The knowledge, perceptions, compliance and challenges of Dental Technicians and Technologists in KwaZulu-Natal towards Continuing Professional Development.

Submitted in fulfilment of the requirements for the award of the degree of

Master of Health Sciences: Dental Technology

Department of Dental Sciences, Faculty of Health Sciences,

Durban University of Technology, Durban, South Africa.

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2020

Supervisor: **Date: 31 August 2020**

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Dedication

This dissertation is dedicated to my parents for giving me love, support and encouragement in my life and for moulding me into what I have achieved.

You have half of our gift, I have the other

Together we make a whole

TOGETHER WE ARE MUCH MORE POWERFUL

TWINSOULS

Acknowledgements

The author of the study would like to acknowledge and thank the following people for their kindness, generosity and assistance towards completing this study.

Dr Anisa Vahed, my supervisor, I thank you for all your efforts. I am grateful for your immeasurable and insightful guidance from the time you introduced me to research. Your constructive criticisms, corrections and knowledge of research methodology have impacted positively on me and the completion of this dissertation.

Dr Tufayl Ahmed Muslim, my Co-supervisor, I thank you for your encouragement, enthusiasm, patience and commitment throughout the course of this study.

My Children, Aadil and Husnaa, your sacrifice, support and encouragement have remained a source of motivation.

Mr Deepak Singh, I thank you greatly for assisting me with the statistical section of this study.

Miss Avenal Jane Finlayson and Mrs Sara Bibi Mitha for their expertise in structuring the dissertation and with the referencing.

Mr Francois van der Merwe of Guild, thank you for your assistance with the development of the on-line questionnaire and allowing me to use the Guild Platform to collect data.

I would like to thank Miss Nomvelo Dladla, for being a critical friend and encouragement throughout my studies.

This acknowledgement would not be complete without expressing my appreciation to Dr Gillian Cruickshank. Your expertise in proofreading this dissertation is whole-heartedly appreciated.

Abstract

Literature documents that Continuing Professional Development (CPD) helps to track how practitioners are improving their skills, competency and performance while acquiring new skills to improve the quality of patient care. This process supports health care professionals to maintain, improve and advance their knowledge, skills, ethical and professional behaviour throughout their working life. Annually, dental technicians and technologists are required to provide evidence of their CPD engagement in order to retain their professional registration. This entails accruing a minimum of 30 Continuing Educational Units (CEUs) per annum. Reportedly, dental technicians have expressed their dissatisfaction with the management of CPD by the South African Dental Technicians Council (SADTC). Apart from this, there are no known studies on the challenges experienced by South African dental technicians and technologists concerning CPD compliance, which is required to keep them abreast of international and technological trends. This study therefore aimed to ascertain the knowledge, perception, compliance and challenges of dental technicians and technologists in KwaZulu-Natal (KZN) towards CPD, in order to provide evidence-based information to guide stakeholders in the provision and management of CPD and to inform CPD policy formation and reform initiatives.

This study used a quantitative non-experimental and descriptive research design, which follows a positivism paradigm. The study population involved dental technicians (n = 83) from KZN who completed an online questionnaire, which was underpinned by Kirkpatrick's Four-level Training Evaluation model. The questionnaire mainly focused on dental technicians' awareness, opinions and perceptions of CPD in terms of its delivery, quality of training, barriers to accessing activities and accruing CEUs. Data was analysed using descriptive (Univariate and Bivariate) and inferential (Mann Whitney and Chi Square) statistics (SPSS Version 25®) with the level of significance set at $p<0.05$. Using the principles of thematic analysis, five prominent themes emerged from the open-ended questions. Content validity ensured that the questionnaire focused on concepts and constructs from the literature review on CPD. The reliability of the results was maintained by Cronbach's alpha.

The results of the study revealed that CPD improves professional competency and supports the learning of advancements in technology. This coupled with the ease of access to CPD-related activities and ongoing communication from the SADTC enabled dental technicians and technologists to be CPD compliant. In contrast, the factors constraining dental technicians and technologists from being CPD compliant were their lack of awareness of the various ways to accrue CEUs, the high costs associated with CPD training, as well as a lack of financial and time relief from dental technologists (employers) to attend CPD activities. The attendance-based CPD activities and negligible adherence of the SADTC audit process to the principles of the South African National Standard (SANS 19011) audit document further exacerbated the constraints on compliance.

