There is very little of any type of evidence to support the effectiveness of CPD in improving the performance of the oral health team” (Best,
Eaton et al., 2005a, p.71). CPD is only effective when a change in practice occurs (Nolan, Owens et al., 1995).

Before any activity can be explored for its effectiveness, barriers to attendance need to be overcome, along with the barriers to implementing the new knowledge or skills into practice. These barriers are explored by Firmstone, Bullock et al. (2004) who report the main barriers to attendance in a cohort of UK dentists were costs and time constraints, while conversely barriers to implementation of new knowledge included costs to patient and personal or staff issues, including resistance from other dentists in the practice. Another barrier to implementing the new skills was insufficient evidence of benefits from the new practice, and this was a reflection of the poor quality of the CPD. Costs as well as work-life balance were also reported by UK doctors as barriers to participation in CPD (Schostak, Davis et al., 2010a).

Effective CPD is also dependent on effective presenters or facilitators. In addition to relevant course content, the quality of presenter or facilitator is a significant determinant of engagement in CPD. Therefore, there is a need to train these presenters. High quality teaching recognises that learners must be engaged with the content of the learning activities in a way that enables them to reach understanding. The choice of how to learn the subject matter is related to high quality learning (Ramsden, 2003, p.97).

My research explores the reasons for attending CPD and preferences for various activities. The usefulness and extent of engagement in CPD activities helps reveal “What kinds of CPD are effective?”

**CPD in Dentistry**

The purpose of CPD is to facilitate change in clinical practice and to maintain and improve clinical performance (Trojan, Suter et al., 2009). It is the declared means by which dentists keep up to date and is a professional responsibility for all practising dentists (Dental Board of Australia, 2010b; Sambrook, Thomson et al., 2001).

In Australia, the Australian Health Practitioner Regulation Agency (AHPRA) has established a National Scheme for health practitioners mandating CPD and released the following statement to the media:
Establishing the National Scheme was the most comprehensive reform of health practitioner regulation ever undertaken in Australia...and places public and patient safety at the heart of health practitioner regulation. (Australian Health Practitioner Regulation Agency, 2011)

A recent report from the DentCPD project in the UK (Bailey, Bullock et al., 2013), supports AHPRA in placing patient safety at the forefront of regulation in identifying four core compulsory CPD topics for European dentists. These are; medical emergencies, infection control, the medically compromised patient and radiation protection with the use of diagnostic X-rays. These topics do address safety issues in the workplace to do with operator and patient, but fail to address safety issues related to incompetence in carrying out dental procedures. For example, a dentist needs more than the four competencies above to carry out a safe extraction. The ability to carry out procedures in a safe manner is a necessary component of dental practice.

The Dental Board of Australia (DBA) under the umbrella of the AHPRA has described good practice to involve maintaining and developing knowledge, skills and professional behaviour throughout a professional’s working life to ensure competence [italics added] (Dental Board of Australia, 2010a pp.9-10). However, as argued later, participation in CPD alone cannot ensure a change in behaviour. The DBA code of conduct for registered health practitioners cites the National Law requiring practitioners to undertake CPD (Dental Board of Australia, 2010a) and complete a minimum of 60 hours CPD activities over a three-year period (Dental Board of Australia, 2011).

Auditing of CPD participation is related to an investigation of a complaint and a dentist who is the subject of the complaint is obliged to provide evidence of participation in a CPD course or activity.

Why do we need CPD in dentistry?
As reviewed in Chapter 2, the professional practitioner is expected to have the ability (practical know-how, experience and familiarity) in relation to problems, tasks or situations and be able to respond and adapt through continuing education, to an environment of rapid change (Matillon, Le Boef et al., 2005; Svensson, 2006). The prima facie duty of dentists is still to provide quality care based on the profession’s current scientific evidence and understanding. The treatment provided must be
appropriate for the specific problem and it must be provided in a quality manner, meeting established technical standards. Professionalism demands keeping abreast of current knowledge and enhancing competence and skills through CPD as consumers have the right to expect dentists to be competent and to remain contemporary (Parochka & Paprockas, 2001).

The practice of dentistry has been driven by advances in materials. In the 1950s choices in materials for filling teeth were limited to gold or amalgam for the back teeth and gold or silicate (white) for the front teeth. Broken down teeth were usually extracted and dentures fitted. Nowadays the global trend is for an ageing population retaining their natural teeth with increasingly complex dental procedures such as dental implants or endodontics (see glossary). The incidence of dental caries (tooth decay) has declined but periodontal (gum) disease is still widespread. This trend puts extra emphasis on dental services beyond the maintenance of oral and general health, to therapies and services which improve quality of life by enhancing masticatory (chewing) function and aesthetics (Davidson, Smith et al., 2008).

As new materials and technologies are developed and released to the profession, dentists have to learn about the material and then up-skill for the appropriate procedure (Coles, 2002; Olive, Hopcraft et al., 2012). Dental services in the future will require more and more complex procedures in order to service the ageing population (Zoldan, 2014). For example, dental implant therapy is a combination of materials science and sophisticated diagnostic and therapeutic procedures (Davidson, Smith et al., 2008).

Interprofessional learning can also be extremely important. Oral health practitioners need to be familiar with management of chronic diseases in older patients and understand how they can influence their own clinical decision-making. In Australia the median age to receive dental implant therapy is between 51-60 years and many in this group also suffer from disorders such as cardiovascular or respiratory disease (Austin, Bailey et al., 2015). The increase in chronic disease has driven demand for interprofessional education to improve collaboration and the quality of patient care (Thistlethwaite, 2012). Choices are now vast and varied and more time is demanded of dentists to explain the options as well as risks as part of the process as informed consent (Personal communication, retired general practitioner dentist, 2014).
Modern (western) society is a risk averse society and professionals are constantly under stress from the question of “what if something goes wrong?” A safe, competent practitioner is one who can perform the core tasks associated with a professional role and solve commonly encountered problems without assistance (Hendricson, Andrieu et al., 2006). Competent, as defined by the Australian Dental Council’s (ADC) means:

The behaviour expected of the beginning practitioner. This behaviour incorporates understanding, skill and values in an integrated response to the full range of requirements presented in practice. It is not just about being able to carry out a procedure but having the understanding, skills and values to consider whether the treatment is justified under the individual circumstances, the risk of harm from the procedure and performing the procedure. (Australian Dental Council, 2010)

Eraut (2006, p.5) expands on this definition to include performance of tasks and roles required to meet other peoples’ expectations. These expectations are socially defined and thus in a constant state of flux. At any one time, competence is limited by the context or space in which the practitioner has to operate, such as the degree of supervision, time pressures, available resources and the situations that the practitioner may encounter such as patient demands.

Professionals are expected to foresee risks and manage them as well as be prepared to face any challenge to their expertise or skill (Frost, 2006). Working in isolation increases the risk of litigation (Andrews, 2007; Dennett, 2007; Noar, 2007). Therefore the support of colleagues is to be encouraged (Crozier, 2007) as peer interaction will generate an understanding of contemporary acceptable practice. That is, what can reasonably be expected of the average practitioner who is:

- Able to recognise, diagnose and treat the problems normally occurring in dentistry. They should have the ability to communicate efficiently, to regard dentistry as a health care discipline geared to prevention, to take an evidence-based approach and work together in and lead a team. (Kersten, Vervoorn et al., 2007 p.3)
Chapter 3

The DBA recognises that a dentist’s qualification that leads to registration provides the complete foundation knowledge to practise all parts of dentistry. Dentists can then build on their foundation knowledge to adopt new techniques using CPD. The CPD relied upon to improve and broaden knowledge should provide experience in the technique or procedure (Dental Board of Australia, 2014).

There is a grey area of definition of “competent” as related to the ADC’s definition earlier and the freedom permitted within the scope of practice with warnings from the dental profession that the education of dentists in Australia is at risk of being “dumbed down” (Bartold, 2009) and graduates under-prepared for clinical practice (Manakil, Rihani et al., 2015). For example, in Australia, the teaching of dental implant procedures at the undergraduate level is underdeveloped (Davidson, Smith et al., 2008) and general dentists can carry out their chosen scope of procedures without the requirement for additional training (Lam, 2014). Due to the increase in litigation with court sentiment favouring a patient’s rights, case selection, experience and referral when in doubt are all the more important. As a matter of duty, dentists need to fully communicate all appropriate options and risks which can only be achieved by knowing the evidence base themselves (Lam, 2014).

Taking risks is necessary for learning (see Chapter 4), but learning should not be at the expense of patient safety or continued health. In general, the research argues that there is a greater tendency for males to take risks and be more confident than females (Dent, Paltridge et al., 2008) and tend to overestimate their competence (Kusurkar, Croiset et al., 2013). CPD is important in mitigating risk but needs to address the differences in attitudes to CPD between males and females as discussed later in this chapter.

Practical wisdom or phronesis, is only acquired after a prolonged period of experience and reflection on that experience (Hilton & Slotnick, 2005). Phronesis grows in concert with the professional’s development of competence and capability and is discussed in more detail later in the next chapter.

An example of the change in knowledge base for the practice of dentistry is in the perspective of dentists as oral health physicians rather than dental surgeons (Hobson, 1998). The treatment of dental caries by way of restorations (fillings) and repair of
restorations takes much time and energy within general practice in Australia (Walsh & Brostek, 2013). Over recent years though, research has directed attention to the actual cause of this disease with a new paradigm of Minimum Intervention Dentistry (MID) in the control of dental caries as well as other disciplines within dentistry such as oral pathology and oral surgery (Tyas, 2013). MID utilises risk assessment and focuses on the early prevention and interception of disease. However, preventive treatment requires dentists to have the knowledge and be able to pass this on to educate their patients (Mount, 2013; Walsh & Brostek, 2013). Risk assessment requires the dentist to spend more time communicating with patients to advise them about their risks regarding possible future oral disease. MID aims to empower patients, through information, skills and motivation, to manage their personal oral health (Calache, Hopcraft et al., 2013). If the profession is going to change the mindset of the population at large then individual dentists have to change their own mindsets from curing caries with restorations or extractions to prevention of the disease.

Professional practice includes managing change. For change to be successful, it is necessary for practitioners to have the knowledge, skills, and motivation needed to adopt a practice (Silver & Leslie, 2009). Furthermore, dentists as professionals have a duty to consider all options in providing quality care to patients and to weigh up the potential benefits against potential risks. Sound communication skills on behalf of the practitioner are thus required to allow patients to make informed decisions about their own care (Nash, 2007).

However, as Mazmanian & Davis (2002) argue, practitioners must first recognise their own needs for change in knowledge, skills or behaviour before engaging in CPD and change in one area of practice may or may not lead to change in another. For example, a change in the ability to perform a clinical procedure does not always result in that procedure being incorporated into clinical practice. Furthermore, a change in clinical performance does not automatically lead to a change in patients' outcomes (Kreindler, Dowd et al., 2012). In addition, it is important that practical and organisational conditions make the new behaviour possible and that colleagues, patients and others accept it.
The dental schools have a responsibility to start the change of mindset in modifying the curricula to reflect a combination of MID and patient-centred care (Kaidonis, Skinner et al., 2013) and also target the existing practitioners, .... “Change is constant …and it is up to the practising profession to keep changing”. (Mount, 2013, p.2). Engaging in CPD as a learning activity is required to facilitate the change in mindset of dentists. Furthermore, I argue that an increased emphasis on the need for CPD be included in the student curricula, particularly during the clinical placements. The restructuring of clinical placements for dental students as a strategy for addressing the under-preparedness of dental graduates is discussed in Chapter 8.

Preferences for CPD in dentistry
A number of authors have surveyed dentists to determine these dentists’ preferences of CPD formats and compared these for sex, age and type of practice. These authors have helped to inform the development of my questionnaire described in Chapter 5. An Australian survey (Best & Brearley-Messer, 2001) examined the participation and attitudes of dentists in Victoria to CPD. These authors reported that the topic and identity of the lecturer were the most important issues in deciding to attend a course. Whether or not a course had a hands-on component was also a consideration with a hands-on component being an incentive to participate. Family commitments and costs were disincentives to attend conferences or courses. A majority of respondents belonged to study groups and two-thirds subscribed to at least one journal apart from the Australian Dental Journal (which is included in the membership of the ADA). The vast majority of respondents engaged in discussion of dental matters on a regular basis with colleagues.

Abbott et al (2010) surveyed the pattern of participation in CPD of dentists in Western Australia. A small majority of courses were presented as lectures with slightly less than half incorporating a clinical or practical component. The most common topics for courses were restorative dentistry and endodontics and those courses with a mix of didactic and practical components were more sought after and indeed were oversubscribed. This begs the question as to why are not more of these courses provided? The simple answer is cost. The nature of practical/clinical courses involves
hands-on activities that demand additional equipment and consumables, which limit the numbers that can attend per session. This issue is discussed further in Chapter 8.

Eaton et al. (2000) surveyed specialist orthodontists within the European Union and reported that hands-on workshops, lectures and study groups were the most preferred CPD activities. Leggate & Russell (2002) conducted a survey of dentists in the UK and reported a preference for lectures as a CPD activity as they provided access to expertise while at the same time participants had a chance to meet up with colleagues. These authors also reported differences between males and females where females preferred small group tutorials and reading journals. Also from the UK, Ralph, Mercer et al. (2001) surveyed the preferences for CPD of practising dentists in Scotland and reported discussion with colleagues as the most useful medium for updating their knowledge. This is consistent with another study from Scotland (Maidment, 2006) which draws attention to the need for solo practitioners to engage in professional peer contact as they are more isolated and more at risk of being out of date. More recently, Bailey, Bullock et al. (2012) investigated the CPD activity of dentists in Wales, UK., as provided by the Wales Deanery. These authors reported no significant differences in CPD activity between females and males but solo practitioners were less engaged than group practitioners.

In a survey of attendees at the 26th Asia Pacific Dental Congress (2004), Chan, Ng et al. (2006) reported a preference for didactic teaching with the most popular topics being implantology, cosmetic dentistry and endodontics. These results are difficult to compare with other studies as cosmetic dentistry embraces all disciplines within dentistry related to the aesthetics of the smile and will overlap with preferences for implantology, crown and bridge work and restorative dentistry. Furthermore, there is an inherent bias in the reported preferences for CPD formats as the respondents were all attendees at a Congress where didactic lectures predominated.

By comparison, a questionnaire survey of preference for CPD formats and topics of interest for pharmacists (Driesen, Leemans et al., 2005) reported lectures as the most popular format followed by workshops or interactive sessions. Pharmacists regard active participation as a stimulating factor for engaging in CPD while time constraints, family commitments and lack of interest in the topic were reasons for non-participation.
McGettigan, Golden et al. (2001) caution that among general practitioners (medical) the sources of information most frequently rated important in the literature were not those most used in practice. The sources of knowledge with the greatest practical importance were those involving the transfer of information through personal contact.

Holt & Ladwa (2008) argue that a culture where dentists are supported by trained and experienced colleagues over all stages of their careers could do more to enhance the delivery of quality care than auditing of techniques. Furthermore, dentists are far more likely to enjoy a lifetime of practice as they maintain the inspiration that drove them to practise dentistry in the first place.

A recent survey of young leaders in dentistry in Australia reveals that they seek meaningful mentoring (Robinson, 2014). Although they can access information on the internet and social media, the personal interaction with a mentor is more powerful. They express a need for role models within the profession, both female and male, to inspire them.

**Summary**

CPD has been defined as “the purposive maintenance, improvement and broadening of your knowledge, skills and personal qualities in order to perform your professional activities successfully throughout your working life.” (Watkins, 1999, p.70). Learning to be a dentist and practising as a professional over a lifetime requires a commitment to lifelong learning and CPD.

Post-university, CPD for dentists in Australia has been until recently, a voluntary exercise. Engagement in CPD has primarily relied on the professionalism of the individual practitioner to keep up-to-date through conferences, courses and workshops offered by the ADA, university dental faculties, or the RACDS.

As the literature reveals, the *prima facie* duty of dentists is still to provide quality care based on the profession’s current scientific evidence and understanding. The rapidly changing knowledge base occurring through research means that the period of initial training cannot equip practitioners with all the skills and knowledge required throughout their years of professional practice. Professionalism demands keeping abreast of current
knowledge and enhancing competence and skills through CPD. Indeed, consumers have the right to expect dentists are competent and remain contemporary.

There is a wide range of CPD activities along a continuum from informal to formal such as discussion with colleagues in the workplace to structured university courses leading to a post-graduate award. The effectiveness of these activities is related to measures that stimulate change in behaviours and attitudes, as well as develop the qualities of self-directed, proactive and independent learning as part of lifelong learning. In particular, mentoring is explored as a CPD activity and is included in the research model introduced in the previous chapter.

In the next chapter I review the literature on learning in the professions and analyse the variables of learning characteristics, incentives and barriers. These variables have been analysed for the strength of their associations with attitudes to the usefulness of CPD activities, extent of engagement in CPD and mentoring. The variables of sex, age of practitioner and type of practice were incorporated into the analyses as controlling variables (see Chapter 5) and the results are reported in Chapter 6. The relationship between these will be useful in testing the hypothesis: “Those who prefer to learn through social interaction and/or collaboration with others are more likely to have a positive attitude to engagement in Continuing Professional Development (CPD).” and through testing the hypothesis, assist in crafting a framework for effective CPD.
This chapter presents a review of the literature on learning in the professions. This leads on from the previous chapter where Continuing Professional Development (CPD) has been defined as the “the purposive maintenance, improvement and broadening of your knowledge, skills and personal qualities in order to perform your professional activities successfully throughout your working life.” (Watkins, 1999, p.70) Thus, CPD is a learning experience with a goal of improving professionals’ ability to engage in wise action (Cervero, 1992) and its effectiveness is related to learning outcomes and any resultant behaviour changes (Cervero, 1985).

Professional practice is a dynamic process, building on the specific origins and traditions of the specific profession. Practitioners involve others in what they are doing to create practice through interaction and participation in specific contexts and situations (Beeston & Higgs, 2001, p.109). Learning in the professions is a social process interacting with likeminded professionals but influenced by the individual learning characteristics of the practitioner.

It is useful to divide the review into two parts. Part I explores the concepts of learning in the professions via communities of practice and social learning. Part II follows with an exploration of learning characteristics as a collective of modes of learning, preferences and styles of learning. Authentic Professional Learning (APL) is reviewed with a final section on the incentives and barriers to engagement in CPD.

**Part 1: Current literature on communities of practice**

Learning for the individual professional is an issue of engaging in and contributing to the practice of one's community. For the community, it is an issue of refining the practice and ensuring new generations of members, while for the organisation, learning is an issue of sustaining the interconnected communities of practice (Wenger, 1998).

Communities of practice are groups of people who share a passion for something that they know how to do, and who interact regularly in order to learn how to do it better. (Wenger, 2004 p.7)
Practitioners within each community have a special connection with each other through shared experiences. The mutual understanding of each other’s stories, difficulties and insights allow them to learn from each other and build on each other's expertise. These communities can vary from collegial face-to-face groups to a wider set of electronic communities (Barratt-Pugh, 2013).

Communities of practice bring together practitioners who are actively involved in doing something, such that over time practical knowledge is accumulated. Small groups that meet regularly have the potential to become communities of practice where members support each other’s learning and share knowledge (Pereles, Lockyer et al., 2002). Learning is the process of entering into a community by adopting its practices and beliefs through zones of proximal development. Novices enter a community of practice peripherally and gradually move to a central zone as expertise is built up and recognised by the community. These zones provide a space that enables communities to be established through a process of forming and changing identities (Renshaw, 1998).

Guile & Young (1998) cite Vygotsky’s definition of a zone of proximal development as:

> The distance between the actual development level is determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more able peers. (Vygotsky, 1978 p.85)

The socialisation into the profession occurs through novices co-constructing knowledge with experts or mentors (see Chapter 3) and constructing their own identity as an expert. For the dental profession: “It is about learning to be a dentist not learning about oral science” (McHarg & Kay, 2008 p.638). Furthermore, the social dimension of the community benefits all the members as ideas, perceptions and approaches are shared, discussed and debated. The interaction of members within a community provides support and encouragement for learning and trying out new ideas and approaches (Chalmers & Keown, 2006). Glazer and Hannafin (2006) have described such interactions within communities of practice in the teaching profession as an effective means of supporting situated professional learning. This (my) research explores the effectiveness of interaction and collaboration for professional learning in dentistry.
The next sections explore the theoretical principles behind social learning and the relationship of social learning to communities of practice.

**Social Learning**  
Bandura (1971, p.2) describes psychological functioning as “continuous reciprocal interaction between behaviour and its controlling conditions.” In the social learning system, new behaviour patterns can be acquired through direct experience or observing the behaviour of others.

Individual cognitive skills enable a person to benefit from the experience and via both insight and foresight, convert the consequences of a behaviour to incentives or barriers. The people one regularly associates with determine the types of behaviour that is repeatedly observed and hence more likely to be learned. Thus communities of practice have a strong influence on the development of an individual’s behaviour through modelling and observation. Social learning theory recognises behaviour as learned through observation of a model of behaviour before it is performed. Modelling stimuli may be transmitted through physical demonstration, pictures or verbal descriptions in order to learn, including how to behave in unfamiliar social settings. The degree of observational learning is enhanced by informing, in advance of the observation, the benefit or reward for adopting the new behaviour.

Mentoring as described in the previous chapter is an example of social learning (Bolton, 1980). A mentor through direct involvement with the mentee, personalises the modelling influences for the individual.

**The Social Cognitive Theory**  
Social Cognitive Theory (SCT) developed from Social Learning Theory (SLT) by Albert Bandura (1971) into the SCT, posits that learning occurs in a social context with a dynamic and reciprocal interaction of the person, environment, and behaviour. The unique feature of SCT is the emphasis on social influence and external and internal social reinforcement. SCT considers the unique way in which individuals acquire and maintain behaviour, while also considering the social environment in which individuals perform the behaviour. The theory takes into account a person's past experiences, which factor into whether behavioural action will occur. These past experiences influence reinforcements and expectations which shape whether a person will engage in a specific behaviour and the reasons why a person engages in that behaviour.
Social Cognitive Theory considers many levels of the social ecological model in addressing behaviour change of individuals. SCT has been widely used in health promotion programmes given the emphasis on the individual and the environment (Bandura, 1999). However, the theory assumes that changes in the environment will automatically lead to changes in the person, when this may not always be true.

Traditional accounts of learning emphasised the individual learning of theoretical or scientific knowledge (propositional knowledge) and assumed this formed the basis of professional competence (Gonczi, 2004, p.29). In contrast, Wenger (1998) asserts that we are all social beings and knowing is a matter of active engagement in the world. Social learning theory argues that knowledge is created by doing in a range of social settings or communities of practice and recognises that learning is enhanced by social interaction. This refers to mutual modifications of behaviour as individuals respond to each other in social settings (Guan, Tregonning et al., 2008).

Lundberg (2003) notes that within a tertiary education environment, peer learning such as in study groups, increases the effort students invest in learning, both in the group setting and individually. Engagement in educationally related peer discussions was the strongest predictor of adult learning.

Social learning emphasises behavioural learning (Jarvis, 2010, p.75) and reflects a more realistic portrayal of learning as a collaborative process. Collaborative learning is the grouping or pairing of learners for the purpose of achieving an academic goal as a co-construction of knowledge (Reusser, 2001). Such learning provides the kind of social context in which normal discourse occurs, such as within a community of knowledgeable peers. Learners are able to develop knowledge and skills that approximates those they need in everyday life (Bruffee, 1997). Collaborative learning is thus a component of personal development (Reusser, 2001), which is consistent with that of Jarvis (2004, 2010).

Collaborative or shared learning allows participants to interact with each other to engage in discussion and active exchange of ideas. Shared learning increases interest among the participants and promotes critical thinking (Gokhale, 1995). Paice and Heard (2003) suggest this is a natural progression from problem-based learning and is to be commended for learning about evidence-based care, communication and change.
management in medicine. However, a limitation to the effectiveness of collaborative learning is how well the instructor serves as a facilitator for learning rather than solely as a transmitter of information. The instructor as a facilitator creates and manages meaningful learning experiences and motivates learners through real-world problems (Gokhale, 1995). The research findings reported in Chapters 6 and 7 includes the quality of the presenter as an incentive to engaging in CPD.

Learning in small groups has been shown to be more likely to lead to useful results in clinical practice in medicine (De Villiers, Bresick et al., 2003). The active participation by learners promotes improved attention to the subject matter and therefore enhances learning (Hyslop-Margison & Strobel, 2007). Internalisation of experiential items is guided by social interaction and the need for collaboration and communication with others members of the group (Hardy & Taylor, 1997). As von Glaserfeld (1989) argues, social interaction is the most frequent secondary influence on a system that modifies simple behaviour (see next section, Experiential learning).

Hyslop-Margison & Strobel (2007) describe Vygotsky’s theory of knowledge acquisition as social constructivism. Here, knowledge is a socially negotiated product generated in cooperation and understanding with others. Vygotsky focused on childhood development of language as a cultural understanding (Vygotsky, 1978) and his model of sociocultural learning has been applied to learning in adults (Wenger, 1998).

Alternatively, constructionism stresses the formation of knowledge through interactions between people and their environment within a social context (Crotty, 1998).

All knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interactions between human beings and their world, and developed and transmitted with an essentially social context. (Crotty, 1998 p.42)

Crotty continues:…

…each of us is directly introduced to a whole world of meaning. The mélange of cultures and sub-cultures into which we are born provides us with meanings. These meanings are taught and we learn in a subtle and complex process of enculturation. (p.79)
For any change in knowledge, skills or practice to occur, new information must be integrated with existing information. Interaction with peers is one way in which practitioners are able to explore the implications of new information for their practices and is a valuable learning aid (Tipping, Donahue et al., 2001).

Constructionism has been further described as social constructionism, emphasising that knowledge and understanding is socially constructed on the basis of the social, historical, cultural and political context from which it arises (Hruby, 2001; Young & Collin, 2004). Sociocultural learning focuses on how learning occurs through discourse (as a collective for conversation, exchange, communication or discussion) with others and the environment. Personal development is a co-construction in a social and cultural space which includes peer interaction and learning in teams (Reusser, 2001). This is enhanced by an infrastructure of engagement to develop collegial interactions (Tillema & Orland-Barak, 2006) and communities of practice (Trevitt, 2005; Young & Collin, 2004). Walker (2001) suggests that socio-cultural theories of learning provide a basis for understanding professional development in professional practice and a framework of socio-cultural learning in the workplace has also been proposed for interprofessional development of health care teams to learn new skills that improve services and outcomes for patients (Wilcock, Janes et al., 2009). Interprofessional education (IPE) is a process of two or more professions learning from, with and about each other to improve collaboration and quality of patient care (Thistlethwaite, 2012, p.60).

Constructionism is often used interchangeably with constructivism (Lee, 2011). However, constructionism differs from constructivism in that constructionism focuses on the collective generation of meaning while constructivism focuses on the individual. As the findings indicate (reported in Chapter 6), this research supports CPD for practising dentists as constructionist learning. The effectiveness of CPD as a learning experience is enhanced through collaboration and interaction with others as co-construction of knowledge, skills, attitudes and behaviours.

*Situated learning* is a further application of a social theory of learning in that the meanings of the concepts are shaped both socially and individually by the contexts in which they are acquired and the contexts in which they are used. Knowledge construction in real settings leads to genuine understanding and is a component of authentic professional learning (see later in this chapter). Context shapes how
professionals look at new information to determine what to learn and what to incorporate into their own practices (Daley, 2000). The cultural perspective on knowledge construction focuses on knowledge as a social process where the collective understanding is shaped and sustained by social interactions through artefacts or objects that mediate these social interactions (Macpherson & Jones, 2008). These authors denote artefacts and objects as products of existing material and social arrangements as well as having the potential to be transformed during social interactions. With the outcomes of shared understandings and shared meanings, the individual perspective is captured by personal knowledge or what the individual brings to situations that enable them to think, interact and perform (Erut, 2006).

*Experiential learning* is constructing knowledge and meaning from real-life experience (Yardley, Teunissen *et al.*, 2012, p.161). Experiential learning thus fits within the social theory of learning described earlier, in that learning is a multi-directional interaction resulting from a collaborative engagement within communities of practice. Experiential learning is a process of constructing knowledge that involves a creative tension among the four learning modes. This process is portrayed as an idealised learning cycle or spiral where the learner “touches all the bases”—experiencing, reflecting, thinking, and acting—in a recursive process that is responsive to the learning situation and what is being learned (Kolb & Kolb, 2005). Modes of learning are discussed further in Part 2 of this chapter.

There is a common denominator of “social” in the above learning descriptions where there is interaction with others. In social learning the principal behavioural effects come from interaction with groups or individuals that control the person’s major source of reinforcement, be it positive or negative (positive reinforcement is reward and negative reinforcement is avoidance of punishment).

For CPD in dentistry this can be applied to the influences of communities of practice and to the mentor/mentee relationship where the mentor is the role model and the major influence on the mentee’s learning and behaviour.
Apprenticeships

The apprenticeship model as an example of social learning has been defined as:

…an educational process in which the exercise of judgement and the ability to act in the world emerge out of the complex of interactions to be found in a community of practice. The interactions combine cognitive, emotional and bodily processes in the social and cultural setting of the workplace or other social settings. That is, real understanding and competence is essentially a result of social rather than individual activities. (Gonczi, 2004, p.21)

The traditional concept of apprenticeships involves four main elements;

1. The apprentice is a learner.
2. Craft knowledge is fixed.
3. The master is a teacher.
4. Learning in the workplace is context bound (Guile & Young, 1998).

The apprenticeship method of training illustrates the significance of a master or expert in the career development of a newcomer to a profession or trade. Various forms of apprenticeship learning exist today in the form of vocational training and experiential learning in both formal and informal settings. Dentistry, as stated earlier, is a vocational profession, which has a significant practical component. Lifelong dental practice requires continuous upskilling once basic knowledge has been acquired and relates the apprenticeship model of learning to that of the mentor/mentee relationship.

Apprenticeships and mentor/mentee relationships (see Chapter 3) both serve to develop the individual in a novice state through experiences provided by a more experienced individual. The difference is that mentor/mentee relationships imply more of a personal relationship than that of apprenticeships. A mentor is defined in terms of the character of the relationship between two individuals rather than the function it serves. Thus, both mentoring and apprenticeship may serve to develop the novice occupationally with the former being much less formal and more personal. (See previous chapter for a review of mentoring).

The apprenticeship model directs us away from the idea of learning as transmission, towards learning as a process in which the apprentice is involved in “learning by doing” with a master as the role model. Expertise is developed through accumulated
experience, under the guidance of the expert (master). When someone learns a practice, he/she is initiated into the community of practitioners (as per a community of practice). The practitioner learns their conventions, systematic knowledge and patterns of knowing in action. Apprenticeships offer direct exposure to real conditions in practice and patterns of work (Schon, 1987 p.37) and the apprentice becomes part of the workplace community of practice. Apprenticeship learning is thus an example of situated learning which views learning as embedded and inseparable from the specific sociocultural context (Reusser, 2001).

A cognitive apprenticeship model of learning is a further example of social learning (Grabinger, Aplin et al., 2007) and equates to the recent graduate as the journeyman engaged in a learning process towards mastery. The notion of the cognitive apprenticeship emphasises the thinking that must precede and be part of a task as well as the observations made after the completion of the task (Woolley & Jarvis, 2007). Existential learning (Jarvis, 2004) is a component of this process with a desired outcome of a truly professional practitioner. This educational approach attends to the immediate needs for skills attainment but within a wider view of learners’ needs for longer term sustainable development. It is also concerned with changing learners’ understanding and establishing a basis for wise decision making that is context-related and underpinned by moral and ethical ideals (Fish & Brigley, 2010).

As discussed in the previous chapter, dentistry is a procedure-based profession and I argue that an apprenticeship model fits well with the goal of educating a dental practitioner for competent, professional practice. Furthermore, post-graduation, the ongoing development of knowledge, skills and practical wisdom as phronesis (see later section) can be conceptualised within an understanding of a cognitive apprenticeship model.

**Problem Based Learning (PBL)**
Problem based learning is a teaching method of constructing and teaching courses using problems as the stimulus or focus for students (Stephenson & Galloway, 2004, p.265). The main elements of PBL include learning in small groups while faced with a realistic problem that the learners are expected to resolve. PBL encourages the development of self-directed learning skills as well as the skills and behaviours to continue to learn (Winning & Townsend, 2007). The students engage in the problem-solving process with
a facilitator as the elements of the problem are discussed to identify what content they need to learn in order to understand and resolve the problem (MacKinnon, 1999; Solomon, 2005).

Other key educational objectives of PBL are:

To assimilate new knowledge that is integrated from different disciplines and structured to facilitate recall and application to a pre-existing conceptual framework.

To develop a systematic approach to analysis of clinical situations, to develop the ability to evaluate one’s own performance and that of others and to develop good team and interpersonal skills. (Winning & Townsend, 2007, p.3)

These approaches can foster the development of the types of knowledge, skills and attributes that dentists as professionals will need in the future, enabling the student to assume responsibility for CPD once in practice (Barnett, Becher et al., 1987). Dental graduates report that this approach enhances their ability to apply knowledge learned to clinical situations and prepares them well for their profession (Bassir, Sadr-Eshkevari et al., 2014; Tashakkori & Creswell, 2007).

Techne and Phronesis
The Aristotelian understanding of knowledge captures the bodily and experience-based forms of knowledge which are often named “tacit knowledge” (Saugstad, 2002). Aristotle perceived knowledge as a competence, as something “you are or you do” (Saugstad, 2002 p.378).

Techne is a practical knowledge which attaches itself to a competence in making producing and manufacturing. Techne consists of an ability to carry out a procedure in practice and to give an account of the general laws and principles behind the procedure and is thus a reflective knowledge (Saugstad, 2002). Unless one has training and experience one is not able to apply the general principles to a specific situation.

Phronesis is the practical knowledge of ethical, social and political life, or practical wisdom. It involves knowing what is the appropriate or best thing to do in any given circumstance and is a consistent aspect of one’s moral character (Jamal, 2004). Phronesis is based on judgment and personal competence (Saugstad, 2002) and can only
be cultivated or acquired after a prolonged period of experience and reflection on that experience (Hilton & Slotnick, 2005; Papastephanou, 2010).

Aristotle understood phronesis as a kind of action competence with a true understanding of what is good/best for the individual. A virtuous human’s character includes knowledge of phronesis to act morally based on the correct deliberations. Phronesis is therefore an essential ingredient to wise dental practice and the discretion to plan treatment which is appropriate for the individual patient. Wise practice includes the ability to reflect in and on practice (Schon, 1987) and to make the necessary adjustments as the context of practice changes (Kinsella, 2010). As clinical experience is acquired, so does the ability to recognise and manage situations efficiently and effectively (Rolfe & Sanson-Fisher, 2002). Hager (2001) supports this concept in describing knowledge as “a capacity for successful acting in and on the world”. The choice of how to act in and on the world comes from the exercise of judgement. Furthermore, because the learner is part of the world, the process of acquisition of knowledge changes both the learner and the world (Hager, 2004).

Personal communication with executives of the Australian Dental Association (ADA) suggests that professional practice involves a discerning dentist where each patient is treated as an individual with unique requirements. Treatment procedures are not cook book options but are planned based on a thorough examination, history and evidence. The hallmark of wise practitioners is the discretion and sound professional judgement they display in caring for individual patients.

In summary, communities of practice demonstrate the notion of a profession which is defined by an occupational scope of practice. Learning in the professions encompasses enculturation of novice practitioners to the mores and standards of practice of the profession as well as providing support and guidance to current practitioners to remain contemporary. Dentistry is a procedure-based profession where professionalism is a combination of competence and capability in technical procedures as well as personal qualities of sound judgement and wisdom.

I argue that professional learning for dentists has an existential component which goes beyond what procedures are carried out in the chair of the dental surgery and into the
wider community. Indeed this is a whole-of-life process and reflects being and becoming who we are as professionals.

Existentialism
Existentialism emphasises the unity of person and the environment and the components of the natural world (biological urge and drive), the social (interactive and interpersonal aspects of existence), and the subjective phenomenological world of the self (Spencer, 2011).

Jarvis (2004) argues that learning is an existential process in which the person is always continuing to learn and develop and this process continues through the whole of life. Thus it is becoming who we are. He defines existential learning as:

The combination of processes throughout a lifetime whereby the whole person – body (genetic, physical and biological) and mind (knowledge, skills, attitudes, values, emotions, meanings, beliefs and senses) – experiences social situations, the content of which is then transformed cognitively, emotively or practically (or through any combination) and integrated into the individual person’s biography resulting in a continually changing (or more experienced) person. (Jarvis, 2010, p.81)

This definition of learning supports Mezirow (1997), who has described adult learning as a result of reflecting on experience as a transformational process. Learning is a critically reflective process where the learner assesses previous understandings to determine whether these assumptions are still valid in the learner’s present situation. Transformative learning thus involves change in people’s understanding of some aspect of their world and a change in behaviour as a result of the transformation of the experience. This view of learning underlines the context and the influence of cultural and social factors. It is holistic in that it points to the whole-person nature of learning, including the importance of dispositions and abilities (Hager, 2004).

Fenwick and Tennant (2004, p.55) add to this by way of:

Ideas of adulthood vary widely that one cannot describe the adult learner as a unique category.

Learning as a mental process does not occur in a vacuum. The context of a person’s life has unique physical, cultural, political and social dynamics, which influence
learning experiences. Such context is not a static environment but is active and dynamic.

Part 2: Learning Characteristics: Modes of learning, styles and preferences

A learning style or preference is “the complex manner in which, and conditions under which, learners most efficiently and most effectively perceive, process, store, and recall what they are attempting to learn” (Lujan & DiCarlo, 2006, p.13). Cognitive style represents the core of an individual’s learning style while the motivational aspects of learning represent a bridge between cognitive style and formation of a learning strategy (Kennedy, 2005). Style matching is any situation where the learning activity meets the learning or personality needs of the learner.

Modes of learning vary between individuals. To engage learners in activities requires educational principles to guide their activities as different people learn more effectively in different ways. Some learn more from the activity itself while others learn from others and need time to think and discuss ideas with others (Grace, 2001).

David Kolb in developing his Experiential Learning Theory (ELT) defined learning as “the process whereby knowledge is created through the transformation of experience” (Kolb & Kolb, 2005, p.194). The ELT model portrays an idealised learning cycle or spiral where the learner “touches all the bases”–experiencing, reflecting, thinking, and acting in a recursive process that is responsive to the learning situation and what is being learned. ELT proposes that this learning cycle will vary with individuals’ learning style and learning context.

Zhang, Sternberg and Fan (2013) offer intellectual style as a collective term for cognitive style, learning style and thinking style. These have been defined as “consistent individual differences in preferred ways of organising and processing information” (Ryan, Lyon et al., 2007, p.187). Others have described learning styles as a component of learning preferences. Learning preferences represent a person’s choice or liking for a particular instructional technique or combination of techniques, which has been summarised into three styles (Sadler-Smith, 1997):
1. Dependent learners; those who prefer teacher-directed highly structured programmes.

2. Collaborative learners; those who prefer social interaction.

3. Independent learners; those who prefer to control the content and structure of a programme.

A further characterisation of learning styles is to define the learners’ preferred mode of learning in terms of the sensory modalities (Lujan & DiCarlo, 2006). The three major sensory modes of learning are: Visual, Auditory, and Kinesthetic, leading to the acronym of VAK. In the 1990’s, Fleming (2012) added an additional category as Reading/writing to create the acronym VARK which is now trademarked. The different learners are described as:

*Visual*: Prefer information to arrive in the form of graphs, charts, and flow diagrams. Learners are sensitive to different or changing spatial arrangements and can work easily with symbols.

*Auditory*: Prefer receiving information by speech; individuals learn by listening.

*Reading/writing*: Prefer reading and writing as their preference for taking in information.

*Kinesthetic*: Is an inclusive style of hearing, smell, taste, and sight but particularly includes tactile senses (touch), which is a component of hands-on activities.

A survey of medical students by Lujan & DiCarlo (2006) reported the majority of students preferred to receive information in a variety of modes. Five percent preferred both visual and auditory and eight percent preferred reading/writing. However, only a third of respondents reported a preference for a single mode which suggests active strategies covering all the senses are preferable.

By way of comparison, Prabha (2013) from a survey of dental students, reported learning modes as VAK (that is, excluding reading/writing as a separate item). The majority of the dental students preferred a single mode (visual, auditory or kinesthetic). Among these students, 17 per cent preferred visual, 22 percent preferred auditory and 18 percent preferred kinesthetic. In contrast, 43 percent preferred multiple modes.
From these two studies, it appears that dental students are far more visual than medical students and have a stronger preference for learning by listening than medical students. The preference of the kinesthetic mode was similar but medical students had a stronger preference for multiple modes than dental students. However, there was no breakdown reported for differences between males and females.

Kirk (1996, p.98) argued that accommodating individual differences in preferred ways of reaching understanding are likely to result in learners becoming engaged with the what they are learning at a higher level. High quality teaching recognises that learners must be engaged with the content of the learning activities in a way that enables them to reach understanding. Choice of how to learn the subject matter is related to high quality learning (Kirk, 1996, p.97). Prabha (2013) adds support to this from his survey of dental students, to conclude that where students are exposed to a teaching style that matches their learning style they do better in their academics than those not taught in their learning style.