In view of the results, the study recommends that dental technologists develop internal company policies to assist staff in attending CPD activities and provide more in-house and work-based CPD activities. It is further recommended that the SADTC revise the current Continuous Professional Development CEU accrual document to better align with the advancements of technologies currently taking place within the profession. Future studies should examine the auditing practices used by the SADTC in order to determine its alignment with the guidelines set out in the SANS 19011 audit document.

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Acronyms and Terminology

Within this dissertation various acronyms and terminologies are used as outlined below.

Acronym

CPD	Continuing Professional Development
DUT	Durban University of Technology
SADTC	South African Dental Technicians Council
DENTASA	Dental Technology Association of South Africa
CEUs	Continuing Education Units
UoT	University of Technology
KZN	KwaZulu-Natal
HPCSA	Health Professions Council of South Africa

Terminology

1. Dental Technician: Any person who is registered as a dental technician under Section 18 of the Dental Technicians Act of 1979.

2. Dental Technologist: Any person who has acquired a Bachelor of Technology (BTech) degree or equivalent and who is registered as a dental technologist under Section 18 of the Dental Technicians Act of 1979.

3. Dental laboratory: Any place where artificial dentures or other dental appliances are made, repaired, altered or worked upon, or where any apparatus for the manufacture, repair or alterations of or the working upon such dentures or appliances has been installed.

Chapter One: Introduction

1.1 Background and Context of the Study

Continuing Professional Development (CPD) is a career-long learning and professional development process supporting health care professionals in maintaining, improving and updating their knowledge, skills, ethical and professional behaviour throughout their working life (Wallace and May 2016; General Dental Council 2018). Internationally, CPD critically demonstrates how professionals maintain their knowledge, skills and confidence levels over a career span (Brestovacki and Milutinovic 2011; Sholer *et al.* 2011). Resonating with them, Austin (2013) argued that the indirect benefits of CPD are increasing personal competence and higher levels of job satisfaction. Furthermore, Knox, Cullen and Dunn (2014), van Niekerk (2009) and Dowds and French (2008) have reported that various professions such as education, architecture, accounting and engineering use CPD as a tool to ensure that practitioners deliver optimal service to their clients. Consequently, the CPD process is high on the agenda of professional bodies such as the Health Professions Council of South Africa (HPCSA) (2017) and South African Dental Technicians Council (SADTC) (2019). This is due to the increasing complexity of the clinical and laboratory environments, as well as older techniques becoming obsolete. Notwithstanding this, CPD helps to track how practitioners are improving their skills, competency and performance while acquiring new skills to improve the quality of patient care (Brestovacki and Milutinovic 2011).

Dental technicians and technologists fabricate various fixed and removable prostheses such as implant supported overdentures, crowns and bridges, and orthodontic appliances according to dentists' written instructions (***figure 1.1***). Vahed, McKenna and Singh (2016: 782) elaborated that a "distinctive characteristic of Dental Technology is that it has both theoretical (or know-why) and practical (or know-how) knowledge" required for the professional field of laboratory-based practice, which is regulated by the SADTC. The SADTC adopted CPD as part of their mandate in 2014. Similar to various other professional and statutory bodies such as the HPCSA (2017) and South African Nursing Council (SANC) (2016) requiring health care practitioners to be CPD compliant, the SADTC also requires dental technicians and technologists to be CPD compliant. In order to maintain and renew their annual registration with the SADTC (2016a), dental technicians (employees) and dental technologists (employers)

are therefore required to obtain a minimum of 30 Continuing Educational Units (CEUs) annually.

Figure 1.1: Various dental appliances
Source: *Photographs taken by the author*

As documented in the literature (Al-Jarallah and Premadasa 2003; Al-Sudani 2008; Giriraju, Yavagal and Lakshminarayan 2013) an increasing challenge is the reduced participation rate in CPD activities. Factors contributing to this include a lack of awareness of the CPD requirements and activities; an insufficient number of CPD activities being offered by CPD providers; geographic remoteness of the CPD activities that are being offered; and insufficient support from employers to enable employees to attend CPD activities. Time constraints, insufficient funds, and an overall malaise by health care professionals towards compliance with CPD requirements further exacerbate this issue. As conveyed by the SADTC (2016a), the non-accrual of the required number of CEUs by registered dental technicians and technologists is problematic, especially in light of the aforementioned challenges.

1.2 Statement of the Problem

Annually, dental technicians and technologists are required to provide evidence of their CPD engagement in order to retain their professional registration. At a SADTC road show held in Durban, KwaZulu-Natal (KZN) on the 23rd of June 2018 (South African Dental Technicians Council Road Show 2018), members expressed concern around the issues of non-compliance with CPD by dental technicians and technologists. Notwithstanding this, at an annual general meeting of the Dental Technology Association of South Africa (DENTASA) (2017), members of the profession expressed their dissatisfaction with the management of CPD by the SADTC. This corroborates

the findings of a study by Zondi (2015), who reported that dental laboratory owners perceived that the SADTC was not managing the CPD system effectively. Apart from the aforementioned concerns, it must be noted that no known studies have been conducted on the challenges experienced by South African dental technicians and technologists with regard to CPD compliance, which is required to keep them abreast of international and technological trends.

1.3 Aim

The aim of this study was to ascertain the knowledge, perception, compliance and challenges of dental technicians and technologists in KwaZulu-Natal towards Continuing Profession Development, in order to provide evidence-based information to guide stakeholders in the provision and management of CPD and to inform CPD policy formation and reform initiatives.

1.4 Objectives of the Study

Using an online questionnaire, this study elicited the:

1.4.1. Knowledge of CPD by dental technicians and technologists in KZN.

1.4.2. Perceptions towards CPD by dental technicians and technologists in KZN.

1.4.3. Compliance rates of dental technicians and technologists in meeting the CPD requirements.

1.4.4. Challenges, if any, faced by dental technicians and technologists in meeting the CPD requirements.

1.5 Rationale of the Study

Significantly, at both individual and profession-wide levels, CPD critically supports the professional development and autonomy of the practitioner (Kennedy 2014). Notwithstanding this, CPD provides evidence–based information that can be used to develop and reform CPD in the dental technology profession while enforcing policy practices (Chao *et al*. 2009). The aforementioned authors emphasised that CPD needs to be understood from both pedagogical and policy perspectives, in order to facilitate an improved understanding of the factors influencing health professionals' compliance

with CPD. The SADTC audits dental technicians and technologists annually for CPD compliance. As previously mentioned, SADTC members acknowledged that there has been a lack of compliance with CPD by dental technicians and technologists, thereby adversely affecting the growth of the profession in terms of members' registration with the council (South African Dental Technicians Council Road Show 2018). It is concerning that dental technicians and technologists who are not CPD compliant may not be allowed to register with the SADTC in the subsequent years. The arguments of the SADTC above formed the basis of this study, especially with the view that the results may provide evidence-based recommendations. The results may also be useful to stakeholders such as DENTASA in policy development and review, and assist in providing information that may lead to informed decisions being made on CPD provision and management in the future.

1.6 Assumptions

It was assumed that the dental technicians and technologists completed the survey sincerely and without bias.

1.7 Delimitations

Only dental technicians and technologists who reside in KZN and are registered with the SADTC were eligible to participate in the study. A point that needs to be mentioned is that this was the first study in CPD amongst dental technicians and technologists in South Africa. It can be extrapolated to provide the basis for future studies in other provinces.

1.8 Structure of the Dissertation

The dissertation is divided into five chapters. This chapter detailed the background and context of the study by highlighting the benefits and challenges of CPD nationally and internationally. Subsequently, the problem statement, aims and objectives, rationale for the study, assumptions, and delimitations were outlined.

Chapter 2 presents an extensive review of the literature and explicitly details the four inter-related elements, namely: the impact of and concerns relating to CPD; mandatory practice of CPD and the SADTCs CPD framework; factors enabling and constraining CPD; and the challenges experienced by dental technicians and technologists in KZN.

Chapter 3 describes the research design and paradigm that was followed. The pilot and main phases of the research are expounded in terms of selection of sample population, data collection and analyses, and validity and reliability.

Chapter 4 discusses the results obtained from the questionnaire. It further discusses the CPD compliance amongst dental technicians and technologists. Tables and figures have been used to support the results and discussion.

Chapter 5 is the final chapter and presents the conclusions drawn from the study, as well as identifying limitation(s) and providing future directions for the research.

Chapter Two: Literature review

This chapter reviews literature related to CPD and is structured into three sections ***(Figure 2.1)***, which details the SADTCs CPD system, factors enabling and constraining CPD, and related challenges.