However, Khalili, Orchard et al. (2013) have suggested that physicians (medical) did not necessarily learn more when the type of CME intervention matched their preferred learning methods. Workshops (as case discussions), small groups and other interactive CME activities may not always be more effective than didactic methods such as lectures. Factors other than learning method preference and type of CME intervention may have a more important impact on learning. For example, topic, provider, convenience, and collegiality may play a role.

This research has explored the associations of a range of individual CPD activities for learning and these are listed in Chapter 5. Preferences for learning as modes, characteristics and styles, based on the above review are included in the research framework described in the next chapter.

Authentic Professional Learning (APL)
The central aspects of authentic learning are the learners’ perspectives and a learning context that promotes real-life applications of knowledge and skills (Barr, Koppel et al., 2005).

Authentic Professional Learning (APL) involves a change in understanding of being a professional, as this meaning is constructed through being with others over time.
Professionals are socialised into their professional worlds through their education, professional associations and everyday practice with others. These interactions serve to construct a sense of self as a professional (Webster-Wright, 2010, p.179).

There are four constituents of APL as described by Webster-Wright (2010, p.112): Understanding, engagement, interconnection and openness. The experience of continuing to learn as a professional involves change in professional understanding through different types of learning transitions. This includes knowing what to do, thinking about what to do and questioning what is done. Professionals learn through a dynamic interaction with a range of other people in an ongoing circuitous and iterative manner (Webster-Wright, 2010, p.114).

Learning between peers involves giving and receiving feedback and demands a sense of trust between colleagues. APL is open-ended, requiring an openness and flexibility of attitude on behalf of the professional to cope with the inherent uncertainty of the process. The experience of APL is unique for each professional as it shaped by the opportunities and constraints of the professional’s working context. APL has an existentialist component (see previous chapter) as individuals are actively involved in the social world with responsibility for the life they choose to lead (Andersson & Andersson, 2005).

Incentives and barriers to learning in the professions
As described earlier, learners are active in the learning process of CPD which includes self-directed learning (SDL) (Webster-Wright, 2009). SDL by definition, relies on the learner being motivated to engage in and participate in the process of learning (Hager, 2004), such that expectations of learning outcomes are limited by the willingness or lack thereof to engage and learn. Motivation can be defined in terms of achievement goals or purposes for engaging in the learning activity. Mastery goals refers to learners’ desires to increase their competence while performance goals are concerned with learners’ desires to outperform others to demonstrate competence or avoid demonstrating incompetence (Clayton, Blumberg et al., 2010). A mastery approach is especially important for adults since as Hegarty (2011) suggests, motivation levels decrease with age.

Personal interest and situational interest are also powerful motivators for learning. Personal or individual interest is described as a “motivational orientation or personal
disposition that develops over time in relation to a particular topic or domain and is 
associated with increased knowledge, value and positive feelings” (Hidi & 
Harackiewicz, 2000, p.152). Situational interest is generated by factors in the 
environment that focus attention as the activity continues and represents an immediate 
reaction which may or may not last (Hidi & Harackiewicz, 2000). Research on both 
personal and situational interest has shown that these are associated with more cognitive 
engagement, more learning, and higher levels of achievement (Pintrich, 2003).

Ainley (2006) offers two routes in stimulating interest in learning; situational interest 
and individual interest. Situational interest refers to the way the learning is presented to 
trigger immediate interest in the topic. Once interest is triggered, individual interest 
needs to be maintained to support the interaction between learner and presenter. The 
content of professional development for learner-centred activities focusses on what is to 
be learned (Hawley & Valli, 2000) and learning is dependent on a match between 
content and individual interest.

Motivational behaviours relate to autonomy and are described as intrinsic when 
undertaken out of personal or individual interest. Individuals with mastery goals are 
intrinsically motivated to develop new skills and acquire new knowledge for their own 
sake. Here the process of learning is valued and the attainment of mastery requires 
effort (Ames & Archer, 1988). Motivation to learn in the professions has also been 
reported as directed by a sense of professional duty to develop new skills and acquire 
new knowledge (Jensen, 2007).

In contrast, extrinsically motivated behaviours are undertaken and maintained because 
of outside influences such as the offer of a reward with an outcome that is separate from 
the activity itself (Vansteenkiste, Lens et al., 2006). When presenters help learners to 
see the relevance to themselves in terms of intrinsic goals, learners are more likely to 
become engaged with the learning activity and in turn understand the material more 
fully and demonstrate more competence. If learners feel pressured to engage in learning 
because of externally controlling factors such as deadlines or “must do this for CPD” 
the enjoyment of the learning, their conceptual integration of, and their persistence in 
the learning activities are likely to be limited.
While it is possible to be both extrinsically and intrinsically motivated, Individuals have a natural tendency to focus on intrinsic goals rather than solely extrinsic goals. This is because the intrinsic goals are thought to be more directly linked to satisfaction of the basic psychological needs for competence and autonomy (Vansteenkiste, Lens et al., 2006). Donche et al., (2013) confirm that motivation is positively associated with lack of regulation and negatively associated with external regulation. However, behaviour is more often motivated by a mix of internal and external factors as well as relevance of the task and participation (Mann, 2004). Parochka & Paprockas (2001) have reported the lack of effectiveness for CPD activities with physicians as largely due to extrinsic factors such as time constraints or lack of reward for implementing the new procedures.

More responsibility is thus on the presenter to stimulate personal interest and maintain that interest throughout the activity. A positive learning outcome relates to the needs as perceived by the individual learner and not as perceived by the presenter (Frank, Snell et al., 2010).

Expectations of how well individuals think they will be able to carry out a task is known as self-efficacy (Hallam, 2002, p.230). Motivation for an activity is at its peak when strong self-efficacy is combined with uncertainty about the outcome and competent individuals are challenged. Successful completion of a task re-enforces self-esteem and motivation for future learning tasks; on the other hand, when learning outcomes are negative, motivation is often impaired. Deci and Ryan (1985) cited by Hallam (2002) note a difference between males and females in the interpretation of praise. Males view praise as affirming their competence for an activity which then strengthens intrinsic motivation, while females tend to interpret praise as being controlled.

Cognitive Evaluation Theory (CET) focuses on the fundamental need for competence and autonomy and argues that social-contextual factors events such as feedback or rewards during action can enhance intrinsic motivation for that action (Deci, Cascio et al., 1975). Optimal challenges and freedom from demeaning evaluations were found to facilitate intrinsic motivation (Manakil, Rihani et al., 2015). This is important in a successful mentor/mentee relationship discussed in Chapter 8.
The motivation for individual participation in CPD was explored in this research as incentives and barriers to engagement in CPD. These include the following incentives as listed by (du Boulay, 1999):

- Improved patient care
- Intellectual challenge
- Need for updating
- Compliance with regulators
- Awareness of shortcomings (personal)
- Fear of litigation.

Barriers to participation in CPD such as time constraints related to work-life balance and costs have been reported in the medical profession (Schostak, Davis et al., 2010b). The influence of incentives and barriers on CPD were explored in this research and the results are reported in Chapter 6.

E-learning

E-learning or online learning is an open system that has the power of the internet with access to almost unlimited information. Learning is facilitated and supported through the use of information and communications technology and offers communication between people towards a collaborative learning environment (Garrison & Anderson, 2003 p.3).

E-learning provides learners with convenience and autonomy with access to learning opportunities from remote locations and the flexibility to work at their own pace. However, the lack of interaction with the facilitator or other learners limits the attractiveness of e-learning as does the inability of e-learning to provide hands-on training (Donavant, 2009). Sociocultural, rather than technical, factors are the main determinants for success or failure of learning in computer mediated conferencing (CMC) and reflect sociocultural theory that knowledge is co-constructed through social dialogues (Guan, Tregonning et al., 2008). These authors have called for social interaction to be incorporated into online Continuing Medical Education (CME) activities to improve social bonding and increase participation (Guan, Tregonning et al., 2008). In a study of dentists in the UK comparing e-learning with face-to-face lectures Browne et al. (2004) expressed concern about the isolation of e-learning and the loss of personal contact with colleagues.
Phillips (2011) has suggested e-mentoring, that is mentoring in an online environment, as a way of overcoming the barriers of distance and remoteness. However, Donavant (2009, p.242) when discussing professional development for police officers states rather forcefully, that online education “has not and will not replace the face-to-face facilitator.” Blended learning is used to describe a combination of online and face-to-face learning and offers a strategy to limit the disadvantages of online learning without losing the advantages of access and flexibility (Bains, Reynolds et al., 2011). These authors concluded that blended learning is the most accepted with e-learning alone the least effective.

My research has explored the usefulness of online learning as a CPD activity and is reported on in Chapter 6.

Summary

Professional lifelong learning is a journey along a continuum from novice to expert developing the professional practitioner according to the definition of a profession. That is, it is more than just cognition or technical ability but encompasses phronesis, giving attention to ethics and moral character.

Individuals engage with their environment and construct and reconstruct their knowledge, skills and attitudes through a process involving multiple acts of cogitation, sense making, interpretation and mulling over. There is no end product of this process of construction (and deconstruction). Rather, it is a continuous process of transformation of a world view that reflects the whole person with an existential quality—a lifelong process of professional learning.

Eraut (2006) notes that learning is shaped by its context, an experience which is unique for each individual practitioner. He describes professional learning as changes in what professionals understand and are capable of doing over time. The context of professional learning for dentists is determined by the space in which they work, involving such things as type of practice and whether working in isolation or interacting with others. Webster-Wright (2009) has reconceptualised CPD as Continuing Professional Learning (CPL), emphasising the role of learning in professional development. She supports Eraut (2006) with her description of professional learning as learning over a lifetime of practice in order to maintain and enhance competence and
capability. Other factors which influence learning are characteristics of learning as a collective of modes, preferences and styles of learning. There is conflicting literature on the effectiveness of style matching and this is explored in my research. Incentives and barriers to engagement in CPD also influence the effectiveness of CPD and are included in the research framework explained in the next chapter.

Learning in the professions is a combination of learning in the workplace and existential learning. It is a process for the graduate professional to be encultured through a community of practice to the ways of the profession in an active manner rather than a passive manner. It is a process of engagement in continuing professional learning that transforms the novice to an expert and then maintains the currency of that expertise throughout one’s working life. Such a process can be considered as an example of an apprenticeship within a cognitive model whereby novices hone their skills and expertise as per techne and phronesis as a journeyman moves to the master. Once a master the cycle continues as the master takes on the role of the mentor to guide the next novice to the level of expert practitioner and professional.

The literature suggests that to be successful, components of CPD for the practitioner must draw on the principles of adult learning within a social learning framework. The framework must cater for all practitioners from the novice to the mature practitioner. In addition, there needs to be a continuum of self-determination, resulting in a demand for both highly structured educational activities and the informal. It must also cater for the practitioner to learn in the workplace from a variety of learning opportunities, such as colleagues in a face-to-face situation and of increasing importance, via the internet. Successful learning in all of these settings has been shown in the literature to be enhanced by interaction with other individuals, whether directly or in the virtual world.

Minimising the risk of litigation is reflected in an understanding of what an average dentist would do under similar circumstances as well as being aware of the full range of alternative options and risk factors. This is particularly important for solo practitioners who need to proactive in interacting with peers, lest they lose sight of what is contemporary practice.

Even as the profession has a responsibility to strengthen the context and approach to CPD in the sort of ways explored here, the process of learning remains the
responsibility of the learner. It is a situational, not a random, occurrence and it happens in the learners’ heads. It is also provisional because most of what is learned should be subject to revision in the light of changing circumstances. However, there is also a cadre of dentists who do not report any interest in learning at all. While we can encourage dentists to engage in CPD programmes through collaboration and interaction, there is still the question of achieving a satisfactory learning outcome. Learning is an active process. If the dentist is unwilling to learn, the challenge is to find a way to break through this barrier.

Figure 3 highlights the inclusion of learning characteristics, incentives and barriers within the research model.

**Summary of literature review**

The review of the literature in the previous three chapters has explored aspects of:

1. Professions and professionalism
2. Continuing Professional Development (CPD)
3. Professional learning.

Arising from the literature is an understanding that CPD is a mechanism for professionalism which is an obligation coupled with membership of a profession. CPD as professional lifelong learning is an existential process with the potential of
developing the complete professional. For CPD to be effective, the literature supports underpinning CPD with the social learning components of interaction and collaboration with others.

With the literature as a backdrop, the aim of this research was to gain a greater understanding of how Australian dentists view CPD. In particular, I wanted to find out how to make CPD more effective leading to the hypothesis:

*Those who prefer to learn through social interaction and/or collaboration with others are more likely to have a positive attitude to engagement in Continuing Professional Development (CPD).*

The next chapter sets out the research framework and methodology for gaining this understanding and identifying predictors of the effectiveness of CPD.
CHAPTER 5: RESEARCH DESIGN

The aim of this study is to gain a greater understanding of CPD for dentists in Australia as a learning experience. In doing so, I have asked if dentists’ backgrounds, learning characteristics and motivational incentives and/or barriers, influence their *attitude to usefulness* and *extent of engagement* in CPD activities. Furthermore, are these attitudes possible predictors of effective CPD?

In order to do this, I have conducted an exploratory survey of practising dentists. The methodology is described in the next section with a later section describing the analysis of the responses. While the analysis largely explored the associations of CPD to background variables of *sex, age of practitioner* and *type of practice, learning characteristics* and motivational *incentives* and *barriers*, the hypothesis is:

*Those who prefer to learn through social interaction and/or collaboration with others are more likely to have a positive attitude to engagement in Continuing Professional Development (CPD).*

Methodology

This section of the chapter explains how the exploratory survey to practising dentists was conducted.

Surveys: Why a questionnaire?
Akers, Krohn *et al.* (1979) have demonstrated that learning concepts are amenable to meaningful questionnaire measurement and that social learning theory can be explored with survey data. A self-administered questionnaire as a method of data collection was chosen for this and other reasons as listed below.

Self-administered questionnaires (SAQs) have been one of the most often used methods of providing response anonymity. With SAQs, respondents record their answers without revealing potentially embarrassing information to an interviewer (Wright, Aquilino *et al.*, 1998). A questionnaire has the advantage of being able to reach a geographically dispersed sample and compared with other data collection methods, such as interviews, a questionnaire allows the respondents time to reflect on the questions. A questionnaire also provides control over the responses in that all participants are posed exactly the
same questions and therefore cannot go off track. A disadvantage is that there is a risk of a low response rate if the targeted respondent is not personally interested in the study and the researcher has little opportunity of checking the truthfulness of the answers (Bryman, 2008, pp.217-219). Also, while there is an expectation that respondents will cooperate with the researcher and tell it how it is rather than what they think the researcher wants to hear, a questionnaire measures only what people say they believe or what they say they like.

There is a variety of formats for questionnaires as a form of data collection (Creswell, 2002) and a number of variations as to how a questionnaire survey can be implemented. Once a questionnaire is crafted, hard copies of the questionnaire can be delivered to the sample population for completion and returned by post or collected. Alternatively, respondents may be invited via email to respond to the questionnaire, which is accessed through an attachment, printed off, filled out and returned by post. A further option is where the email and the instructions on the hard copy questionnaire direct the respondent to an internet site to complete the questionnaire online. Submitting the questionnaire via the internet facilitates data collection into a statistical programme for analysis, but this requires the respondents to be familiar and comfortable with computers (Creswell, 2002). There is a cost advantage with online access and responses to questionnaires in that there are no printing or postage costs as with any mailed out questionnaire. However, online surveys are reported to have lower response rates than comparable mailed out questionnaires (Bryman, 2008, p.653). In this (my) research, all respondents to the mailed out questionnaires were given the choice of either submitting online via a website link, or returning the questionnaire as a hard copy to a third party.

Within a questionnaire, broadly speaking, there are two types of questions, either open or closed. An open question allows for freedom in the wording of the written response to reflect the full richness and complexity of the views of the respondent and the responses are recorded in full. Typically, a questionnaire will allow a space or number of lines for the response and the allotted space will direct the length and richness of the response (Oppenheim, 1992, p.112). Open questions require more effort from the respondents and are more time consuming for the researcher as it requires the researcher reading through each response and determining themes for analysis (Bryman, 2008, p.232).
A closed question is one where the respondents are offered a limited choice of responses from which to select. The selection can be limited to two, as in Yes/No or multiple selections from a tick box list. Alternatively, a Likert scale offers options for the degree of agreement or disagreement as a rating scale offers a measure of strength, for example, “never” to “extremely” (Bryman, 2008, p.146). Limited choices mean that closed questions are quicker and easier to complete as well as quantify but the skill of the researcher to identify the range of options offered is critical. However, forcing the respondents to make a choice may introduce bias and so the addition of another category as an open-ended response helps to mitigate this risk of bias by allowing respondents to freely express alternatives (Oppenheim, 1992, p.114). In the questionnaire used in my study, a mixture of open and closed questions was used, including other as an option in the closed questions.

Reliability and validity
Merriam (2009, p.209), argues that all research is concerned with producing reliable and valid knowledge in an ethical way. Reliability refers to how far the research instrument, as in the questionnaire, will produce similar results when used on a different occasion or by a different researcher (Roberts, Priest et al., 2006). However, it is impossible to repeat a questionnaire survey to check for reliability as it is impossible to replicate a social setting. Internal consistency is the relationship between all the results from a single survey. That is, if a questionnaire asks multiple questions about similar topics but using different words, the responses should all be similar (Roberts, Priest et al., 2006). For example, in this survey (see Appendix: I) there is a significant correlation between the learning preference, I learn from hands-on (Question 91) and the usefulness of hands-on workshops (Question 68), supporting the internal consistency of the survey.

Validity asks the questions “are the data the right kind for investigating the topic and have they been measured correctly?” (Denscombe, 2010, p.298) and to what extent the researcher(s) can demonstrate that the results are an accurate interpretation of the participants’ meaning (Creswell, 2007, p.206).

The next section describes the process of crafting the questionnaire as the method of data collection for this research project.
Questionnaire design
A self-administered questionnaire was designed and crafted with the aim of recording attitudes and behaviours of practising dentists to CPD. The crafting of the questionnaire with the use of open and closed questions and Likert scales was used as described by Johnston, Leung et al. (2003), Greene & Caracelli (1997), and van der Sanden, Mettes et al. (2002) who developed and validated self-administered questionnaires for the assessment of knowledge, attitude, behaviour and perceptions for medical students. Maio, Balazi et al. (2003) also used Likert scales in their survey of pharmacists to determine what CPD programme formats pharmacists found most valuable and to what extent they believed CPD programmes contribute to their knowledge and affect their clinical practice behaviour.

Questionnaire content
The questionnaire content was divided into five sections as follows:

Section I recorded demographics and practice profile for sex, age, country of training, and type of practice. These were recorded as tick boxes or spaces for open responses such as age.

Section 2 recorded motivational factors (as incentives and barriers) for engaging in CPD, rated on a Likert scale from 1–not at all to 5–extremely.

Section 3 asked closed questions on dentists’ personal needs for updating knowledge and skills.

Section 4 recorded opinions on accreditation of CPD providers and activities by outside agencies via Likert scales and closed questions.

Section 5 recorded personal reflections on developing competence and expertise as well as personal learning characteristics with a combination of Likert scales, open and closed questions.

The questionnaire content was adapted from a range of surveys on the professions described later, spanning the English language literature.

Best & Brearley-Messer (2001) used self-administered questionnaires to survey Australian dentists from the register in the State of Victoria. These authors looked at patterns in professional development including age and type of practice of the dentists. They reported that specialists attended significantly more hours of CPD than general practitioners. John and Parashos (2007) recorded the socio-demographics of participants in a CPD programme as year of graduation, gender [sic] and type of practice (solo or group). These authors reported approximately half the participants had graduated within
the previous 10 years and 41 percent of the participants were female with 27 percent in solo practice as compared with group practice. A study in the UK by Tredwin, Eder et al. (2005), surveyed the participants in CPD via the *British Dental Journal*. They also recorded gender [sic], age and type of practice of the respondents; 42 percent were female and the majority of the respondents were in the 36-40 year age group with 82 percent in general practice.

In my questionnaire learning characteristics are listed as a collective of modes of learning, learning styles, preferences and attitudes. These characteristics of learning were examined in the responses to Questions 86-95 in the survey. Livneh & Livneh (1999), explored skills and characteristics of learning as predictors of involvement in CPD amongst educators. The following characteristics from these authors (Livneh & Livneh, 1999, p.12) were adapted into my questionnaire to explore these characteristics in dentists:

- I am self-motivated rather than chiefly motivated by others.
- I am a curious, inquisitive person.
- I am able to learn by myself.
- I believe that keeping updated and competent in my profession is important.

Other modes of learning were adapted from the UK Standing Committee on Postgraduate Medical and Dental Education (SCOPME) report, *A strategy for continuing education and professional development for hospital doctors and dentists* (Oxley, 1999). For example, in my questionnaire, a learning characteristic I learn from reading is listed. Reading was identified in the SCOPME report as a key element for doctors and dentists in keeping up to date. The SCOPME report also explored other ways of learning such as interaction with others and hands-on learning. Preferred formats for learning were also adapted from Leggate & Russell (2002), who surveyed attitudes and trends in Scottish dentists towards CPD. These authors reported hands-on as the most preferred format by 94 percent of respondents. These modes of learning are also included in my questionnaire.

Questions on motivation were included to explore the incentives and barriers to engaging in CPD. These questions (Q11-29) rated attitudes to various incentives and barriers via a Likert scale. The list of incentives to engaging in CPD was compiled from a number of published papers as well as my own thoughts. Items within my
questionnaire such as desire to keep up-to-date with new knowledge and relevance to own practice were adapted from the SCOPME report based on interview responses from doctors and dentists in the UK offering reasons for engagement in CPD. This report also cited social factors, such as discussion with colleagues and interaction with others at meetings, as very useful sources of new ideas and learning (Oxley, 1999, pp.63,64). Other items in the list of incentives were adapted from Best & Brearley-Messer (2001). These included the topics of the course, identity of the presenter as very important with venue and opportunity for a working holiday as of very little importance. The addition of items related to litigation and CE credits as incentives were added to the list based on my own experience as a consumer and provider of CPD in Australia.

The list of barriers was also adapted from the SCOPME report (Oxley, 1999) as constraints that make access to CPD difficult. For example, personal time constraints and family commitments. Glazebrook & Harrison (2006), in a review of obstacles to maintenance of advanced procedure skills for rural and remote medical practitioners in Australia, also identified time constraints and the family as well as costs and lack of locum relief as major obstacles to undertaking CPD. These items were all included in the list of barriers to engaging in CPD in the questionnaire.

Within the research framework described later in this chapter under “Model development”, are the variables within CPD of attitude to usefulness, extent of engagement and mentoring. Questions on the usefulness of CPD activities asked respondents to rate on a five point Likert scale, the usefulness of a range of activities covering didactic, interactive and social learning formats. The list of CPD formats was adapted from Leggate and Russell (2002) who reported hands-on and lectures as the most preferred formats. Small group tutorials, books and journals were also well supported as learning formats whereas internet learning was not well supported. Activities incorporating social learning such as group discussion within your practice and seeking advice from an experienced colleague, were adapted from John and Parashos (2007) who reported dentists employed in group practices were more likely to rely on colleagues to advise them on new materials and techniques than solo practitioners (p.308). Additional items concerning interaction with colleagues were adapted from Maidment (2006), who surveyed Scottish dentists and concluded that interaction with colleagues was seen as professionally stimulating by the majority of respondents.
Extent of engagement as a variable asked respondents to tick from the same list of activities as per attitude to usefulness, those activities actually engaged in within the last (previous) six months.

The third variable within the research model is mentoring. Specific questions on mentoring were adapted from Ali & Panther (2008). These authors identify a successful mentor/mentee relationship based on mutual respect and a conducive learning environment. Questions on mentoring were based on my own experience in teaching graduate students and organising CPD activities.

The essential components of dental practice were included in the questionnaire for attitudes to updating. Updating was further explored within the questionnaire for areas of need in diagnostic and treatment planning skills, procedural skills and the frequency of updating for the different disciplines of dental practice. Questions on updating components of dental practice were adapted from Kersten, Vervoorn et al. (2007) and Nash (2007) to provide responses to dental practice within the categories of:

- Theoretical knowledge
- Technical skills
- Diagnostic skills
- Communication skills
- Business skills.

These skills relate requirements of graduate dentists to be knowledgeable, skilled and committed to providing quality care in the interests of their patients. Clinical judgment (Hendricson et al., 2006), combined with the ability to communicate to others, contributes to the quality of care delivered to the patient. Questions on communication and diagnostic skills were thus included in the essential components of dental practice for the questions on updating. Business skills were also included as they relate to the nature of private practice which is the predominant mode of delivery of dental services in Australia.

Compartmentalising dentistry into the various disciplines is an adaptation of the list of dental subjects and procedures in general dental practice from Patel, Fox et al. (2006), who surveyed dentists in their training year for the National Health Service in England, UK. The questionnaire also provided a comprehensive list of dental subjects and
procedures which supplemented the list from Patel, Fox et al. (2006). Additional input was taken from Chan, Ng et al. (2006), who surveyed dentists in Hong Kong on their preferences for CPD. These authors reported the oral implantology and cosmetic dentistry were the most preferred subjects for CPD. Best & Brearley-Messer (2001), in a survey of Australian dentists, reported courses based on the disciplines of orthodontics and endodontics were the most popular as well as those which included a hands-on component.

Direct comparison of results from other authors from whom the questionnaire was crafted was not possible in all cases. For example, the responses from the SCOPME report (Oxley, 1999) recorded responses via quotations rather than frequencies. However, such questions and the like from Livneh & Livneh (1999) were adapted for inclusion in the questionnaire to gather data specifically on dentists in Australia.

Questionnaire administration

Pilot
A draft questionnaire targeted to practising dentists was pilot tested on 25 dentists at a study group meeting in Canberra. Within this group of dentists were general practitioners and specialists with a mix of males and females across a broad spectrum of ages. There were also members of the ACT Dental Board, executive members of the Australian Dental Association (ADA) and the Royal Australasian College of Dental Surgeons (RACDS).

Hard copies of the questionnaires were handed out to participating dentists and instructions were given to complete the questionnaire at their own pace. I remained on site to answer any questions that presented regarding clarity or ambiguity of wording. Participants were asked to record the time it took to complete the questionnaire and make comments as to the readability, clarity, repetition or ambiguity of any of the questions as well as the overall length of the questionnaire. The pilot questionnaire was presented as a typed monochrome document with 16 pages of text on A4 paper. The results from the pilot testing suggested the questionnaire could be completed in 30 minutes and a number of questions were subsequently modified to improve clarity and enhance validity.
Final Questionnaire
The final questionnaire was then drafted and produced as a three-colour document of 16 pages printed as double sided on white A4 paper and bound as a booklet (see Appendix: I). The front cover contained the title of the research, instructions for completing and returning the questionnaire as well as a personal expression of thanks. The rear page also carried the instructions and a thank you.

The strategy for the survey to dentists was adapted from Parashos, Morgan et al. (2005), who carried out a questionnaire survey to Australian dentists. These authors used multiple mail outs of the questionnaire followed by telephone contact. The questionnaire was accompanied by university stationery, a paid reply envelope and personalised correspondence.

In my survey, each dentist from the population sample (see next section, “Sampling”) received a copy of the questionnaire as hard copy accompanied by a letter of introduction from the Chairman of the Dental Board of the ACT. Also enclosed was a personally signed covering letter under the ANU letterhead outlining the purpose of the research, ethics approval, guarantee of anonymity of the respondents and a consent form. Instructions were given to sign the consent form, enclose and seal it in the provided envelope, then complete the questionnaire and return the sealed consent form and completed questionnaire in the provided stamped envelope addressed to a third party at the ANU. This protocol aimed to ensure anonymity and enhance the response rate (Parashos, Morgan et al., 2005). An alternative option was to complete and submit the questionnaire online and submit same online via an ANU template. Instructions were provided through an internet link to the ANU and clicking the submit button was taken as an expression of consent.

Sampling
In this research the population of all registered dentists in the ACT and surrounding regions was chosen and a total of 325 dentists were invited to respond. From the 325 questionnaires, 127 responses were received from the initial mail out with the majority as hard copy. Follow up invitations to respond were mailed out after four weeks and again after eight weeks, generating a response group of 143 from an initial population of 325 and a response rate of 44.0 percent. Of the 143 responses, 98 were hard copy and these were transcribed by the researcher to the ANU online link as a means of data entry.
for direct import into the statistical package, Statistical Package for the Social Sciences (IBM SPSS v20) for future analysis. A comparison between the responses within the first round and the follow up responses showed little difference for sex, age of practitioner or type of practice supporting the credibility of the responses when analysed as a total response group.

**Response rate and bias**

The response rate was similar to that of Al-Habsi, Roberts et al. (2009), who surveyed 228 dentists with a mailed out questionnaire, explanation letter, consent form and prepaid return envelope with a response rate of 46 per cent. Nakai, Milgrom et al. (2005) in a postal survey of 478 dentists also had a similar response rate of 46.7 percent, as did Quinonez et al., (2009), who surveyed 2219 Canadian dentists via a questionnaire with a response rate of 45.8 per cent. The significance of the response rate is related to the risk of bias. That is a difference between those who participate and those who do not which impacts on the credibility of the findings (Bryman, 2008, p.219).

Particular caution is necessary before one can assume the sample of dentists from the ACT region is sufficiently representative for generalisations to be made from the results to the wider population. In order to test the possibility of bias between the respondents and the total population of dentists, comparisons were made between the background variables of sex, age of practitioner and type of practice within the response group, the population sample and the national profile. In the response group, the proportion of female respondents was 35 percent compared with the national proportion of females to males of 38.1 per cent with the ACT 36.3 percent and NSW 38.0 per cent. The average age of dentists was between 46 and 47 years (median year of graduation 1987 with a mean of 1988.6) compared to the average age of dentists in NSW and the ACT of 47 years with the national average age 46.7 years (Barnard, 2012b). To complete the comparison, 81 percent of dentists were in general practice compared with the national average of 82 per cent. There was a slightly higher proportion of females than males with no significant differences observed (Australian Research Centre for Population Oral Health, 2011).

In the previous section I have described the rationale for the methodology used in this study and outlined the crafting of a questionnaire and the approach to sampling of participants.
Model development

In this section, I present a causal model based on the results of previous research on CPD to identify predictors of the effectiveness of CPD with dependent variables nominated as; *attitude to usefulness, extent of engagement* and participation in *mentoring*. Motivational factors relate to *incentives* and *barriers* to CPD.

The model developed from the literature as outlined in Figure 4 provided the framework for analysis of the responses. The review of the literature in Chapters 2 and 3 has identified features of CPD activities that contribute to the effectiveness of these activities as learning outcomes. Leading on from this, I have assumed that the modes of learning, characteristics and styles (as preferences) as outlined in Chapter 4 directs the causal arrow from learning, incentives and barriers to the variables within CPD listed above.

![Figure 4. Schematic model for analysis of the relationships identified in the previous chapter.](image)

**Background Variables**

The socio-demographic variables of dentists were recorded and included *sex, age of practitioner* and *type of practice*. These variables were chosen as sections within the profile of dental practice in Australia that allowed comparisons between the sample group and the national population of dentists.

**Sex**

A significant change in the profile of dental practice in Australia is a continuing increase in the proportion of women entering dentistry which can be described as feminisation of the profession (Riska, 2008). In the analysis of responses to the questionnaire, sex differences in learning characteristics and incentives and barriers
were addressed, as were the differences in attitudes and behaviours within the dependent variables in CPD. The terminology of sex rather than gender is used in this thesis as sex is a “dichotomous biological variable of either male or female.” (Sax, 2005, p.262)

**Age of practitioner**
Within the questionnaire, the respondents were asked both “what is your age?” and “what is your year of registration?” There were many missing responses to the question of age but almost all respondents recorded their year of graduation. There was a high correlation between the age of practitioners and the year of graduation, suggesting that the vast majority of respondents entered a dental programme immediately after leaving school. Registration years were divided into six ranges, and set the framework for analysis of the relationships between the age of practitioner, and the variables within learning, incentives and barriers and the dependent variables within CPD.

**Type of practice**
The analysis explores the background variable of type of practice, whether solo, group, general or specialist, as a further control or filter on the relationships between variables within learning, incentives and barriers and the dependent variables within CPD.

**Learning characteristics**
Central to the model (Figure 4) are learning characteristics. The associations of learning characteristics are a collective of modes of learning, learning styles, preferences and attitudes. The characteristics of learning are examined in the responses to Questions 86-95 in the survey to practising dentists (see Appendix I). These questions explore modes of learning, learning in interaction with others and the notion of intellectual curiosity.

An initial cluster analysis on these questions as individual items grouped well and suggested a factor analysis was worthwhile. However, a factor analysis with all the above items included did not load strongly on any one factor. A further factor analysis was carried out excluding Question 95, *I critically appraise new ideas before putting them into practice* and gave an improved grouping and reduced these items to three groups as follows:
The relationships of the learning items to the dependent variables and the background variables of sex, age of practitioner and type of practice were analysed via factor analyses as well as correlations of the individual items. It was found that the individual items for all of the above generated factors were both robust and adequate for the analysis to explore the relationships and these are reported in Chapter 6.

Incentives and barriers to CPD
Questions 11 to 24 in the questionnaire were rated as incentives for CPD and questions 25 to 29 were rated as barriers to CPD (see Appendix I). Question responses took the form of a Likert Scale with the options of “Not at all”, “Not very”, “Somewhat”, “Very” and “Extremely” and coded from 1 to 5 from the lowest level of agreement to the highest.

A cluster analysis followed by a factor analysis was carried out on these components in two parts. The first grouped the components for incentives and the second grouped the components of barriers to CPD. For the items within incentives the generated factors were as follows:
A factor analysis on the barriers to CPD produced two component groups as follows:

<table>
<thead>
<tr>
<th>Factor name</th>
<th>Variance %</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs</td>
<td>37.0</td>
<td>Registration costs of courses or conferences</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Travel and accommodation costs</td>
</tr>
<tr>
<td>Personal</td>
<td>33.0</td>
<td>Personal time constraints</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Family commitments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lack of locum cover when away</td>
</tr>
</tbody>
</table>

These factors for incentives for CPD and barriers to CPD formed the basis of the analysis of the relationships to the attitudes and behaviours as subsets of CPD and the background factors of sex, age of practitioner and type of practice. The relationships are reported in the next chapter.

**Dependent Variables**

The first dependent variable in the model is attitude to usefulness. The questionnaire, asked respondents to rate the usefulness of a range of activities that could reasonably be
expected to advance professional development as a dentist. The questionnaire asked respondents to rate the extent of engagement over the previous six months, in the same activities as those listed within attitude to usefulness and this was the second dependent variable. Questions were also asked as to attitudes to a mentor programme in dentistry and sub-questions on acting as a mentor or being mentored providing the third dependent variable.

**Attitude to usefulness**

Within the questionnaire, CPD activities were listed from Question 63 to 72 (see Appendix I) and respondents were asked to rate their usefulness for CPD. An initial cluster analysis on the listed CPD activities suggested groupings, which were positive for a factor analysis. Four factors for usefulness were generated as follows:

<table>
<thead>
<tr>
<th>Factor</th>
<th>Variance %</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social (Use Social)</td>
<td>21</td>
<td>One-to-one discussion(s) with another dentist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Group discussion(s) within your practice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Seeking advice from an experienced colleague</td>
</tr>
<tr>
<td>Interactive (Use Interactive)</td>
<td>17.5</td>
<td>Lectures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hands-on workshops</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Internet/online learning</td>
</tr>
<tr>
<td>Passive (Use Passive)</td>
<td>16.0</td>
<td>Journal reading (by yourself)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Listening to audio recordings</td>
</tr>
<tr>
<td>Group learning (Use Group learning)</td>
<td>5.5</td>
<td>Journal reading club(s)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Study groups</td>
</tr>
</tbody>
</table>

The first three factors formed the basis for correlations between the background variables of sex, age of practitioner and type of practice as well as learning variables, incentives and barriers and are reported in the next chapter.

**Extent of engagement**

The activities listed from Questions 63 to 72 were also grouped to suggest the extent of engagement (see Question 74 in Appendix I). A factor analysis proved to be worthwhile and if internet/online learning was omitted items were grouped into three components as follows:
<table>
<thead>
<tr>
<th>Factor</th>
<th>Variance %</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interaction with others</td>
<td>24.4</td>
<td>Study groups</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lectures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>One-to-one discussion(s) with another dentist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Group discussion(s) within your practice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Seeking advice from an experienced colleague</td>
</tr>
<tr>
<td>Engage by yourself</td>
<td>12.7</td>
<td>Journal reading (by yourself)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Listening to audio recordings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Internet/online learning</td>
</tr>
<tr>
<td>Engage clubs</td>
<td>11.8</td>
<td>Journal reading club(s)</td>
</tr>
</tbody>
</table>

Variations in terms of the background variables of *sex, age of practitioner* and *type of practice* as well as the generated factors within *learning, incentives* and *barriers* are reported in the next chapter.

**Mentoring**

Attitudes to mentoring were explored in three parts. Firstly to gauge the support for a *mentor* programme, secondly to gauge the support for *acting as a mentor* and thirdly to gauge the support for *being mentored*. The responses were correlated to *learning* variables, *incentives* and *barriers* and further analysed via cross tabulations for the influences of *sex, age of practitioner* and *type of practice*. The strength of the relationships of *acting as a mentor* and *being mentored*, as useful CPD activities, were tested via correlations to the generated factors within *usefulness*. These additional correlations were outside the research model but supported the testing of a mentor programme as a CPD activity.

**Testing associations of variables**

The main method for the analysis of the responses was quantitative with the results presented as frequencies and percentages. Where comparisons are made between two or more variables, the results are presented as Pearson correlations between variables. The question then arises of how we can know if a particular correlation is sufficiently large so that we may conclude with some confidence that it did not occur by chance. There are two concepts of significance to be taken into account. First, there is statistical significance which is used in the next chapter and is an estimate of whether a difference may have arisen by chance. For most comparisons in this study, two levels
of significance have been used. Conventionally, the results are reported at the 0.01 or 0.05 level. A \( p \) value of less than or equal to 0.01, reports a probability of occurring one in a hundred times and is recorded as ** level of significance. A \( p \) value of less than or equal to 0.05, reports a probability of one in twenty and recorded as * level of significance. When applying the probability tests, I am assuming that the response sample is representative of the population of Australian dentists based on the comparatives of the background variables. However, while statistical significance is concerned whether a research finding is due to chance or sampling variability, the practical significance is concerned with how useful the finding is in the real world. Collected data can still support a hypothesis even though the \( p \) value is greater than 0.05 (Kirk, 1996).

A related technical issue is whether or not, on the basis of theory or of other studies, I am predicting a particular outcome. For example, females are more likely than males to participate in reading groups. If so a “one tailed test” of significance is used. If, however, the analysis is more exploratory and there is reason to expect that one way or the other, there is a connection of sex, with reading but does not predict which way, a “two tailed test” is used. A “one tailed test” is more powerful because it has direction and was used in this research.

The correlation coefficient (r value) is a measure of the strength of the relationship between the variables. A low or near zero value indicates a weak relationship while a value closer to +1 or -1 indicates a stronger relationship. The statistical analysis of the responses looked at the strength of an association between variables and not cause and effect.

In my study the correlations are in the order of 0.3 or lower and where statistically significant support the exploratory relationship. However, a correlation of 0.3 only explains nine percent of the variation in the independent variable and it is important to be aware that there might be a measurement error or other factors at work. For example, a significant correlation between I learn from hands-on (Q.91) as a learning preference and the usefulness of hands-on workshops (Q.68) is to be expected as it correlates like with like. Nonetheless, it does add support to the reliability of the responses.
Correlations were conducted to test the strength of the associations between the items, and variables as per the research model. In addition, $\chi^2$ analyses were conducted on the responses to test levels of significance.

Cross tabulations were conducted using IBM Statistical Package for the Social Sciences (SPSS version 20) to explore the influences of the background variables of sex, age of practitioner and type of practice on those correlations between learning variables or incentives and barriers and the dependent variables that were significant. For example, if it was suspected that the association between group learning and being mentored might be due in part to influences of sex or age of practitioner, the group was divided into younger/older, male/female to search for any influences.

Likert scales offer options for the degree of agreement or disagreement as a rating scale. The questions on incentives and barriers, attitude to usefulness, mentoring and learning characteristics were rated on a five point Likert scale. For example: “Not at all” to “Extremely” and coded from 1 to 5 from the lowest level of agreement to the highest. Responses were recorded as percentages.

Cluster and factor analyses were used where it was suspected that an underlying relationship could be better represented by a combination of items than a single one. For example, the factor Intellectually curious grouped the following from the list of 10 items related to modes of learning and characteristics of learning:

- I am self-motivated rather than dependent on others for my motivation.
- I am an inquisitive person.
- I like to keep up to date.
- I am open to new ideas and insights.

Factors were generated from the individual items within attitude to usefulness, extent of engagement, learning characteristics, (modes, styles and preferences) and incentives and barriers. These are described in the next section and were used as a method of testing the strength of the relationships outlined in the research model.

Free-form qualitative comments were invited within the questionnaire in order to expand on and illuminate the quantitative results. These comments were reported as direct quotes and/or summarised in table form via a simplified content analysis.
Further data collection

Within the questionnaire, additional information on CPD relating to attitudes to updating CPD and accreditation of CPD were recorded. Questions were related to the components of dental practice: Theoretical knowledge, technical skills, diagnostic skills, communication skills and business skills. Updating was further explored within the questionnaire for areas of need in diagnostic and treatment planning skills, procedural skills and the frequency of updating for the different disciplines of dental practice. The analysis of the responses to question items on updating is reported in Chapter 7.