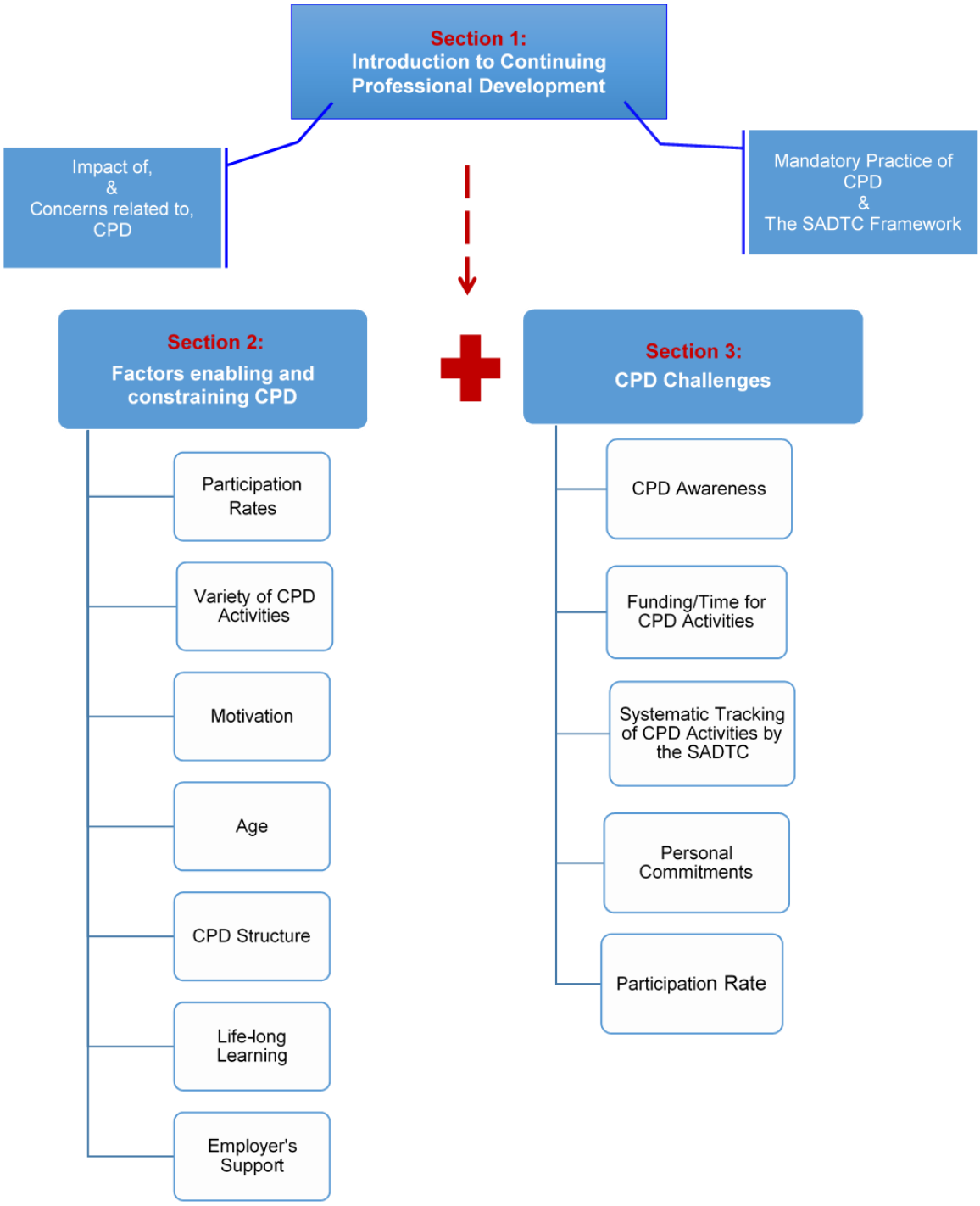

Figure 2.1: Overview of the Literature Review

2.1. Introduction

In a rapidly evolving healthcare system factors such as legislative, social and economic developments directly affect the environment, whilst technological advancements provide radically different ways of working. Continuing Professional Development became prominent in the 1990s, as statutory bodies required evidence-based monitoring of health professionals who were more adaptable to their working environment (Sims 1994; Gopee 2001; Ryan 2003). The CPD system ensures that professionals improve and maintain their knowledge and skills by keeping astride of developments within their field of professional practice (Cantillon and Jones 1999; van Vuuren and Nel 2013). Internationally, CPD is defined as learning that occurs outside undergraduate or postgraduate training which aims to maintain and improve performance within a specific scope of practice (Health Professions Council of South Africa 2017).

Arguably, accruing CEUs empowers professionals by increasing their knowledge, boosting their confidence, increasing their credibility, improving their productivity and quality of work, and equipping them with tools to cope positively with change (Brestovacki and Milutinovic 2011; Gibbs 2011; Opfer and Pedder 2010). Austin (2013) highlighted that CPD participation is a reassurance mechanism of workplace competence for professionals to improve their skills and continuously improve and advance their knowledge. Ideally, CPD should be patient-centred (Hegney *et al.* 2009; Gibbs 2011; Nsemo *et al.* 2013; Mizuno–Lewis *et al.* 2014). From a legal perspective, van Niekerk (2009) and Barnes *et al.* (2013) pointed out that CPD may assist in reducing litigation as professionals are obligated to ensure that their professional knowledge is well maintained and regularly updated. Additionally, dental technicians and technologists could become more knowledgeable in understanding the rules and regulations of the profession, thus reducing the incidence of *ultra vires* decisions. In support of the aforementioned authors, the HPCSA (2018) outlined that the primary purpose of CPD is to enable healthcare professionals to become lifelong learners by punctually renewing and revising their skills, knowledge and ethical approach to promote and intensify professional integrity.

Concerningly, several authors reported that most evaluations of CPD activities focused on perceived benefits rather than objectively assessing the impact of outcomes (Sutherland and Leatherman 2006; Eaton *et al*. 2011; Chisholm, Shipway and Tong 2012; Mathers, Mitchell and Hunn 2012; Firmstone *et al*. 2013). They argued that professionals tend to have a 'tick box' mentally, that is, an attitude of simply attaining the mandatary CEUs without fully engaging in the specific CPD activity. In corroboration with the aforementioned authors, Nsemo *et al.* (2013) reported that healthcare professionals mainly participated in CPD activities because it is a mandatory requirement to enable them to practice their profession, and not necessarily to advance their knowledge and skills. Schafheutle, Hassell and Noyce (2013) therefore advised that dental professionals should focus on the intended outcomes of the CPD activity, instead of basing their attendance on the number of CPD points. This is consistent with Newsome and Langley's (2014) study, which argued that CPD compliance should be outcomes based as opposed to points based.

Equally important, Weglicki, Reynolds and Rivers (2015) argued as to whether CPD is a form of re-certification as it is unclear to what extent it is achieving its intended purpose of maintaining professional competency, especially as per statutory body standards. Several authors have noted that participating in CPD activities is an indicator of practitioners' engagement and is not necessarily a confirmation of their learning (Vernon *et al*. 2015; Mathers, Mitchell and Hunn 2012; Chisholm, Shipway and Tong 2012; The Royal College of Surgeons of England 2007). Wallace and May (2016) therefore asserted that practitioners should be more self-reflective of the learning acquired from engaging in CPD activities. In support of these authors' assertion, a report by the HPCSA (2017) highlighted that nuanced approaches are to be encouraged when measuring the effectiveness of CPD activities. For example, a healthcare practitioner can develop a professional development plan to identify areas for improvement and link it to CPD participation. Consequently, quantitative and qualitative approaches can be used to effectively measure the impact of CPD activities.

As part of their mandate, which is contained in the Health Professions Act of 1974 (Act No. 56 of 1974 - as amended), the HPCSA outlines that registered practitioners are obligated to comply with CPD requirements in order to maintain their registration (Health Professions Council of South Africa 2017). Continuing Professional

Development is therefore a mandatory requirement for South African healthcare workers who fall under the ambit of the HPCSA. In response to the constructs of Section 26 of the Health Amendments Bill of 2006, the HPCSA developed a framework to guide practitioners in meeting the requirements of CPD programmes. Similarly, the Dental Technicians Act of 1979 (as amended) officially included CPD on the 12 May 2014 (South African Dental Technicians Council 2016b). The CPD framework guides dental technicians and technologists on how to become CPD compliant, particularly in delivering high-quality dental services. This mandate finally aligns with statutory bodies in other countries, such as the Dental Board of Australia (2015) and the Dental Council of Ireland (2015).

In conjunction with maintaining and monitoring CPD activities, the SADTCs CPD framework guides dental technicians and technologists on methods to acquire and accrue CEUs annually (South African Dental Technicians Council 2016a). A CEU is defined as being a unit of credit that is equal to an hour of participation in an accredited or unaccredited activity, and provides evidence of CPD completion (South African Dental Technicians Council 2016a). As per the SADTCs requirements 30 CEUs need to be obtained annually, which is part of the annual audit process. Moreover, and in reviewing the literature, a point that needs to be mentioned is that there appears to be an absence of known research on the above within a South African context. More evidence-based research is therefore required to assess factors enabling and constraining CPD participation, especially in strengthening the link between CPD accreditation and improved quality of practice. Hence, the point of departure for the next section will be the factors enabling and constraining CPD participation.