Questions on accreditation related to whether or not CPD should be accredited by an appropriate authority and whether CPD activities should be weighted. In addition, respondents were asked if Continuing Education (CE) credits should be used as evidence of professional competence for re-registration. The responses to attitudes to accreditation are also reported in Chapter 7.

Updating

For CPD to be effective, it must also address the needs of the individual practitioner (Schostak, Davis et al., 2010a). Within the questionnaire there are four sets of questions related to attitudes to updating. Here, learning needs are identified and prioritised. The first (See Question 32, Appendix: I) asks “Which areas of your own professional practice do you think needs attention or updating?” with the following responses available.

1. Theoretical knowledge
2. Technical skills
3. Diagnostic skills
4. Communication skills
5. Business skills

The responses were marked via tick boxes and coded 0 or 1 as a Yes/No response. The second set of questions (See Question 34, Appendix: I) asked respondents to tick from the list of dental subjects below, their own diagnostic and treatment planning skills they thought needed updating. Again these were coded 0 or 1 as Yes/No responses. The subjects of dentistry are listed as follows:
Anaesthetics and sedation  Implantology
CPR  Oral pathology/oral medicine
Crown and bridge  Orthodontics
Cross-infection control  Paediatric dentistry
Dental anomalies  Periodontology
Dental materials  Pharmacology
Dento-alveolar surgery  Radiology/radiography
Endodontics

The third set of questions (See Question 35, Appendix I) sought responses for the need to update procedure skills for the same list of dental subjects as above.

The responses to the questions on updating were analysed as descriptives for the individual questions and further scrutinised via correlation tables and factor analysis for significance relationships to the background items of sex, age of practitioner and type of practice as well as learning characteristics, incentives and barriers.

The findings reported in Chapter 7 indicate a very clear spectrum of importance of individual subject areas when it comes to updating diagnostic and treatment planning skills and procedure skills. Rather than analysing these relationships via factor analyses, the individual subjects as items are analysed separately and reported as such.

**Attitude to accreditation**

Questions 58 to 62 were asked on attitudes to accreditation as a reference to incentives. These were:

Q 58. Providers of conferences, courses and clinical days etc., should be accredited by an appropriate authority.

Q 59. Conferences, courses and clinical days should be weighted with CE credits.

Q 60. CE credits should be used as evidence of professional competence for re-registration.

Q 61. Would you attend a course or a programme that did not distribute CE credits?

Q 62. If yes to the above, under what circumstances? (e.g., presenter, exotic location).
Summary

In this chapter, I have described the methodology of this research incorporating a self-administered questionnaire. The rationale for a questionnaire has been explained followed by a description of the design and crafting of same as guided by the literature.

The model developed from the literature, as outlined in Figure 4, provided the framework for analysis of the responses. The review of the literature in Chapters 2 and 3 has identified features of CPD activities which contribute to the effectiveness of these activities as learning outcomes. I have described the research model as a causal path to explore the associations of learning characteristics and the motivational incentives and barriers to CPD. The dependent variables are attitude to, usefulness of activities, extent of engagement in CPD activities and mentoring. These associations are further explored for their relationships to sex, age of practitioner and type of practice as controlling variables.

In the next two chapters, I report the analysis of the response group as a purposeful sample of dentists at large. In using tests of statistical significance, I am making the assumption that the 143 responses are a random sample of registered dentists in the ACT and surrounding areas. This is not strictly correct; however, the close matching of the background factors provides some confidence in the similarity of results from other studies. Nevertheless, it is still possible that there are biases in other measures.

Chapter 6 reports on the analysis guided by the research model illustrated in Figure 4 and Chapter 7 reports on the themes of updating and accreditation.
**CHAPTER 6: RESULTS PART A: ANALYSIS OF RELATIONSHIPS BETWEEN VARIABLES**

This chapter reports the response frequencies and associations of the variables identified in the research model, described in the previous chapter. The particular focus is the strength of the associations between the independent variables and the dependent CPD variables, controlling where possible, for *sex, age of practitioner* and *type of practice*. As discussed in Chapter 4, these items have been identified from the literature and crafted into the questionnaire (see Appendix I). The reporting has been organised in four parts addressing each component within the research model.

Part I:
- 1.1: Sex
- 1.2: Age of practitioner
- 1.3: Type of practice

Part 2:
- 2.1: Learning characteristics
- 2.2: Incentives and barriers.

Part 3: The CPD outcomes
- 3.1: Attitudes to usefulness of CPD activities
- 3.2: Extent of engagement in CPD activities
- 3.3: Mentoring.

Part 4 Associations of CPD with (demographic) background, learning, incentives and barriers.
- 4.1: Attitude to the usefulness of CPD by:
  - 4.1.1: Sex
  - 4.1.2: Age of practitioner
  - 4.1.3: Type of practice
  - 4.1.4: Learning characteristics
  - 4.1.5: Incentives and barriers.
4.2: Extent of engagement in CPD by:
   4.2.1: Sex
   4.2.2: Age of practitioner
   4.2.3: Type of practice
   4.2.4: Learning characteristics
   4.2.5: Incentives and barriers.

4.3: Mentoring by:
   4.3.1: Sex, age of practitioner
   4.3.2: Type of practice
   4.3.3: Learning characteristics
   4.3.4: Incentives and barriers.

Part I: Demographics
This section reports the percentages and proportions of the background variables of sex, age of practitioner and type of practice from the response group to the questionnaire.

1.1: Sex
At the time this survey was carried out, that is 2010, the national proportion of male dentists to female dentists was 67 percent males and 33 percent females (Barnard, 2012b), while the proportion of males to females within the response group was 65 percent males and 35 percent females. There has been a continuing increase in the proportion of females graduating from dentistry, with an increase from 16 percent in 1997 to 33 percent in 2010 (Barnard, 2012b). The sex distribution in the response group by age (see Figure 5) shows a similar trend, with the proportion of females increasing from a small minority in the older age groups to even proportions in those who graduated in the 1990s and continuing upward to the more recent years with females making up the majority of graduates.

The survey reveals variations making up the greater proportion of dental graduates. in the work patterns of male and female dentists. Among the general practitioners, 15 percent worked less than 25 hours a week with about half in the over 50 year-olds and half in the under 50 year-olds. Furthermore, there were no female part-timers in the older group and twice as many female part-timers as male part-timers in the younger age group.
Females made up 12 per cent of the specialists and all of them were less than 50 years old and worked part time. Males made up 88 percent of the specialists with almost a third less than 50 years old. Of these, two-thirds worked part time. The implications of these findings for the dental profession will be explored in more detail in Chapter 8.

![Figure 5. The proportion of female to male respondents by year of graduation.](image)

### 1.2: Age of practitioner

Respondents were asked both “what is your age?” and “what is your year of registration?” Because there were missing responses to the question “what is your age?” this variable was calculated from the year of graduation which was answered by all respondents and correlated almost perfectly with age. The distribution is shown in Table 1. The base line of the average age of graduation was 25 years (Barnard, 2012b) with the highest proportion at 32 percent graduating between 1980 and 1989 with an age range of 45 to 54 years. The mean age of dentists in New South Wales (NSW) and the Australian Capital Territory (ACT) is 47 years with the national average age 46.7 years (Barnard, 2012b). Within the response group, the average age of dentists was between 46 and 47 years (median year of graduation 1987 with a mean of 1988.6).
In the following analysis of “younger” and “older” practitioners, the sample has been divided at the median age of 50 years old. These are reported in a later section of this chapter.

**Table 1. Year of registration and age.**

<table>
<thead>
<tr>
<th>Year of registration</th>
<th>Frequency</th>
<th>Valid Percent</th>
<th>Age: Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>1955-1959</td>
<td>1</td>
<td>0.7</td>
<td>75-79</td>
</tr>
<tr>
<td>1965-1969</td>
<td>7</td>
<td>5.2</td>
<td>65-69</td>
</tr>
<tr>
<td>1970-1974</td>
<td>8</td>
<td>6</td>
<td>60-64</td>
</tr>
<tr>
<td>1975-1979</td>
<td>21</td>
<td>15.7</td>
<td>55-59</td>
</tr>
<tr>
<td>1980-1984</td>
<td>21</td>
<td>15.7</td>
<td>50-54</td>
</tr>
<tr>
<td>1985-1989</td>
<td>21</td>
<td>15.7</td>
<td>45-49</td>
</tr>
<tr>
<td>1990-1994</td>
<td>7</td>
<td>5.2</td>
<td>40-44</td>
</tr>
<tr>
<td>1995-1999</td>
<td>11</td>
<td>8.2</td>
<td>35-39</td>
</tr>
<tr>
<td>2000-2004</td>
<td>14</td>
<td>10.4</td>
<td>30-34</td>
</tr>
<tr>
<td>2005-2009</td>
<td>23</td>
<td>17.2</td>
<td>25-29</td>
</tr>
<tr>
<td>Valid Total</td>
<td>134</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Missing System</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>139</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**1.3: Type of practice**

The respondents were asked “Which of the following best describes your dental practice?” general, group, specialist or solo. General practitioners made up 81 per cent and specialists made up 19 percent. Approximately a quarter of all respondents were in solo practice and three quarters in group practice (see Table 2 for a more detailed breakdown of the response group). A recent report into types of practice in Australia gave national proportions of 88 per cent general practitioners and 12 percent for specialists (Australian Research Centre for Population Oral Health, 2010).

**Table 2. The distribution of respondents as a percentage for Solo, Group, General and Specialist practice.**

<table>
<thead>
<tr>
<th>Practice</th>
<th>General Practice (n=113)</th>
<th>Specialist Practice (n=26)</th>
<th>Total (n=139)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solo</td>
<td>26</td>
<td>23</td>
<td>39</td>
</tr>
<tr>
<td>Group</td>
<td>74</td>
<td>77</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>139</td>
</tr>
</tbody>
</table>
Chapter 6

Part 2: Learning

2.1: Learning characteristics

This section addresses the responses to the questions on learning characteristics as a collective of modes of learning, preferences and styles. These relate to the complex manner in which, and conditions under which, learners most efficiently and most effectively perceive, process, store, and recall what they are attempting to learn (Lujan & DiCarlo, 2006). The learning characteristics were explored in Questions 86-95 from the questionnaire and rated via a five point Likert scale from “Strongly disagree” to “Strongly agree”. The percentages for responses for “Agree” and “Strongly agree” are reported in Table 3.

Table 3. The proportions of respondents who recorded "Agree" or "Strongly agree" with a range of learning characteristics (%).

<table>
<thead>
<tr>
<th>Learning characteristics</th>
<th>n= 138</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q86. I am self-motivated rather than dependent on others for my motivation.</td>
<td></td>
<td>49</td>
<td>42</td>
</tr>
<tr>
<td>Q87. I am an inquisitive person.</td>
<td></td>
<td>65</td>
<td>28</td>
</tr>
<tr>
<td>Q88. I can learn by myself.</td>
<td></td>
<td>72</td>
<td>20</td>
</tr>
<tr>
<td>Q89. I learn from reading.</td>
<td></td>
<td>76</td>
<td>16</td>
</tr>
<tr>
<td>Q90. I learn from listening.</td>
<td></td>
<td>74</td>
<td>16</td>
</tr>
<tr>
<td>Q91. I learn from hands on.</td>
<td></td>
<td>53</td>
<td>44</td>
</tr>
<tr>
<td>Q92. I like to keep up to date.</td>
<td></td>
<td>57</td>
<td>38</td>
</tr>
<tr>
<td>Q93. I am open to new ideas and insights.</td>
<td></td>
<td>63</td>
<td>33</td>
</tr>
<tr>
<td>Q94. I learn through interaction with peers.</td>
<td></td>
<td>56</td>
<td>27</td>
</tr>
<tr>
<td>Q95. I critically appraise new ideas before putting them into practice.</td>
<td></td>
<td>54</td>
<td>35</td>
</tr>
</tbody>
</table>

Within the response group, the learning characteristic with the strongest response was, *I learn from hands-on* with 44 percent “Strongly agree” followed by, *I am self-motivated rather than dependent on others for my motivation* with 42 percent “Strongly agree”. *I like to keep up to date* recorded 38 per cent “Strongly agree” and *I am open to new ideas and insights* recorded 33 percent “Strongly agree”. The “Agree” plus Strongly agree” for *learning from hands-on* (97 percent) is consistent with Leggate and Russell (2002) who reported *hands-on* as the most preferred (94 percent) learning format amongst a cohort of UK dentists. Reports by Best, Eaton et al. (2005b) and Abbott, Burgess et al. (2010) on participation of dentists overseas and in Australia, record that there is an
unfilled demand for activities with a hands-on component and, where such courses were available, they were oversubscribed.

Cross tabulations of the learning characteristic, *I learn from hands-on* by *sex* and *age of practitioner* showed the “Agree” and “Strongly agree” was consistent across the sample of respondents irrespective of sex or age (see Table 4).

Table 4. Strength of agreement for the learning characteristic "I learn from hands-on" as a function of sex and age of practitioner (%).

<table>
<thead>
<tr>
<th>Age: Less than 50 years old</th>
<th>Characteristic: I learn from hands-on</th>
<th>Sex</th>
<th>Agree</th>
<th>Strongly agree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Female n=36</td>
<td>58</td>
<td>36</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male n=40</td>
<td>45</td>
<td>50</td>
<td>95</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F+M n=76</td>
<td>51</td>
<td>43</td>
<td>94</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age: Greater than or equal to 50 years old</th>
<th>Characteristic: I learn from hands-on</th>
<th>Sex</th>
<th>Agree</th>
<th>Strongly agree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Female n=11</td>
<td>45</td>
<td>55</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male n=44</td>
<td>57</td>
<td>41</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F+M n=55</td>
<td>55</td>
<td>44</td>
<td>99</td>
</tr>
</tbody>
</table>

More than half the respondents agreed to the learning characteristic, *I learn through interaction with peers* with 27 percent in strong agreement. By comparison, approximately three quarters of respondents agreed with, *I can learn by myself, I learn from reading and I learn from listening*, with comparatively low strength in the responses for “Strongly agree” (see Table 3).

The strength of the agreement with *I learn through interaction with peers* as a characteristic is supported by the written comments when asked, “Think back to a conference, congress, lecture programme or workshop, which you attended and would rate as successful. Please comment on what it was that you valued and made it successful for you”. For example:

Endodontic lecture programme 2009. Refreshed and enhanced my knowledge–presenter was a great teacher. The group involved was small
and more intimate than many other ‘mass’ day seminars I have attended. Interaction with the presenter was more convenient and valuable I actually LEARNT something practical for my clinical practice. (Male general practice, age<50 yo) (Emphasis in original)

2.2: Learning factors
A factor analysis conducted on the learning characteristics as listed in Table 3, resulted in three factors as explained in Chapter 5. These are described as:

1. Intellectually curious
2. Independent learner
3. Interactive learner.

Because the items within these factors were inter-correlated, I thought there might be an underlying dimension so I carried out a factor analysis. However, the factors did not explain the findings better than the associations between the individual items within the learning preferences. Therefore, I have reported the analysis of the findings via cross tabulations of the individual learning characteristics.

The breakdown of responses for sex, age of practitioner and type of practice to the individual items that clustered as intellectually curious, recorded differences (see Appendix III for percentages of responses). Younger males were consistently more strongly in agreement with these questions as self-descriptions than younger females. For the older age group, intellectual curiosity in males seems to wane to approximately a third in agreement. Older females maintained their level of intellectual curiosity to that of younger females. While this is consistent with Hegarty (2011), who has reported that motivation levels decrease with age, he has not differentiated between males and females. The pattern of responses between specialists and general practitioners were consistent across all four items with a greater proportion of specialists strongly agreeing with the descriptions (see Appendix IV).

\[\text{Factor, Intellectual curiosity was generated from the grouping of questions: 86, 87, 92 and 93 from Table 3.}\]
For the individual questions that clustered to the factor *Independent learner*[^2] cross tabulations showed similar agreement for *I can learn by myself*. For *I learn from reading*, general practitioners recorded 13 percent strong agreement with specialists 27 percent. *I learn from listening* showed the largest difference between general practitioners and specialists with strong agreement from 13 percent of the general practitioners and 31 percent of the specialists. Cross tabulations for the component questions showed similar low levels (15- 20 percent) of strong agreement for females and males and younger or older age groups. The implications of these results for the delivery of CPD is discussed in Chapter 8.

The individual item within the factor *Interactive learner*[^3], *I learn through interaction with peers*, showed a difference between specialists as against general practitioners. Cross tabulations showed that specialists responded 42 percent “Strongly agree” while general practitioners responded 23 percent “Strongly agree”.

**2.3: Incentives and barriers**

This section addresses the incentives and barriers to engaging in CPD with the analysis of responses to Questions 11 to 29. These questions asked “*How motivational do you find the following activities for engaging in CPD activities?*” The responses were recorded via a five point Likert scale with “Extremely” the highest on the scale. The results for “Very” and “Extremely” are reported as percentages in Table 5. *Relevance to own practice* had the strongest response as an incentive to engaging in CPD with 45 percent “Extremely motivational”. *Quality of presenter* was next at 42 percent “Extremely motivational ” followed by, *course content* and *opportunity to improve clinical skills* recording 40 percent “Extremely motivational”. The next strongest incentive was *desire to keep up to date with new knowledge and developments*, with a response of 38 percent “Extremely motivational”. The aggregated percentages of “Very motivational ” and “Extremely motivational ” are consistent with the incentives for CPD reported by John & Parashos (2007), who reported 92 percent undertaking a particular

[^2]: Factor, *Independent learner* was generated from the grouping of questions: 88, 89 and 90 from Table 3.

[^3]: Factor, *Interactive learner* was generated from the grouping of questions: 91 and 94 from Table 3.
course to improve their clinical skills and the background of the presenter as the major reason for attendance/non-attendance. Hopcraft, Manton et al. (2010) surveyed cohorts of Australian dentists, and reported that the main reason that practitioners attended CPD was to improve their knowledge with an average of 60 percent of males, females, general practitioners and specialists nominating this.

Just over half the respondents reported that *self-assessed need* was “Very” or “Extremely” motivational an incentive with slightly more than half, reporting *peer interaction* “Very” or “Extremely” motivational.

The selection of courses on the basis of learning needs has been reported to enhance the impact of CPD for dentists in the UK National Health Service (NHS) (Firmstone, Bullock et al., 2004). These authors grade impact based on how courses affects practice and how much learning has taken place. Abbott, Burgess et al. (2010) reported that in a cohort of dentists in Western Australia, where attendance at CPD was not mandatory, self-perceived need was a strong influence on the selection of courses attended.

Table 5. The strength of responses recorded for incentives and barriers to engaging in CPD activities as a percentage.

<table>
<thead>
<tr>
<th>Incentives n=139</th>
<th>Very motivational</th>
<th>Extremely motivational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desire to keep up to date with new knowledge and developments.</td>
<td>50</td>
<td>38</td>
</tr>
<tr>
<td>Opportunity to improve clinical skills.</td>
<td>52</td>
<td>40</td>
</tr>
<tr>
<td>Opportunity for peer interaction.</td>
<td>35</td>
<td>12</td>
</tr>
<tr>
<td>Need to mitigate risk of litigation.</td>
<td>26</td>
<td>15</td>
</tr>
<tr>
<td>Opportunity for social interaction.</td>
<td>17</td>
<td>6</td>
</tr>
<tr>
<td>Opportunity for a working holiday.</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Venue.</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>Course Content.</td>
<td>55</td>
<td>40</td>
</tr>
<tr>
<td>Proximity to home.</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>Quality of Presenter(s).</td>
<td>48</td>
<td>42</td>
</tr>
<tr>
<td>Relevance to own practice.</td>
<td>48</td>
<td>45</td>
</tr>
<tr>
<td>Personal Interest.</td>
<td>60</td>
<td>27</td>
</tr>
<tr>
<td>Number of CE credits.</td>
<td>15</td>
<td>7</td>
</tr>
<tr>
<td>Self-assessed need.</td>
<td>44</td>
<td>9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Barriers =139</th>
<th>Very discouraging</th>
<th>Extremely discouraging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal time constraints.</td>
<td>19</td>
<td>24</td>
</tr>
<tr>
<td>Registration costs of courses or conferences.</td>
<td>22</td>
<td>15</td>
</tr>
<tr>
<td>Travel &amp; accommodation costs.</td>
<td>25</td>
<td>11</td>
</tr>
<tr>
<td>Family commitments.</td>
<td>26</td>
<td>17</td>
</tr>
<tr>
<td>Lack of locum to cover when away.</td>
<td>13</td>
<td>14</td>
</tr>
</tbody>
</table>
As explained in the previous chapter, a factor analysis grouped the components for *incentives* and *barriers* to CPD as follows:

<table>
<thead>
<tr>
<th>Factor name</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worthwhile</td>
<td>Course content</td>
</tr>
<tr>
<td></td>
<td>Quality of presenter(s)</td>
</tr>
<tr>
<td></td>
<td>Relevance to own practice</td>
</tr>
<tr>
<td></td>
<td>Personal interest</td>
</tr>
<tr>
<td>Extrinsic prof dev.</td>
<td>Need to mitigate the risk of litigation</td>
</tr>
<tr>
<td></td>
<td>Proximity to home</td>
</tr>
<tr>
<td></td>
<td>Number of CE credit points</td>
</tr>
<tr>
<td></td>
<td>Self-assessed need</td>
</tr>
<tr>
<td>Social/peer interaction</td>
<td>Opportunity for peer interaction</td>
</tr>
<tr>
<td></td>
<td>Opportunity for social interaction</td>
</tr>
<tr>
<td>Skill dev.</td>
<td>Desire to keep up-to-date with new knowledge and developments</td>
</tr>
<tr>
<td></td>
<td>Opportunity to improve clinical skills</td>
</tr>
<tr>
<td>Location</td>
<td>Opportunity for a working holiday</td>
</tr>
<tr>
<td></td>
<td>Venue</td>
</tr>
<tr>
<td>Costs</td>
<td>Registration costs of courses or conferences</td>
</tr>
<tr>
<td></td>
<td>Travel and accommodation costs</td>
</tr>
<tr>
<td>Personal</td>
<td>Personal time constraints</td>
</tr>
<tr>
<td></td>
<td>Family commitments</td>
</tr>
<tr>
<td></td>
<td>Lack of locum cover when away</td>
</tr>
</tbody>
</table>

It was found that the individual items for all of the above generated factors were both robust and adequate for the analysis to explore the relationships.

The components of the generated factor, *extrinsic professional development* (*extrinsic prof dev*) are, *the need to mitigate the risk of litigation, number of CE credits and self-assessed need*. Cross tabulations (see Appendix V) showed that almost half the general practitioners and a third of the specialists recorded *the need to mitigate the risk of litigation* as a “Very” or “Extremely” motivational incentive to engagement in CPD. There was also a strong difference between females and males for *self-assessed need* as an incentive, with almost two thirds of the females and half of the males identifying this.
A component incentive of the generated factor skill dev., opportunity to improve clinical skills recorded 52 percent “Very” and 40 percent “Extremely” motivational as an incentive to engagement in CPD. Cross tabulations for sex showed a difference between females and males with just over half the females and a third of the males recording opportunity to improve clinical skills as an “Extremely” motivating incentive.

However, there is a higher proportion of females in the younger age group so the difference in response rates between females and males could be a factor of age rather than sex. To clarify, I have looked at the different age groups. Within the younger age group, opportunity to improve clinical skills was “Extremely” motivating for females (64 percent) compared with males (48 percent). Within the older age group, females (18 percent) reported similarly to males (20 percent) for “Extremely” motivating, indicating both an age and sex related association (see Appendix VI).

The next section reports on the barriers to engaging in CPD listed in Table 5. Personal time constraints (24 percent “Extremely” and 19 percent “Very” discouraging”) and family commitments (17 percent “Extremely” and 26 percent “Very” discouraging) were the strongest barriers to engaging in CPD. This was followed by registration costs and costs of travel and accommodation with slightly more than a third of respondents reporting these as “Very” or “Extremely” discouraging (see Table 5).

Glazebrook & Harrison (2006), reported similar barriers for rural and remote medical practitioners while costs were also reported by Hopcraft, Manton et al. (2010) as a major barrier to attending CPD for Australian dentists.

Younger respondents more than older respondents saw family commitments as a barrier to CPD. The younger group (less than 50 years old) recorded little difference between females and males (females; 33 percent “Very” discouraging and 22 percent “Extremely” discouraging, males; 30 percent “Very” discouraging and 18 percent “Extremely” discouraging) with regards to family commitments. The number of responses for the over 50 year olds is low which questions the reliability of the findings, however there was a higher proportion of females than males reporting this as “Extremely” discouraging (see Table 6).
Table 6. The strength of “Family commitments” as a barrier to engagement in CPD as a function of sex and age of practitioner. Responses presented as a percentage for “very discouraging” and “extremely discouraging”.

<table>
<thead>
<tr>
<th>Age: Less than 50 years old</th>
<th>Barrier: Family commitments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Very discouraging</td>
</tr>
<tr>
<td>Female n=36</td>
<td>33</td>
</tr>
<tr>
<td>Male n=40</td>
<td>30</td>
</tr>
<tr>
<td>F+M n=76</td>
<td>32</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age: Greater than or equal to 50 years old</th>
<th>Barrier: Family commitments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Very discouraging</td>
</tr>
<tr>
<td>Female n=11</td>
<td>18</td>
</tr>
<tr>
<td>Male n=45</td>
<td>22</td>
</tr>
<tr>
<td>F+M n=56</td>
<td>21</td>
</tr>
</tbody>
</table>

These findings differ from the literature where family commitments have been reported as a particular concern for women (Ayers, Thomson et al., 2008; McKay & Quinonez, 2012). My results show no significant difference between males and females in the younger age group regarding the impact of family commitments on CPD, but females in the older group reported this as a barrier. This is an interesting observation as the proportion of females in the dental profession increases and warrants further research as to the practical significance of these results. This is discussed in Chapter 8.

Part 3: CPD outcomes
This section reports the analysis of the responses for:

3.1: Attitude to usefulness of CPD activities
3.2: Extent of engagement in CPD activities
3.3: Mentoring

3.1: **Attitude to Usefulness of CPD activities**
Respondents were asked to rate the usefulness of various activities that could reasonably be expected to advance professional development as a dentist (Questions 63-72). The options provided were; "Not at all", "Not very", "Somewhat”, "Very" and "Extremely".
The most useful activities were hands-on workshops and lectures. Hands-on workshops were reported by a third of respondents as very useful and more than half of the respondents as “Extremely” (the highest on the Likert scale). Lectures were also reported as almost two thirds of respondents as “Very” and “Extremely” useful by just over a quarter of respondents (see Table: 7). These findings are consistent with a report by Leggate & Russell (2002) on the preferences for CPD formats of CPD activities in Scottish dentists with 94 percent for hands-on and 90 percent for lectures. Hopcraft et al. (2010) also reported hands-on courses and lectures as the most preferred formats for CPD in a cohort of Australian dentists.

Social learning considerations were explored within the activities of; one to one discussion with another dentist, group discussion within your practice and seeking advice from an experienced colleague. These all recorded strong responses for “Very” or “Extremely” useful. These results have a practical significance in developing a framework for CPD as discussed in Chapter 9. Best and Brearley-Messer (2001) identified these activities as important in conference formats because of the need for professional identification and personal contact.

Table 7. Usefulness of CPD activities. Responses recorded for “Very useful” and “Extremely useful” as a percentage.

<table>
<thead>
<tr>
<th>CPD activities</th>
<th>Very useful</th>
<th>Extremely useful</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=139</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Journal reading (by yourself)</td>
<td>39</td>
<td>19</td>
</tr>
<tr>
<td>Journal reading club(s)</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Study groups</td>
<td>30</td>
<td>9</td>
</tr>
<tr>
<td>Listening to audio recordings</td>
<td>26</td>
<td>11</td>
</tr>
<tr>
<td>Lectures</td>
<td>60</td>
<td>27</td>
</tr>
<tr>
<td>Hands-on workshops</td>
<td>34</td>
<td>52</td>
</tr>
<tr>
<td>Internet/online learning</td>
<td>29</td>
<td>12</td>
</tr>
<tr>
<td>One-to-one discussion(s) with another dentist</td>
<td>38</td>
<td>26</td>
</tr>
<tr>
<td>Group discussion(s) within your practice</td>
<td>41</td>
<td>21</td>
</tr>
<tr>
<td>Seeking advice from an experienced colleague</td>
<td>45</td>
<td>34</td>
</tr>
</tbody>
</table>

3.2: Extent of engagement in CPD activities

Respondents were asked to nominate from a list (Question 74), those activities actually engaged in within the previous six months. This list is the same set of activities used for usefulness and the Yes responses are reported as percentages in Table 8.

Almost all respondents engaged in journal reading, lectures and one-to-one discussion with another dentist. More than three-quarters engaged in seeking advice from an
experienced colleague and almost two-thirds engaged in hands-on workshops. These proportions are in general agreement with a review of CPD for dentists in Europe by Barnes, Bullock et al. (2012), who reported that journal reading, lectures and hands-on courses were undertaken by almost all dentists.

Table 8. Yes responses as a percentage for engagement in CPD activities.

<table>
<thead>
<tr>
<th>CPD activities</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal reading (by yourself)</td>
<td>94</td>
</tr>
<tr>
<td>Journal reading club(s)</td>
<td>9</td>
</tr>
<tr>
<td>Study groups</td>
<td>52</td>
</tr>
<tr>
<td>Listening to audio recordings</td>
<td>56</td>
</tr>
<tr>
<td>Lectures</td>
<td>92</td>
</tr>
<tr>
<td>Hands-on workshops</td>
<td>61</td>
</tr>
<tr>
<td>Internet/online learning</td>
<td>47</td>
</tr>
<tr>
<td>One-to-one discussion(s) with another dentist</td>
<td>84</td>
</tr>
<tr>
<td>Group discussion(s) within your practice</td>
<td>59</td>
</tr>
<tr>
<td>Seeking advice from an experienced colleague</td>
<td>77</td>
</tr>
</tbody>
</table>

3.3: Mentoring

Mentoring is a social learning activity between senior (mentor) and junior (mentee) professionals which aims to extend and strengthen characteristics and qualities of professionalism within the junior professional. Mentoring sets up a dialogue between mentors and mentees, and the process of learning through interaction with others can be the key element through which mentoring translates into learning outcomes (Lankau & Scandura, 2002). Mentoring is thus a form of CPD where both the mentor and the mentee benefit. Role modelling and the mentor/mentee relationship are consistent with social learning theory reviewed in Chapter 4.

This section reports the responses to the questions on attitudes to a mentor programme in dentistry and sub-questions on acting as a mentor or acting as a mentee. There was extremely strong support for a mentor programme across all age groups with 86 per cent overall Yes. Two-thirds of the respondents supported acting as mentor and almost half supported acting as a mentee (being mentored).

The reporting of mentoring is treated separately from that of attitude to usefulness or extent of engagement. However, it is also useful to report the connections between mentoring, acting as a mentor and being mentored to the usefulness of CPD activities. These reports are included with in the reporting of attitudes to a mentor programme in section 4.3.
Chapter 6

Part 4: Associations of CPD with (demographic) backgrounds, learning, incentives and barriers.

4.1: Attitude to usefulness
This section reports the relationships of attitudes to usefulness of CPD activities with sex, age of practitioner and type of practice, learning characteristics and incentives and barriers.

4.1.1: Attitude to usefulness by sex
From the list of activities shown in Table 9, those with the strongest support for usefulness are:

- Hands-on workshops
- Lectures
- Seeking advice from an experienced colleague
- One-to-one discussion with another dentist
- Group discussion within your practice.

There was little difference between females and males for the usefulness of lectures or group discussion within your practice, but females found other activities involving interaction and collaboration with others more useful than males did. 57 percent of females and 40 percent of males reported seeking advice from an experienced colleague as “Extremely” useful and 51 percent of females and 39 percent of males reported one to one discussion with another dentist “Extremely” useful (see Table 9).

Table 9. Usefulness of CPD activities presented as a function of sex, age group of practitioner and type of practice (%).

<table>
<thead>
<tr>
<th>CPD activity</th>
<th>Female</th>
<th>Male</th>
<th>&lt;50yo</th>
<th>≥50yo</th>
<th>General</th>
<th>Specialist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal reading (by yourself)</td>
<td>19</td>
<td>11</td>
<td>19</td>
<td>21</td>
<td>17</td>
<td>32</td>
</tr>
<tr>
<td>Journal reading club(s)</td>
<td>11</td>
<td>15</td>
<td>8</td>
<td>7</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Study groups</td>
<td>11</td>
<td>12</td>
<td>12</td>
<td>11</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Listening to audio recordings</td>
<td>19</td>
<td>8</td>
<td>6</td>
<td>8</td>
<td>13</td>
<td>8</td>
</tr>
<tr>
<td>Lectures</td>
<td>28</td>
<td>27</td>
<td>26</td>
<td>29</td>
<td>30</td>
<td>12</td>
</tr>
<tr>
<td>Hands on workshops</td>
<td>59</td>
<td>51</td>
<td>61</td>
<td>42</td>
<td>58</td>
<td>32</td>
</tr>
<tr>
<td>Internet/online learning</td>
<td>10</td>
<td>15</td>
<td>17</td>
<td>9</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>One-to-one discussion(s) with another dentist</td>
<td>51</td>
<td>39</td>
<td>31</td>
<td>26</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>Group discussion(s) within your practice</td>
<td>23</td>
<td>24</td>
<td>29</td>
<td>19</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Seeking advice from an experienced colleague</td>
<td>57</td>
<td>40</td>
<td>38</td>
<td>36</td>
<td>36</td>
<td>32</td>
</tr>
</tbody>
</table>
However, there is a higher proportion of females in the younger age group so that one to one discussion with another dentist could be a factor of age rather than sex. To explore this, I have looked at the results for females and males within each age group. Within the younger and the older age groups, a higher percentage of females reported this as “Very” or “Extremely” useful than did males. Thus, sex contributes to usefulness over and above age, for one-to-one discussion with another dentist (see Table 10).

Table 10. Usefulness of one-to-one discussion with another dentist presented as a function of sex and age of practitioner. Percentage responses recorded for “Very” useful and “Extremely” useful.

<table>
<thead>
<tr>
<th>Age: Less than 50 years old</th>
<th>One-to-one discussion with another dentist</th>
<th>Sex</th>
<th>Very useful</th>
<th>Extremely useful</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female n=32</td>
<td></td>
<td></td>
<td>47</td>
<td>34</td>
<td>81</td>
</tr>
<tr>
<td>Male n=35</td>
<td></td>
<td></td>
<td>43</td>
<td>29</td>
<td>72</td>
</tr>
<tr>
<td>F+M n=67</td>
<td></td>
<td></td>
<td>45</td>
<td>31</td>
<td>76</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age: Greater than or equal to 50 years old n=52</th>
<th>One-to-one discussion with another dentist</th>
<th>Sex</th>
<th>Very useful</th>
<th>Extremely useful</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female n=11</td>
<td></td>
<td></td>
<td>64</td>
<td>27</td>
<td>91</td>
</tr>
<tr>
<td>Male n=41</td>
<td></td>
<td></td>
<td>34</td>
<td>24</td>
<td>58</td>
</tr>
<tr>
<td>F+M n=52</td>
<td></td>
<td></td>
<td>40</td>
<td>25</td>
<td>65</td>
</tr>
</tbody>
</table>

A similar finding is shown for the usefulness of group discussion within your practice as shown in Appendix VII. Within the younger age group, 75 percent of the females and 61 percent of the males endorsed the usefulness of group discussion within your practice as either “Very” or “Extremely” useful. In the older age group, all the females (100 percent) and 68 percent of the males similarly endorsed group discussion within your practice, suggesting that sex contributes to this over and above age.

4.1.2: Attitude to usefulness by age of practitioner

Cross tabulations (see Table 9) showed little difference between the younger and older age groups for the usefulness of most of the listed activities except for the usefulness of listening to audio recordings (younger 49 percent and older age groups 30 percent) and internet/online learning (younger 51 percent and older 36 percent). A higher proportion
of those in the younger age group also found *seeking advice from an experienced colleague* very or extremely useful (younger 85 percent and older 81 percent) than those in the older age group. Closer scrutiny of these findings shows that *sex* and *age* both contribute to the usefulness of *seeking advice from an experienced colleague*. Overall, *sex* contributes over and above *age* with females reporting this more useful than males (see Appendix VIII).

Table 11. Frequency of agreement recorded as a percentage for variables that make a CPD activity successful as a function of sex, age of practitioner and type of practice.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Female n=47</th>
<th>Male n=88</th>
<th>Age &lt;50 n=76</th>
<th>Age ≥50 n=58</th>
<th>General n=113</th>
<th>Specialist n=26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relevance to practice</td>
<td>43</td>
<td>43</td>
<td>51</td>
<td>40</td>
<td>47</td>
<td>31</td>
</tr>
<tr>
<td>Quality of presenter</td>
<td>47</td>
<td>39</td>
<td>50</td>
<td>45</td>
<td>33</td>
<td>35</td>
</tr>
<tr>
<td>Social Interaction</td>
<td>36</td>
<td>21</td>
<td>22</td>
<td>21</td>
<td>13</td>
<td>23</td>
</tr>
</tbody>
</table>

In addition to the findings from the set (closed) questions, respondents were invited to provide written comments (see Table 11). *Social interaction* was recorded as important in making a CPD activity successful with almost twice as many females (36 percent) as males (21 percent) nominating this with little difference between the younger or older age groups. These comments are consistent with earlier findings and have practical significance for understanding females as social learners, more so than males.

4.1.3: *Attitude to usefulness by type of practice*

*Hands on workshops* recorded the highest response for usefulness with 34 percent “Very” and 52 percent “Extremely”. Cross tabulations showed a significant difference between general practitioners who recorded 58 percent “Extremely” useful and specialists with 32 percent “Extremely” useful. However, the raw numbers are small for specialists and may suggest a bias (see Appendix IX).

*Lectures* were recorded as “Very” or “Extremely” useful by the vast majority of respondents (87 percent). Cross tabulations showed a difference between general practitioners and specialists. *Lectures* were favoured slightly more by the general practitioners (30 percent) than the specialists (26 percent) (see Appendix IX).
The results for **hands-on workshops** are consistent with Hopcraft, Manton *et al.* (2010), who reported that 31 percent of the general practitioner dentists nominated a preference for hands-on courses compared with 12 percent of specialists, but differs for lectures where these authors reported 45 percent of specialists preferred lectures compared with 34 percent of general practitioners.

As reported earlier, the social learning activities from the list of CPD activities are **seeking advice from an experienced colleague; one-to-one discussion with another dentist and group discussion within your practice** (see Table 7).

*One to discussion with another dentist* was supported as “Very” or “Extremely” useful across general practice (70 percent) and specialist practice (71 percent). *Group discussion within your practice* was supported as “Very” or “Extremely” useful by 74 percent of the general practitioners and 71 percent of the specialists. *Seeking advice from an experienced colleague* recorded 87 percent “Very” or “Extremely” useful by general practitioners, 80 percent by specialists (see Table 9).

4.1.4: **Usefulness factors by learning characteristics**

The generated factors for the learning variables and the factors within usefulness have been explained in Chapter 5. Correlations of these factors recorded significant correlations (**) for **intellectual curiosity by use social**. Those respondents who are intellectually curious find activities related to collaboration and interaction with others useful (see Appendix X). This is supported by the associations between *I am open to new ideas and insights* and *one-to-one discussion with another dentist* (*) as well as *I like to keep up-to-date* and the generated factor, *use social*.

The correlations for the individual items within the factors, *learn interactive* and *use social* show a significant correlation between *I learn from hands-on* and *hands-on workshops* (***) which is to be expected as it compares like with like. *I learn from__* __

---

4 The generated factor “use social” consists of the CPD activities One-to-one discussion(s) with another dentist, Group discussion(s) within your practice and Seeking advice from an experienced colleague.

5 The generated factor “learn interactive” consists of the learning characteristics of I learn from hands-on and I learn through interaction with peers.
hands-on also has a significant correlation with one-to-one discussion with another dentist (**) (see Appendix XI). I learn through interaction with peers recorded a stronger correlation with seeking advice from an experienced colleague (**) and one-to-one discussion with another dentist (**).

Activities involving interaction with others can relate to informal activities where implicit, unintended, opportunistic learning can occur in the absence of a teacher (Eraut, 2004, p.250). They can be also be associated with more formal activities such as within the mentor/mentee relationship. The strong correlations for social learning characteristics with interactive CPD activities has implications for the success of mentoring and the mentor/mentee relationship discussed in Chapter 8. These results are consistent with Eraut (2011), who has suggested that workplace activities provide between 70-90 percent of the learning and recognises the social significance of learning from others and in the spaces surrounding CPD activities. This is discussed further in Chapter 8.

These findings support the hypothesis that those who prefer to learn through social interaction and or collaboration between peers are more likely to have a positive attitude to engagement in Continuing Professional Development (CPD).

4.1.5: Usefulness by incentives and barriers

Correlations for the usefulness of CPD activities by incentives and barriers is shown in Appendix XII. As reported earlier, the most useful CPD activities revealed from the survey are lectures, hands-on workshop, one-to-one discussion with another dentist, group discussion within your practice and seeking advice from an experienced colleague.

The strongest incentives (see Table 5) were relevance to own practice, course content, opportunity to improve clinical skills and desire to keep up to date with new knowledge and developments.

There were significant correlations between lectures and course content (**), quality of presenter(s) (**) and relevance to own practice (*). Hands-on workshops also had significant correlations to these three incentives as well as desire to keep up with new knowledge and developments (*) and opportunity to improve clinical skills (**). The
significant correlation between *opportunity to improve clinical skills* with *hands on workshops* (**) is consistent with the written responses from Q.80 which asked respondents to record how they developed their clinical skills (see Table 19 later in this chapter).

In addition, *hands-on workshops* correlated significantly with *self-assessed need* (**), which is consistent with the literature showing adults as self-directed and the importance of self-assessment as the missing link in CPD. *Hands-on workshops* also significantly correlated (*) with *the need to mitigate the risk of litigation*. While *the need to mitigate the risk of litigation* is a comparatively weak incentive for CPD, the significant correlation with *hands-on workshops* is consistent with the need to improve clinical skills and keep up-to-date.

*One-to-one discussion with another dentist*, correlated significantly with *desire to keep up-to-date with new knowledge and developments* (*), *course content* (**), and *quality of presenter* (**). *Group discussion within your practice* correlated significantly with *the need to mitigate risk of litigation* (**), *self-assessed need* (**), while *seeking advice from an experienced colleague* correlated significantly with *course content* (**), *quality of presenter* (**), *relevance to own practice* (**), and *self-assessed need* (*). These correlations support the importance of interaction and collaboration in CPD, particularly with reference to mentoring as a CPD activity discussed in Chapter 8.

*Costs related to travel and accommodation* (*) correlated significantly with *hands-on workshops*. This may be biased to the sample within this survey as the local availability of hands-on workshops is limited and there is a greater need for practitioners to travel to enroll in such activities.

Contingency tables were generated from the cross tabulations of usefulness of CPD activities by incentives and barriers to calculate Chi square (χ2) as a statement of significance of the association. The spread of the responses across the five point Likert scale was divided into “Weak” and “Strong” and reported as percentages. “Weak” represents the aggregate of responses for "Not at all", "Not very", "Somewhat" and "Very" while "Strong" represents the responses for "Extremely".
Table 12. The strength of the association between course content as an incentive and the usefulness of lectures (%).

<table>
<thead>
<tr>
<th>Course content as an incentive</th>
<th>Weak</th>
<th>Strong</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usefulness of lectures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weak</td>
<td>48</td>
<td>25</td>
<td>73</td>
</tr>
<tr>
<td>Strong</td>
<td>12</td>
<td>15</td>
<td>27</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>40</td>
<td>100</td>
</tr>
</tbody>
</table>

$\chi^2 = 5.68, p<0.05$. The strength of the association between course content as an incentive and usefulness of lectures is statistically significant.

Of those who reported “Strong” support for the usefulness of lectures, 15 percent report course content as a “Strong” incentive, compared with 25 percent of those who showed “Weak” support for lectures reporting course content as a “Strong” incentive (Table 12). The usefulness of lectures is significantly associated with course content.

The strength of the associations for the usefulness of lectures and relevance to own practice and quality of presenter were not statistically significant (see Appendices XIII and XIV). These results suggest there are other reasons for lectures being a popular choice for CPD and is discussed in Chapter 8.

Cross tabulations for the strong incentives noted above also had strong associations with the usefulness of hands-on workshops (Table 13, Table 14 and Table 15).

Table 13. The strength of the association between course content as an incentive and the usefulness of hands-on workshops (%).

<table>
<thead>
<tr>
<th>Course content as an incentive</th>
<th>Weak</th>
<th>Strong</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usefulness of hands-on workshops</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weak</td>
<td>35</td>
<td>12</td>
<td>47</td>
</tr>
<tr>
<td>Strong</td>
<td>24</td>
<td>29</td>
<td>53</td>
</tr>
<tr>
<td>Total</td>
<td>59</td>
<td>41</td>
<td>100</td>
</tr>
</tbody>
</table>

$\chi^2 = 13.06, p<0.01$. The strength of the association between course content as an incentive and usefulness of hands-on workshops is statistically significant.

Of those who report “Strong” support for the usefulness of hands-on workshops, 29 percent report course content as a “Strong” incentive, compared with 12 percent of those who showed “Weak” support for the usefulness of lectures reporting course content as a “Strong” incentive. That is, the usefulness of hands-on workshops is significantly associated with course content.
Table 14. The strength of the association between quality of presenter as an incentive and the usefulness of hands-on workshops (%).

<table>
<thead>
<tr>
<th>n=138</th>
<th>Quality of presenter as an incentive</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weak</td>
<td>Strong</td>
</tr>
<tr>
<td>Usefulness of hands-on workshops</td>
<td>Weak</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Strong</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>58</td>
</tr>
</tbody>
</table>

$\chi^2=9.44, p<0.01$. The strength of the association between quality of presenter as an incentive and usefulness of hands-on workshops is statistically significant.

Of those who strongly support *hands-on workshops* as useful, 29 percent report *quality of presenter* as a “Strong” incentive, compared with 13 percent of those show “Weak” support for the usefulness of *hands-on workshops* who report *quality of presenter* as a “Strong” incentive. That is, the usefulness of *hand-on workshops* is significantly associated with the *quality of presenter*.

Table 15. The strength of the association between opportunity to improve clinical skills as an incentive and the usefulness of hands-on workshops (%).

<table>
<thead>
<tr>
<th>n=136</th>
<th>Opportunity to improve clinical skills as an incentive</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weak</td>
<td>Strong</td>
</tr>
<tr>
<td>Usefulness of hands-on workshops</td>
<td>Weak</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Strong</td>
<td>26</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>59</td>
</tr>
</tbody>
</table>

$\chi^2=15.80, p<0.01$. The strength of the association between opportunity to improve clinical skills as an incentive and usefulness of hands-on workshops is statistically significant.

Of those who strongly support the usefulness of *hands-on workshops*, 27% strongly support the *opportunity to improve clinical skills* as an incentive. This compares with 14 percent of those who report “Weak” support for *hands-on workshops* who report “Strong” support for *opportunity to improve clinical skills* as an incentive. That is, the usefulness of *hand-on workshops* is significantly associated with the *opportunity to improve clinical skills* as an incentive.

Furthermore, self-assessed need and *relevance to own practice* were also reported as “Strong” incentives for CPD and contingency tables showed that these were significant for the usefulness of *hands-on workshops* (Tables 16 and 17).
Table 16. The strength of the association between self-assessed need as an incentive and the usefulness of hands-on workshops (%).

<table>
<thead>
<tr>
<th></th>
<th>Weak</th>
<th>Strong</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usefulness of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hands-on workshops</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weak</td>
<td>32</td>
<td>15</td>
<td>47</td>
</tr>
<tr>
<td>Strong</td>
<td>17</td>
<td>36</td>
<td>53</td>
</tr>
<tr>
<td>Total</td>
<td>49</td>
<td>51</td>
<td>100</td>
</tr>
</tbody>
</table>

$\chi^2 = 16.85, p < 0.05.$ The strength of the association between self-assessed need as an incentive and usefulness of hands-on workshops is statistically significant.

Of those who strongly support the usefulness of hands-on workshops, 36 percent report self-assessed need as a “Strong” incentive for CPD. This compares with 15 percent of those who show “Weak” support for hands-on workshops who report self-assessed need as a “Strong” incentive. The usefulness of hands-on workshops is significantly associated with self-assessed need as an incentive.

Table 17. The strength of the association of relevance to own practice as an incentive for the usefulness of hands-on workshops (%).

<table>
<thead>
<tr>
<th></th>
<th>Weak</th>
<th>Strong</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usefulness of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hands-on workshops</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weak</td>
<td>34</td>
<td>13</td>
<td>47</td>
</tr>
<tr>
<td>Strong</td>
<td>21</td>
<td>32</td>
<td>53</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>45</td>
<td>100</td>
</tr>
</tbody>
</table>

$\chi^2 = 13.67, p < 0.01.$ The strength of the association between relevance to practice as an incentive and usefulness of hands-on workshops is statistically significant.

Of those who strongly support hands-on workshops as useful, 32 percent report relevance to own practice as a “Strong” incentive, compared with 13 percent of those who show “Weak” support for hands on workshops reporting relevance to own practice as a “Strong” incentive. That is, the usefulness of hands-on workshops is significantly associated with relevance to own practice.

Barriers

Table 5 (page 110) gives the percentage responses for “Very” and “Extremely discouraging” of barriers to CPD. As reported earlier, the most frequently reported barriers to engagement in CPD are family commitments and personal time constraints. Registration costs and travel and accommodation costs. There were significant
correlations (*) for registration, travel and accommodation costs with the usefulness of hands-on workshops (see Appendix XV).

Open-ended questions on incentives and barriers to CPD

Written comments were invited to the question asking: Think back to a conference, congress, lecture programme or workshop which you attended and would rate as successful. Please comment on what it was that you valued and made it successful for you. A simple content analysis was conducted on the responses and the frequencies of these are reported in Table 18.

Table 18. Frequency of recorded responses as a function of sex, age and type of practice to the question (Q31): Think back to a conference, congress, lecture programme or workshop, which you attended and would rate as successful. Please comment on what it was that you valued and made it successful for you (%).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Female n=47</th>
<th>Male n=88</th>
<th>Age &lt;50 n=76</th>
<th>Age ≥50 n=58</th>
<th>General n=113</th>
<th>Specialist n=26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relevance to practice</td>
<td>43</td>
<td>43</td>
<td>51</td>
<td>40</td>
<td>47</td>
<td>31</td>
</tr>
<tr>
<td>Quality of presenter</td>
<td>47</td>
<td>39</td>
<td>50</td>
<td>45</td>
<td>33</td>
<td>35</td>
</tr>
<tr>
<td>Social Interaction</td>
<td>36</td>
<td>21</td>
<td>22</td>
<td>21</td>
<td>13</td>
<td>23</td>
</tr>
</tbody>
</table>

The most represented responses for a successful activity were relevance to practice, quality of presenter and social interaction. For example, the following indicates the importance of relevance:

…one day workshop on restoring the worn dentition using composite resin and transparent silicone templates. Brilliant, truly visionary because his simple technique filled a gap in our treatment options available to patients which no other technique has and he took us through how to apply it to the clinical situation we all face. Then we actually tried it out, It has extended my practice enormously. His workshop was simple, hands-on, well researched easily transferable and met an actual clinical need. (Male general practitioner, age <50 yo)
A comment from a 50 yo male specialist highlights the importance of the quality of the presenter:

Quintessence conference (Sydney) 2007, periodontics, very successful, brought together 4 presenters of the highest quality for a 3 day hands-on live surgical workshop. Smaller meetings, access to presenters opportunity for peer interaction (Male specialist ≥50 yo)

Finally, as the following demonstrates, interaction with colleagues over coffee was highlighted:

The most important part of a dental conference is the interaction with the other dentists that I have met over many years. I maintain that more is learnt during the coffee breaks when we discuss common problems. If the lecture programme is good then that is a bonus. (Male general practitioner, age ≥50 yo)

The responses for sex, age of practitioner and type of practice showed relevance to practice as the strongest condition for a successful activity for approximately half of all males and females and both older and younger age groups. Approximately a third of the specialists and half of the general practitioners also found this an important condition for a successful activity. The quality of the presenter was favoured most by the younger age group and females.

The largest difference between the background groups and conditions for a successful activity was for social interaction. Almost twice as many females (36 percent) than males (21 percent) nominated this as a condition for a successful CPD activity.

In order to expand on the previous results on characteristics of learning, the respondents were asked to reflect on their own experience and report their strategies for developing knowledge and skills. The next section reports a sample of written responses to the open-ended questions 79 and 80. These responses are direct quotes from the questionnaire with typographical errors corrected.
Table 19 shows a report of the content analysis of all the written responses to the question: *Looking at your own practice situation, how have/will you develop your own knowledge from that of a new graduate to that of an expert?*

### Table 19. Most frequent recorded responses as a percentage for Question 79: Looking at your own practice situation, how have/will you develop your own knowledge from that of a new graduate to that of an expert? (NB. Multiple responses for each activity).

<table>
<thead>
<tr>
<th>CPD Activity</th>
<th>Female n=47</th>
<th>Male n=88</th>
<th>&lt;50 yo n=76</th>
<th>&gt;=50 yo n=58</th>
<th>General n=113</th>
<th>Specialist n=26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer Interaction</td>
<td>60</td>
<td>52</td>
<td>57</td>
<td>52</td>
<td>59</td>
<td>58</td>
</tr>
<tr>
<td>Hands-on</td>
<td>19</td>
<td>8</td>
<td>15</td>
<td>12</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Lectures</td>
<td>34</td>
<td>26</td>
<td>21</td>
<td>24</td>
<td>22</td>
<td>26</td>
</tr>
<tr>
<td>Reading</td>
<td>23</td>
<td>23</td>
<td>24</td>
<td>17</td>
<td>24</td>
<td>34</td>
</tr>
</tbody>
</table>

The most frequent response was *peer interaction* with the majority of all respondents across all groups nominating this as a factor in developing their own knowledge. *Lectures* and *reading* were nominated by between a quarter and a third of respondents as activities for developing personal knowledge irrespective of *sex, age of practitioner* or *type of practice*. Examples of the open-ended responses are quoted below. Ways in which two female general practitioners, one from the younger age group (≥50 yo) and the other from the older age group (<50 yo) reported their strategies for personal professional development include:

**Ways in which two female general practitioners, one from the younger age group (≥50 yo) and the other from the older age group (<50 yo) reported their strategies for personal professional development include:**

- Working as an assistant for 5 years. Working in a group practice for 35 years. Occasional conferences, dinner meetings, suburban study groups ADA ACT dental group, journals and texts. (≥50 yo)

And

- Working with an experienced dentist, Study group participation, Exchanging/talking through cases with other peers, Hand-on courses, lectures, own experience through working, journals. (<50 yo)

Additional comments from male practitioners, two of whom were more than 50 years old, are quoted below.
There is no substitute for practical experience—a short period of work experience with an experienced practitioner should be mandatory. (Male general practitioner ≥50 yo)

MDSc very important—discussions with specialist colleagues - working with experienced colleagues. (Male specialist, ≥50 yo)

Working with experienced dentist, short courses, lectures, reading. Practice. (Male general practitioner <50 yo)

Table 20 reports a summary of the results of a content analysis of all written responses to the question: *Looking at your own practice situation, how have/will you develop your own clinical skills?*

Table 20. Summary of recorded responses as a percentage across all groups for Question 80: *Looking at your own practice situation, how have/will you develop your clinical skills from that of a new graduate to that of an expert?* (NB. Multiple responses for each activity).

<table>
<thead>
<tr>
<th>CPD Activity</th>
<th>Female</th>
<th>Male</th>
<th>&lt;50 yo</th>
<th>&gt;=50 yo</th>
<th>General</th>
<th>Specialist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer Interaction</td>
<td>68</td>
<td>68</td>
<td>51</td>
<td>78</td>
<td>74</td>
<td>19</td>
</tr>
<tr>
<td>Hands-on</td>
<td>36</td>
<td>22</td>
<td>38</td>
<td>19</td>
<td>33</td>
<td>19</td>
</tr>
<tr>
<td>Lectures</td>
<td>4</td>
<td>7</td>
<td>9</td>
<td>7</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Reading</td>
<td>4</td>
<td>8</td>
<td>7</td>
<td>10</td>
<td>9</td>
<td>0</td>
</tr>
</tbody>
</table>

The most frequent response was *interaction with peers* with the majority of all dentists except for specialists nominating this as a factor in developing their own clinical skills. Hands-on activities were nominated by 36 percent of the females and 22 percent of the males for developing clinical skills. Lectures and reading journals were not well supported for improving clinical skills.

There is a difference in reported activities for developing personal knowledge as compared with developing clinical skills. *Peer interaction* is reported by approximately two-thirds of respondents for developing knowledge and skills, but *hands-on* is reported by more for developing clinical skills and less so for developing knowledge. On the other hand, *lectures* are reported by a third of respondents for developing personal knowledge with very few respondents reporting their use for developing clinical skills.
The following quotations are examples of responses to the open-ended question asking respondents on how they developed their own clinical skills (Q.80). Two of the citations are from the older group of respondents who were both male and two are from the younger group, one of whom is female.

I have been fortunate to have worked with some outstanding clinicians in the past. Also as a member of the endodontic society and in the past being in a study group (general dentistry) I have benefitted greatly (Male general practitioner ≥50 yo)

Mentoring, attending courses, pre-clinical hands-on and private study. (Male general practitioner ≥50 yo)

Lots of practice with a mentor or an experienced dentist to guide you, work shops, short courses. (Male general practitioner <50 yo)

Team work, observing attending workshops. (Female general practitioner <50 yo)

4.2: Extent of engagement
As reported earlier in this chapter (Table 8, page 115), journal reading was the most engaged in activity (94 percent) followed by lectures (92 percent) and one-to-one discussion with another dentist (84 percent).

4.2.1: Extent of engagement by sex
There is a slight difference in the extent of engagement between females and males in journal reading with 100 percent of females and 91 percent of males reporting engagement in this activity. Females (66 percent) were more engaged than males (55 percent) in group discussion within your practice and seeking advice from experienced colleagues (females 83 percent, males 72 percent) (see Appendix XVI).

4.2.2: Extent of engagement by age of practitioner
Almost all of the respondents engaged in journal reading, lectures and one-to-one discussion with another dentist. Cross tabulations for age of practitioner showed no significant differences between the older or younger age groups for these activities. Slightly more of those in the younger age group compared with the older age group
engaged in *hands-on workshops*, *group discussion within your practice* and *seeking advice from an experienced colleague*. This is significant for the discussion later on mentoring (see Appendix XVII).

**4.2.3: Extent of engagement by type of practice**

*Journal reading* was the most engaged in of any activity, supported by all of the solo practitioners with almost all in group general or specialist practice. *Lectures* received the next most support, with all solo practitioners and specialists and the vast majority of general practitioners having attended lectures within the previous six months. Two-thirds of the specialists also had a preference for *study groups* while two-thirds of the general practitioners had a preference for *listening to audio recordings*. *Hands-on workshops* were well attended, with the vast majority of group practitioners and more than two-thirds of the solo practitioners engaged in this activity.

*One-to-one discussion with another dentist* was supported by the vast majority of all categories of practice, with specialists engaging the most. *Seeking advice from an experienced colleague* was supported by more than three-quarters of solo practitioners, three-quarters of general practitioners and two-thirds of the specialists (see Appendix XVIII).

**4.2.4: Extent of engagement by learning characteristics**

Correlations of activities engaged in with learning characteristics (see Appendix XIX) showed a significant correlation between *learning from hands-on* and engagement in *study groups* (*). *Learning through interaction with peers* also correlated significantly with engagement in *study groups* (*) and *hands-on workshops* (*).

Cross tabulations of *learning through interaction with peers*, by *hands-on workshops* were significant (see Appendix XX). However, this did not support the question of whether learning through interaction with peers is associated with engagement in *hands-on workshops*. Of those who strongly supported *learning through interaction with peers* as a learning characteristic, only 20 percent engaged in *hands-on workshops* compared with 40 percent who did not endorse *learning through interaction with peers* as a learning preference.
4.2.5: Extent of engagement by incentives and barriers

This section reports the relationships of incentives and barriers to activities actually engaged in. Lectures were the most engaged in of all activities (see Table 8, page 115) and correlated significantly with the incentive self-assessed need (**) (see Appendix: XXI).

Cross tabulations showed that of those who recorded self-assessed need as a “Strong” incentive, 50 percent engaged in lectures, compared with 42 percent who showed “Weak” support for self-assessed need as an incentive (see Table 21).

Table 21. The strength of the association between self-assessed need as an incentive and engagement in lectures (%).

<table>
<thead>
<tr>
<th>n=139</th>
<th>Engagement in lectures</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Self-assessed need as an incentive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weak</td>
<td>6</td>
<td>42</td>
</tr>
<tr>
<td>Strong</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>92</td>
</tr>
</tbody>
</table>

$\chi^2$=3.05. The strength of the association between self-assessed need as an incentive and engagement in lectures is not statistically significant

Self-assessed need as an incentive correlated significantly with engagement in hands-on workshops (**). Cross tabulations showed that of those who recorded self-assessed need as a “Strong” incentive, 37 percent engaged in hands-on workshops compared with 24 percent who reported self-assessed need as a “Weak” incentive (see Table 22).

Table 22. The strength of the association of self-assessed need as an incentive and engagement in hands-on workshops (%).

<table>
<thead>
<tr>
<th>n=139</th>
<th>Engagement in hands-on workshops</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Self-assessed need as an incentive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weak</td>
<td>23</td>
<td>24</td>
</tr>
<tr>
<td>Strong</td>
<td>16</td>
<td>37</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>61</td>
</tr>
</tbody>
</table>

$\chi^2$=4.91, p<0.05. The strength of the association between self-assessed need as an incentive and engagement in hands-on workshops is statistically significant

Cross tabulations (see Table 23) showed that of those who see the need to mitigate risk of litigation as an incentive, the most engaged in activities were, journal reading, lectures, one-to-one discussion with another dentist and seeking advice from an experienced colleague.
Table 23. The strength of the association between extent of engagement in CPD activities and need to mitigate risk of litigation (%).

<table>
<thead>
<tr>
<th>Activity engaged in</th>
<th>No %</th>
<th>Yes %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal reading (by yourself)</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>Journal reading club(s)</td>
<td>37</td>
<td>4</td>
</tr>
<tr>
<td>Study groups</td>
<td>19</td>
<td>22</td>
</tr>
<tr>
<td>Listening to audio recordings</td>
<td>17</td>
<td>24</td>
</tr>
<tr>
<td>Lectures</td>
<td>5</td>
<td>36</td>
</tr>
<tr>
<td>Hands on workshops</td>
<td>12</td>
<td>29</td>
</tr>
<tr>
<td>Internet/online learning</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>One-to-one discussion(s) with another dentist</td>
<td>6</td>
<td>36</td>
</tr>
<tr>
<td>Group discussion(s) within your practice</td>
<td>14</td>
<td>27</td>
</tr>
<tr>
<td>Seeking advice from an experienced colleague</td>
<td>6</td>
<td>35</td>
</tr>
</tbody>
</table>

4.3: Preferences for a mentor programme
Following on from the previous section on mentoring, this section reports the relationships of attitudes to a mentor programme, *acting as a mentor* and *being mentored* to the background variables, learning characteristics and incentives and barriers. In addition, the relationships between mentoring and usefulness are reported.

4.3.1: Mentor programme by sex and age of practitioner
There was strong support for a mentor programme from recent graduates to senior practitioners (Figure 6) with an overall *Yes* response of 86 percent. Females in both older and younger age groups, were more supportive of a mentor programme than males (less than 50 years old; females 94 percent, males 75 percent, greater than or equal to 50 years old, 91 percent females and 87 percent males) (see Table 24).
Figure 6. Support for a mentor programme across all ages.

Table 24. Support for a mentor programme as a function of sex and age group. (%).

<table>
<thead>
<tr>
<th>Sex</th>
<th>Yes support</th>
<th>Do not support</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female n=36</td>
<td>94</td>
<td>6</td>
</tr>
<tr>
<td>Male   n=40</td>
<td>75</td>
<td>25</td>
</tr>
<tr>
<td>F+M n=76</td>
<td>84</td>
<td>16</td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female n=11</td>
<td>91</td>
<td>9</td>
</tr>
<tr>
<td>Male   n=45</td>
<td>87</td>
<td>13</td>
</tr>
<tr>
<td>F+M n=56</td>
<td>88</td>
<td>12</td>
</tr>
<tr>
<td>Grand total n=132</td>
<td>86</td>
<td>14</td>
</tr>
</tbody>
</table>

"Would you value an organised mentor programme to assist new graduates in practice?"
The level of interest in acting as a mentor and being mentored were measured on a five point Likert scale from “Not at all” to “Extremely”. For acting as a mentor 27 percent of the responses were “Very” interested with 12 percent “Extremely” so. For being mentored, 16 percent were very interested with five percent extremely so.

Cross tabulations (Table 25) for acting as a mentor showed greater interest from the males (30 percent “Very” interested and 15 percent “Extremely” interested) than females (21 percent “Very” interested and nine percent “Extremely” interested). This suggests that sex is a controlling influence with a greater proportion of males than females interested in acting as a mentor and is consistent with the results in the next section on being mentored.

Table 25. The strength of the association between the level of interest in acting as a mentor and sex (%).

<table>
<thead>
<tr>
<th>Sex</th>
<th>Very interested</th>
<th>Extremely interested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female n=47</td>
<td>21</td>
<td>9</td>
</tr>
<tr>
<td>Male n=85</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td>F+M n=132</td>
<td>27</td>
<td>12</td>
</tr>
</tbody>
</table>

$\chi^2 = 15.27$. The strength of the association between acting as a mentor and sex is not statistically significant.

Cross tabulations show a large difference between females and males for being mentored. The proportions show females more than males, were both “Very” and “Extremely interested” in being mentored. The difference was particularly apparent for “Extremely” interested with 13 percent for females and only one percent for males (Table 26).

Table 26. The strength of the association between the level of interest in being mentored and sex (%).

<table>
<thead>
<tr>
<th>Sex</th>
<th>Very interested</th>
<th>Extremely interested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female n=47</td>
<td>23</td>
<td>13</td>
</tr>
<tr>
<td>Male n=88</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>F+M n=132</td>
<td>17</td>
<td>5</td>
</tr>
</tbody>
</table>

$\chi^2 = 15.56, p<.01$. The strength of the association between being mentored and sex is statistically significant.
However, as noted earlier, because there is a higher proportion of females in the younger age group, this could be a factor of age rather than sex. Within the younger age group, 44 percent of females and 23 percent of males were “Very” or “Extremely” interested in being mentored with 9 percent of females and 7 per cent of males equal or over the age of 50 responding Yes. The relatively higher proportion of younger females and males supporting being mentored compared with older males and females, suggests that both age and sex are contributing but sex contributes over and above age (see Appendix XXII).

These findings are consistent with the correlations between being mentored and age of practitioner that report significant support for being mentored from the younger dentists. The highest level of interest in being mentored was from the respondents in the 25-29 year old range with 52 percent either “Very” or “Extremely” interested (see Appendix XXIII).

4.3.2: Mentor programme by type of practice
There is a slightly greater level of interest from the general (87 percent) and group practitioners (92 percent) over the solo practitioners (77 percent) or specialists (77 percent) for a mentor programme. Acting as a mentor has the strongest (significant) level of interest from the specialists (*). Although the raw numbers are low, cross tabulations show that two-thirds of the specialists were “Very” or “Extremely” interested in acting as a mentor compared with one-third of the general practitioners (see Appendix XXIV).

Putting it all together, these findings along with the specialists’ self-description of I learn through interaction with peers and willingness to act as a mentor, all indicate the probability of specialists becoming good mentors. Specialists by way of wanting to keep up-to-date and being open to new ideas and insights, have much to gain from mentees as mentees are generally more recent graduates and more up-to-date with knowledge and current research.

A quarter of the general practitioners recorded “Very” or “Extremely” interested in being mentored and only 12 per cent of specialists recorded same (see Appendix
XXIV). As reported earlier, being mentored is also skewed to the younger dentists who are predominantly female.

4.3.3: Results from open-ended questions on mentoring
The responses from the survey asking: *What features do you suggest for a mentor programme?* (Question 83) support the literature on mentoring for the characteristics of quality, attitudes and behaviours described in Chapter 3. The extracts below are from the responses to the above from dentists who responded *Yes* to Question 82: *Would you value an organised mentor programme to assist new graduates in practice?* and either “Very” or “Extremely” interested in being actively involved as *a mentor* (Question 84) or *mentee* (Question 85). The extracts have been corrected for typographical errors.

Passionate dentists/mentors-flexibility-great communicators. (Female general practitioner, age =>50 yo, graduated from an Australian university)

Use retired dentists who can actually stand over the new graduate when necessary[sic] and assist/ watch like a tutor would at uni. Surely there will be lots of retiring baby boomer dentists who would give up a couple of hours a week to give back to the profession to ensure the continued good standard of dentistry in this country. I will. (Female general practitioner, age ≥ 50 yo, graduated from an Australian university)

Training for mentors, everyone should be acting as a mentor/peer reviewer. (Female general practitioner, age <50 yo, graduated from an Australian university)

A social element as well as a formal framework is important to make the experience engaging for the new grad. (Male specialist, age <50 yo, graduated from an Australian university)

Collaborative, confidential, coaching, trust overarching organisation and support, training for mentor, clear understanding of principles and professional support for such a scheme. (Male general practitioner, age ≥50 yo, graduated from an Australian university)
Just the support to have someone to talk to. (Female general practitioner, age <50 yo, graduated from a non-Australian university)

While there is strong interest from the older practitioners to act as mentors, there are cautionary comments as to the receptiveness of younger dentists to be mentored.

The following are quotes from respondents who did not value a mentor programme and replied not at all to being interested in active involvement as a mentor or mentee.

You can’t force people to learn. If they wish to learn there are 1001 avenues already available including willing mentors. I am happy to mentor interested people who approach me, but would hate to be involved in a programme where people are forced to seek mentors by legislation. (Male specialist, age ≥50 yo, graduated from an Australian university)

Bloody new dentists who think that they already know more than you do as they have just learnt it, and can’t be told that they are doing sub optimal, understandably as they are new, work and further practice is needed. Once bitten, twice shy. (Female general practitioner, age < 50 yo, graduated from an Australian university)

In contrast to the above, the following quote is from a dentist who valued a mentor programme and replied as “Very” interested, both as a mentor and as a mentee.

Junior dentists need to respect ‘senior’ dentists purely for their experience alone. Can't stand new graduates who think they know it all or can do all. (Male general practitioner, age <50 yo, graduated from an Australian university)

A simple content analysis was conducted on the written responses to the question asking; What features do you suggest for a successful mentor programme? The most frequent comments extracted from the responses were, communication and collaboration with a trusting relationship between mentor and mentee and the mentors need to be trained with support from the profession. This is consistent with other authors on the role of mentorship (Ali & Panther, 2008; Holt & Ladwa, 2009a).
4.3.4: Mentoring by learning characteristics

Correlations were calculated between the learning characteristics (see Table 3, page 106) and, How interested are you in being involved in a mentor programme? As a mentor? as a mentee?

The strongest correlation for acting as a mentor with the learning characteristics was *I am an inquisitive person* (***) where of those who supported acting as a mentor, 40 percent were inquisitive. There are also significant correlations between acting as a mentor (*), *I like to keep up to date* (*), *I am open to new ideas and insights* (*) and *I learn through interaction with peers* (*) (see Table 27).

There was a significant correlation between *I am open to new ideas and insights* and being mentored (***) where of those who were “Very” or “Extremely” interested in being mentored, 28 percent were open to new ideas and insights. This was the only significant correlation between being mentored and any of the learning variables.

Table 27. Correlations of learning variables by acting as a mentor/being mentored (acting a mentee).

<table>
<thead>
<tr>
<th>Learning variables</th>
<th>Acting as a Mentor</th>
<th>Being mentored (acting as a Mentee)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q.86 I am self-motivated rather than dependent on others for my motivation</td>
<td>0.01</td>
<td>-0.08</td>
</tr>
<tr>
<td>Q.87 I am an inquisitive person</td>
<td>0.23 ***</td>
<td>-0.03</td>
</tr>
<tr>
<td>Q.88 I can learn by myself</td>
<td>0.02</td>
<td>-0.11</td>
</tr>
<tr>
<td>Q.92 I like to keep up to date</td>
<td>0.16 *</td>
<td>0.07</td>
</tr>
<tr>
<td>Q.93 I am open to new ideas and insights</td>
<td>0.19 *</td>
<td>0.24 ***</td>
</tr>
<tr>
<td>Q.94 I learn through interaction with peers</td>
<td>0.16 *</td>
<td>0.03</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (1-tailed)
** Correlation is significant at 0.01 level (1-tailed)

The correlations suggest that mentees tend not to be self-motivated or inquisitive and are less likely to learn by themselves. This lends support to the importance of interaction with others and the benefits of mentoring for developing skills and behaviours as noted by Merriam (1983) and Lankau & Scandura (2002).
4.3.5: Mentoring by incentives and barriers

There was a significant correlation (**) for acting as a mentor with the incentive course content. Other incentives to acting as a mentor were desire to keep up-to-date with new knowledge and developments (*), personal interest (*), self-assessed need (*) and quality of presenter (see Appendix XXV).

Cross tabulations showed that of those who supported acting as a mentor, the incentive desire to keep up-to-date, was significant (see Table 28).

Table 28. The strength of the association between desire to keep up-to-date with new knowledge and developments as a incentive and interest in acting as a mentor (%).

<table>
<thead>
<tr>
<th>n=139</th>
<th>Interest in acting as a mentor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weak</td>
</tr>
<tr>
<td>Desire to keep up-to-date with new knowledge and developments as an incentive</td>
<td>Weak</td>
</tr>
<tr>
<td></td>
<td>Strong</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
</tr>
</tbody>
</table>

\( \chi^2=6.30 \ p=0.01 \). The strength of the association between desire to keep up-to-date with new knowledge and developments as an incentive and interest in acting as a mentor is statistically significant.

Of those who strongly supported desire to keep up-to-date with new knowledge and developments as an incentive, 21 percent also strongly supported acting as a mentor, compared with 19 percent of those who weakly supported desire to keep up-to-date with new knowledge and developments as an incentive.

Cross tabulations show that those who reported being strongly interested in being mentored also reported the incentives of opportunity to improve clinical skills and desire to keep up-to-date with new knowledge and developments as “Strong” (Tables 29 and 30).
Table 29. The strength of the association between opportunity to improve clinical skills as an incentive and interest in being mentored (%).

<table>
<thead>
<tr>
<th>n=139</th>
<th>Interest in being mentored</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weak</td>
<td>Strong</td>
<td>Total</td>
</tr>
<tr>
<td>Opportunity to</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>improve clinical</td>
<td>Weak</td>
<td>41</td>
<td>17</td>
</tr>
<tr>
<td>skills as a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>incentive</td>
<td>Strong</td>
<td>19</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>60</td>
<td>40</td>
</tr>
</tbody>
</table>

$\chi^2=8.29 \ p=0.01$. The strength of the association between opportunity to improve clinical skills as an incentive and interest in being mentored is statistically significant.

Of those who strongly supported opportunity to improve clinical skills as an incentive, 23 percent strongly supported being mentored, compared with 17 percent of those who reported opportunity to improve clinical skills as a “Weak” incentive.

Table 30. The strength of the association between desire to keep up-to-date with new knowledge and developments as an incentive and interest in being mentored (%).

<table>
<thead>
<tr>
<th>n=139</th>
<th>Interest in being mentored</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weak</td>
<td>Strong</td>
<td>Total</td>
</tr>
<tr>
<td>Desire to keep up-to-date with new knowledge and developments as an incentive</td>
<td>Weak</td>
<td>40</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Strong</td>
<td>22</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>62</td>
<td>38</td>
</tr>
</tbody>
</table>

$\chi^2=5.28 \ p<0.05$. The strength of the association between desire to keep up-to-date with new knowledge and developments as an incentive and interest in being mentored is statistically significant.

Of those who strongly supported desire to keep up-to-date with new knowledge and developments as a “Strong” incentive, 21 percent strongly supported being mentored compared with 17 percent of those who reported desire to keep up-to-date with new knowledge and developments as a “Weak” incentive.

The correlations for the significance of barriers, reported family commitments (*) as a barrier for both acting as a mentor and being mentored. Registration costs (*) were reported as a barrier for being mentored is consistent with costs as a barrier for younger practitioners to engage in CPD (see Appendix XXVI).

4.3.6: Mentor/mentee by generated factors for usefulness

There was a significant correlation between the generated factor for usefulness, use social (cluster of: One-to-one discussion with another dentist, group discussion within...
your practice and seeking advice from an experienced colleague) and acting as a mentor. Being mentored correlated significantly with the generated factors for usefulness, interactive, passive and group learning (see Appendix XXVII). This suggests that younger, predominantly female, dentists preferred interactive and collaborative activities but still found activities such as reading and listening to recordings useful activities.

The factor use passive, grouped journal reading (by yourself) and listening to audio recordings. The factor use group learning was made up of journal reading club(s) and study groups. The support for journal reading clubs as a useful activity was the lowest of all activities at ten percent “Very” and four percent “Extremely”. However, support for study groups as a useful activity was 30 percent “Very” and nine percent “Extremely”. Of those who were strongly interested in being mentored, 25 percent reported “Strong” support for study groups compared with 22 percent who weakly supported being mentored (see Table 31).

Table 31. The strength of the association between the usefulness of study groups and interest in being mentored (%).

<table>
<thead>
<tr>
<th></th>
<th>n=139</th>
<th>Being mentored</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weak</td>
<td>Strong</td>
</tr>
<tr>
<td>Usefulness of study groups</td>
<td>Weak</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Strong</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>47</td>
</tr>
</tbody>
</table>

$\chi^2=4.33 \ p<0.05$. The strength of the association of the usefulness of study groups and interest in being mentored is statistically significant.
Summary

This chapter reports the findings of a survey exploring the attitudes and behaviours to CPD of a population of practising dentists in regional Australia. The key points are summarised here in preparation for Chapter 8 which discusses these results in reference to the research framework as described in Chapter 5.

There were significant correlations among the learning activities, *hands-on workshops, one-to-one discussion with another dentist, study groups, group discussion within your practice, learn through interaction with peers and seeking advice from an experienced colleague*, and the CPD activities listed as useful and/or actually engaged. These items all include interaction and collaboration with others and these correlations lend support to the hypothesis: *Those who prefer to learn through interaction with peers are more likely to have a positive attitude to engagement in Continuing Professional Development (CPD).*

The most frequent response given for making an educational activity successful is *relevance to practice* with approximately half of all respondents across *sex* and *age of practitioner* nominating this. There was a difference within *type of practice* with half of the general practitioners and a third of the specialists nominating this as contributing to a successful activity. *Quality of presenter* was the second most frequently cited condition with between a half and a third across the spectrum of backgrounds nominating this. This is consistent with the responses to the individual questions on incentives where *course content, relevance to own practice* and *quality of presenter* had the highest response as motivational items within the response group. However, females cite *social interaction* far more than the other categories as a contributor to a successful educational activity. The dominant activities in successful learning were *peer interaction, hands-on workshops, lectures and reading. Personal time constraints* and *family commitments* were the strongest barriers to CPD.

The CPD activities reported as most usefulness were *hands-on workshops* and *lectures*. Preferred activities for developing personal knowledge are different from those for developing clinical skills. *Peer interaction* was reported by the majority of respondents for developing knowledge and skills but *hands-on workshops* was reported by more for
developing clinical skills and less so for developing knowledge. On the other hand, *lectures* were reported by a third of respondents for developing personal knowledge with very few respondents reporting their use for developing clinical skills.

Younger practitioners found the listed CPD activities very useful, particularly *group discussion within your practice* and *seeking advice from an experienced colleague*. Females, irrespective of age, tended to be more social in their learning with study groups and discussion with others more favoured than by males. However, males showed a preference for more social approaches in their learning as they aged.

*Journal reading* was the most engaged in across all age groups with *lectures* a close second. The vast majority of respondents engaged in *one-to-one discussion with another dentist* and a majority sought advice from an experienced colleague.

There were no significant differences between females and males for types of learning but females were more motivated to improve clinical skills than males. Specialists responded more positively than general practitioners did to learning by reading, listening and interaction with peers. Specialists were also more prone to engage in critical appraisal of new ideas and were generally more intellectually curious than general practitioners.

A significant difference was recorded for type of practice and usefulness of *hands-on workshops* with general practitioners and particularly solo practitioners finding these much more useful than specialists. A difference was also noted for *lectures* where general practitioners found these more useful than specialists. Solo practitioners also showed strong but not significant support for internet and online learning as compared with the other categories of practice.

Younger practitioners irrespective of *sex*, engaged the most in CPD activities and the level of engagement fell away with age. Those in group practice maintained a high level of engagement with solo practitioners the least engaged, reflecting the greater impact of costs of time away from practice. Those solo practitioners that did engage, preferred *lectures, one-to-one discussion* and *seeking advice from a more experienced colleague*. Females, irrespective of age, more than males read journals, joined study groups,
engaged in one-to-one-discussion with other dentists and sought advice from more experienced colleagues. General practitioners and particularly, solo practitioners, found hands-on workshops useful and actually engaged in these more than specialists.

The strongest incentives for usefulness and engagement were relevance to practice, quality of presenter, course content and opportunity to improve clinical skills. These were reflected particularly in the choice of hands-on workshops. Skills development was an important consideration in being mentored which accords with the earlier correlations of younger, particularly females’ interest in being mentored and improving clinical skills. As expected, costs were more of concern for younger dentists than older ones and general practitioners rather than specialists.

An incentive to engage for the younger practitioners was the opportunity to improve clinical skills as well as proximity to home. Personal interest and the number of CE credits were also significant incentives to engage in CPD. General practitioners saw proximity to home, CE credits and personal interest as incentives for CPD while the specialists were attracted by the opportunity for a working holiday. Solo practitioners were particularly encouraged by course content and relevance to own practice.