2.2. The Factors Enabling and Constraining CPD Participation

Generally, the extent to which professionals integrate the knowledge acquired from a CPD activity into their professional practice is more often linked to specific reasons for participating in the CPD activity (Rothes, Lemos and Goncalves 2014). Aiga (2006) and Mathers, Mitchell and Hunn (2012) argued that the dual benefit for healthcare professionals in engaging with a CPD activity is to improve dental technicians and technologists skills and increase their professional knowledge. Other personal

reasons may include supporting community engagement and non-governmental organisation (NGO) projects and to achieve their personal learning goals.

Despite CPD being a mandatory requirement by the various statutory bodies, several authors reported on the challenges associated with low CPD participation and compliance rates (Eaton *et al*. 2011; Sholer *et al*. 2011; Mathers, Mitchell and Hunn 2012; Anderson, Pang and Aarts 2012; Barnes *et al*. 2013; Johnson *et al*. 2014; Prescott-Clement *et al*. 2015). For instance, a study conducted in Germany in 2009 amongst dentists participating in CPD activities (Sholer *et al*. 2011) revealed that only 63% of the participants engaged in CPD activities. They further noted that professionals working in the private sector participated regularly in CPD in comparison to those employed in the public sector. Another study by Pool, Poell, and Cate (2013) reported that professionals working shifts engaged less with CPD activities. Resonating with the above authors, Castillo and Caruana (2014) confirmed that practitioners' personal and family commitments adversely influenced their availability to attend CPD activities, which exacerbated CPD participation rates.

Gould, Papadopoulos and Kelly (2014) reported that workshops and conference attendance were the more common forms of CPD participation. Attendance-based CPD activities, however, are considered less effective modes of learning than peer discussions on technical or professional issues (Council of Medical Colleges of New Zealand 2016). Nsemo *et al*. (2013) asserted that the most effective type of CPD engagement is interactive educational meetings and learning related to clinical practice. They therefore advised practitioners to attend CPD activities that enable them to acquire both knowledge and skills that enrich their professional practice.

In contrast to the conventional methods of CPD engagement, Govranos and Newton (2014) and Stokes *et al.* (2015) reported that online CPD related activities are increasing because of the ease of accessibility, flexibility and convenience. This enables professionals to plan their learning around their work and personal commitments. Moreover, online CPD courses and webinars can be comparatively cheaper and a more affordable option than traditional learning methodologies. For example, Moonasar (2018) argued that there are no commuting costs for delegates or the trainer, and course materials are made easily available and accessible online. The distinguishing elements of an online CPD course is that it is an automated system

where the operational processes are streamlined to ultimately reduce time wastage. The Society and College of Radiographers (2019) has elaborated that in view of there being no physical classrooms or laboratories, online CPD activities provide a personalised space for professionals to learn comfortably. Essentially, online CPD allows knowledge to be transferred without the constraints of geographical locations. Gould, Papadopoulos and Kelly (2014) have cautioned, however, that online learning is not for individuals who are not self-directed. Cognisance of the aforementioned factors affecting participation rates was taken into account in the design and development of the questionnaire, which is discussed later in the methodology chapter.

Hegney *et al*. (2009) have identified motivation as being a significant factor influencing CPD participation among healthcare practitioners. They contended that learning is ineffective in the absence of a strong motivation to participate in the activity. For example, and as explained by Gunn and Goding (2009), physiotherapists are motivated to develop professionally due to their professional obligations and their desire to deliver a quality service. James and Francis (2011) further elaborated that the motivational factors for individual CPD engagements are improved performance; earning a higher income; becoming more employable; expanding individual network; and building credibility and confidence within the profession. Similarly, Gray, Rowe and Barnes (2014) reported that the confidence levels of nurses in Australia were bolstered when their patients acknowledged their professionalism and skills. This positively motivated them to further their knowledge and to be CPD compliant. In contrast, the studies of Ikenwilo and Skatun (2014) and Marshall, Punys and Sykes (2006) revealed a lack of motivation among senior practitioners to engage in CPD activities.