The strongest learning factor was intellectual curiosity, which grouped the items I am self-motivated, I am inquisitive, I like to keep up to date and I am open to new ideas and insights. Younger males were consistently more strongly in agreement with questions as self-descriptions than younger females. For the older age group, intellectual curiosity in males seems to wane to approximately a third in agreement. Older females maintained their level of intellectual curiosity to that of younger females. Specialists were more intellectually curious than general practitioners were and this was reflected in the relationship between specialists and acting as a mentor where it is predicted that specialists will make good mentors.

There was very strong support for a mentoring programme with 86 percent of respondents in favour. The older practitioners, that is, the over 50 year olds, were supportive of acting as a mentor while younger practitioners welcomed the idea of such a programme with significant support to being mentored. This is consistent with how younger dentists in particular, found group discussion and seeking advice from
colleagues very useful and the significantly greater support from females who also report a preference for one-to-one discussion with another dentist. Being mentored was also significant for improving clinical skills. This reflects the preference within the younger age group, of females more so than males, for improving clinical skills.

Acting as a mentor correlates significantly with course content, quality of presenter, relevance to own practice and personal interest as incentives. Acting as a mentor had the strongest support from the specialists. The features for a successful mentor programme were communication and collaboration with a trusting relationship between mentor and mentee.

Cross tabulations for registration costs as a barrier and age of practitioner recorded the 25-29 age group expressing the strongest concern. Two-thirds of dentists in this age group reported registration costs a very to extremely strong barrier to CPD. Overall, almost all respondents in the younger age group and three-quarters of the older age group expressed concern over costs. There was little difference between males and females in the older age group with a slightly higher proportion of males than females in the younger age group. Correlation tables for type of practice reported a significant difference between general practitioners and specialists for the barrier costs, with this being a greater concern for general practitioners.

Family commitments were a significant concern for the over 50 age group. Cross tabulations for barriers to CPD reported no significant differences between males and females (see Table 6). This finding differs from the literature where family commitments has been reported as a concern for female dentists (Australian Research Centre for Population Oral Health, 2011).

The next chapter reports the findings of the survey respondents to attitudes to updating the components of dental practice as well as the findings on attitudes to accreditation.
Chapter 7: Results Part B: Areas of Need and Attitudes to Updating and Accreditation

As reviewed in Chapter 3, one of the functions of CPD is updating knowledge and skills in both existing and new areas of practice. This chapter reports the findings of the survey respondents in two parts. Firstly; attitudes to updating the components of dental practice and secondly; attitudes to accreditation.

Part 1: Areas of Need for Updating

1.1: Areas of professional practice
Technical skills were reported as most in need of updating with almost two-thirds of the response group reporting this skill. Communication skills were reported as the least in need at less than a third of respondents (Figure 7). Communication issues were considered important or very important by 97 percent of dentists in a European survey (Woelber, Deimling et al., 2012) and recent reports from Australia show the lack of communication is responsible for over 40 per cent of complaints against dentists (Fricker, 2013). The relatively low self-assessment of the need for updating communication skills amongst Australian dentists is a concern and the implications of this finding are discussed in Chapter 8.

Figure 7. Frequency of “Yes” responses by practice area, in response to being asked if a professional practice area needs updating.
The responses for areas of need in diagnostic and treatment planning skills and procedural skills for the different subjects within the practice of dentistry are reported in Table 32 (see Glossary page 228 for a description of these subjects).

For self-reporting of the need to update diagnostic and treatment planning skills, almost two-thirds of the respondents expressed the need to update oral pathology/oral medicine. Approximately half reported the need to update these skills in implantology and pharmacology.

Table 32. Percentages of Yes responses for updating areas of dental practice.

<table>
<thead>
<tr>
<th>Subject or discipline</th>
<th>Need to update own diagnostic and treatment planning skills</th>
<th>Need to update procedural skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaesthetics and sedation</td>
<td>25 Yes</td>
<td>19 Yes</td>
</tr>
<tr>
<td>Business management</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Communication Skills</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>CPR</td>
<td>22 Yes</td>
<td>25 Yes</td>
</tr>
<tr>
<td>Crown and bridge</td>
<td>30 Yes</td>
<td>32 Yes</td>
</tr>
<tr>
<td>Cross infection control</td>
<td>16 Yes</td>
<td>12 Yes</td>
</tr>
<tr>
<td>Dental anomalies</td>
<td>36 Yes</td>
<td>17 Yes</td>
</tr>
<tr>
<td>Dental materials</td>
<td>37 Yes</td>
<td>21 Yes</td>
</tr>
<tr>
<td>Dento-legal matters</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Dento-alveolar surgery</td>
<td>27 Yes</td>
<td>30 Yes</td>
</tr>
<tr>
<td>Diagnosis &amp; treatment planning</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Endodontics</td>
<td>39 Yes</td>
<td>44 Yes</td>
</tr>
<tr>
<td>Implantology</td>
<td>47 Yes</td>
<td>42 Yes</td>
</tr>
<tr>
<td>Oral pathology/oral medicine</td>
<td>62 Yes</td>
<td>33 Yes</td>
</tr>
<tr>
<td>Orthodontics</td>
<td>29 Yes</td>
<td>19 Yes</td>
</tr>
<tr>
<td>Paediatric dentistry</td>
<td>26 Yes</td>
<td>27 Yes</td>
</tr>
<tr>
<td>Periodontology</td>
<td>28 Yes</td>
<td>28 Yes</td>
</tr>
<tr>
<td>Pharmacology</td>
<td>48 Yes</td>
<td>25 Yes</td>
</tr>
<tr>
<td>Radiology/radiography</td>
<td>31 Yes</td>
<td>22 Yes</td>
</tr>
</tbody>
</table>

For updating procedural skills, the highest reported need for updating was for endodontics and implantology with approximately half reporting a need. Implantology reported a similar response for updating diagnostic and treatment planning skills as procedural skills.
The need for updating in the topics of implantology and endodontics are consistent with the findings of Hopcraft, Manton et al. (2010) who reported these subjects as most in need of further CPD by a cohort of practising dentists in Australia.

1.2: Areas of need by sex
The overall responses were further scrutinised for any variations between males and females. Females more than males see the need to update their technical skills and cross tabulations for sex and age of practitioner show that this is consistent across both younger and older dentists (see Appendix XXVIII). Within type of practice, general practitioners more than specialists report the need for updating technical skills. These differences are discussed in the next chapter with regard to the changing nature of dental practice.

There is a significant difference between males and females on the need for updating communication skills (**) with males (38 percent) expressing a greater need to update than females (17 percent). Cross tabulations of sex and age of practitioner for updating communication skills shows a greater proportion of males in both the less than 50 year old and equal or over 50 year old age groups reporting a need to update communication skills (see Appendix XXIX).

1.3: Areas of need by age of practitioner
Older dentists (62 percent) expressed a greater need than younger dentists (46 percent) for updating theoretical knowledge which is consistent with the recognition that the body of knowledge which forms the basis of professional work is continually developing and expanding with a limited “shelf life.” Younger dentists (57 percent) express a greater need than older dentists (43 percent) for updating technical skills which is consistent with the time required to develop these skills in conjunction with phronesis. Older dentists (58 percent) also express a greater need than younger dentists (46 percent) to update business skills.

Part 2: Attitudes to updating

2.1: Attitude to updating diagnosis and treatment planning skills by sex
Females reported a higher need than males with a ten percent or more difference in the Yes in the reported need for updating diagnostic and treatment planning skills in the
areas of crown and bridgework, orthodontics, dental anomalies, dental materials and paediatric dentistry, irrespective of age. The responses for crown and bridgework, orthodontics and dental materials is consistent with a greater proportion of females expressing a need to update technical skills. Males showed an 11 percent higher Yes response rate in the need for updating diagnostic and treatment planning skills in radiology/radiography. Males make up a higher proportion of the older practitioners who express a greater need for updating oral pathology/oral medicine. Radiology is a diagnostic tool in oral pathology/oral medicine, which indicates consistency of the responses.

2.2: Attitude to updating diagnosis and treatment planning skills by age of practitioner
There was a significant difference across age groups for the need to update diagnostic and treatment planning skills in implantology, orthodontics, and pharmacology. The most significant was implantology (**), where the older practitioners reported little need to update their diagnostic and treatment planning skills and two-thirds of the younger dentists reported a need to update their diagnostic and treatment planning skills. Cross tabulations controlling for sex and age of practitioner showed that there was little difference between males and females in both the older and the younger groups and therefore age contributed over and above sex (see Appendix XXX).

Dento-alveolar surgery also showed a difference across age groups with two-thirds of the most recent graduates expressing a need to update their diagnostic and treatment planning skills. Cross tabulations controlling for sex and age of practitioner showed that females (36 percent) and males (30 percent) in the less than 50 year old age group were similar. No females and a quarter of the males in the older age group expressed the need to update their diagnosis and treatment planning skills in dento-alveolar surgery with little difference between males and females in the younger age group (see Appendix XXXI).

Orthodontics was similar (**); the older practitioners saw little need to update skills while half of the 30-34 age group and almost half of the 25-29 age group expressed a need to update their diagnostic and treatment planning skills in orthodontics. Cross tabulations controlling for sex and age of practitioner showed that sex and age were
factors with a higher proportion of females in the younger age group but similar proportions of males and females in the older group (see Appendix XXXII).

Cross tabulations showed little difference between males and females in the younger age group but just over half of the males and almost all of the females in the older age group expressed a need to update diagnostic and treatment planning skills in oral pathology/oral medicine, suggesting this was both age and sex related (see Appendix XXXIII). This is consistent with the earlier report for oral pathology/oral medicine and different age groups.

The need to update diagnostic and treatment planning skills in pharmacology was significant but with a reverse trend from those above. The most recent graduates expressed the least need to update with a trend increasing to very strong as the practitioner aged. This suggests that recent graduates feel that they are well prepared in these areas and that there is a need for providers of CPD to target pharmacology to the older practitioners. 60 percent of those in the older age group expressed a need to update pharmacology with 38 percent of in the younger age group expressing a need to update pharmacology (see Appendix: XXXIV).

2.3: Attitude to updating procedural skills by sex
With regard to updating procedure skills, there were significant differences between males and females in self-reported need to update crown and bridge (**), dento-alveolar surgery (*) and paediatric dentistry(*).

The response for crown and bridge were females (45 percent) males (24 percent); for dento-alveolar surgery, females (40 percent) males (23 percent) and for paediatric dentistry, females (36 percent) and males (21 percent) reporting a need to update procedural skills. In addition there was a large difference between females and males for updating procedural skills in periodontology with females 36 percent and males 21 percent. Cross tabulations controlling for sex and age of practitioner showed that this was both sex and age related with older females reporting a greater need to update in crown and bridge and dento-alveolar surgery (see Appendices XXXV and XXXVI). However, for updating paediatric dentistry, sex and age of practitioner were factors in a
different direction with a much higher proportion of females in the younger age group reporting a need to update, than the older age group (see Appendix XXXVII).

2.4: Attitude to updating procedural skills by age of practitioner
There were significant differences in the reported needs to update procedural skills across age groups of practitioners for implantology (**), orthodontics (**), and paediatric dentistry (*). For implantology, 46 percent in the younger group with 33 percent in the older group. For orthodontics, 25 percent in the younger group and 11 percent in the older group and for paediatric dentistry, 36 percent in the younger group and 16 percent in the older group. Cross tabulations controlling for sex and age of practitioner supported the previous cross tabulations for these subjects (see Appendices XXXVIII and XXXIX) with sex contributing over and above age within the younger age group.

Part 3: Attitudes to accreditation
The following questions from the survey reported attitudes to accreditation.

Q58: Providers of conferences, courses and clinical days etc., should be accredited by an appropriate authority
Q59: Conferences, courses and clinical days should be weighted with CE credits
Q60: CE credits should be used as evidence of professional competence for re-registration

The responses were rated on a five point Likert Scale with a positive agreement across the three individual questions and the majority of responses in the “Agree” or “Strongly Agree” category. A higher proportion of males than females in the younger age group agreed that CPD providers should be accredited. The reverse was reported for the older age group (see Appendix XL).

3.1: Attitudes to accreditation by sex and age of practitioner
For Question 59, cross tabulations reported little difference between males and females. There was a difference between the older and younger age groups where the vast majority of the younger dentists (82 percent) and two-thirds (66 percent) of the older dentists supported the weighting of CPD with credits (see Appendix XLI). Cross tabulations for Question 60 confirms a majority in favour of CE credits being used as
evidence of professional competence with little difference between age groups or sex (See Appendix XLII).

However, the response to Question 61, *Would you attend a course or programme that did not distribute CE credits*, reported a very strong agreement with the overwhelming majority (84 per cent) responding *Yes*, which seems at odds with the strong positive agreement to accreditation. Cross tabulations controlling for *sex* and *age of practitioner* report difference between older and younger dentists as well as males and females. Just over half the older dentists responded *Yes* with more than three-quarters of the younger dentists responding *Yes*. Within the older age group, a higher proportion of males responded *Yes* while in the younger age group, a higher proportion of females responded *Yes*. Here both *sex* and *age* are controlling factors (see Appendix XLIII).

The factor, *extrinsic professional development* grouped the *need to mitigate risk of litigation, proximity to home, number of CE credits and self-assessed need*, from the list of incentive variables. There was a strong negative correlation between *extrinsic professional development* and attendance at a course or programme that did not distribute CE credits (**). That is, those who are extrinsically motivated would likely not attend a programme without CE credits. Correlation of factor *accreditation* and *extrinsic professional development* was also significant and supports the above (**).

The variable, *motivation to attend without CE credits* was created to measure attitude to *accreditation* by matching the *Yes* responses in Question 61 to the written responses in Question 62. The written responses were examined as to the reason for attendance and were categorised as positive learning, and holiday. For example:

[I would attend] *If I thought the course had a valuable learning opportunity.* (Male general practitioner < 50 yo)

Or: *location; tax deductible holiday.* (Male general practitioner ≥ 50 yo).

Overall 70 percent of the response group reported attendance for positive learning reasons.
Summary

The self-reported area of greatest need for updating components of dental practice was *technical skills* while the lowest reported need was for *communication skills*. A closer scrutiny of the responses shows that males report that they are more in need of updating their *communication skills* than females.

The area of greatest reported need for *updating diagnosis and treatment planning skills* was for *oral pathology/oral medicine* with almost two-thirds of all respondents reporting a need to update and older dentists regarding this as more important than younger dentists.

Younger dentists see a greater need to *update technical skills* than older dentists. There were significant differences in the needs to update procedural skills across ages of practitioners where the recent graduates (younger dentists) expressed a greater need to update their procedural skills. Cross tabulations were conducted to control for *sex* and *age of practitioner* and within *crown and bridge* there was little difference between males and females in the younger group but three times the proportion of females (41 percent) compared with males (13 per cent) in the older age group. For *dento-alveolar surgery*, *sex* was the main influence with half the females and a third of the males in the younger group expressing a need to update in this area.

There was general agreement for the *accreditation and weighting of CPD activities* but these were not the primary reasons for choosing a CPD activity.

The next chapter is a discussion of these findings from this and the previous chapter, in the context of Australian professional dental practice.
CHAPTER 8: DISCUSSION OF FINDINGS

This chapter examines the findings described in the previous chapters in light of the literature reviewed in Chapters 2 and 3 and the implications for advancing CPD in dentistry. The cornerstone of this discussion is an understanding of the effectiveness of CPD with an underlying hypothesis of:

*Those who prefer to learn through social interaction and/or collaboration with others are more likely to have a positive attitude to engagement in Continuing Professional Development (CPD).*

“There is very little of any type of evidence to support the effectiveness of CPD in improving the performance of the oral health team” (Best, Eaton *et al.*, 2005a, p.71). This rather alarming conclusion from a UK review of CPD in dentistry presents a challenge to CPD providers to offer effective CPD, not only for dentistry and the other health professions, but for all professions. An effective learning experience relates to the development of knowledge and skills and the application of these to problems faced by practising professionals (du Boulay, 1999).

I introduce this chapter with a summary from the literature of the purpose of CPD. This is followed by a discussion of my findings on effective CPD from a learner’s perspective and the extent of engagement in CPD. Connecting the concepts of adult learning then leads to a discussion of what learners want from providers of CPD, strategies for the delivery of CPD, and the predictability of CPD outcomes.

I continue with a wider consideration of issues identified in the literature and from my findings, with reference to the changing face of dental practice in Australia, particularly feminisation. The chapter finishes with a discussion of professionalism and policy issues with particular attention to preparing for clinical practice.

The purpose of CPD

The Dental Board of Australia (DBA), under the umbrella of the Australian Health Practitioner Regulation Agency (AHPRA), has described good practice as maintaining and developing knowledge, skills and professional behaviour throughout a
professional’s working life to ensure competence (Dental Board of Australia, 2010a pp.9-10) (italics inserted). CPD is the declared means by which dentists keep up-to-date and is a professional responsibility for all practising dentists (Dental Board of Australia, 2010b; Sambrook, Thomson et al., 2001).

The DBA recognises that dentists’ qualifications that lead to registration provides the foundation knowledge required to practise all parts of dentistry. Dentists can then access and adopt new techniques through the process of CPD to build on their foundational knowledge. CPD should also provide experience in the technique or procedure (Dental Board of Australia, 2014).

The DBA code of conduct for registered health practitioners cites the National Law requiring practitioners to undertake CPD (Dental Board of Australia, 2010a) and complete a minimum of 60 hours of CPD activities over a three-year period (Dental Board of Australia, 2011, p.1). Professionals are expected to maintain a log of their CPD activities, which may be subject to an audit in the event of a complaint. Any dentist who is the subject of the complaint is obliged to provide evidence of participation in any course or activity which features in this log.

However, while mandating CPD may increase the exposure of less committed practitioners to current knowledge and practice, there is little evidence to support mandatory CPD as effective in improving practice performance (Winslade, Tamblyn et al., 2007). It would seem that realising the potential of CPD as a learning experience in the health professions has been eclipsed by the mandating of CPD.

This thesis challenges current understanding of CPD and promotes ways to think differently about CPD. The challenge is to provide effective CPD that is dependent on the development and achievement of learning outcomes geared to change. Effective CPD addresses practitioners’ learning needs to enhance or confirm dentists’ behaviour in conducting clinical practice commensurate with contemporary standards and professional expectations.
Effectiveness of CPD

Best practice CPD is directed towards particular learning outcomes, with the target audience understanding the purpose of the activity and the activity responding to learners’ individual needs. It is not sufficient to know what up-to-date practice is; practitioners also need to reflect on existing practices and pursue targeted new learning appropriate to identified learning needs. Furthermore, practitioners need to be motivated to apply new learning to their own practices to improve standards of care for all patients.

In the review of the literature (Chapters 3 and 4), I identified features of CPD which contribute to its effectiveness. The literature supports the incorporation of adult learning principles within a social learning framework into CPD. As a result, CPD for dentists in Australia can be conceptualised as engaging in adult learning over a lifetime of practice.

Arising from my research I have posited that effectiveness of CPD is a product of the usefulness of, and engagement in a CPD activity matched to the learning preferences of the individual undertaking CPD.

Critical to the effectiveness of CPD leading to a learning outcome is identifying learners’ needs. For the purposes of developing a framework for the delivery of CPD (see next chapter), learners’ needs can be categorised as described in Chapter 5 as theoretical knowledge, technical skills, diagnostic skills, communication skills and business skills.

Theoretical knowledge includes updating the knowledge base of a profession whereas technical skills includes the procedures necessary in carrying out the science and art of a profession. All professions require sound judgement, problem solving and diagnostic skills in these areas. These attributes contribute to practical wisdom, described as phronesis (see Chapter 4).

Learners’ needs and characteristics have been categorised within the demographics of sex, age of practitioner and type of practice. My findings show little difference overall between females and males as to learner needs but a practical difference between females and males for learning characteristics (see Table 9, Chapter 6). Females prefer
social learning more than males. The differences in age groups relate more to learning needs than learning characteristics. Younger practitioners need updating *technical* and *diagnostic skills*, which is consistent to developing phronesis. Older practitioners need regular updating on *theoretical knowledge*. 

**Effectiveness of CPD from a learner’s perspective**

The effectiveness of CPD is dependent on achieving learning outcomes geared to change in behaviour. Effective CPD also seeks to enhance or confirm dentists’ behaviour in clinical practice (Suomalainen, Karaharju-Suvanto *et al.*, 2013). That is, effectiveness implies success in skills transfer. Practitioners need to be able to take new ideas or procedures that have been learnt during CPD (that is, off the job) with them, back to the workplace. However, because one cannot assume that learning has occurred at a CPD event, the responsibility for the effectiveness of CPD lies with the learner (Eraut, 2001b).

Just over half the respondents in this study agreed or strongly agreed that *self-assessed need* was an incentive to engage in CPD (see Table 5, Chapter 6). This is encouraging as self-assessment has been identified by others (Redwood, Winning *et al.*, 2010) as “the missing link” for the effectiveness of CPD and implies a comprehensive system of ongoing monitoring of learning over a lifetime of practice.

**Usefulness of CPD activities**

Analysis of the usefulness of different CPD activities (see Table 7, Chapter 6), reveals that *hands-on workshops* are perceived as the most useful, followed by *lectures*. In addition, the vast majority of respondents reported the activities of *seeking advice from an experienced colleague, one-to-one discussion with another dentist* and *group discussion within your practice* as useful. A mentoring programme, discussed later, involves these activities and is consistent with the strong support from the respondents for such a programme.

The findings for *hands-on workshops* and *lectures* from my survey differ from the results of a survey of practising dentists in the UK (Davidson, Smith *et al.*, 2008). These authors report that *lectures* were more effective than *hands-on courses*. However, the effectiveness of lectures is discounted by others who report that *lectures* are the least
effective education method involving, as they do, didactic teaching and distributed print material (Forsetlund, Bjorndal et al., 2009; Hays, Lockhart et al., 2015). Lectures have been criticised for their tendency to be a one-way transmission of information rather than being learner-centred (Davis, O'Brien et al., 1999).

However, lectures are not necessarily one-way transmission. Lectures can be an effective CPD activity when the lecturer is engaging and there is an opportunity to ask questions. Indeed, perceptions about the lecturer/presenter/facilitator of any CPD activity will influence the effectiveness of that activity as well as the self-reporting of perceived usefulness. As explained by Gokhale (1995), it is the presenter who motivates learners and manages meaningful learning experiences.

**Extent of engagement in CPD activities**

*Journal reading* was reported as the most engaged in of any activity, with *lectures* the next most supported (see Table 8, Chapter 6). However, this is not to say they are necessarily the most effective approach to CPD. The popularity of *journal reading* and *lectures* may simply reflect their ease of access. For example, membership of the ADA includes six editions of the *Australian Dental Journal* (ADJ).

*Hands-on workshops* were engaged in by two-thirds of the respondents regardless of *sex, age of practitioner or type of practice*. This is somewhat lower than expected as *hands-on workshops* were reported as the most useful of CPD activities with 52 percent of respondents recording this as “Extremely useful” (see Table 7, Chapter 6). The lower expected rate of engagement may be a reflection of their lack of availability, as well as other barriers discussed later in this chapter.

The majority of all dentists reported that they engaged in *one-to-one discussion with another dentist* and *seeking advice from an experienced colleague* with the highest level of engagement within the previous six months by the under 50 year old age group. This is relevant to a consideration of the support that may be offered by practitioners for a mentoring programme, as discussed further in a later section of this chapter.
Incentives and barriers to engagement in CPD

Motivation for learning as well as the ability to learn are crucial prerequisites if one is to engage in CPD as a lifelong learner (Cartney, 2000; Knapper & Cropley, 1985).

The strongest incentives for engaging in CPD (see Table 5, Chapter 6) were Course content, relevance to practice, opportunity to improve clinical skills and quality of presenter. Course content and relevance to practice were explored as separate items as course content may spark general interest without necessarily being relevant to practice. For example, specialist maxillo-facial surgeons may have an interest in a lecture on orthodontics, though it is not relevant to their own day-to-day practice. Relevance to practice has also been identified by others as an incentive to engage in CPD (Abbott, Burgess et al., 2010; Best & Brearley-Messer, 2001; John & Parashos, 2007).

The incentives to engage in CPD can vary for each individual, and may involve a desire to keep up to date or a general inquisitiveness for new ideas, for example. Incentives were explored further by way of open-ended questions, which asked dentists to reflect on a CPD programme that had produced a valued learning outcome for them. The variety of themes revealed in these written responses supported the already identified themes of relevance to practice and quality of presenter, and added social interaction as a strong incentive.

For example, one comment was:

The most important part of a dental conference is the interaction with the other dentists that I have met over many years. I maintain that more is learnt during the coffee breaks when we discuss common problems. If the lecture programme is good then that is a bonus. (Male general practitioner, age ≥50 years old)

My research found that relevance to practice was the strongest condition for a successful activity for approximately half of all respondents. A third of the specialists and half of the general practitioners also indicated that this relevance was an important condition for a successful activity. The quality of the presenter was an incentive for the majority of the younger age group and females. However, females (36 percent) saw social interaction as a greater incentive than males (21 percent) (Table 11, Chapter 6).
Almost two-thirds of the response group reported a need to update their technical skills (see Figure 7, Chapter 7), which is consistent with opportunity to develop clinical skills (which in dentistry have a technical component) as “Very” or “Extremely” motivational for CPD (see Table 5, Chapter 6).

Integral to the notion of effectiveness of CPD is the idea that barriers to engagement need to be overcome, along with the barriers to implementing the new knowledge or skills in practice. The survey findings showed that family commitments, personal time constraints and costs were the strongest discouraging factors.

This is consistent with Firmstone, Bullock et al. (2004), who report the main barriers to attendance in a cohort of UK dentists were costs and time constraints. Barriers to implementation of new knowledge included costs to patient and personal or staff issues, including resistance to change from other dentists in the practice. Insufficient evidence of benefits from the change was also a barrier to implementation.

Family commitments have been reported elsewhere as a particular concern for women (Ayers, Thomson et al., 2008; McKay & Quinonez, 2012) but my results show no significant difference between males and females. This suggests a cultural shift as the profession becomes more feminised, with more of a shared role in parenting and the use of third-party childcare becoming more prevalent. This is consistent with AlSharif et al., (2012), who reported in an Australian study that just over half of their respondents thought that childcare should be shared by both parents. These authors suggest that younger dentists will take a different approach from their predecessors to their professional life and work-life balance. It is also consistent with Robinson (2014), who reported that young dentists in Australia recognise the challenges of time constraints in achieving a work-life balance and have a shared responsibility with partners for child care.

The extent of engagement in CPD activities also reflects the availability of a particular activity. In Australia, lectures are generally more readily available than hands-on workshops, especially for those living outside the state capitals. Lectures are less expensive to run than hands-on workshops, both in terms of unit cost and in terms of marginal cost. That is, it costs very little to enrol more delegates in a lecture programme.
apart from the catering. Indeed, the unit costs go down with more participants whereas *hands-on workshops* generally require a pre-determined set of consumables per delegate or participant. Younger dentists need access to hands-on programmes to enhance their technical skills generally and established dentists need these to enhance their skills in more complex procedures such as *implantology*.

Currently the provision of hands-on activities is generally limited to metropolitan centres where CPD opportunities are provided by universities and professional organisations. This leads to increased challenges for dentists in regional areas, such as the cohort of practitioners in this survey. Through the tyranny of distance, these practitioners face additional costs for travel and accommodation in addition to registration costs, which act to further reduce engagement in CPD.

*Costs* of engagement as a barrier to CPD were understandably a greater concern for recent graduates, who are likely to be carrying considerable debt. Costs were a greater barrier to engaging in CPD for general practitioners compared with specialists. These findings are consistent with the perceived barriers to engagement in CPD experienced by dentists in the UK (Firmstone, Bullock *et al.*, 2004) where the main constraints were found to be cost and time. Cost barriers were also reported as greater for (UK) general practitioners than specialists (Firmstone, Bullock *et al.*, 2004).

**Connecting the concepts of adult learning**

This section connects the concepts of adult learning arising from the review of the literature (see Chapter 3). The exploration of these connections provides a link to the next section, which discusses the findings on what learners want from providers of CPD.

Adult learning principles posit that adults are active agents in their own learning and need to feel personally responsible for their learning. Adults need learning to be immediately relevant, no matter whether the emphasis is on acquiring new knowledge, information, skills, or abilities. Adults are also seen to possess a greater store of experiences to reflect on than children do, and to be more likely and able to engage in meaningful reflection. To learn is to interact with the wider social context and
professional environment, and includes the process of re-affirming, reorganising and reintegrating one’s previous experiences throughout life.

The literature supports the idea of CPD as a learning process, incorporating adult learning principles within a social learning framework. A framework for the delivery of CPD, described later in this chapter, caters for all practitioners, from novices to mature clinicians. It also accommodates a range of structured activities such as lectures or hands-on workshops. In addition, it caters for the practitioner learning in the workplace, such as in a formal mentor programme.

Social learning theory recognises that adults actively participate in the process of learning. Adults are independent thinkers, constructing their own knowledge in response to the environmental inputs of culture, habits and customs of the community in which they participate. CPD is more than a question of specifying taught courses for defined core skills but a matter of developing the all-round potential of the individuals concerned as a process of lifelong learning (Belfield, Morris et al., 2001). As Jarvis (2004) argues, learning is an existential process through the whole of life.

What do learners want from a provider of CPD?

Areas of need were categorised into the components of practice, knowledge and technical skills. Technical skills were reported as most in need of updating with almost two-thirds of the respondents nominating this. Half the respondents nominated theoretical or knowledge skills with communication skills nominated as the least in need of updating.

Nearly two-thirds of the respondents nominated oral pathology/oral medicine as the discipline in need of updating and half the respondents nominated pharmacology. The latter was regarded as more in need of updating by older dentists, with little difference between males and females.

The significance of these findings relates to the practice of dentistry in the wider context of oral health maintenance and dentists as oral health physicians. For example, the incidence of oral cancer is increasing and dentists as oral health physicians have a greater responsibility in early diagnosis and thus successful treatment of this disease.
This study showed that overall, the need to update technical skills was high with a greater proportion of females and younger respondents reporting this need. In particular, implantology, orthodontics and dento-alveolar surgery were in need of updating, which implies a rising demand for hands-on courses and workshops in these more complex areas of dentistry (see Table 22, Chapter 6).

**Figure 8.** © John Fricker Graphic representation of a dental implant made up of an artificial root of titanium secured into the bone of the jaw and capped with a crown of porcelain. The placement of implants involves enhanced knowledge and skills in dento-alveolar surgery, periodontics and crown and bridge work.

Implantology, endodontics, and crown and bridgework have also been reported as the preferred disciplines for updating amongst the majority of general dental practitioners by others in Australia and overseas (Abbott, Burgess et al., 2010; Bullock, Butterfield et al., 2000; Chan, Ng et al., 2006; Hopcraft, Manton et al., 2010). In contrast to my findings, the need to update oral pathology/oral medicine or pharmacology was not reported in the literature.

Implantology endodontics, and crown and bridgework all require advanced technical skill. That respondents identify these as areas of need for updating is consistent with a dentist’s motivation to be a “better dentist”. In particular, dental implantology has evolved to become a highly technical and multidisciplinary branch of dentistry, which
requires constant updating of knowledge and clinical competence in *dento-alveolar surgery, periodontics* and *crown and bridgework* (Figure 8). Dental implants are predicted to occupy a significant part of general practice as the population ages and retains their dentition (Davidson, Smith *et al.*, 2008).

These results are consistent with Ucer, Botticelli *et al.* (2014), who expressed concern that dentists are underequipped to carry out the full spectrum of implant dentistry expected in a modern general practice. These authors suggest that CPD in implantology is needed irrespective of whether it is taught in the undergraduate curriculum or as part of formal postgraduate education or training.

**Learning characteristics**

The results (Table 3, Chapter 6) show that the most strongly supported learning characteristic was *I learn from hands-on* with 53 percent “Agree” and 44 percent “Strongly agree”. The nomenclature *hands-on* in dentistry implies a tactile learning activity, one that involves touching or holding, as a procedure is learned. Hands-on learning in dentistry is thus a kinesthetic learning characteristic. Cross tabulations for *I learn from hands-on* with *sex* and *age of practitioner*, show that the majority of practising dentists are hands-on learners irrespective of *sex* or *age of practitioner* (see Table 4, Chapter 6).

The strong preference for *learning from hands-on* is consistent with the findings of others (John & Parashos, 2007; Leggate & Russell, 2002; Mercer, Long *et al.*, 1998). Reports by Best, Eaton *et al.* (2005b) and Abbott, Burgess *et al.* (2010) on participation of dentists in CPD overseas and in Australia, record that there is an unfilled demand for activities with a hands-on component.

The findings reported in Chapter 6 showed the preference for *I learn through interaction with peers* recorded 56 percent “Agree” and 27 percent “Strongly agree”. Engagement in related social learning activities was very high with 84 percent of the respondents engaging in *one-to-one discussion with another dentist* and 77 percent reporting engaging in *seeking advice from an experienced colleague* (see Table 8, Chapter 6).
The significant correlation between one-to-one discussion with another dentist and I learn from hands-on supports the notion of hands-on learning in dentistry as a collaborative and interactive activity (see Appendix: XI). Such correlations support the idea of effective CPD delivered via a mentor/mentee relationship. These findings corroborate the arguments made by other authors outside dentistry (see Chapters 3 and 4) that engagement in educationally related peer discussions is the strongest predictor of learning in adults and the source of greatest practical importance (Lundberg, 2003; McGettigan, Golden et al., 2001).

My results suggest that the vast majority of respondents did not gain from reading and listening and were not passive learners. Although desire to keep up to date with new knowledge and developments correlated significantly with journal reading, the low preference for learning by listening suggests limitations to lectures which take the form of one-way transmission as effective learning activities. Audio recordings or video streamed lectures likewise severely limit the opportunity to engage with a presenter.

**Awareness of learning characteristics as a function of demographics.**

The preference for learning by social interaction exhibited the largest difference as a function of the independent variables (sex, age of practitioner and type of practice), with almost twice as many females (36 percent) as males (21 percent) nominating this as a condition for successful CPD. Females also expressed preference for one-to-one discussion with another dentist (females 51 percent, males 39 percent “Extremely useful”) and seeking advice from an experienced colleague (females 57 percent, males 40 percent “Extremely useful”), (see Table 9). This is consistent with Hartley and Turvey (2002) who reported that females are far more likely to engage in reading groups than males and illustrates the influence of informal CPD activities on learning (Eraut, 2011).

Females were more receptive to being mentored than males. More than a third of females (36 percent) expressed a strong or extremely strong interest in being mentored compared with 13 percent of males. A significant difference was also noted between the sexes for opportunity to improve clinical skills as an incentive to engage in CPD, with more females than males supporting this. This is both a sex and age of practitioner related association with sex contributing over and above age. Older (predominantly male) practitioners supported acting as a mentor.
For developing knowledge, peer interaction was rated the most utilised irrespective of sex, age of practitioner or type of practice. Lectures were rated next with a third of females and a quarter of the groups within, age of practitioner or type of practice (see Table 19, Chapter 6). The responses to the usefulness of lectures supports lectures in developing knowledge, with 87 percent of respondents describing lectures as very or extremely useful activities.

For developing clinical skills, peer interaction (see Table 20, Chapter 6) was the most nominated activity but with variations as a function of sex, age of practitioner and type of practice. Just over half the younger dentists (up to 50 years of age) and more than three-quarters of the older dentists (equal or more than 50 years of age) nominated peer interaction as most utilised as did three-quarters of the general practitioners but less than a fifth of the specialists.

Hands-on workshops were also reasonably well supported for developing clinical skills with a third of the females, younger dentists and general dentists nominating this as an important activity. This is consistent with more females in the younger group and younger dentists reporting a need to improve clinical skills.

Content for CPD
The area of greatest reported need for updating diagnosis and treatment planning skills was for oral pathology/oral medicine, with almost two-thirds of all respondents reporting a need to update. Almost half the respondents reported a need to update pharmacology with little difference between males and females. Older dentists (62 percent) more than younger dentists (46 percent) reported a need for updating these knowledge-based subjects of oral pathology and pharmacology. This is consistent with the recognition that a body of knowledge has a limited “shelf-life and is rapidly changing in response to extensive research over recent decades.

Younger dentists need access to hands-on programmes to enhance their technical skills and established dentists need these to enhance their skills in more complex procedures such as implantology. However, as discussed earlier, the barriers of costs are the greatest for younger dentists.
In order for CPD to be truly effective in developing and enhancing clinical skills for all practising dentists, the barriers to hands-on activities need to be reduced. One can speculate on subsidies from dental companies as sponsors for hands-on programmes, but there is always the concern that sponsors “push” their own product rather than being evidence-based.

There was a large difference in responses between general practitioners and specialists in the need for developing technical skills, with general practitioners reporting a greater need than specialists. This difference is possibly related to the fact that specialists have been recipients of training programmes leading to specialist recognition whereas general practitioners have not. It is during these intensive programmes that specialists develop their clinical/technical skills before being admitted to restricted practice and therefore they have less (but not nil) need to update these skills through any activity after entering specialist practice.

The responses to the needs for updating components of dental practice highlighted differences between the sexes and between older and younger dentists. Females generally asked for updating on technical elements as did the younger dentists. The fact that there were more females in the younger age groups potentially confounds this, but controlling for sex and age of practitioner confirmed this as a sex related factor over and above age.

These preferences are a reflection of the older dentists’ loss of knowledge as the number of years increase from their knowledge base at graduation compared with technical skills that tend to improve with the years of practice. For the younger dentists, this knowledge base is still fresh but the need for advanced technical skills is apparent. These differences emphasise the need to design CPD programmes to accommodate the varying learning needs within the practising profession.

**Strategies for CPD: What are the options?**

The majority of CPD provision in Australia is arranged by universities and professional bodies under the banner of a conference or congress. These educational meetings generally include lectures and/or hand-on workshops. Other strategies for successful CPD identified in this research are study groups and mentoring.
A review of national conferences of the ADA and RACDS and the Australian Society of Orthodontists (ASO) over the last ten years shows that lectures dominate the majority of CPD for dentists in Australia (see Appendix XLIV). A criticism of lectures is that the content is limited to the lecturer’s choice of topic and any deviation from the topic through questions from the audience is limited in order to cover the planned material within the allotted time (Rutel, 2011). However, lectures do have the potential to clarify concepts, promote problem solving and challenge attitudes when effort is made to engage learners (Di Leonardo, 2007). Olson & Tooman (2012) also support the use of lectures and note that that lecture-based formats still predominate in education within the health professions. They further note that saying that didactic sessions in CPD “do not directly and immediately lead to change in clinical competency or practice is not the same as saying they have no value”. Formal didactic sessions do have a role to play in facilitating change in clinical practice (Olson & Tooman, 2012).

The data from my survey supports the use of lectures for updating knowledge but suggests they have limited effectiveness for improving technical or procedure skills as a component of phronesis. Addressing the needs of practitioners requires a combination of didactic and interactive activities to develop the practitioner as a complete professional. The framework for the delivery of CPD explained in the next chapter, offers suggestions for these strategies appropriate to their purpose and demographics of the audience.

More recently the results from a report by the UK College of Emergency Medicine (Schostak, Davis et al., 2010a) recorded the highest scores for positive CPD experiences as conference attendance, local events and reading journals. The majority of respondents in this report agreed that the greatest impacts of CPD were changes in clinical practice, knowledge acquisition and learner satisfaction. This is in contrast with an often cited paper by Davis, O'Brien et al. (1999), who report that while traditional educational methods such as conferences, meetings and lectures may have a necessary role in improving factual knowledge acquisition, didactic sessions have little impact on actual practice or changing the performance of physicians. However, the interpretation of the language within any self-reporting can be ambiguous.
As mentioned earlier, conferences, congresses and seminars can be classified as formal activities with a strong didactic component. However, this does not mean that the lecture format should be ignored as an effective strategy for the delivery of CPD. Lecture-based conferences and congresses can offer many opportunities to network and interact with others through conversation. Lectures are effective for the delivery of theoretical subject matter but as the findings show, a good presenter is a very strong incentive to engage in CPD. Presenters should be engaging, relate the information to participants’ current experience, and not attempt to present excessive amounts of information in any one sitting. Providers of CPD need to choose presenters wisely, that is, not just for the knowledge or experience they have, but also for their ability to engage with the target audience.

My survey showed that study groups were strongly supported as useful by females in the survey but rated low on engagement. I posit that the low rate of engagement is also a reflection of their lack of availability. This highlights an important challenge, and opportunity, for providers of CPD. Study groups, potentially act out the principles of social learning theory through interaction and collaboration. Furthermore, the notion of small group learning is consistent with adult learning principles. Given the emerging feminisation of the profession (discussed further below), providers of CPD need to be alert to study groups as a desirable strategy for CPD and respond accordingly.

There is a lot of support from various educational institutions for on-line delivery of CPD. On-line or e-learning has the power of the internet with access to almost unlimited information. In contrast, the findings from the survey show little support for on-line learning. However, the responses are a snapshot of opinions from the sample of practitioners and may well change as technology advances.

E-learning provides learners with convenience and autonomy with access to learning opportunities from remote locations. Costs are reduced with on-line delivery and on-line instruction allows learners the flexibility to work at their own pace. However, the lack of interaction with the facilitator or other learners limits the attractiveness of e-learning as does the inability of e-learning to provide hands-on training.
Defence lawyers in dental professional indemnity cases have cautioned that on-line CPD is not a reliable strategy for gaining competence in new procedures. A recent case report of a complaint to the Health Commission (Australia) (Dell'Oro, 2013) highlights the benefit of a hands-on component in CPD when updating or learning new technique-based procedure skills, such as for endodontics and crown and bridge work.

Mentoring
The findings reveal mentoring, as an effective strategy for the provision of CPD but up to now, has not been utilised as a strategy for the majority of CPD for dentists in Australia. An exception is the RACDS where mentoring is formalised within the training of oral and maxillo-facial surgeons and candidates for the College Fellowship and Membership programmes.

As reviewed in the literature (see Chapter 3), a typical mentor/mentee relationship is similar to the apprenticeship model of training with a master or expert involved in the career development of a newcomer to a profession or trade. Eraut (2011) has suggested that improving opportunities for productive engagement in the workplace can enhance learning in a wide range of work processes.

There was overwhelming support across the sample of respondents for an organised mentor programme and warrants the more detailed discussion presented here. The modern concept of mentoring centres on a relationship between professionals that is based on mutual respect. Responses to the questions on what makes a mentor programme successful (see section 4.3.3, Chapter 6), emphasised mutual respect and that both mentor and mentee can learn from each other.

Overall, there is strong support for a mentor programme across all ages from recent graduates to senior practitioners (Figure 6, Chapter 6). Females (94 percent) were more supportive of a mentor programme than males (81 percent) with little difference between the younger (84 percent) and older age groups (88 percent) (see Table 24, Chapter 6). Cross tabulations (see Table 25, Chapter 6) for acting as a mentor showed greater support from the males than females. This suggests that sex is a controlling influence with a greater proportion of males than females interested in acting as a mentor.
Mentoring is an example of social learning and my survey distinguished between acting as a mentor and being mentored. Correlations between I am an inquisitive person, I can learn by myself, I like to keep up to date and I am open to new ideas and insights I learn through interaction with peers were significant with acting as a mentor (see Table 27, Chapter 6). The significant correlation for acting as a mentor supports mutual benefits of mentoring, as the mentor is exposed to new ideas from the mentee. In addition, seeking advice from an experienced colleague was favoured more by females than males as a useful activity, which is consistent with females being more supportive of being mentored than males.

Mentoring as a strategy for CPD, has the capacity to be effective over a wide range of needs and demographics. Within the subsets of acting as a mentor and being mentored, there are opportunities for effective CPD for improving technical skills and updating knowledge. Alignment of the subsets with content and demographic groups is the critical component of success of the mentoring programme.

The strong support for a mentoring programme for practising dentists is a call for the increased utilisation of mentoring for CPD. The findings reveal the mentor/mentee relationship can be a successful CPD strategy, but currently the activities of acting as a mentor and being mentored are not weighted with appropriate CE credits. Weighting of CPD activities is discussed later in this chapter needs to include acting as a mentor, and being mentored. However, before acting as a mentor can attract CE credits, mentors need to be trained.

Training of mentors
An important determinant of a successful mentor/mentee relationship is formal mentor training (Zellers, Howard et al., 2008). Each mentor/mentee relationship occurs in a unique, interpersonal context were effectiveness is dependent on the emotional intelligence of the mentor to adjust to each situation. The good mentor recognises the beginner as a developing person and peer, that is, a professional colleague but less experienced. Training of mentors should include understanding the link between mentor and mentee as well the role of a mentor as a facilitator to help mentees learn for themselves (Holt & Ladwa, 2010).
Mentoring is potentially an effective framework for CPD where new skills appropriate for modern practice can be learned as well as the attitudes of patient-centred professionalism. However, an obstacle to staging an effective mentor programme is the recruitment of appropriate mentors. Ideally, mentors need to be familiar with modern practice and proficient in passing on their own technical skills and sense of professional judgment, while at the same time eschewing bad habits or unsafe practices. It might be timely to experiment with a call for mentors for a widened clinical placement programme via the ADA, the Royal Australasian College of Dental Surgeons (RACDS) and the specialist societies. Such a call should be open to responses from dentists of all levels of experience, willing to be trained as mentors. As one respondent in this study stated:

Use retired dentists who can actually stand over the new graduate when necessary[sic] and assist/watch like a tutor would at uni[sic]. Surely there will be lots of retiring baby boomer dentists who would give up a couple of hours a week to give back to the profession to ensure the continued good standard of dentistry in this country. I will. (Female general practitioner, age ≥50 years, graduated from an Australian university)

Schrubbe (2004) has commented that we all have the potential to mentor another. Furthermore, effective mentors take pride in the professional development of their mentees and gain respect from others as a result of working with them. An additional reward would be acknowledgement of mentoring as an effective CPD activity and weighted accordingly (see later section under Policy issues).

**Towards more effective CPD**

Earlier in this chapter, a review of the data on the usefulness of and extent of engagement in the listed CPD activities revealed a tension between what is perceived as useful and what is actually engaged in. Hands-on workshops were perceived as the most useful activities, followed by lectures. However, more than 90 percent of respondents engaged in lectures with only approximately two thirds of respondents engaging in hands-on workshops. Other, social learning activities such as seeking advice from an experienced colleague, one-to-one discussion with another dentist and group discussion within your practice were reported as useful by the vast majority of respondents.
The review of the data revealed *I learn from hands-on* as the strongest learning characteristic which suggests hands-on activities will provide more robust and effective CPD. The majority of respondents also reported being *intellectually curious* which reflects strong internal motivation to engage in CPD and the disposition of respondent practitioners to seek out activities to satisfy their desire to keep up-to-date. A related finding was recorded for, *desire to keep up-to-date with new knowledge and developments* as an incentive, with a response of 50 percent “Very motivational” and 38 percent for “Extremely motivational” (see Table 5, Chapter 6).

These attributes suggest that respondents are both proactive and discerning in seeking out appropriate CPD. However, the level of *intellectual curiosity* varies as a function of *sex or age of practitioner*. Younger males were more intellectually curious than younger females but levels of curiosity waned as males aged. In contrast, older females maintained their *intellectual curiosity* (see Appendix: III). These variations demand consideration of CPD activities targeted to the different demographics in order to both spark interest to engage in CPD as well as sustain that interest.

Incentives and barriers mediate the level of engagement in CPD. The need that each individual experiences to strike a balance between these two key influences helps to explain the discrepancy between the reported *usefulness* of activities and the *extent of engagement* in the same activity. The strongest incentives were *course content, relevance to practice* and *quality of presenter*, while the strongest barriers were *family commitments, personal time constraints and costs* (see Table 5, Chapter 6). The incentives were similar for *hands-on workshops* and *lectures* but *costs* to the practitioner were greater for *hands-on workshops*.

In order to maximise the effectiveness of CPD it will be necessary to provide CPD activities that enhance usefulness and minimise barriers. CPD programmes which align activities revealed as useful with declared learning preferences and appropriate content are more likely to promote engagement in CPD and increase the likelihood of success.

For example, CPD activities for updating *technical skills* should appeal to younger practitioners with content related to *implantology, dento-alveolar surgery* and *crown bridge* and (see Appendices: XXX, XXXI and XXXV). Strategies for these activities
need a *hands-on* component to enable the development and demonstration of competence and capability in these areas. The observed correlation between *I learn from hands-on* and *hands-on workshops* as a CPD activity is an important consideration here, as is *I learn from hands-on* with *one to one discussion with another dentist* (see Appendix XI). These correlations suggest that designing a *hands-on workshop* as an interactive and/or collaborative activity should enhance the likelihood of valuable learning outcomes being achieved, especially when such activities take account of prevalent learning preferences.

In Australia the limited availability of *hands-on workshops* for CPD is already oversubscribed (Abbott, Burgess *et al.*, 2010). With the increasing numbers of new graduates (Thomlinson, 2013), the relative lack of availability will worsen. There is a growing urgency to meet this increasing demand for *hands-on workshops* for the benefit of the profession and quality of care to patients. However, as noted earlier, the provision of *hands-on workshops* is expensive, and the profession and the providers of these activities need to be able to work together to both contain and manage their costs. While it is easy to say “practitioners, as users, must pay”, *costs* are a barrier to engagement in CPD and there is need to explore avenues for reducing these, such as third party sponsorship. Offering *hands-on workshops* more frequently outside of metropolitan areas will also reduce *costs* for *travel and accommodation* and free up more time for practitioner-attendees to attend to *family commitments*.

Conversation as distinct from talk is conducive to professional learning through interaction with others (Haigh, 2005). Generally, these informal social interactions are perceived as non-threatening but focused on personal or immediate matters. *Social interaction* is important for successful CPD across the whole sample of respondents, but particularly for solo practitioners who are otherwise isolated (see Appendix XIX) and at risk of losing sight of what is contemporary practice. Solo practitioners make up approximately a third of practitioners in Australia which is an incentive for providers of CPD to allow ample time within their programmes for conversation and interaction. As revealed in the earlier discussion of *learning characteristics*, *social interaction* was also important in making CPD successful for females more than males (see Table 11, Chapter 6).
Incorporating *social interaction* into the provision of CPD (for example, within courses, conferences or congresses) will raise the likelihood of CPD having a positive learning outcome. As the dental profession becomes increasingly feminised, CPD underpinned by social learning activities should enjoy greater success. Further, any initiative to implement a profession wide mentor programme should likewise meet with approval.

The development of a framework for the delivery of CPD, described in the next chapter, has been guided by the considerations arising from this section.

**Wider considerations of the literature and survey findings**

**CPD and the changing face of dental practice in Australia**

Dentists work as independent practitioners and, once registered, may practise all aspects of dentistry within their competency and training. They provide assessment, diagnosis, treatment, management and preventive services to patients of all ages. The educational requirement in Australia for a graduate dentist to be registered is a minimum of a four-year full-time educational programme providing a foundation of skills and knowledge.

Dental programmes in Australia are moving to second-degree entry with the professional component reduced from five to four years. However, with the rapid expansion of knowledge and technology leading to innovations in dental practice, there is always more to be learned within these limited time frames.

This is a critical time for dentistry as well as the professions more broadly in Australia. Higher education in Australia is under stress with reduced funding and there are more students wishing to enter universities. With the increase in number of dental schools over the last few years and the shortage of academic staff, there are warnings from the dental profession in Australia of declining standards for graduates (Bartold, 2009, 2014). Many consider that there is now an oversupply of dentists in Australia (Thomlinson, 2013). However, the relative oversupply of dentists may change as the Federal Government has announced that from 1 July 2015, dentists and dental specialists are no longer on the skills occupations list that governs the entry of independent skilled migrants into Australia.
The increasing numbers of oral health therapists entering the dental profession in both the public and private sectors also threatens dentists with under-employment. The scope of practice of oral health therapists is broadening to include services traditionally provided by registered dentists, which further impacts on the employment prospects of dentists.

The majority of dental schools in Australia have clinical placements in their final (clinical) years and there is a wide variation in the range of experience gained within these placements. In addition, there is a lack of diversity of patient treatment needs for the development of overall competence. Together these suggest limited effectiveness of the clinical placements that are currently on offer.

There are also other signs of change as established private practices, both general and specialist, are being bought out and managed by corporate enterprises. A general model for such practices is a corporation owning the practice and employing registered dentists who provide the services (Mahler, Karstens et al., 2012). Generally practitioners are paid either by salary or commission but maintain responsibility for their own professional indemnity insurance. This model of multi-practitioner centres has the advantage of reducing management costs where expensive high technology equipment is shared amongst more than one practitioner. However, there is always tension between organisational professionalism and occupational professionalism (Evetts, 2011). This is due to corporations being driven by the wishes of their shareholders to make a profit and the practitioner dentist pressured to maximise returns rather than prioritise the needs of the patient (Mahler, Karstens et al., 2012).

The above comments raise concerns but can appear to be rather harsh and an overgeneralisation. Personal communication with corporate practitioners has informed me that some managers of such corporations are taking responsibility for both the organisational and occupational professionalism of their employee dentists (many of whom are recent graduates) through in-house mentoring programmes.

**The dental profession in Australia**

This study has researched dentistry as a case scenario to provide new base line data about the attitudes, beliefs and behaviours of professional practitioners to CPD.
Dentistry is a regulated profession where practitioners have both a legal and ethical responsibility to carry out the best treatment appropriate for needs of the patient. Publicly, the Australian Health Practitioner Regulation Agency (AHPRA) and the Dental Board of Australia (DBA) present a picture of dentists keeping up-to-date by way of CPD to ensure patient safety. As discussed in Chapters 2 and 3, ‘keeping up-to-date’ demands that new learning replaces old. CPD, as it is currently practised in Australia, only requires evidence of activities attended. Unfortunately, attendance alone at CPD events does not ensure keeping up-to-date. Also, knowing what to do and knowing how to do it does not necessarily equate to doing it in a safe way.

The rapid pace of scientific and social developments generates new issues for the law as it applies to the profession. The legal issues are fundamental, covering the scope of practice and what should be considered negligent. While dentistry in Australia has enjoyed a high level of public trust to date (Morgan, 2014), society is becoming less forgiving of all professions and the incidence of complaints and litigation is increasing (Dennett, 2013). There is a public awareness that health professionals have a CPD component as part of regulated practice, but we as a profession need to convince the public that we are practising contemporary dentistry. This adds urgency to offer effective CPD as a mechanism of enhancing professionalism and the continued status of dentistry as a health care profession. The survival of the profession is based on the trust the public has in the profession.

**Feminisation of dental practice**

As noted previously (see Chapter 2), the word “feminisation” is used in this thesis to describe the increase in the proportion of females to males in dental practice. In Australia, female dentists currently make up approximately a third of dentists in practice nationally (Chrisopoulos, Beckwith et al., 2011). The proportion of females graduating from dental schools around Australia is now more than 50 percent (Barnard, 2012a) and the findings show that the dental profession in Australia will become predominantly female.

A corollary of this will be a shift to fewer clinical hours available to the population as more female dentists work part-time. My results show a trend towards more females than males working less than 25 hours per week. This trend is consistent with that found
in other studies in Australia (Schofield & Fletcher, 2007), Canada and USA (Akers, Krohn et al., 1979; McKay & Quinonez, 2012). In each case, female dentists work fewer hours a week, see fewer patients and perform fewer procedures than male dentists.

Within medicine there is a similar pattern (Firth-Cozens, 2008). There are more females graduating than males in the UK but on average males complete more individual services than females. In medicine and other health professions, women have longer consultations, are more patient-centred and they converse more with their patients. Consequently “productivity” per hour appears to be less (Schofield & Fletcher, 2007). This will be reflected in an overall reduction of oral health services delivered per dentist.

However, while males may have higher output than females, Firth-Cozens (2008) notes that males consistently experience more litigation than females and suggests that the situation must be looked at more broadly than just in terms of the cost of providing health services. Although females accounted for 42 percent of the GP medical workforce in the UK (2004), only 13 percent of referred complaints involved females (Firth-Cozens, 2008). More recently in a survey of 242 dental litigation cases in the USA, 11 of the defendants were female general dentists and one defendant was a female oral surgeon. This represents five percent of the total dental suits (Baxter, 2015). Therefore, any comparison of the productivity of male and female practitioners must also take into account sex differences in the costs of poor performance, litigation, re-education, and rehabilitation.

As mentioned earlier, the frequency of complaints and litigation in dental practice is increasing. Riska & Novelskaite (2008) suggest that females are assumed to be more caring and empathic, therefore as the proportion of females in practice increases, so a reduction in complaints should follow. In Australia, a breakdown in communication is often a trigger for complaints against dentists and cause for litigation (Dennett, 2012), suggesting that records of complaints might usefully be consulted for differences as a function of sex. My findings revealed less than 20 percent of females but up to 40 percent of males, reporting a need to update communication skills (see Appendix:
Unfortunately, records of dental complaints in Australia to date cannot be broken down in this way. This is an area worthy of further research.

My results show that females, more than males, are prepared to seek advice from others (see Table 9, Chapter 6) which consistent with females being inherently more risk averse than males (Sax, 2005). Conversely there is a greater tendency for males to take risks, be more confident than females (Dent, Paltridge et al., 2008) and to overestimate their competence (Kusurkar, Croiset et al., 2013). My survey findings also reveal that female practitioners more than males report being motivated to improve clinical skills (see Appendix VI), which could imply that they are less confident than male practitioners – a situation found in one Australian dental school by Manakil, Rihani et al. (2015).

A limitation of these findings is that they have been obtained by self-reports. However, these sex differences are consistent with work by Gorter & Freeman (2005), who showed that in practices with a female dentist, the communication and working style is friendlier and contains more personal attention when compared with male dentists.

The literature suggests that professions will remain dominated by male values due to males controlling the knowledge and power of the professions (Riska, 2008). However, this is not apparent for the dental profession in Australia. Over recent years, professional organisations representing dentistry have seen females taking on senior executive roles. For example, presidents of the Federal ADA and the NSW Branch of the ADA as well as president of the RACDS. As the proportion of females in the profession increases to a majority as predicted, it is likely there will be a cultural shift in dentistry leading to a more empathetic profession.

The medical profession has also witnessed an increase in the proportion of females. In addition, there is a clustering of females and males into different specialties that are seen to embody typical male versus female characteristics. For example, females cluster into paediatrics, which is associated with a greater emphasis on caring and empathy, while males favour surgery (Riska, 2008). A similar clustering of females is apparent in paediatric dentistry in Australia which has a proportion of approximately 60 percent
females to males, compared with approximately 12 percent across all other dental specialties (Australian Research Centre for Population Oral Health, 2010).

My results show no significant difference between males and females in the younger age group regarding the impact of family commitments on CPD, but females in the older group report this as a barrier (see Table 6, Chapter 6). There appears to be a cultural shift within the younger age group compared with the older age group towards a more shared role in parenting.

**Oral health physicians**
The relative aging of the Australian population is coincident with an increasing proportion suffering from chronic disorders such as cardiovascular or respiratory disease (Austin, Bailey et al., 2015). Oral health is a component of general health and one perspective on the future of dental practice in Australia is that of oral health physicians working in partnership with other health care professionals for the overall health of the community. The increase in chronic disease has driven demand for interprofessional education in the management of these diseases to improve collaboration and the quality of patient care (Thistlethwaite, 2012). This is coincident with the increasing need for CPD on pharmacology as patient medication has a direct influence on deciding on a treatment plan.

The future of dental practice is to work in multidisciplinary teams to ensure that health care is continuous and reliable. CPD must respond to the immediate needs of practitioners and should include the concepts and behaviours of working in teams. Building a teamwork approach to the management of oral health requires open communication between health professionals. CPD programmes need to include interactive fora or workshops which facilitate face-to-face interaction with others in the team. *Social interaction* is the key to breaking down the silos of practice and lead to a mutual respect of each profession’s role in holistic health care.

Future practice will increasingly involve the paradigm of Minimum Intervention Dentistry (MID) (Walsh & Brostek, 2013). Here, communication between practitioners as oral health physicians and patients is paramount in order to educate patients to take responsibility for their own oral health. CPD providers will need to offer opportunities
to develop and rehearse communication skills as well as inform practitioners of the supporting evidence for MID principles and practice. Research into craniofacial biology will also expand the role of the oral health physician. For example, utilising saliva as a medium, the tools are now available for gene-based diagnostics. Continued research in this area will lead to more effective diagnosing of oral and systemic diseases as well as early intervention for a range of congenital defects (Townsend & Brook, 2014).

**Professionalism**

Professionalism refers to behaviours that generate trust in the dentist-patient relationship. Such behaviours demonstrate ethics, competence, knowledge, discretion and skill. Professionalism is existential, in bringing about behaviour to generate and maintain trust between professional practitioners and their clients/patients. CPD is the mechanism for professionalism (Fricker, Kiley et al., 2011) for all professions where activities and content are guided by the profession to maintain contemporary practice as well as drive future practice.

In an editorial in the *Australian Dental Journal*, Bartold (2014) described dentistry as a very demanding profession but one which carries a danger of mediocrity. Dentists carry a responsibility to treat patients to the very best of their ability then reflect on whether the treatment or service could have been done better or differently to improve the outcome. However, if mediocrity does creep into dental practice, I argue that professionalism is threatened. The threat of mediocrity adds to the urgency to provide effective CPD.

Dentistry as a health profession is often put in the same basket as other health professions for the purposes of considering approaches to student education and CPD. However, while there are many core competencies in common, there are fundamental differences in that dentistry is mainly a procedure-based profession centred on one-on-one interaction with the patient. Dental procedures are invasive, both anatomically and in terms of personal space, and usually the patient is unaware of precisely what is going on during the procedure. Patient trust in the dentist to be competent, safe and to ‘do the right thing’, is therefore fundamental to the professional relationship between patient and dentist.
Professionalism includes phronesis and judgement of the appropriate or best thing to do in any given circumstance. Phronesis is cultivated through experience, practice and repetition to form an essential ingredient of wise dental practice. A supportive working environment or community of practice, characterised by a mentor/mentee relationship, enhances the development of phronesis within the individual practitioner.

Technical skills may be the hallmark of a good dentist at one level but phronesis is the hallmark of a well-rounded professional who has the wherewithal to offer patients a range of options and advise on what is in their best interest. However, the most important skill is communication with patients, closely followed by diagnostic skills and communication with the wider dental team (Buck, Malik et al., 2000). That is, the notion of a good dentist from a dentist’s point of view may favour technical skill, but from a patient’s perspective communication skills are at least as important (Lahti, Tuutti et al., 1996).

**Policy issues**

The Legislative Context of CPD

The DBA code of conduct for registered health practitioners cites the National Law requiring practitioners to undertake CPD (Dental Board of Australia, 2010a) and to complete a minimum of 60 hours CPD activities any given three year period. The DBA, under the umbrella of the AHPRA, has described good practice as maintaining and developing knowledge, skills and professional behaviour throughout a professional’s working life to ensure competence (Dental Board of Australia, 2010a, pp.9-10) (italics inserted). However, as is discussed elsewhere, participation in CPD cannot ‘ensure’ a change in behaviour leading to improved competence. While mandating CPD may increase the exposure of less committed practitioners to current knowledge and practice, it does not necessarily enhance the quality of practice.

Many professions (including dentistry in Australia) have instituted systematic programmes for registration or awarding continuing status for their members through the collection of credit points or hours (Boud, 2010). Any dentist who is the subject of the complaint is eligible to be audited as part of any investigation and obliged to provide evidence of participation in CPD. We need to be careful that CPD as a learning
experience in the health professions does not become eclipsed by the mandating of CPD. The effectiveness of CPD is related to learning outcomes relevant to dentists’ needs and not credit points or hours.

**Litigation**
On graduation, registration as a practitioner grants dentists entry to a profession with the rights and responsibilities of professional practice as discussed earlier. Furthermore, registration grants a licence to practise unsupervised in all areas of general dental practice. However, new dental graduates tend to enter professional practice with limited competence, discretion and skill but with robust theoretical knowledge. We live and work within a litigious society where a complaint or litigation can result from a poor technical outcome or a breakdown in communication. Either scenario will involve an investigation of the experience of the dentist who has the complaint against them. Notwithstanding, taking risks is essential for gaining practical experience and early career learning and leads to the development of phronesis. Providing practitioners opportunities to learn new skills within a mentor/mentee framework, offers a safer environment for patients as practitioners develop competence and capability.

Contemporary practice is an understanding of what an average dentist would do under similar circumstances as well as being aware of the full range of alternative options and risk factors. These factors are critical in defending complaints and litigation and alert all practitioners to interact and collaborate with peers, should they lose sight of what is contemporary practice. *The need to mitigate the risk of litigation* can be a strong incentive to engage in CPD with 41 percent of respondents in this study reporting this as either “Very” or “Extremely” motivational (see Table 5, Chapter 6). Almost half the general practitioners and a third of the specialists recorded *the need to mitigate the risk of litigation* as an incentive to engage in CPD (see Appendix V).

**Accreditation**
With regard to accreditation, almost all of the respondents agreed that an appropriate authority (such as a university or the ADA) should accredit CPD activities. All females agreed that CPD providers should be accredited with almost all males in agreement (see Appendix XL).
A majority of respondents were in favour of CE credits being used as evidence of professional competence and re-registration, with little difference between age groups or sex (see Appendix XLII). I argue that this is a concern for the profession as the issuing of CPD credits is only a record of attendance and, as argued in this study, cannot guarantee a learning outcome leading to a behaviour change.

**Weighting of CPD activities**

Overall, the majority of respondents also supported weighting activities with CPD credits. The vast majority of the younger dentists (87 percent) and two-thirds of the older dentists supported the weighting of CPD with credits (see appendix XLI). However, 83 percent responded “yes” to attending a course that did not offer CE points. That dentists would attend a course that did not offer CE points demonstrates that while dentists support accreditation of activities, the primary professional responsibility of addressing one’s learning needs in order to keep up-to-date is a powerful incentive for engagement in appropriate CPD. The profession relies on the majority of practitioners accepting their responsibility to keep up-to-date. Encouraging engagement in activities that have predicted effectiveness supports dentists to fulfil this responsibility. The alternative is to do site visits to assess dentists for competence and capability as they are working. While site visits would be ideal, Australia’s vast geographical expanse means such an approach would not be workable.

CPD policy as prescribed by AHPRA is an input model based on hours of attendance. However, my findings and the literature support the predictability of the effectiveness of CPD activities that involve collaboration and interaction with others. Providing such activities has the support of practising dentists as being useful and therefore they are more likely to engage in it and learn from it. In addition, there is strong support for the weighting of activities and I posit that those activities that are more collaborative and/or interactive, such as hands on workshops, should be weighted more heavily rather than just recording the time involved. Furthermore, the activities of acting as a mentor and being mentored have been shown to be effective CPD activities and need to be weighted heavily for CPD credits. Presenters or facilitators of lectures, hands-on workshops and study groups should also claim extra CE credits in recognition of their input.
Weighting of CPD may offer a way of mitigating barriers to engaging in CPD. For example, if hands-on workshops were weighted over and above the hours of attendance, this would help to justify the added costs of learners engaging in these activities. Providers will also benefit from the increased attendance and be encouraged to make more such activities available, especially outside metropolitan areas.

Both accreditation and weighting of CPD activities will become increasingly important in the selection of activities in order to comply with regulatory requirements, as well as reduce the risk of litigation.

Preparing for clinical practice
Current dental practice is primarily that of repair and maintenance of the dentition as more people are keen to keep their teeth with good function and aesthetics. As the population ages, there will be an increased demand for more complex treatment. Therefore, in response to these needs CPD activities need to be effective in developing both diagnostic and procedural skills in such disciplines as periodontics, restorative dentistry and implantology. The effective activity for this is hands-on workshops characterised by interaction and collaboration with others in small groups. This is particularly relevant for practitioners who have limited experience (as in recent graduates) and who wish to develop their own phronesis.

There are warnings from the dental profession that graduates are under-prepared for clinical practice (Manakil, Rihani et al., 2015). Given that society is becoming more litigious with court sentiment favouring a patient’s rights, case selection, experience and referral when in doubt are all the more important. As a matter of duty, dentists need to fully communicate all appropriate options and risks which can only be achieved by knowing the evidence base themselves (Lam, 2014).

A recent report from an Australian dental school showed that the majority of graduating students support an increase in clinical placements to add to their hands-on experience (Manakil, Rihani et al., 2015). While this is not strictly CPD as in professional development for practising dentists, I propose the development of a programme of interactive and collaborative activities underpinned by mentoring to develop the phronesis of graduates. This will require cooperative partnerships between universities,
the profession and regulators to provide a broad range of experience for the increasing numbers of students. A coordinated programme of clinical placements, involving the nine dental schools in Australia and the state and territory oral health programmes, would offer consistency of graduate attributes.

Clinical placements would also need to offer the opportunity for cross-professional practice and the development of dentists as oral health physicians. Collaboration with other health professionals in both the private and public sectors will be an important part of the overall development of dental students for future practice, for example, dental student placements in partnership with medical interns, as well as pharmacy, speech therapy and physiotherapy students.

Current student clinical placements offer oral health services to eligible patients within the public sector. However, Australian dental schools have raised concerns over the lack of availability of appropriate patients. Recent figures from the ADA (Stewart, 2013) show that there is an unmet demand for oral health services. Further research is required to determine the geography of this unmet demand and why it is not being responded to already. The findings should direct the placement of students to areas with both a diverse patient cohort and a high demand for treatment to be carried out.

A review from Honey, Lynch et al. (2011) of graduates from Cork (Ireland) and Cardiff (Wales) also reported a lack of preparedness in *dento-alveolar surgery, endodontics, orthodontics and crown and bridge work*. These authors comment, “It is possible that dental schools consider that confidence in all these skills is more effectively developed in a general practice arena.” If this is true in the Australian context, under-preparedness of graduates entering practice may be placing prospective patients at risk, since in Australia, it is recognised that after registration “the newly graduated dentist can practise all aspects of dentistry” directly with the public (Australian Dental Council, 2010, p.4).

These results suggest the need for future research on clinical placements. There is an opportunity to test the findings of this research and the breakdown of activities that are effective for both knowledge acquisition and procedural skills. Students need to acquire knowledge during their pre-clinical years and then hands-on experience to develop
phronesis when engaged in their clinical placements. Student clinical placements also offer the opportunity to enculture present and future students into the profession and enhance attitudes to CPD as lifelong professional learning. Similar to post-university CPD, successful learning outcomes is also dependent on the availability of trained mentors who are disposed to lifelong learning and professionalism.

The findings and implications of this study have built upon previous research and will be valuable to any future offering of CPD to professionals in Australia. In conclusion, the next chapter offers a new framework for effective CPD for all professions. This CPD framework has been developed within the Australian context and the rapidly changing demographics of Australian dental practice.
CHAPTER 9: CONCLUSION

The purpose of Continuing Professional Development (CPD), as reviewed in this thesis, is to facilitate the maintenance and development of knowledge, skills and behaviours for contemporary and future practice (see Chapter 3). The significance of this research is the revelation of issues that need to be considered for the effective provision of CPD. Effectiveness of CPD is judged from the perspective of outcomes of professional learning throughout a lifetime of practice and is conditional upon matching the available CPD strategies to the preferred learning environments of the audience appropriate to the topic or course content.

This research reveals that the incorporation of social learning attributes of interaction and collaboration into the provision of CPD leads to an expectation of effective CPD and should apply to all professionals as adult learners. However, a sound understanding of the demographics of each profession will guide the provision of CPD to meet the unique requirements set by each profession.

The findings from this research and the cited literature reveal that dentistry and medicine are becoming increasingly feminised and personal communication has suggested that this is also occurring in other professions such as law and accounting.

Future professional practice is driven by effective CPD which is, in turn, driven by the demographics of the learners. For example, within dentistry, by targeting female preferences for social learning in the provision of CPD will soon result in catering to the needs of the majority of practitioners. As an outcome of this thesis, I offer a framework for CPD provision to accommodate contemporary and future dental practice. The principles presented in this framework may also be helpful to other professions in providing effective CPD.

A proposed framework for the provision of CPD

The framework has been crafted in two parts as guided by the discussion in the previous Chapter. The first part identifies areas of need for CPD matched to the demographic variables of sex and age of practitioner, while the second recommends strategies for delivery of CPD appropriate for the areas of professional practice.
Identifying learner needs by demographic factors

The first step in fulfilling the purpose of CPD is to identify the needs of the learner as they relate to shortfalls in knowledge, skills or behaviour. Specifically for dentistry, these needs are listed as technical, theoretical, diagnostic, communication and business skills with the addition of professionalism and the training of mentors. While there are likely to be different learner needs for different professions, from this research it is clear that demographic factors such as sex and age of practitioner are critical to addressing the specific needs of learners. For example, in dentistry younger, female practitioners are particularly interested in opportunities to advance their technical skills whereas older, male practitioners are interested in opportunities to improve their knowledge base (see Table 33).

Table 33. Learner needs as a function of sex and age group.

<table>
<thead>
<tr>
<th>Areas of professional practice</th>
<th>Female</th>
<th>Male</th>
<th>&lt;50</th>
<th>≥50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Theoretical</td>
<td>=</td>
<td>=</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Diagnostic</td>
<td>=</td>
<td>=</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Communication</td>
<td>Low</td>
<td>High</td>
<td>=</td>
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</tr>
<tr>
<td>Business</td>
<td>=</td>
<td>=</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Professionalism</td>
<td>=</td>
<td>=</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Mentoring training</td>
<td>=</td>
<td>=</td>
<td>Mentee</td>
<td>Mentor</td>
</tr>
</tbody>
</table>

This research reveals clear differences between females and males and between different age groups for areas of need and preferred learning environments. Learner needs also vary between general and specialist practitioners.

A further example is professionalism, which, as behaviour, is part of the enculturation of recent graduates into a profession. Therefore, it is not surprising that both female and male respondents in the younger age group indicated a greater need for CPD in this area.  

Using dentistry as a case example, Table 34 lists individual topics for the general components of professional practice. As revealed in Chapter 7, technical areas of

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6 Within Tables 32 and 33, The differences in learner needs between the groups is rated “High” or “Low” with similarities represented by “=”
practice were those in greatest need of updating. The specific disciplines with a large technical component are implantology, crown & bridge, dento-alveolar surgery, endodontics and orthodontics/paediatric dentistry. Providers of CPD need to be aware that the audience for CPD programmes covering these areas will be attractive to predominantly younger female practitioners. On the other hand, the audience for theoretical subjects such as pharmacology, dental anomalies and dental materials will be predominantly in the older age group. It is argued that a sub-set of identifying a sub-set of learner needs for CDP across various professions will benefit from the close examination of learner needs by sex, age and type of practice.

Table 34. Learner needs for dentistry as a function of sex and age group.

<table>
<thead>
<tr>
<th>Area of practice</th>
<th>Female</th>
<th>Male</th>
<th>&lt;50yo</th>
<th>≥50yo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implantology</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Crown &amp; bridge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dento-alveolar surgery</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Endodontics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orthodontics/paediatric dentistry</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theoretical</td>
<td>=</td>
<td>=</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Pharmacology</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dental anomalies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dental materials</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Diagnostic</td>
<td>=</td>
<td>=</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Oral Pathology/medicine</td>
<td></td>
<td></td>
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<tr>
<td>Radiology</td>
<td></td>
<td></td>
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<tr>
<td>Communication</td>
<td>Low</td>
<td>High</td>
<td>=</td>
<td>=</td>
</tr>
<tr>
<td>Business</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Professionalism</td>
<td>=</td>
<td>=</td>
<td>High</td>
<td>Low</td>
</tr>
</tbody>
</table>

Strategies for the delivery of CPD

The second principle for effective CPD provision identified from this research relates to strategies for delivery of CPD. For dentistry, they are listed as lectures, hands-on workshops, a combination of lectures and hands-on workshops, study groups and mentoring (see Table 35). A key consideration in developing this framework for the provision of CPD is aligning the strategy with the topic or content that needs updating.

As revealed in this research, lectures as a didactic strategy are effective for updating knowledge while hands-on activities are effective for updating technical skills required in performing clinical procedures. Social interaction is also a component of study groups and mentoring which are appropriate strategies for learning in all areas of
professional practice. A combination of these strategies will maximise *social interaction* to further enhance the learning outcomes.

**Table 35. Delivery strategy by topic.**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Lectures</th>
<th>Hands-on workshop</th>
<th>Combination lecture/hands-on</th>
<th>Study groups</th>
<th>Mentoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Theoretical</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Diagnostic</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Communication</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>Business</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Professionalism</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Mentoring training</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

In other professions, it is to be expected that there will be a range of other strategies to meet specific aims and learning outcomes but, as the research suggests, matching strategies for the delivery of CPD to the needs of learners is a critical principle in effective CPD provision.

A breakdown of individual subjects within dentistry directs the appropriate strategy for CPD based on the alignments outlined in Table 36. *Lectures, hands-on workshops* and *study groups* can be selected as the appropriate activity, as guided by this research, as to what will be effective. These strategies are available to providers, but what is often missing from available CPD, is *mentoring*. This research reveals that *mentoring* is effective for the full range of learner needs and should be utilised by CPD providers.

These tables represent the general considerations in designing an effective CPD programme in dentistry and to explain how these can be used, I present a case scenario for the design and delivery of CPD for dentistry.
### Table 36. Delivery strategy for dentistry by topic.

<table>
<thead>
<tr>
<th>Area of practice</th>
<th>Lecture</th>
<th>Hands-on workshop</th>
<th>Combination</th>
<th>Study group</th>
<th>Mentoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Implantology</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>Crown &amp; bridge</td>
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<td>Dento-alveolar surgery</td>
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<td>Orthodontics/pediatric dentistry</td>
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<tr>
<td>Theoretical</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Pharmacology</td>
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<td>Dental anomalies</td>
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<td>Dental materials</td>
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<tr>
<td>Diagnostic</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Oral Pathology/medicine</td>
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<td>Radiology</td>
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<tr>
<td>Communication</td>
<td>No</td>
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<tr>
<td>Business</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Professionalism</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Using the framework

The first step in the preparation of any CPD programme for all professions is to identify shortfalls in knowledge, skills or behaviours and confirm the area of need as the basic theme of the CPD programme. This research has revealed that *technical skills* are the predominant area of need for updating in dental practice.

Secondly, providers need to explore the demographics of practitioners to work out who will be attracted to a programme that offers the opportunity to improve *technical skills*. This research reveals the audience will be younger practitioners who are most likely female. The third consideration is the preferred strategy(ies) to be used for the programme. This research reveals that *hands-on workshops* are the most effective in enhancing technical skills.

Finally, to put it all together, a decision is made as to the particular topic and the broadness of the learning opportunity to be offered.

**Case scenario**

*Implantology* is reported as most in demand for dental CPD. As discussed in the previous chapter (see Figure 8), dental implants reflect the increasing complexity of dental treatment coincident with the aging population. *Implantology* is also more than just technical skills, but also requires diagnostic skills and a sound understanding of
theory. Moreover, *implantology* is a merging of high-level knowledge and skills in *periodontics, dento-alveolar surgery and crown and bridge*. A proposal for a CPD programme on *implantology* will require a combination of strategies to address the theory and the techniques involved.

The research also reveals the lack of availability of *hands-on workshops* outside the metropolitan centres. The cost of providing these can be significant and registration costs are a barrier to engagement. However, staging such programmes in regional areas minimises costs to participants and encourages full subscription. Furthermore, as discussed in the previous chapter, support from industry can help to reduce costs but care needs to be taken that presenters remain objective in their information.

To satisfy the above requirements, I would construct a two-day programme with day one devoted to the *periodontal, dento-alveolar* components of dental implants and day two devoted to the *crown and bridge* components. The total number of participants would be limited to allow interaction with presenters and other participants and the programme designed to allow ample time for breaks and conversation.

The morning session for each day begins with plenary sessions with lectures covering relevant theory and an introduction to the clinical techniques to be covered in the hands-on session after lunch.

*Hands-on workshops* should be in small groups with each group assigned a facilitator/mentor over and above the main presenter. Personal experience shows this is often lacking in available *hands-on workshops*. While providing extra personnel as mentors may increase costs to stage a programme, the research reveals that incorporating mentoring into CPD has the likelihood of enhancing learning outcomes.

Question and answer sessions at the end of each day would allow opportunities to digest the information gathered through the day and the final day should finish with a more informal session of discussion to allow delegates to consolidate their learning and confirm contacts for the development of camaraderie.
**Hindsight**

This project began as a research proposal to explore CPD for dentists and required a search for a suitable survey instrument for data collection. My search looked at Delphi surveys with multiple iterations to focus on key components as well as focus groups of practising dentists. I also considered interviewing practising dentists from a range of backgrounds and clinical expertise before settling on the self-managed questionnaire.

However my questionnaire was too broad and a difficult part was what to leave out for future research and what to leave in for this thesis. The broadness of the questionnaire also meant that the statistical analysis of the many variables put me on a steep learning curve to understand statistics in both qualitative and quantitative domains. Perhaps it would have been better to reduce the size of the questionnaire and then support the responses with interviews from a sample of the respondents. Nonetheless, a self-reported questionnaire is still the best way to gather information where resources are limited, from a wide section of dentists despite the limits of a single data source. Also, relying on a smaller sample of interviews alone, would not have given me the same depth, range and thickness of the data I collected.

A personal limitation was endeavouring to carry out this project as a part time candidate over eight years. During this period I tried to balance the research with private practice and family which was not always smooth sailing. There was always a danger of the data becoming dated, but as a snap shot of Australian dental practice, I am quite confident the data is still valid in raising questions about policy and suggestions for the provision of CPD in the future. In addition, I have learnt a lot about survey methods and now have the confidence to carry out further educational research and the related statistical analyses required.

**Limitations**

This study has several limitations that should be mentioned. In the first place, I acknowledge that my own opinions and bias may have influenced this research, even though I have endeavoured to minimise this. A new survey instrument was designed and crafted for this research and the content was pilot tested by practitioners to confirm the appropriateness of the questions.
This study assessed attitudes, beliefs and behaviours of practising dentists to CPD based upon self-reporting. Such an approach has some limitations. The responses may carry a bias of “what does the researcher want me to say?” rather than a personal response. Furthermore, a self-reported questionnaire is a record of a moment in time and is therefore impossible to replicate.

A potential weakness of the study is the relatively low sample size. The data for this study was gathered from one region of Australia. While the age and sex profile of the sample compared well with national figures, the response rate was just under half of the total sample approached. This may have introduced a bias into what was essentially an exploratory study.

**Areas for Future Research**

Arising from this research are areas that warrant further investigation. I have presented a framework for the provision of CPD and research is required to evaluate this framework when applied to dentistry and other professions. This research would inform dental regulators and CPD providers about the impact of specific activities on learning and practice behaviour enabling CPD activities to be targeted more appropriately to outcomes.