As inferred from several other studies, CPD appears not to be a priority among professionals who are above 60 years old and who are in practice for more than 10 years. For example, Pool, Poell, and Cate (2013) identified ‘age group’ as a factor contributing to low CPD participation. In their study, professional nurses in the 30-40 year age group participated more in CPD activities than those who were aged 60 years and older. Similarly, Ikenwilo and Skatun (2014) and Aparicio (2015) asserted that professionals who have been in a position for more than a decade do not necessarily prioritise engagement with CPD activities. In fact, Laal, Laal and Aliramaei (2014) pointed out that the younger professionals preferred technology and media when

engaging with CPD. Equally important, Mizuno-Lewis *et al*. (2014) noted that different learning preferences were evident among nursing professionals across various age groups. For example, nursing professional between 20–29 years of age preferred web-based and online courses whereas professionals older than 40 preferred to attend formal CPD activities. This is pertinent to this study, especially in view of the fact that the average age of dental technicians and technologists at the 2018 DENTASA Annual General Meeting (AGM) ranged between 55 and 65 years.

Notably, healthcare professionals predominantly attend CPD activities organised by their respective statuary societies and voluntary associations because it is structurally planned and organised professionally (General Dental Council 2018). At a DENTASA AGM (2018), dental technicians and technologists expressed their discontentment regarding the structure of CPD activities. In particular, they conveyed that the availability of online courses for dental technicians and technologists is limited, especially for those who are unable to attend the annual DENTASA workshops and AGM. The associated high costs, which at times is beyond their budget, makes it even more difficult for them to attend CPD activities organised by DENTASA and the SADTC. Cognisance was taken of the aforementioned factors in the design and development of the research questionnaire.

Aliramaei (2014) reported that CPD enhances lifelong learning as professionals are afforded the opportunity to keep their knowledge current, learn new skills, and pursue a wide variety of interests through intellectual growth and expansion. This is consistent with other studies (Laal 2013; Laal, Laal and Aliramaei 2014; Talati 2014), which have proffered that academic and accreditation organisations, governments, employers and the public recognise and support life-long learning as one of the most significant competencies that professionals must possess. A recognised benefit of CPD is that it enriches professionals' lifelong learning skills, which enables them to remain relevant and continue to provide safe and effective oral healthcare to patients. Several other studies (Brestovacki and Milutinovic 2011; Gibbs 2011; Opfer and Pedder 2010; Recker-Hughes *et al*. 2010) have highlighted that completing CPD increases the confidence and credibility of professionals, thereby enabling them to demonstrate their achievements within their practice. Factors associated with life-long learning were also considered in the design and development of the research questionnaire.

More recently, the report by the General Dental Council (2018) critically pointed out that professional development training of professionals is frequently overlooked and is perceived to be unappreciated in terms of employee retention and recruitment. Following this, the Society and College of Radiographers (2019) have highlighted that employees attending professional development training programmes perform better and it also prepares them for positions of greater responsibility. Moreover, ongoing financial support from employers who support their employees to attend CPD reassures them that their skills remain relevant in an increasingly competitive laboratory environment, which is rapidly transforming with the advent of digital dental techniques and the introduction of new materials and methods. Computer-aided design and computer-aided manufacture lab-side systems, for example, combine the high competence of the dental technician with digital technologies (Anon. 2019). Furthermore, and as acknowledged by Gibbs (2011), increasing staff competence and skill-levels through CPD activities can effectively improve their flexibility in performing additional discipline-specific tasks. This can save the costs of employing more specialised professionals in the medium to long term.

Resonating with Gibbs (2011), Mizuno–Lewis *et al*. (2014) argued that having a number of employees undertake CPD, whether concurrently or over a period of time, allows for the sharing of best practice and support between colleagues. Ultimately, this contributes to maximising staff potential, improves morale and provides a useful benchmark for annual appraisals. Apart from the positive attributes the aforementioned authors, together with several other studies, have documented the challenges related to being CPD compliant (Castle, Holloway and Rage 1998; Gawugah, Jadva-Patel and Jackson 2011; Gibbs 2011; Henwood and Flinton 2012; Ikenwilo and Skatun 2014; Mizuno-Lewis *et al*. 2014; Summers 2015). The next section focuses on challenges experienced by healthcare professionals in order to be CPD compliant.