The findings related to the demographics of dental practice suggest that more research is needed on the impact feminisation of dentistry and other professions. For example, females are assumed to be more caring and empathic, so a reduction in complaints should follow on to a reduction in personal indemnity insurance premiums, at least for female practitioners. This warrants further research into the comparisons between females and males in the level of patient satisfaction as well as the incidence of complaints and litigation.

Intellectual curiosity arose from the findings as an interesting trait and with a positive association to CPD. This may an area of further research in the selection of candidates for dental programmes.

How CPD is recorded as both formal and informal activities warrants further research. A key questions is: “Who measures effectiveness and is self-assessment enough?”
Revalidation is being mooted in Australia whereby dentists will be asked to provide evidence that they are meeting standards of practice to remain registered by the DBA. If CPD records are to be the measure of competence to practise, there is an urgent need for effective CPD and the weighting of activities that have a predictable learning outcome, such as hands-on workshops or mentoring. Research will be required to assess the feasibility of an outcomes model and the costs and benefits in the Australian context.

A possible replacement for the soon to be discontinued Voluntary Dental Graduate Year Programme is a coordinated, structured programme of student clinical placements. An important question is; “Who will fund this?” On the one hand, the universities have a responsibility to graduate competent dentists but, on the other, the profession as a whole also has a responsibility for resisting mediocrity. Furthermore, governments have a responsibility in managing the overall health of the community. This option should be further explored.

**A vision**

A vision for the future of dental practice in Australia is that of oral health physicians working in partnership with other health care professionals for the overall health of the community. CPD delivery needs to be the driver of modern practice, therefore providers of CPD need to look to the future of dentistry in Australia with a view to offering activities that direct dentists towards this vision. Designing CPD programmes incorporating interaction and collaboration with others (including other health professionals) offers a positive and enjoyable experience that contributes to the well-being of individual practitioners. I contend that through effective CPD, one can generate a community of practice with this shared vision and improved quality of life for both practitioner and patient.
References


continuing professional development (CPD) topics for the European dentist. 


http://www.skope.ox.ac.uk/sites/default/files/Monogrpah%209.pdf


References


Glossary

This section describes the different subjects within the practice of dentistry.

Endodontics deals with the morphology, physiology, and pathology of the human tooth and, in particular, the dental pulp, root and peri-radicular tissues.

Implantology: An area of dentistry that involves the surgical insertion and integration of metal implants into the jawbone, followed by the construction of an artificial tooth crown over the integrated metal implants.

Oral and Maxillofacial Surgery deals with the diagnosis, surgical and adjunctive treatment of diseases, injuries and defects of the human jaws, the dento-alveolar complex and associated structures.

An Oral Physician deals with the clinical diagnosis, assessment and principally non-surgical, pharmacological management of anatomical variants, pathological conditions, diseases and pain of the dental, oral and adjacent anatomical structures and the dental/oral manifestations and complications of systemic diseases, pathology and conditions and their treatment.

Oral Pathology deals with diseases of the teeth, jaws, oral soft tissues and associated structures, studies their causes, pathogenesis and effects, and by use of clinical, radiographic, microscopic and other laboratory procedures establishes differential diagnoses and provides forensic evaluations.

Orthodontics deals with the study and supervision of the growth and development of the dentition and its related anatomical structures, including preventive and corrective procedures of dento-facial irregularities requiring the re-positioning of teeth, jaws, and/or soft tissues by functional or mechanical means.

Paediatric Dentistry deals with the prevention and the treatment of dental diseases and abnormalities in children and their associated developmental and behavioural problems.
Periodontics deals with the prevention, recognition, diagnosis and treatment of the diseases and disorders of the investing and supporting tissues of natural teeth or their substitutes.

Prosthodontics deals with the restoration and maintenance of oral health, function and appearance by coronal alteration or reconstruction of natural teeth, or the replacement of missing teeth and contiguous oral and maxillofacial tissues with substitutes. (Australian Dental Association, 2014).

The term "restorative dentistry" refers to the integrated management of oral health problems and restoring the mouth to a functional and aesthetic state. Many of the procedures are also covered by the dental specialty of prosthodontic dentistry, including fillings, veneers, crowns, bridges, full and partial dentures and dental implants.

This section describes the terminology for the analysis as described in Chapter 5.

An item is a question from the questionnaire in Appendix I used for either qualitative or quantitative analysis.

A variable is an item used in the research model which has a score attached.

A factor is a variable which has been generated from interrelated items.

The variable Age of practitioner was constructed from the responses to the Year of graduation and the strong correlation between year of graduation and age of practitioner. There were many missing responses to the question of age but almost all respondents recorded their year of graduation.
Appendix I: Questionnaire for data collection

What is good Continuing Professional Development (CPD) for the contemporary dentist in Australia?

Instructions ⬤⬤⬤⬤⬤⬤

This questionnaire is available on line and I would encourage you to go to the following link:


Follow the prompt and answer all the questions. The survey should take no more than 30 minutes and I ask you to submit it as soon as convenient.

Alternatively, you may complete the enclosed questionnaire and sign the consent form.

Place the signed consent form in the smaller envelope, labelled consent form.

Then place the completed survey and the consent form in the reply paid envelope, addressed to Dr M Kiley who is supervising this research at the ANU.

Please return all of the above within fourteen (14) days.

Thank you very much for your time in participating in this survey.

John Fricker BDS MDSc FRACDS

john.fricker@anu.edu.au
Section I: Background Information

Demographics:
Q1. What is your age in years?

Q2. What is your sex? (Please tick). ○ Male ○ Female

Q3. In which country/countries did you complete your dental training? (Please tick all that apply).
   ○ Australia  ○ New Zealand  ○ UK  ○ Republic of Ireland
   ○ Other: (Please specify)

Q4. Were you ADC / ADEC examined? (Please tick). ○ Yes ○ No

Q5. In what year were you first registered in an Australian State or Territory?

Practice Profile:
Q6. Which of the following best describes your dental practice? (Please tick the most appropriate response only).
   ○ General Practice ○ Solo Practice ○ Group practice
   ○ Specialist Practice: (Please specify)

Q7. If in group practice, which of the following best describes your position? (Please tick the most appropriate response only).
   ○ Principal ○ Partner/Associate ○ Assistant

Q8. What is the total number of dentists in your group practice?

Q9. What was the average number of hours per week you were involved in patient contact during the last month?

Q10. What is the longest period of time you have taken on extended leave away from practice? (Please tick the most appropriate response only).
    ○ Never ○ < 12 months ○ 1-2 years ○ > 2 years
Section 2: Factors for Engaging in Continuing Professional Development

How MOTIVATIONAL do you find the following factors for engaging in CPD activities?

<table>
<thead>
<tr>
<th>Question</th>
<th>Description</th>
<th>Not at all</th>
<th>Not very</th>
<th>Somewhat</th>
<th>Very</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q11.</td>
<td>Desire to keep up to date with new knowledge and developments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q12.</td>
<td>Opportunity to improve clinical skills</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Q13.</td>
<td>Opportunity for peer interaction</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Q14.</td>
<td>Need to mitigate risk of litigation</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Q15.</td>
<td>Opportunity for social interaction</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Q16.</td>
<td>Opportunity for working holiday</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Q17.</td>
<td>Venue</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Q18.</td>
<td>Course content</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Q19.</td>
<td>Proximity to home</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Q20.</td>
<td>Quality of presenter(s)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Q21.</td>
<td>Relevance to own practice</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Q22.</td>
<td>Personal Interest</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Q23.</td>
<td>Number of CE credits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q24.</td>
<td>Self assessed need</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

How DISCOURAGING of engagement in CPD activities do you find the following factors?

<table>
<thead>
<tr>
<th>Question</th>
<th>Description</th>
<th>Not at all</th>
<th>Not very</th>
<th>Somewhat</th>
<th>Very</th>
<th>Extremely</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q25.</td>
<td>Personal Time Constraints</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Q26.</td>
<td>Registration costs of courses or conferences</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q27.</td>
<td>Travel &amp; accommodation costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q28.</td>
<td>Family commitments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q29.</td>
<td>Lack of locum to cover when away</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Questionnaire Survey
### Q30. Other discouraging factors: (please add below and provide a rating for each using the scale provided).

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Not very</th>
<th>Somewhat</th>
<th>Very</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>○</td>
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<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

### Q31. Think back to a conference, congress, lecture programme or workshop which you attended and would rate as successful. Please comment on what it was that you valued and made it successful for you.

...
Section 3:
Updating Knowledge and skills

Q32. For each of the following areas of your own professional practice, please tick those you think need attention or updating:

- Theoretical Knowledge
- Technical Skills
- Diagnostic Skills
- Communication Skills
- Business Skills

Q33. Please tick which of the following activities (if any) you are engaged in:

- Active support for your local dentists
- Volunteer work in dentistry
- Active support for the wider profession
- Involvement in other community activities

Diagnosis and Treatment Planning

Q34. In which of the following areas do you think you need to update your own diagnostic and treatment planning skills? (Please tick all that apply):

- Anaesthetics and sedation
- CPR
- Crown and bridge
- Cross infection control
- Dental anomalies
- Dental materials
- Dento-alveolar surgery
- Endodontics
- Implantology
- Oral pathology/oral medicine
- Orthodontics
- Paediatric dentistry
- Periodontology
- Pharmacology
- Radiology/radiography

Procedural Skills

Q35. In which of the following areas do you think you need to update your own procedural skills? (Please tick all that apply):

- Anaesthetics and sedation
- CPR
- Crown and bridge
- Cross infection control
- Dental anomalies
- Dental materials
- Dento-alveolar surgery
- Endodontics
- Implantology
- Oral pathology/oral medicine
- Orthodontics
- Paediatric dentistry
- Periodontology
- Pharmacology
- Radiology/radiography
Please indicate how often (in years) you think you should update your knowledge and skills in each of the following: (If “Never”, please enter a 0 value).

<table>
<thead>
<tr>
<th>Question</th>
<th>Skill</th>
<th>Number of Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q36</td>
<td>Anaesthetics and sedation</td>
<td></td>
</tr>
<tr>
<td>Q37</td>
<td>Business management</td>
<td></td>
</tr>
<tr>
<td>Q38</td>
<td>Communication skills</td>
<td></td>
</tr>
<tr>
<td>Q39</td>
<td>CPR</td>
<td></td>
</tr>
<tr>
<td>Q40</td>
<td>Crown and bridge</td>
<td></td>
</tr>
<tr>
<td>Q41</td>
<td>Cross infection control</td>
<td></td>
</tr>
<tr>
<td>Q42</td>
<td>Dental anomalies</td>
<td></td>
</tr>
<tr>
<td>Q43</td>
<td>Dental materials</td>
<td></td>
</tr>
<tr>
<td>Q44</td>
<td>Dento-legal matters</td>
<td></td>
</tr>
<tr>
<td>Q45</td>
<td>Dento-alveolar surgery</td>
<td></td>
</tr>
<tr>
<td>Q46</td>
<td>Diagnosis and treatment planning</td>
<td></td>
</tr>
<tr>
<td>Q47</td>
<td>Endodontics</td>
<td></td>
</tr>
<tr>
<td>Q48</td>
<td>Implantology</td>
<td></td>
</tr>
<tr>
<td>Q49</td>
<td>Oral pathology/oral medicine</td>
<td></td>
</tr>
<tr>
<td>Q50</td>
<td>Orthodontics</td>
<td></td>
</tr>
<tr>
<td>Q51</td>
<td>Paediatric dentistry</td>
<td></td>
</tr>
<tr>
<td>Q52</td>
<td>Periodontology</td>
<td></td>
</tr>
<tr>
<td>Q53</td>
<td>Pharmacology</td>
<td></td>
</tr>
<tr>
<td>Q54</td>
<td>Radiology/radiography</td>
<td></td>
</tr>
<tr>
<td>Q55</td>
<td>Trouble shooting</td>
<td></td>
</tr>
</tbody>
</table>
Q56. What other knowledge and skills do you think require updating regularly and how often?

Q57. Which of the following do you believe dental boards should compel you to regularly update? *(Please tick all that apply)*.

- ○ Anaesthetics and sedation
- ○ Business management
- ○ Communication skills
- ○ CPR
- ○ Crown and bridge
- ○ Cross infection control
- ○ Dental anomalies
- ○ Dental materials
- ○ Dento-legal matters
- ○ Dento-alveolar surgery
- ○ Diagnosis & treatment planning
- ○ Endodontics
- ○ Implantology
- ○ Oral pathology/oral medicine
- ○ Orthodontics
- ○ Paediatric dentistry
- ○ Periodontology
- ○ Pharmacology
- ○ Radiology/radiography
- ○ Trouble shooting
Section 4:
Accreditation Activities & Providers

Please indicate your level of disagreement/agreement with the following statements:

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>No opinion</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q58. Providers of conferences, courses and clinical days etc. should be accredited by an appropriate authority</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Q59. Conferences, courses and clinical days should be weighted with CE credits</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Q60. CE credits should be used as evidence of professional competence for re registration.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Q61. Would you attend a course or programme that did not distribute CE credits? (Please tick).

○ Yes  ○ No

Q62. If yes, under what circumstances (e.g., as presenter, exotic location)?

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
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__________________________________________________________________________
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__________________________________________________________________________
Continuing Professional Development (CPD)

The Dental Board of the ACT defines CPD as:

Study, training, courses, seminars, reading and various other activities that could reasonably be expected to advance professional development as a dentist.

For the following activities please rate their USEFULNESS for your own CPD:
(If you have never used, please select N/A).

<table>
<thead>
<tr>
<th>Q63. Journal reading (by yourself)</th>
<th>Not at all</th>
<th>Not very</th>
<th>Somewhat</th>
<th>Very</th>
<th>Extremely</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q64. Journal reading club(s)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Q65. Study group(s)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Q66. Listening to audio recordings</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Q67. Lectures</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Q68. Hands on workshops</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Q69. Internet/online learning</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Q70. One-to-one discussion with another dentist (eg. formal as an assistant or mentor program)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>Q71. Group discussion within your practice</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>Q72. Seeking advice from an experienced colleague (eg. informal via professional networks)</td>
<td>○</td>
<td>○</td>
<td>○</td>
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</tr>
</tbody>
</table>

Q73. Other activity/activities: (please add below and provide a rating for each using the scale provided).

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Not very</th>
<th>Somewhat</th>
<th>Very</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>○</td>
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</tr>
</tbody>
</table>
Q74. From the list below, please tick activities you have engaged in within the last six months:

- Journal Reading (by yourself)
- Journal Reading Clubs
- Study Groups
- Listening to Audio recordings
- Lectures
- Hands on workshops
- Internet/online learning
- One-to-one discussion(s) with another dentist
- Group discussion(s) within your practice
- Seeking advice from an experienced colleague
- Other activity/activities: *(Please specify below).*

Q75. Are there other CPD activities you would like to engage in? Please identify examples you would value and briefly explain why.
Q76. Are you currently engaged in research or further organised study (not necessarily dental)? (Please tick).
  ○ Yes  ○ No
  If "yes", please describe:
  
  
  
  
  

Q77. Have you completed one or more organised study programmes since graduation (not necessarily dental)? (Please tick).
  ○ Yes  ○ No
  If "yes", please list:
  
  
  
  
  

Q78. Have you presented or otherwise engaged in a conference, study group or meeting in the last two years (not necessarily dental)? (Please tick).
  ○ Yes  ○ No
  If "yes", please describe:
  
  
  
  
  

Questionnaire Survey
Section 5: Developing Your Own Competence & Expertise

Q79. Looking at your own practice situation, how have you/will you develop your knowledge from that of a new graduate to that of an expert? (Eg., working with experienced dentists, Short courses, College Membership/Fellowship exams).

Q80. Looking at your own practice situation, how have you/will you develop your clinical skills from that of a new graduate to that of an expert? (Eg., working with experienced dentists, Short courses, College Membership/Fellowship exams).

Q81. In what areas do you consider yourself to be an expert?

A mentor is defined as someone who supports learning in an interprofessional environment and who assesses and judges proficiency.


Q82. Would you value an organised mentor programme to assist new graduates in practice? (Please tick).

○ Yes ○ No
Appendices

Q83. What features do you suggest are needed for such a programme to be successful?

How interested are you in being actively involved in a mentor programme:

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Not very</th>
<th>Somewhat</th>
<th>Very</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q84. As a Mentor?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Q85. As a Mentee?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Learning characteristics**

Please indicate your level of disagreement/agreement with the following:

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>No opinion</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q86. I am self motivated rather than dependent on others for my motivation</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Q87. I am an inquisitive person</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Q88. I can learn by myself</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Q89. I learn from reading</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Q90. I learn from listening</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Q91. I learn from hands on</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Q92. I like to keep up to date</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Q93. I am open to new ideas and insights</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Q94. I learn through interaction with peers</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Q95. I critically appraise new ideas before putting them into practice</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
</tr>
</tbody>
</table>

*Adapted from Livneh & Livneh (1999)*

Scenarios

Please indicate which of the following scenarios you most closely identify with. *(Please tick one response only).*

Q96. After having considered all the alternatives for treatment, you would:

- Explain all options to the patient and then leave him/her to make their own choice.
- Explain all options then guide the patient to an appropriate choice.
- Give an opinion only when the patient requests it.
- Use your own experience to act in the patient’s best interests and present one option.

Q97. Overhanging margins with chronic periodontal involvement are discovered in an emergency patient from another practice. You would:

- Tell no-one.
- Tell the patient but not the other dentist.
- Tell the other dentist but not the patient.
- Tell both the patient and the other dentist.

Q98. A patient requests a receipt to be backdated for insurance purposes. You would:

- Refuse with no explanation given.
- Refuse with a legal explanation given.
- Refuse with a non legal explanation given.
- Agree to the request.

Q99. A patient is referred to you for an opinion and he/she is passed on to an associate within the same practice. You would:

- Notify the patient of the change prior to the patient being seen.
- Notify the referring dentist of the change prior to the patient being seen.
- Notify the referring dentist and the patient of the change prior to the patient being seen.
- Allow the associate to see the patient first and he/she report to the referring dentist.

*Adapted from Porter and Grey (2002)*

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Preferences for conferences/courses

When choosing a course or conference overseas/interstate, what are your preferences in terms of:

Q100. Number of days? ........................................................................................................................................

Q101. Day(s) of the week? .....................................................................................................................................

Q102. Number of hours per day? ............................................................................................................................

Q103. Month(s) of the year? ....................................................................................................................................

When choosing a course or conference within the ACT, what are your preferences in terms of:

Q104. Number of days? ........................................................................................................................................

Q105. Day(s) of the week? .....................................................................................................................................

Q106. Number of hours per day? ............................................................................................................................

Q107. Month(s) of the year? ....................................................................................................................................

Thank you very much for your time and effort in participating in this survey. Your contribution is significant and valued.

John Fricker
Instructions

Thank you very much for completing this survey. Please ensure that the consent form has been filled in, signed and placed in the smaller envelope labelled, consent form.

Place the completed survey and the sealed consent envelope in the larger reply paid envelope addressed to Dr M Kiley, who is supervising this research at the ANU.

Please return the completed survey within fourteen (14) days

Thank you again for your contribution to this research.

John Fricker BDS MDSc FRACDS

john.fricker@anu.edu.au
Appendices

Appendix II: Published article Professionalism: what is it, why should we have it and how can we achieve it?

Australian Dental Journal (2011) 56(1), 92-96

Professionalism: what is it, why should we have it and how can we achieve it?

JP Fricker, M Kiley, G Townsend, C Trevitt

1 Centre for Educational Development and Academic Methods, The Australian National University, Canberra, Australian Capital Territory.
2 School of Dentistry, The University of Adelaide, Adelaide, South Australia.
3 Oxford Learning Institute, University of Oxford, United Kingdom.

ABSTRACT

In this paper we argue that the terms ‘profession’, ‘professional’ and ‘professionalism’ provide us with important insights into the practice of dentistry and the priorities for the continuing development of dentistry as a profession. More significantly, we suggest that this understanding can assist us in designing continuing professional development (CPD) programmes aimed at maintaining the professionalism of dentists throughout their working lives.

A CPD framework is required to support both the new graduate to develop from novice to expert as well as support experienced practitioners to maintain their expertise within a rapidly changing environment. Rather than an onerous task, CPD should be a positive and enjoyable experience, self-motivated to improve job satisfaction and self-confidence. Research is currently being undertaken to determine what is good CPD for the practicing dentist with a view to recommending strategies based on sound educational theory.

Keywords: Continuing Professional Development, dental practice, profession, professionalism.

INTRODUCTION

In a recent editorial of the Australian Dental Journal, the Editor highlighted the overwhelming need for dentists to keep up with all aspects of professional practice, as well as an obligation to be lifelong learners.1 Continuing Professional Development (CPD) is now part of professional practice and an important element of professional attributes of the newly qualified dentist as described by the Australian Dental Council.2

In this paper, we argue that improved understanding of the terms ‘profession’, ‘professional’ and ‘professionalism’ provide us with important insights into the practice of dentistry and the priorities for continuing development of dentistry as a profession. More significantly, we suggest that this understanding can assist us in designing CPD programmes aimed at maintaining the professionalism of dentists throughout their working lives.

BACKGROUND

A profession is defined by the Australian Council of Professions as ‘a disciplined group of individuals who adhere to ethical standards and who hold themselves out as, and are accepted by the public as possessing special knowledge and skills in a widely recognised body of learning derived from research, education and training at a high level, and who are prepared to apply this knowledge and exercise these skills in the interests of others’.3

Ethics is the concept or code of conduct under which one lives as an individual and as a society. All health professionals carry a responsibility to attend to those in need to the best of their ability and to also represent their profession in a dignified manner.4 An important component of dentistry as a profession is the need to establish trust in the dentist/patient relationship.5 The term ‘patient’ rather than ‘client’ is preferred as the dentist/patient relationship implies a duty of care over and above the provision of a service within a commercial transaction.

Tasks carried out by professionals generally carry high levels of complexity and also uncertainty. The diversity of tasks in dentistry means that each situation is unpredictable, but the professional must take ultimate responsibility for every outcome. Such complex tasks need to be supported by well-developed skills.

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knowledge and practices. All professionals need to take responsibility for the continued development of these throughout their working lives in the public expects that professionals provide their services both competently and as experts worthy of trust.1

Once admitted to the profession via the appropriate educational process, professionalism refers to the conduct and/or behaviour of the individual in upholding the social contract between society and the profession. Such conduct or behaviour is what earns the trust and confidence of the community and the individual patient in the profession, e.g. dentistry. Therefore, being a professional requires a commitment to lifelong learning and maintaining competence in skills, knowledge and attitudes for safe practice. This paper proposes that CPD provides the vehicle for ongoing professionalism throughout one’s practising life.

**Historical perspective on dentistry as a profession**

The learned professions of medicine, law and theology began in medieval Europe and were developed to address specific problems in society. Dentistry was first identified as a unique profession in 1609, when an edict was passed in France legalising the position of dentists and distinguishing them from physicians, surgeons and barber-surgeons. The ‘father of dentistry’ is widely acclaimed to be the Frenchman Pierre Fauchard. As a dentist in Paris, he published a two-volume text in 1728 titled *Le Chirurgien Dentiste* (The Surgeon Dentist), which was a comprehensive, systematic overview of the scientific and practical knowledge of dentistry at that time. This was an instructional text for those preparing for practice and raised the scientific status of dentistry. This scientific base was further strengthened following the publication in 1771 of *The Natural History of the Human Teeth* by John Hunter in England.

**Professionalisation**

The professionalisation of occupations was an important element in the development of British society during the Industrial Revolution. Prior to this, society was characterised by the need for individuals to display a versatility and variety of skills. Modernisation meant specialisation and dentistry was an example where a group of individuals identified a problem in society and offered itself as a provider of the solution.

The creation of professional associations with established criteria for recruitment related to education, behaviour and ethics, further enhanced professionalisation of recognised occupations. These organisations facilitated an exchange of ideas and information that enhanced the growth of science and technology.1 The first dental society in England was the Odontological Society of London, formed in 1858. This society published a journal, *The British Journal of Dental Science* and, in 1859, drafted a curriculum for apprenticeship training of dentists. Successful advocacy resulted in governments sanctioning these new experts when the Dental Act in 1878 registered appropriately trained dentists.

**The Triad of Professionalisation**

As the various professions developed, there were three main components in their establishment or professionalisation. These were, the formation of a society, the establishment of a journal and the provision of education to the members, thereby creating the Triad of Professionalisation.2 These three components are closely linked, with each dependent on the other. For example, the association represents the membership of the profession and sets the rules for such membership. It is also responsible for the publication of research through a journal and it provides input into the education of dentists for contemporary practice. Professional attitudes are certainly major internal motivators to keep up, improve and derive self-satisfaction for a job well done. Given that entry to a profession is a voluntary act, it could be argued that responsibility to keep up is part of the acceptance of the label of being a professional and the civic identity which comes with that voluntary nature.3

We argue that the dental profession is not only responsible for the education of new members of the profession, but ‘professionalism’ demands ongoing education and development of existing members as a cyclic process (Fig 1).

Dentistry has continued to be identified as a regulated occupation with a unique set of knowledge and skills dependent on appropriate training.

**DENTISTRY IN AUSTRALIA**

As one might expect, the dental profession in the colonies within mainland Australia and New Zealand followed the English model with the first dentists arriving into the colony of New South Wales in 1818. Prior to this, dental treatment was essentially for emergency services and was carried out by Royal Navy surgeons.4 The development of dentistry in all colonies of mainland Australia and New Zealand followed a similar pattern. With the gold rushes of the 1850s and the economic boom related to primary industries, migration to the colonies accelerated. From the 1880s on, there was an explosion of knowledge in science and technology following discoveries such as those relating to bacteria by Pasteur. The discoveries of X-rays, anaesthetics and new materials, such as porcelain and vulcanite rubber, as well as the invention of the foot

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drill, further improved the practice of dentistry. As more dentists arrived, many saw the need to raise the profile of dentistry as a profession and by the end of the 19th century, all the colonies had lobbied their respective governments for a Dental Act regulating who could be called a dentist.

Unique to the colonies of Australia and New Zealand (Australasia), the dental boards which were set up under various Acts, set the examinations for registration rather than under licence from a medical college as in the United Kingdom. In Australasia, dentistry was independent of medicine from the outset. This independence was further reinforced with the opening of dental faculties within the universities of Sydney, Melbourne, Queensland, Adelaide, and Western Australia in Australia as well as Otago in Dunedin, New Zealand. Professionalism within dentistry was also demonstrated in treating the needy pro bono. In all colonies, the dental fraternity set up dental hospitals for the needy, and these also doubled as practical training centres for the apprentice dentists.

Confirming dentistry as a profession in Australia

In England before the Industrial Revolution, the professions of law, medicine and divinity, as well as the armed services, were regarded as occupations for gentlemen. A profession was seen as a passport to good society and was conditional upon the professional behaving like a gentleman which precluded indulging in retail trade such as advertising.

A major event in the recognition of dentistry as a unique profession was the First World War of 1914 to 1918. In 1914, the Australian Army rejected 15,773 volunteers on the grounds of lack of dental fitness. In 1915, the Australian Army appointed 14 dentists as commissioned officers, elevating the profession to gentlemen status and recognising that dental disease was a significant factor in reducing a soldier's fitness to deploy. The stated policy was "No man was to be allowed to proceed overseas unless his mouth was free of caries or any pathological condition of the gum, or an insufficiency of teeth for adequate mastication." Once overseas, instructions were given that "no teeth should be extracted, which can be saved" and this placed a much higher responsibility on dentists in the management of the overall health of soldiers compared with pre-1914.

Following the Second World War, there was a further boom in technology with inventions such as the air rotor drill, improved surgical techniques, new filling materials and adhesives. The discovery of the effects of fluoride in reducing dental decay led to fluoridation of reticulated water supplies and the transformation of dentistry's philosophy from repair and maintenance to prevention. The scientific basis of dentistry also grew with contemporary practitioners encouraged to base their practice on evidence. Clinical research became more important with journals publishing more articles in this area and new journals were created to cope with the explosion of information.

Contemporary practice in Australia

Dentistry in Australia is relatively small profession with approximately 10,000 registered practitioners. Professional education of dentists in Australia, for both general practice and specialist practice (with the exception of oral and maxillofacial surgery) is university-based leading to qualifications for registration in Australia upon graduation. Modern professionalism is shaped by the dynamic interplay between commercialism and professionalism. As the consumerist culture becomes more prevalent, dentistry is increasingly moving to a business model as demonstrated by seminars and courses marketed to the practitioner to improve profit and grow rich. An appropriate balance is needed between satisfying the demands of the patient and recommending what is appropriate treatment in the light of financial incentives. The majority of practising dentists work in the private sector with approximately 40% in solo practice. The practising dentist thus faces a potential conflict between the traditional definition of a "professional" and the requirement to run a private practice as a business, generating a profit to cover overheads and personal income. However, the interests of the patient must come first and the dentist must have the appropriate knowledge and skills to select and prioritise treatment options.
PROFESSIONAL EDUCATION

Dental education in Australia is university-based, be it undergraduate or graduate, and the graduate is eligible for registration to practise on the public from the date of graduation. However, practical wisdom or "phronesis" is only acquired after a prolonged period of experience and reflection on that experience.24 It is suggested that phronesis, combined with the professional's development of knowledge and skills, is a critical attribute for dentists. One way of supporting both reflection on practice and the continuing development of knowledge and skills is through engaging in CPD throughout a lifetime of practice.17 The good dentist is a lifelong learner25 and the introduction of problem-based learning (PBL) approaches into Australian dental schools, in part, aims to promote and develop lifelong learners.

There is some evidence that PBL can foster the development of the types of knowledge, skills and attributes that dentists will need in the future.26

What is Continuing Professional Development?

A recent policy paper by the Dental Board of the Australian Capital Territory (ACT) defines CPD as "study, training, courses, seminars, reading and various other activities that could reasonably be expected to advance professional development as a dentist. It is the means by which members of the profession can maintain, improve and broaden their knowledge and skills and develop their personal qualities required in their personal lives ... and is a process of lifelong learning with professionals to expand and fulfill their potential."28

An essential component of CPD is lifelong learning which can be seen as a cyclic process of reflection, planning, action and evaluation in order to develop one's practice.25 Professional expertise develops within a specific domain of knowledge with expert performance in dentistry being a combination of a sound knowledge base, good reasoning skills and broad experience with patients.26 As expertise increases, the individual is better able to deal with more complex clinical problems and the adaptive expert is able to utilise existing knowledge and practices to learn when presented with a new problem.27 CPD is thus a vehicle for professionals in the delivery of services to patients and society (as indicated in Fig 1).

Why do we need Continuing Professional Development?

As an example of a university-based vocational programme, dentistry requires a period of formal education to be completed prior to admission to the workforce in that occupation. Traditionally, it has been implied that all learning required for a lifetime of practice is completed within a university course. Nowadays, however, newly graduated dentists are generally unprepared for independent practice and need support for at least the first 3-4 years after graduation.25,26

Skills in management and clinical decision-making need to be honed early in their careers and new graduates need to be motivated to seek appropriate CPD in order to maintain the currency of these skills.26 Likewise, a preparedness to engage in practice on these terms is required of new graduates, as is understanding and acceptance on the part of established members of the profession, that these developments simply reflect how things have changed (and continue to change) over their working lives. The Australian Dental Association and professional indemnity companies encourage engagement in CPD activities to minimise complaints and litigation.27,28 Contemporary practice is regarded as what can reasonably be expected of the average graduate in terms of recognising, diagnosing and treating problems that normally occur in dentistry with an evidence-based approach.14 However, there is a need for healthcare practitioners to respond to a rapidly changing environment and this has placed CPD high on the list of priorities with registration boards, as consumers have the right to expect that health professionals are practising in a competent and professional manner. Dentistry is not a static profession and there is a need for both the newly graduated dentist and the new graduate to constantly upgrade their knowledge and skills.25 CPD should also include the development of self-assessment skills for both identifying deficiencies in skills and knowledge, and as a comprehensive system of ongoing monitoring.27 However, there is little evidence to support mandatory CPD as a mechanism for the long-term maintenance or improvement of clinical competencies.13 One can lead the practitioner to an educational activity, but CPD demands an active engagement in the learning process.

Learning new procedures and techniques has an element of risk and there needs to be a judicious reckoning of the risks involved. What every dentist may be asked to do is to provide safe treatment, society must accept that there is human error and there are risks when dealing with a biological system. The practitioner must strive to maximise the margin of safety and this requires the support of the profession to develop the knowledge, skills and attitudes of the novices to those of the expert.

Professional mystique takes many years of practice and demands an engagement in CPD over a lifetime of practice. It can be hastened by involving others in the
process. The threat of litigation may motivate the practitioner to engage in CPD and risk management aimed at minimizing errors as essential as part of the learning process.

CONCLUSIONS

We have argued in this paper that CPD is the mechanism for professionalism, based on a cyclic process of learning and reflection that enhances one's skills and competencies, and enables the generation of trust between dentists and patient. The development of professional life is governed by ethical behaviour and the continuous updating of knowledge. Increasingly, a CPD framework is required to support both the new graduate to develop from novice to expert as well as support experienced practitioners to maintain their expertise within a rapidly changing environment. Rather than an onerous task, CPD should be a positive and enjoyable experience, self-motivated to improve job satisfaction and self-confidence and to contribute to professionalism. It is beyond the scope of this paper to engage in a detailed discussion of CPD. However, research is currently being undertaken to determine what is good CPD for the practising dentist with a view to recommending strategies based on contemporary educational theory.

REFERENCES


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Appendix III. Responses as a percentage for strongly agree to items clustered within the factor intellectual curiosity. Females and males by age groups.

<table>
<thead>
<tr>
<th>Age less than 50 years old</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>Females n=36</td>
</tr>
<tr>
<td>I am self-motivated</td>
<td>42</td>
</tr>
<tr>
<td>I am an inquisitive person</td>
<td>25</td>
</tr>
<tr>
<td>I like to keep up-to-date</td>
<td>33</td>
</tr>
<tr>
<td>I am open to new ideas and insights</td>
<td>25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age greater than or equal to 50 years old</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>Females n=11</td>
</tr>
<tr>
<td>I am self-motivated</td>
<td>45</td>
</tr>
<tr>
<td>I am an inquisitive person</td>
<td>6</td>
</tr>
<tr>
<td>I like to keep up-to-date</td>
<td>14</td>
</tr>
<tr>
<td>I am open to new ideas and insights</td>
<td>27</td>
</tr>
</tbody>
</table>

Appendix IV. Responses as a percentage for strongly agree to items clustered within the factor intellectual curiosity. Specialists and general practitioners

<table>
<thead>
<tr>
<th>Item</th>
<th>Specialists n=26</th>
<th>General practitioners n=112</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am self-motivated</td>
<td>54</td>
<td>39</td>
</tr>
<tr>
<td>I am an inquisitive person</td>
<td>42</td>
<td>24</td>
</tr>
<tr>
<td>I like to keep up-to-date</td>
<td>50</td>
<td>36</td>
</tr>
<tr>
<td>I am open to new ideas and insights</td>
<td>46</td>
<td>30</td>
</tr>
</tbody>
</table>
Appendix V. Components of the factor, extrinsic professional development as incentives as a function of sex, age of practitioner and type of practice. Aggregate of percentage responses for “Very” and “Extremely motivating”.

<table>
<thead>
<tr>
<th>Incentive</th>
<th>Males n= 88</th>
<th>Females n= 47</th>
<th>&lt; 50 yo n= 76</th>
<th>&gt;= 50 yo n= 58</th>
<th>General n= 113</th>
<th>Specialist n= 26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitigate risk of litigation</td>
<td>49</td>
<td>47</td>
<td>45</td>
<td>34</td>
<td>43</td>
<td>31</td>
</tr>
<tr>
<td>No of CE credits</td>
<td>24</td>
<td>23</td>
<td>25</td>
<td>19</td>
<td>25</td>
<td>8</td>
</tr>
<tr>
<td>Self-assessed need</td>
<td>47</td>
<td>64</td>
<td>55</td>
<td>48</td>
<td>55</td>
<td>42</td>
</tr>
</tbody>
</table>

Appendix VI. The strength of opportunity to improve clinical skills as an incentive: Responses for “Very motivating” and “Extremely motivating” as a function of sex and age of practitioner (%).

Age: Less than 50 yo
Opportunity to improve clinical skills

<table>
<thead>
<tr>
<th>Sex</th>
<th>Very motivating</th>
<th>Extremely motivating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female n=36</td>
<td>26</td>
<td>64</td>
</tr>
<tr>
<td>Male n=40</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>F+M n=76</td>
<td>41</td>
<td>55</td>
</tr>
</tbody>
</table>

Age: Greater than or equal to 50 yo
Opportunity to improve clinical skills

<table>
<thead>
<tr>
<th>Sex</th>
<th>Very motivating</th>
<th>Extremely motivating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female n=11</td>
<td>73</td>
<td>18</td>
</tr>
<tr>
<td>Male n=45</td>
<td>69</td>
<td>20</td>
</tr>
<tr>
<td>F+M n=56</td>
<td>70</td>
<td>20</td>
</tr>
</tbody>
</table>
### Appendix VII. Usefulness of group discussion within your practice. Responses for “Very” and “Extremely useful” as a function of sex and age (%).

<table>
<thead>
<tr>
<th>Age: Less than 50 years old</th>
<th>Usefulness of group discussion within your practice</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sex</td>
<td>Very useful</td>
<td>Extremely useful</td>
</tr>
<tr>
<td></td>
<td>Female n=32</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Male n=38</td>
<td>29</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>F+M n=70</td>
<td>39</td>
<td>29</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age: Greater than or equal to 50 years old</th>
<th>Usefulness of group discussion within your practice</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sex</td>
<td>Very useful</td>
<td>Extremely useful</td>
</tr>
<tr>
<td></td>
<td>Female n=11</td>
<td>82</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Male n=35</td>
<td>51</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>F+M n=46</td>
<td>59</td>
<td>17</td>
</tr>
</tbody>
</table>
### Appendix VIII. Usefulness of seeking advice from an experienced colleague. Responses for very and extremely useful as a function of sex and age (%).

<table>
<thead>
<tr>
<th>Age: Less than 50 years old</th>
<th>Usefulness of seeking advice from an experienced colleague</th>
<th>Sex</th>
<th>Very useful</th>
<th>Extremely useful</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Female n=35</td>
<td>57</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male n=37</td>
<td>38</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F+M n=72</td>
<td>47</td>
<td>38</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age: Greater than or equal to 50 years old</th>
<th>Usefulness of seeking advice from an experienced colleague</th>
<th>Sex</th>
<th>Very useful</th>
<th>Extremely useful</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Female n=11</td>
<td>55</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male n=43</td>
<td>42</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F+M n=54</td>
<td>44</td>
<td>35</td>
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</table>
Appendix IX. The strength of the association between the usefulness of CPD activities as a function of type of practice. Responses for “Extremely useful” (%) and χ².

<table>
<thead>
<tr>
<th>CPD activity</th>
<th>General n=</th>
<th>%</th>
<th>Specialist n=</th>
<th>%</th>
<th>χ²</th>
<th>p</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>34</td>
<td>30</td>
<td>3</td>
<td>26</td>
<td>9.50(4),</td>
<td>.05</td>
<td>The strength of the association between lectures and type of practice is more significant for general practitioners than specialists</td>
</tr>
<tr>
<td>Hands-on workshops</td>
<td>64</td>
<td>58</td>
<td>8</td>
<td>32</td>
<td>13.92(4),</td>
<td>.01</td>
<td>The strength of the association between hands-on workshops and type of practice is more significant for general practitioners than specialists</td>
</tr>
<tr>
<td>One-to-one discussion with another dentist</td>
<td>30</td>
<td>30</td>
<td>6</td>
<td>25</td>
<td>ns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group discussion within your practice</td>
<td>24</td>
<td>24</td>
<td>5</td>
<td>24</td>
<td>ns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seeking advice from an experienced colleague</td>
<td>39</td>
<td>36</td>
<td>8</td>
<td>32</td>
<td>ns</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix X. Correlations of usefulness factors by learning characteristics.

<table>
<thead>
<tr>
<th>Learning characteristics</th>
<th>Use social (Q's 70 71 72)</th>
<th>Use interactive (Q's 67 68 69)</th>
<th>Use passive (Q's 63 66)</th>
<th>Use group learning (Q's 64 65)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am self-motivated</td>
<td>.24*</td>
<td>-.01</td>
<td>-.02</td>
<td>-.32**</td>
</tr>
<tr>
<td>rather than dependent on</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>others for my motivation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am an inquisitive</td>
<td>.32**</td>
<td>.06</td>
<td>.16</td>
<td>-.24*</td>
</tr>
<tr>
<td>person.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can learn by myself.</td>
<td>.19</td>
<td>-.01</td>
<td>-.14</td>
<td>-.37**</td>
</tr>
<tr>
<td>I learn from reading.</td>
<td>.12</td>
<td>-.03</td>
<td>.08</td>
<td>-.03</td>
</tr>
<tr>
<td>I learn from listening.</td>
<td>.12</td>
<td>.00</td>
<td>.148</td>
<td>-.17</td>
</tr>
<tr>
<td>I learn from hands on.</td>
<td>.23*</td>
<td>.10</td>
<td>-.09</td>
<td>-.21**</td>
</tr>
<tr>
<td>I like to keep up to date.</td>
<td>.26</td>
<td>.23</td>
<td>.10</td>
<td>-.09</td>
</tr>
<tr>
<td>I am open to new ideas</td>
<td>.25*</td>
<td>.11</td>
<td>.05</td>
<td>-.14</td>
</tr>
<tr>
<td>and insights.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I learn through</td>
<td>.26*</td>
<td>-.28**</td>
<td>.06</td>
<td>.08</td>
</tr>
<tr>
<td>interaction with peers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I critically appraise new</td>
<td>.14</td>
<td>-.22*</td>
<td>.03</td>
<td>-.07</td>
</tr>
<tr>
<td>ideas before putting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>them into practice.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F Learn intellectually</td>
<td>.31**</td>
<td>.16</td>
<td>.02</td>
<td>-.30**</td>
</tr>
<tr>
<td>curious 86 87 92 93</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F Learn Independent</td>
<td>.12</td>
<td>-.05</td>
<td>.03</td>
<td>-.20*</td>
</tr>
<tr>
<td>Learner 88 89 90</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F Learn Interactive</td>
<td>.18</td>
<td>-.08</td>
<td>.09</td>
<td>.16</td>
</tr>
<tr>
<td>learner 91 94</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (1-tailed)
** Correlation is significant at 0.01 level (1-tailed)
### Appendix XI. Correlations of learning characteristics by CPD activities.

<table>
<thead>
<tr>
<th>Learning characteristics</th>
<th>CPD activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Journal Reading (by yourself).</td>
</tr>
<tr>
<td>I am self motivated rather than dependent on others for my motivation.</td>
<td>.08</td>
</tr>
<tr>
<td>I am an inquisitive person.</td>
<td>.07</td>
</tr>
<tr>
<td>I can learn by myself.</td>
<td>-.07</td>
</tr>
<tr>
<td>I learn from reading.</td>
<td>.19*</td>
</tr>
<tr>
<td>I learn from listening.</td>
<td>.13</td>
</tr>
<tr>
<td>I learn from hands on.</td>
<td>-.14</td>
</tr>
<tr>
<td>I like to keep up to date.</td>
<td>.19*</td>
</tr>
<tr>
<td>I am open to new ideas and insights.</td>
<td>.15*</td>
</tr>
<tr>
<td>I learn through interaction with peers.</td>
<td>.05</td>
</tr>
<tr>
<td>I critically appraise new ideas before putting them into practice.</td>
<td>.17*</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (1-tailed)

** Correlation is significant at 0.01 level (1-tailed)
Appendix XII. Correlations of usefulness of CPD activities by incentives and barriers. Only the significant $r$ values are reported.

<table>
<thead>
<tr>
<th>Incentives and barriers</th>
<th>CPD activities from questionnaire (Appendix I)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desire to keep up to date with new knowledge and developments.</td>
<td>0.18*</td>
</tr>
<tr>
<td>Opportunity to improve clinical skills.</td>
<td>0.28**</td>
</tr>
<tr>
<td>Opportunity for peer interaction.</td>
<td>0.14* 0.23</td>
</tr>
<tr>
<td>Need to mitigate risk of litigation.</td>
<td>0.15*</td>
</tr>
<tr>
<td>Opportunity for social interaction.</td>
<td>0.26** 0.20*</td>
</tr>
<tr>
<td>Opportunity for a working holiday.</td>
<td>0.18* 0.22*</td>
</tr>
<tr>
<td>Venue.</td>
<td>0.17*</td>
</tr>
<tr>
<td>Course Content.</td>
<td>0.26** 0.25** 0.21** 0.23** 0.17*</td>
</tr>
<tr>
<td>Proximity to home.</td>
<td>0.23**</td>
</tr>
<tr>
<td>Quality of Presenter(s).</td>
<td>0.18* 0.18* 0.27** 0.23** 0.29**</td>
</tr>
<tr>
<td>Relevance to own practice.</td>
<td>0.16* 0.21** 0.18*</td>
</tr>
<tr>
<td>Personal Interest.</td>
<td>0.33** 0.20* 0.15* 0.23**</td>
</tr>
<tr>
<td>Self-assessed need.</td>
<td>0.18* 0.25** 0.16* 0.20* 0.14*</td>
</tr>
<tr>
<td>Q26. Registration costs of courses or conferences.</td>
<td>0.15* 0.16*</td>
</tr>
<tr>
<td>Travel &amp; accommodation costs.</td>
<td>-0.19* 0.19* 0.19* 0.16*</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (1-tailed)
** Correlation is significant at 0.01 level (1-tailed)
Appendix XIII. The strength of the association between usefulness of lectures and relevance to own practice as an incentive (%).

<table>
<thead>
<tr>
<th></th>
<th>Weak</th>
<th>Strong</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usefulness of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lectures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weak</td>
<td>42</td>
<td>31</td>
<td>73</td>
</tr>
<tr>
<td>Strong</td>
<td>13</td>
<td>14</td>
<td>27</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>45</td>
<td>100</td>
</tr>
</tbody>
</table>

\( \chi^2 = 0.93, p = 0.35 \). The strength of the association of usefulness of lectures and relevance to own practice is not statistically significant.

Appendix XIV. The strength of the association between usefulness of lectures and quality of presenter as an incentive (%).

<table>
<thead>
<tr>
<th></th>
<th>Weak</th>
<th>Strong</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usefulness of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lectures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weak</td>
<td>46</td>
<td>27</td>
<td>73</td>
</tr>
<tr>
<td>Strong</td>
<td>12</td>
<td>15</td>
<td>27</td>
</tr>
<tr>
<td>Total</td>
<td>58</td>
<td>42</td>
<td>100</td>
</tr>
</tbody>
</table>

\( \chi^2 = 3.15, p = 0.08 \). The strength of the association of usefulness of lectures and quality of presenter is not statistically significant.
## Appendix XV. Correlations, barrier items by usefulness of CPD activities.

<table>
<thead>
<tr>
<th>Barriers items</th>
<th>Journal Reading (by yourself)</th>
<th>Journal reading club(s)</th>
<th>Study group(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal time constraints.</td>
<td>.05</td>
<td>-.01</td>
<td>-.11</td>
</tr>
<tr>
<td>Registration costs of courses or conferences.</td>
<td>.05</td>
<td>.14</td>
<td>.03</td>
</tr>
<tr>
<td>Travel &amp; accommodation costs.</td>
<td>.00</td>
<td>-.04</td>
<td>-.05</td>
</tr>
<tr>
<td>Family commitments.</td>
<td>.07</td>
<td>.06</td>
<td>.12</td>
</tr>
<tr>
<td>Lack of locum to cover when away.</td>
<td>.13</td>
<td>.08</td>
<td>.04</td>
</tr>
</tbody>
</table>

**Correlations: Barrier items by usefulness items**

<table>
<thead>
<tr>
<th>Barriers items</th>
<th>Listening to audio recordings.</th>
<th>Lectures.</th>
<th>Hands-on workshops.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal time constraints.</td>
<td>.06</td>
<td>-.07</td>
<td>.03</td>
</tr>
<tr>
<td>Registration costs of courses or conferences.</td>
<td>.14</td>
<td>-.04</td>
<td>.15*</td>
</tr>
<tr>
<td>Travel &amp; accommodation costs.</td>
<td>.06</td>
<td>-.19*</td>
<td>.19*</td>
</tr>
<tr>
<td>Family commitments.</td>
<td>.07</td>
<td>-.01</td>
<td>-.07</td>
</tr>
<tr>
<td>Lack of locum to cover when away.</td>
<td>-.07</td>
<td>-.02</td>
<td>.05</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (1-tailed)
** Correlation is significant at 0.01 level (1-tailed)
### Correlations: Barrier items by usefulness items (continued)

<table>
<thead>
<tr>
<th>Barriers items</th>
<th>Internet/online learning.</th>
<th>One-to-one discussion with another dentist (eg. formal as an assistant or mentor programme).</th>
<th>Group discussion within your practice.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal time constraints.</td>
<td>.10</td>
<td>.02</td>
<td>.01</td>
</tr>
<tr>
<td>Registration costs of courses or conferences.</td>
<td>.16*</td>
<td>-.05</td>
<td>.07</td>
</tr>
<tr>
<td>Travel &amp; accommodation costs.</td>
<td>.19*</td>
<td>.11</td>
<td>.09</td>
</tr>
<tr>
<td>Family commitments.</td>
<td>.03</td>
<td>.08</td>
<td>-.01</td>
</tr>
<tr>
<td>Lack of locum to cover when away.</td>
<td>.10</td>
<td>-.15*</td>
<td>-.07</td>
</tr>
</tbody>
</table>

Seeking advice from an experienced colleague (eg. informal via professional networks).

<table>
<thead>
<tr>
<th>Barriers items</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal time constraints.</td>
<td>.12</td>
</tr>
<tr>
<td>Registration costs of courses or conferences.</td>
<td>.14</td>
</tr>
<tr>
<td>Travel &amp; accommodation costs.</td>
<td>.16*</td>
</tr>
<tr>
<td>Family commitments.</td>
<td>.09</td>
</tr>
<tr>
<td>Lack of locum to cover when away.</td>
<td>.01</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (1-tailed)
** Correlation is significant at 0.01 level (1-tailed)
### Appendix XVI. Summary of CPD activities actually engaged in as a function of sex (%).

<table>
<thead>
<tr>
<th>CPD Activity</th>
<th>Actual engagement</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All n=139</td>
<td>Male n=87</td>
<td>Female n=47</td>
</tr>
<tr>
<td>Journal reading (by yourself)</td>
<td>94</td>
<td>91</td>
<td>100</td>
</tr>
<tr>
<td>Journal reading club(s).</td>
<td>9</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Study groups.</td>
<td>52</td>
<td>52</td>
<td>51</td>
</tr>
<tr>
<td>Listening to audio recordings.</td>
<td>56</td>
<td>51</td>
<td>62</td>
</tr>
<tr>
<td>Lectures</td>
<td>92</td>
<td>93</td>
<td>89</td>
</tr>
<tr>
<td>Hands on workshops</td>
<td>61</td>
<td>63</td>
<td>57</td>
</tr>
<tr>
<td>Internet/online learning</td>
<td>47</td>
<td>51</td>
<td>45</td>
</tr>
<tr>
<td>One-to-one discussion(s) with another dentist</td>
<td>84</td>
<td>83</td>
<td>85</td>
</tr>
<tr>
<td>Group discussion(s) within your practice</td>
<td>59</td>
<td>55</td>
<td>66</td>
</tr>
<tr>
<td>Seeking advice from an experienced colleague</td>
<td>77</td>
<td>72</td>
<td>83</td>
</tr>
</tbody>
</table>

### Appendix XVII. Summary of CPD activities actually engaged in as a function of age of practitioner (%).

<table>
<thead>
<tr>
<th>CPD Activity</th>
<th>Actual engagement</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All n=136</td>
<td>&lt; 50 yo n=78</td>
<td>&gt;=50 yo n=58</td>
</tr>
<tr>
<td>Journal reading (by yourself)</td>
<td>94.0</td>
<td>96</td>
<td>91</td>
</tr>
<tr>
<td>Journal reading club(s).</td>
<td>9.0</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Study groups.</td>
<td>52.0</td>
<td>47</td>
<td>59</td>
</tr>
<tr>
<td>Listening to audio recordings.</td>
<td>56.0</td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>Lectures</td>
<td>92.0</td>
<td>93</td>
<td>91</td>
</tr>
<tr>
<td>Hands on workshops</td>
<td>61.0</td>
<td>63</td>
<td>59</td>
</tr>
<tr>
<td>Internet/online learning</td>
<td>47.0</td>
<td>51</td>
<td>41</td>
</tr>
<tr>
<td>One-to-one discussion(s) with another dentist</td>
<td>84.0</td>
<td>84</td>
<td>86</td>
</tr>
<tr>
<td>Group discussion(s) within your practice</td>
<td>59.0</td>
<td>61</td>
<td>57</td>
</tr>
<tr>
<td>Seeking advice from an experienced colleague</td>
<td>77.0</td>
<td>79</td>
<td>74</td>
</tr>
</tbody>
</table>
Appendix XVIII. Summary of CPD activities actually engaged in as a function of type of practice type of practice (%).

<table>
<thead>
<tr>
<th>CPD Activity</th>
<th>Actual engagement</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All n=139</td>
<td>General n=62</td>
<td>Group n=37</td>
<td>Solo n=13</td>
<td>Specialist n=26</td>
</tr>
<tr>
<td>Journal reading (by yourself)</td>
<td>94.0</td>
<td>90.0</td>
<td>97.0</td>
<td>100.0</td>
<td>96.0</td>
</tr>
<tr>
<td>Journal reading club(s).</td>
<td>9.0</td>
<td>7.0</td>
<td>14.0</td>
<td>8.0</td>
<td>23.0</td>
</tr>
<tr>
<td>Study groups.</td>
<td>52.0</td>
<td>45.0</td>
<td>62.0</td>
<td>30.0</td>
<td>65.0</td>
</tr>
<tr>
<td>Listening to audio recordings.</td>
<td>56.0</td>
<td>65.0</td>
<td>54.0</td>
<td>46.0</td>
<td>42.0</td>
</tr>
<tr>
<td>Lectures</td>
<td>92.0</td>
<td>87.0</td>
<td>92.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Hands on workshops</td>
<td>61.0</td>
<td>50.0</td>
<td>87.0</td>
<td>69.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Internet/online learning</td>
<td>47.0</td>
<td>44.0</td>
<td>57.0</td>
<td>39.0</td>
<td>46.0</td>
</tr>
<tr>
<td>Q74CB8. One-to-one discussion(s) with another dentist</td>
<td>84.0</td>
<td>74.0</td>
<td>92.0</td>
<td>85.0</td>
<td>96.0</td>
</tr>
<tr>
<td>Group discussion(s) within your practice</td>
<td>59.0</td>
<td>60.0</td>
<td>70.0</td>
<td>23.0</td>
<td>58.0</td>
</tr>
<tr>
<td>Seeking advice from an experienced colleague</td>
<td>77.0</td>
<td>74.0</td>
<td>89.0</td>
<td>77.0</td>
<td>65.0</td>
</tr>
</tbody>
</table>
## Appendix XIX. Correlations of learning characteristics by extent of engagement.

<table>
<thead>
<tr>
<th>Learning characteristics</th>
<th>CPD Activities engaged in</th>
<th>Factor engage, Interaction with others</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Journal reading</td>
<td>Study groups</td>
</tr>
<tr>
<td>I am self-motivated</td>
<td>0.15*</td>
<td>0.06</td>
</tr>
<tr>
<td>I am an inquisitive person</td>
<td>0.03</td>
<td>0.09</td>
</tr>
<tr>
<td>I can learn by myself</td>
<td>-0.01</td>
<td>-0.01</td>
</tr>
<tr>
<td>I learn from reading</td>
<td>0.27**</td>
<td>0.06</td>
</tr>
<tr>
<td>I learn from hands-on</td>
<td>0.01</td>
<td>0.15*</td>
</tr>
<tr>
<td>I like to keep up to date</td>
<td>0.15**</td>
<td>0.13</td>
</tr>
<tr>
<td>I am open to new ideas and insights</td>
<td>-0.04</td>
<td>-0.02</td>
</tr>
<tr>
<td>I learn through interaction with peers</td>
<td>-0.06</td>
<td>0.15*</td>
</tr>
<tr>
<td>I critically appraise new ideas before putting them into practice</td>
<td>0.05</td>
<td>0.08</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (1-tailed)

** Correlation is significant at 0.01 level (1-tailed)
Appendix XX. The strength of the association between I learn through interaction with peers as a characteristic and engagement in hands-on workshops (%).

<table>
<thead>
<tr>
<th>I learn through interaction with peers as a characteristic</th>
<th>No</th>
<th>Yes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weak</td>
<td>33</td>
<td>40</td>
<td>73</td>
</tr>
<tr>
<td>Strong</td>
<td>7</td>
<td>20</td>
<td>27</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>60</td>
<td>100</td>
</tr>
</tbody>
</table>

$\chi^2=4.65$, $p<0.05$. The strength of the association of I learn through interaction with peers as a learning characteristic and engagement in hands-on workshops is statistically significant.

Appendix XXI. Correlations: Incentive items by CPD activities engaged in.

<table>
<thead>
<tr>
<th>Incentive</th>
<th>Journal reading (by yourself)</th>
<th>Journal reading club(s)</th>
<th>Study groups</th>
<th>Listening to audio recordings</th>
<th>Lectures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desire to keep up to date with new knowledge and developments</td>
<td>.05</td>
<td>-.08</td>
<td>-.07</td>
<td>.01</td>
<td>-.09</td>
</tr>
<tr>
<td>Opportunity to improve clinical skills</td>
<td>.07</td>
<td>.15</td>
<td>-.07</td>
<td>.02</td>
<td>-.02</td>
</tr>
<tr>
<td>Opportunity for peer interaction</td>
<td>-.02</td>
<td>.07</td>
<td>.14</td>
<td>-.07</td>
<td>.10</td>
</tr>
<tr>
<td>Need to mitigate risk of litigation</td>
<td>.12</td>
<td>.01</td>
<td>.08</td>
<td>.08</td>
<td>-.10</td>
</tr>
<tr>
<td>Opportunity for social interaction</td>
<td>.00</td>
<td>.01</td>
<td>.09</td>
<td>.08</td>
<td>.08</td>
</tr>
<tr>
<td>Opportunity for a working holiday</td>
<td>.09</td>
<td>-.04</td>
<td>.00</td>
<td>-.09</td>
<td>.14</td>
</tr>
<tr>
<td>Venue</td>
<td>.15</td>
<td>-.04</td>
<td>.01</td>
<td>-.04</td>
<td>.22</td>
</tr>
<tr>
<td>Course Content</td>
<td>-.02</td>
<td>.10</td>
<td>-.08</td>
<td>.06</td>
<td>.02</td>
</tr>
<tr>
<td>Proximity to home</td>
<td>.15</td>
<td>.14</td>
<td>-.20</td>
<td>.10</td>
<td>.05</td>
</tr>
<tr>
<td>Quality of Presenter(s)</td>
<td>-.11</td>
<td>.05</td>
<td>-.02</td>
<td>-.06</td>
<td>.10</td>
</tr>
<tr>
<td>Relevance to own practice</td>
<td>-.05</td>
<td>.09</td>
<td>-.05</td>
<td>.06</td>
<td>-.01</td>
</tr>
<tr>
<td>Personal Interest</td>
<td>.09</td>
<td>.16</td>
<td>.07</td>
<td>-.01</td>
<td>.09</td>
</tr>
<tr>
<td>Number of CE credits</td>
<td>.29</td>
<td>.21</td>
<td>-.10</td>
<td>.05</td>
<td>.10</td>
</tr>
<tr>
<td>Self-assessed need</td>
<td>.13</td>
<td>.05</td>
<td>-.15</td>
<td>.14</td>
<td>.25</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (1-tailed)
** Correlation is significant at 0.01 level (1-tailed)
### Correlations: Incentive items by CPD activities engaged in (continued)

<table>
<thead>
<tr>
<th>Incentives</th>
<th>Hands-on workshops.</th>
<th>Internet/online learning.</th>
<th>One-to-one discussion with another dentist.</th>
<th>Group discussion within your practice.</th>
<th>Seeking advice from an experienced colleague.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desire to keep up to date with new knowledge and developments.</td>
<td>.03</td>
<td>-.01</td>
<td>-.09</td>
<td>.01</td>
<td>-.02</td>
</tr>
<tr>
<td>Opportunity to improve clinical skills.</td>
<td>.08</td>
<td>.01</td>
<td>-.03</td>
<td>.01</td>
<td>.02</td>
</tr>
<tr>
<td>Opportunity for peer interaction.</td>
<td>.05</td>
<td>.09</td>
<td>.16*</td>
<td>.13</td>
<td>.11</td>
</tr>
<tr>
<td>Need to mitigate risk of litigation.</td>
<td>.14</td>
<td>.04</td>
<td>.07</td>
<td>.10</td>
<td>.19*</td>
</tr>
<tr>
<td>Opportunity for social interaction.</td>
<td>.03</td>
<td>.08</td>
<td>.17*</td>
<td>.10</td>
<td>.10</td>
</tr>
<tr>
<td>Opportunity for a working holiday.</td>
<td>.06</td>
<td>.16*</td>
<td>-.01</td>
<td>.14</td>
<td>.03</td>
</tr>
<tr>
<td>Venue.</td>
<td>.04</td>
<td>-.02</td>
<td>-.02</td>
<td>.04</td>
<td>-.08</td>
</tr>
<tr>
<td>Course Content.</td>
<td>.06</td>
<td>-.05</td>
<td>.07</td>
<td>.01</td>
<td>-.02</td>
</tr>
<tr>
<td>Proximity to home.</td>
<td>.11</td>
<td>.14</td>
<td>-.09</td>
<td>-.09</td>
<td>-.00</td>
</tr>
<tr>
<td>Quality of Presenter(s).</td>
<td>.00</td>
<td>-.04</td>
<td>.05</td>
<td>.07</td>
<td>.09</td>
</tr>
<tr>
<td>Relevance to own practice.</td>
<td>.01</td>
<td>.03</td>
<td>-.00</td>
<td>-.01</td>
<td>.00</td>
</tr>
<tr>
<td>Personal Interest.</td>
<td>.06</td>
<td>-.11</td>
<td>.11</td>
<td>.06</td>
<td>.07</td>
</tr>
<tr>
<td>Number of CE credits.</td>
<td>.07</td>
<td>.04</td>
<td>.02</td>
<td>.00</td>
<td>-.00</td>
</tr>
<tr>
<td>Self-assessed need.</td>
<td>.22*</td>
<td>.08</td>
<td>.08</td>
<td>.05</td>
<td>.08</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (1-tailed)
** Correlation is significant at 0.01 level (1-tailed)
Appendix XXII. Level of interest in being mentored as a function of sex and age. Responses for “Very” and “Extremely interested” (%).

<table>
<thead>
<tr>
<th>Age: Less than 50 years old</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of interest in being mentored</td>
<td>Sex</td>
<td>Very interested</td>
</tr>
<tr>
<td></td>
<td>Female n=36</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Male n=40</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>F+M n=76</td>
<td>26</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age: Greater than or equal to 50 years old</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of interest in being mentored</td>
<td>Sex</td>
<td>Very interested</td>
</tr>
<tr>
<td></td>
<td>Female n=11</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Male n=45</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>F+M n=56</td>
<td>4</td>
</tr>
</tbody>
</table>
Appendix XXIII. Five year groups (years) by level of interest in being mentored.

<table>
<thead>
<tr>
<th>Five year age group</th>
<th>Level of interest in being mentored</th>
<th>n=</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very interested</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-29</td>
<td>8</td>
<td>4</td>
<td>23</td>
</tr>
<tr>
<td>30-34</td>
<td>6</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>35-39</td>
<td>3</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>40-44</td>
<td>2</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>45-49</td>
<td>1</td>
<td>1</td>
<td>21</td>
</tr>
<tr>
<td>50-54</td>
<td>2</td>
<td>1</td>
<td>21</td>
</tr>
<tr>
<td>55-59</td>
<td>0</td>
<td>1</td>
<td>21</td>
</tr>
<tr>
<td>60-64</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>65-69</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>75-79</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
Appendix XXIV. Level of interest for acting as a mentor or being mentored as a function of type of practice (%).

<table>
<thead>
<tr>
<th>Activity</th>
<th>General practice n=113</th>
<th>Specialist practice n=26</th>
<th>( \chi^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acting as a mentor</td>
<td>Very interested: 23</td>
<td>Extremely interested: 11</td>
<td>Very interested: 46</td>
</tr>
<tr>
<td>Being mentored</td>
<td>18</td>
<td>5</td>
<td>8</td>
</tr>
</tbody>
</table>

Appendix XXV. Correlations: Incentive items by mentor/mentee items.

<table>
<thead>
<tr>
<th>Incentives</th>
<th>As a Mentor?</th>
<th>As a Mentee?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desire to keep up to date with new knowledge and developments.</td>
<td>.14</td>
<td>.18</td>
</tr>
<tr>
<td>Opportunity to improve clinical skills.</td>
<td>.11</td>
<td>.24**</td>
</tr>
<tr>
<td>Opportunity for peer interaction.</td>
<td>.13</td>
<td>-.07</td>
</tr>
<tr>
<td>Need to mitigate risk of litigation.</td>
<td>-.22*</td>
<td>.06</td>
</tr>
<tr>
<td>Opportunity for social interaction.</td>
<td>.00</td>
<td>-.16*</td>
</tr>
<tr>
<td>Opportunity for a working holiday.</td>
<td>-.06</td>
<td>.03</td>
</tr>
<tr>
<td>Venue.</td>
<td>.00</td>
<td>-.04</td>
</tr>
<tr>
<td>Course Content.</td>
<td>.21**</td>
<td>.19*</td>
</tr>
<tr>
<td>Proximity to home.</td>
<td>-.04</td>
<td>.17*</td>
</tr>
<tr>
<td>Quality of Presenter(s).</td>
<td>.20*</td>
<td>.09</td>
</tr>
<tr>
<td>Relevance to own practice.</td>
<td>.02</td>
<td>-.04</td>
</tr>
<tr>
<td>Personal Interest.</td>
<td>.15*</td>
<td>.14</td>
</tr>
<tr>
<td>Number of CE credits.</td>
<td>-.18*</td>
<td>-.01</td>
</tr>
<tr>
<td>Self-assessed need.</td>
<td>.17*</td>
<td>.23**</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (1-tailed)
** Correlation is significant at 0.01 level (1-tailed)
Appendix XXVI. Correlations: Barrier items by mentor/mentee items.

<table>
<thead>
<tr>
<th>Barriers</th>
<th>As a Mentor?</th>
<th>As a Mentee?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal time constraints.</td>
<td>.08</td>
<td>.07</td>
</tr>
<tr>
<td>Registration costs of courses or</td>
<td>-.02</td>
<td>.17*</td>
</tr>
<tr>
<td>conferences.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel &amp; accommodation costs.</td>
<td>.01</td>
<td>.06</td>
</tr>
<tr>
<td>Family commitments.</td>
<td>.18*</td>
<td>.15*</td>
</tr>
<tr>
<td>Lack of locum to cover when away.</td>
<td>.07</td>
<td>.04</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (1-tailed)
** Correlation is significant at 0.01 level (1-tailed)

Appendix XXVII. Correlations: Usefulness factors by mentor/mentee items.

<table>
<thead>
<tr>
<th>Generated factors</th>
<th>As a Mentor?</th>
<th>As a Mentee?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use social</td>
<td>.35</td>
<td>.09</td>
</tr>
<tr>
<td>Use interactive</td>
<td>.11</td>
<td>.35*</td>
</tr>
<tr>
<td>Use passive</td>
<td>.05</td>
<td>.34*</td>
</tr>
<tr>
<td>Use group learning</td>
<td>.21*</td>
<td>.33*</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (1-tailed)
** Correlation is significant at 0.01 level (1-tailed)

Appendix XXVIII. Need for updating technical skills as a function of sex and age of practitioner (%).

**Age: Less than 50 yo**

<table>
<thead>
<tr>
<th>Sex</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female n=36</td>
<td>69</td>
<td>31</td>
<td>47</td>
</tr>
<tr>
<td>Male n=40</td>
<td>50</td>
<td>50</td>
<td>53</td>
</tr>
<tr>
<td>F+M n=76</td>
<td>59</td>
<td>41</td>
<td>100</td>
</tr>
</tbody>
</table>

**Age: Greater than or equal to 50 yo**

<table>
<thead>
<tr>
<th>Sex</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female n=11</td>
<td>73</td>
<td>27</td>
<td>20</td>
</tr>
<tr>
<td>Male n=45</td>
<td>58</td>
<td>42</td>
<td>80</td>
</tr>
<tr>
<td>F+M n=56</td>
<td>61</td>
<td>39</td>
<td>100</td>
</tr>
</tbody>
</table>
Appendix XXIX. Need for updating communication skills as a function of sex and age of practitioner (%).

<table>
<thead>
<tr>
<th>Age: Less than 50 yo</th>
<th>Sex</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need for updating communication skills</td>
<td>Female n=36</td>
<td>17</td>
<td>83</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>Male  n=40</td>
<td>35</td>
<td>65</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>F+M  n=76</td>
<td>26</td>
<td>74</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age: Greater than or equal to 50 yo</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Need for updating diagnosis and treatment planning skills in implantology as a function of sex and age of practitioner (%).</th>
</tr>
</thead>
</table>

Appendix XXX. Need for updating diagnosis and treatment planning skills in implantology as a function of sex and age of practitioner (%).

<table>
<thead>
<tr>
<th>Age: Less than 50 years old</th>
<th>Sex</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need for updating diagnosis and treatment planning skills in implantology</td>
<td>Female n=36</td>
<td>58</td>
<td>42</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>Male  n=40</td>
<td>53</td>
<td>47</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>F+M  n=76</td>
<td>55</td>
<td>45</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age: Greater than or equal to 50 years old</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Need for updating diagnosis and treatment planning skills in implantology</th>
<th>Sex</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female n=11</td>
<td>27</td>
<td>73</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Male  n=45</td>
<td>33</td>
<td>67</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>F+M  n=56</td>
<td>32</td>
<td>68</td>
<td>100</td>
</tr>
</tbody>
</table>
Appendix XXXI. Need for updating diagnosis and treatment planning skills in dento-alveolar surgery as a function of sex and age of practitioner (%).

<table>
<thead>
<tr>
<th>Age: Less than 50 yo</th>
<th>Need for updating diagnosis and treatment planning skills in dento-alveolar surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Yes</td>
</tr>
<tr>
<td>Female n=36</td>
<td>36</td>
</tr>
<tr>
<td>Male n=40</td>
<td>30</td>
</tr>
<tr>
<td>F+M n=76</td>
<td>33</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age: Greater than or equal to 50 yo</th>
<th>Need for updating diagnosis and treatment planning skills in dento-alveolar surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Yes</td>
</tr>
<tr>
<td>Female n=11</td>
<td>0</td>
</tr>
<tr>
<td>Male n=45</td>
<td>24</td>
</tr>
<tr>
<td>F+M n=56</td>
<td>20</td>
</tr>
</tbody>
</table>

Appendix XXXII. Need for updating diagnosis and treatment planning skills in orthodontics as a function of sex and age of practitioner (%).

<table>
<thead>
<tr>
<th>Age: Less than 50 years old</th>
<th>Need for updating diagnosis and treatment planning skills in orthodontics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Yes</td>
</tr>
<tr>
<td>Female n=36</td>
<td>44</td>
</tr>
<tr>
<td>Male n=40</td>
<td>30</td>
</tr>
<tr>
<td>F+M n=76</td>
<td>37</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age: Greater than or equal to 50 years old</th>
<th>Need for updating diagnosis and treatment planning skills in orthodontics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Yes</td>
</tr>
<tr>
<td>Female n=11</td>
<td>18</td>
</tr>
<tr>
<td>Male n=45</td>
<td>18</td>
</tr>
<tr>
<td>F+M n=56</td>
<td>18</td>
</tr>
</tbody>
</table>
Appendix XXXIII. Need for updating diagnosis and treatment planning skills in oral pathology/oral medicine as a function of sex and age of practitioner (%).

<table>
<thead>
<tr>
<th>Age: Less than 50 years old</th>
<th>Need for updating diagnosis and treatment planning skills in oral pathology/oral medicine</th>
<th>Sex</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Female n=36</td>
<td>56</td>
<td>44</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male n=40</td>
<td>60</td>
<td>40</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F+M n=76</td>
<td>58</td>
<td>42</td>
<td>100</td>
</tr>
<tr>
<td>Age: Greater than 50 yo</td>
<td>Need for updating diagnosis and treatment planning skills in oral pathology/oral medicine</td>
<td>Sex</td>
<td>Yes</td>
<td>No</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female n=11</td>
<td>91</td>
<td>9</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male n=45</td>
<td>58</td>
<td>42</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F+M n=56</td>
<td>64</td>
<td>36</td>
<td>100</td>
</tr>
</tbody>
</table>

Appendix XXXIV. Need for updating diagnosis and treatment planning skills in pharmacology as a function of sex and age of practitioner (%).

<table>
<thead>
<tr>
<th>Age: Less than 50 years old</th>
<th>Need for updating diagnosis and treatment planning skills in pharmacology</th>
<th>Sex</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Female n=36</td>
<td>39</td>
<td>61</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male n=40</td>
<td>38</td>
<td>62</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F+M n=76</td>
<td>38</td>
<td>62</td>
<td>100</td>
</tr>
<tr>
<td>Age: Greater than 50 yo</td>
<td>Need for updating diagnosis and treatment planning skills in pharmacology</td>
<td>Sex</td>
<td>Yes</td>
<td>No</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female n=11</td>
<td>73</td>
<td>27</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male n=45</td>
<td>56</td>
<td>44</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F+M n=56</td>
<td>59</td>
<td>41</td>
<td>100</td>
</tr>
</tbody>
</table>
Appendix XXXV. Need to update procedure skills in crown and bridge as a function of sex and age of practitioner (%).

<table>
<thead>
<tr>
<th>Age: less than 50 yo</th>
<th>Need to update procedure skills in crown and bridge</th>
<th>Sex</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Female n=36</td>
<td>42</td>
<td>58</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male n=40</td>
<td>28</td>
<td>72</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F+M n=76</td>
<td>34</td>
<td>66</td>
<td>100</td>
</tr>
<tr>
<td>Age: greater or equal to 50 yo</td>
<td>Need to update procedure skills in crown and bridge</td>
<td>Sex</td>
<td>Yes</td>
<td>No</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female n=11</td>
<td>45</td>
<td>55</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male n=45</td>
<td>18</td>
<td>82</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F+M n=56</td>
<td>23</td>
<td>77</td>
<td>100</td>
</tr>
</tbody>
</table>

Appendix XXXVI. Need to update procedure skills in dento-alveolar surgery as a function of sex and age of practitioner (%).

<table>
<thead>
<tr>
<th>Age: Less than 50 years old</th>
<th>Need to update procedure skills in dento-alveolar surgery</th>
<th>Sex</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Female n=36</td>
<td>47</td>
<td>53</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male n=40</td>
<td>25</td>
<td>75</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F+M n=76</td>
<td>36</td>
<td>64</td>
<td>100</td>
</tr>
<tr>
<td>Age: Greater than or equal to 50 years old</td>
<td>Need to update procedure skills in dento-alveolar surgery</td>
<td>Sex</td>
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<td>No</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female n=11</td>
<td>18</td>
<td>82</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F+M n=56</td>
<td>20</td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>
Appendix XXXVII. Need to update procedure skills in paediatric dentistry as a function of sex and age of practitioner (%).

<table>
<thead>
<tr>
<th>Sex</th>
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<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Female n=36</td>
<td>42</td>
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</tr>
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<td>Male n=40</td>
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<td>72</td>
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<tr>
<td>F+M n=76</td>
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<td>64</td>
<td>100</td>
</tr>
</tbody>
</table>

Age: Greater than or equal to 50 years old

<table>
<thead>
<tr>
<th>Sex</th>
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<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female n=11</td>
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<td>20</td>
</tr>
<tr>
<td>Male n=45</td>
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<td>84</td>
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<td>84</td>
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</table>

Appendix XXXVIII. Need to update procedure skills in implantology as a function of sex and age of practitioner (%).

Age: Less than 50 years old

<table>
<thead>
<tr>
<th>Sex</th>
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<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
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<td>Female n=36</td>
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<td>53</td>
<td>47</td>
</tr>
<tr>
<td>Male n=40</td>
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<td>55</td>
<td>53</td>
</tr>
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<td>F+M n=76</td>
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<td>54</td>
<td>100</td>
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Age: Greater than or equal to 50 years old

<table>
<thead>
<tr>
<th>Sex</th>
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<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female n=11</td>
<td>36</td>
<td>64</td>
<td>20</td>
</tr>
<tr>
<td>Male n=45</td>
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<td>80</td>
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<tr>
<td>F+M n=56</td>
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<td>66</td>
<td>100</td>
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</table>
Appendix XXXIX. Need to update procedure skills in orthodontics as a function of sex and age of practitioner (%).

<table>
<thead>
<tr>
<th>Age: Less than 50 years old</th>
<th>Need to update procedure skills in orthodontics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Yes</td>
</tr>
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<td>28</td>
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<tr>
<td>Male n=40</td>
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<td>F+M n=76</td>
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<table>
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<tr>
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<th>Need to update procedure skills in orthodontics</th>
</tr>
</thead>
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</tr>
<tr>
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<td>9</td>
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<tr>
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<td>11</td>
</tr>
<tr>
<td>F+M n=56</td>
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</tbody>
</table>

Appendix XL. Q58 Providers of CPD should be accredited as a function of sex and age of practitioner (%).

<table>
<thead>
<tr>
<th>Age: less than 50 yo</th>
<th>Providers of CPD should be accredited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Agree</td>
</tr>
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<td>Female n=36</td>
<td>53</td>
</tr>
<tr>
<td>Male n=39</td>
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<td>F+M n=75</td>
<td>49</td>
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<table>
<thead>
<tr>
<th>Age: greater or equal to 50 yo</th>
<th>Providers of CPD should be accredited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Agree</td>
</tr>
<tr>
<td>Female n=11</td>
<td>36</td>
</tr>
<tr>
<td>Male n=45</td>
<td>47</td>
</tr>
<tr>
<td>F+M n=56</td>
<td>45</td>
</tr>
</tbody>
</table>
Appendix XI. Q59 Conferences, courses and clinical days should be weighted with CE credits as a function of sex and age of practitioner (%).

<table>
<thead>
<tr>
<th>Age: less than 50 yo</th>
<th>Conferences, courses and clinical days should be weighted with CE credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td>Agree</td>
</tr>
<tr>
<td>Female n=35</td>
<td>51</td>
</tr>
<tr>
<td>Male  n=39</td>
<td>51</td>
</tr>
<tr>
<td>F+M  n=74</td>
<td>51</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age: greater or equal to 50 yo</th>
<th>Conferences, courses and clinical days should be weighted with CE credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td>Agree</td>
</tr>
<tr>
<td>Female n=11</td>
<td>55</td>
</tr>
<tr>
<td>Male  n=45</td>
<td>51</td>
</tr>
<tr>
<td>F+M  n=56</td>
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</table>

Appendix XLII. Q60 CE credits should be used as evidence of professional competence for re-registration by sex and age of practitioner.

<table>
<thead>
<tr>
<th>Age: less than 50 yo</th>
<th>CE credits should be used as evidence of professional competence for re-registration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td>Agree</td>
</tr>
<tr>
<td>Female n=36</td>
<td>39</td>
</tr>
<tr>
<td>Male  n=38</td>
<td>50</td>
</tr>
<tr>
<td>F+M  n=74</td>
<td>45</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age: greater or equal to 50 yo</th>
<th>CE credits should be used as evidence of professional competence for re-registration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td>Agree</td>
</tr>
<tr>
<td>Female n=11</td>
<td>45</td>
</tr>
<tr>
<td>Male  n=44</td>
<td>36</td>
</tr>
<tr>
<td>F+M  n=55</td>
<td>38</td>
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</tbody>
</table>
Appendix XLIII. Q61 Would you attend a course or programme that did not distribute CE credits? As a function of sex and age of practitioner (%).

<table>
<thead>
<tr>
<th>Age: less than 50 yo</th>
<th>Would you attend a course or programme that did not distribute CE credits?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Yes</td>
</tr>
<tr>
<td>Female n=35</td>
<td>80</td>
</tr>
<tr>
<td>Male n=38</td>
<td>74</td>
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<tr>
<td>F+M n=73</td>
<td>77</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Age: greater or equal to 50 yo</th>
<th>Would you attend a course or programme that did not distribute CE credits?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Yes</td>
</tr>
<tr>
<td>Female n=11</td>
<td>82</td>
</tr>
<tr>
<td>Male n=44</td>
<td>95</td>
</tr>
<tr>
<td>F+M n=55</td>
<td>93</td>
</tr>
</tbody>
</table>
Appendix XLIV. Summary of activities on offer at recent conferences for the ADA, RACDS and ASO.

ADA Federal Conference 2015.

Three days (Thurs Fri Sat) Lecture programme with plenary sessions and multiple sessions with support of lunch time discussion forums.

Four all day hands-on workshops @ $990.00 available covering:

- implantology
- radiology
- restorative dentistry (Two workshops)

These are all limited attendance with advanced booking required.

The NSW ADA 2014 programme offers one day sessions 8.30 to 5.00. the cost is approximately $1000

Hands-on programmes were offered for:

restorative
paediatric dentistry
orthodontics
crown and bridge
local anaesthesia

One day lecture programmes were offered on the following with costs varying from:
$350 to $900

restorative dentistry
implants
endodontics
practice management
patient communications
paediatric dentistry
oral surgery/medicine
RACDS

National Convocations held every two years.

2006, 2008, 2010, 2012, 2014, Scientific programmes are lecture based over four days, including the week-end. There was a combination of plenary sessions with keynote speakers supported by multiple streams of lectures.

Topics covered the broad range of subjects related to the practice of dentistry and the interprofessional relationships with medicine and public health.

Australian Society of Orthodontists (ASO) Conference 2014

The scientific programme was lecture based over three days including the week-end. There was a mix of plenary sessions with the keynote speakers supported by multiple concurrent lectures. Pre and post Congress hands-on courses were also offered at extra cost with limited attendance. These were full day programmes covering the use of orthodontic appliances.

A similar format was used for the previous five conferences.