2.3. CPD Challenges experienced by healthcare professionals

Eaton *et al. (*2011) and Mathers, Mitchel and Hunn (2012) reported on the perceived challenges experienced by healthcare professionals, particularly emphasising the potential risk to patients if CPD requirements are not adequately addressed. The most common challenges cited by Anderson, Pang and Aarts (2012), Barnes *et al.* (2013),

Johnson *et al.* (2014) and Summers (2015) were the limited provision of CPD activities in discipline-specific areas, and a loss of income experienced by professionals who attend CPD training programmes during their normal working days. High costs were also incurred when professionals participated in CPD activities outside their working hours. The findings of the Annual Report of the HPCSA (2017), together with a study by Moonasar (2018) further support this perspective. In particular, the demanding working environment, irregular working patterns, increased family commitments, and affective factors such as negative attitude and lack of motivation had limited professionals to complete the annual CEU requirements. More recently, a report by the South African Dental Technicians Council (2019) revealed high levels of CPD non-compliance caused by regulations which are written ambiguously and often 'couched in very lenient terms'. Importantly, CPD non-compliance "…means that the public is exposed to practitioners whose knowledge and skill is not refreshed/updated through council-validated CPD interventions" (South African Dental Technicians Council 2019: 23). Some of the factors identified above, which were pertinent to this study, are further elaborated on in the sections below.

2.3.1 CPD Awareness

The HPCSA regularly conducts conferences, roadshows and symposia to encourage healthcare professionals to engage in CPD activities (Health Professions Council of South Africa 2018). At some of these events, cost effective methods of CPD engagement such as reading journal articles and online activities are conveyed to healthcare professionals. Despite this attempt and the regularity of CPD events, Moonasar (2018) critically cited a lack of awareness of the various CPD activities as the predominant contributing factor for healthcare professionals not being compliant. Similarly, and despite the efforts made by the SADTC in engaging dental technicians and technologists through countrywide roadshows, there has been a low response rate to these events by the profession (South African Dental Technicians Council Roadshow 2018).

2.3.2 Funding and Time for CPD activities

Henwood and Flinton (2012) and Nsemo *et al.* (2013) identified the lack of funds to attend CPD events as the most common cause of CPD non-compliance. In corroboration with the aforementioned authors, Johnson *et al*. (2014) elaborated that the associated high costs to attend or participate in CPD events was observed amongst professionals working in rural areas. Employers and statutory bodies not supporting the funding to attend CPD events further exacerbates this issue (Summers 2015). Unless there is no registration fee and the CPD activity is within working hours, professionals are generally reluctant to attend CPD events and activities. The lack of time to participate in CPD activities was cited by Henwood and Flinton (2012) and Mathers, Mitchell and Hunn (2012) as a barrier to CPD compliance. Summers (2015) elaborated that work commitments and extended working hours contributed extensively to professionals not having the time to participate in CPD activities. More recently, Moonasar (2018) noted that staff shortage is a contributing factor in professionals being unable to attend CPD activities. This can be alleviated, however, through online CPD activities such as the review of journal articles.

2.3.3 Systematic tracking of CPD activities

From the perspective of evidence-keeping of CPD activities, professionals confirmed that time was a challenge in tracking their own CPD activities frequently and systematically (Naidoo 2016). Councils such as the Pharmaceutical Society of Northern Ireland (2016) and the General Pharmaceutical Council (2016) have therefore implemented online CPD monitoring systems to reduce the aforementioned challenge. Similarly, the SADTC uses 'Pluto online Platforms', which is an online monitoring company, to allocate CEUs and to track CPD participation. This assists members to easily monitor and track CEUs acquired from CPD engagements.

2.3.4 Family Responsibilities

Various authors (Gawugah, Javda-Patel and Jackson 2011; Mathers, Mitchell and Hunn 2012; Naidoo 2016) have documented that the demands and responsibilities related to being a parent, married and employed full-time are factors contributing to professionals not engaging with CPD. As cited in the studies mentioned above, taking

care of younger children or ageing parents contributes to increased family commitments, which adversely affects professionals in being unable to attend CPD events. To find and maintain a balance between family and work responsibilities is therefore a challenge. Dental technicians and technologists who attended a recent DENTASA (2019) meeting held in Durban had similar opinions.

2.3.5 Motivation for CPD participation

Notably, healthcare professionals take responsibility for the planning and engagement of their own CPD engagement. This requires support from employers, particularly ensuring that employees engage with CPD timelessly (Henwood 2000; Munro 2008; Mathers, Mitchell and Hunn 2012). Munro (2008) proffered that the employers should extrinsically motivate employees, as this potentially enables them to become intrinsically motivated to engage in CPD events and activities. Instead, Munro (2008) reported that employers devalued the support of external CPD education, which inevitably inhibits the growth of employees. Employees who are funded by employers to attend accredited courses or who have a facilitator to help them learn their discipline-specific area, by contrast, have increased motivation. A report by the South African Department of Labour (2018) revealed that on average an individual spends eight hours a day engaging with work or work-related tasks. Motivation is therefore a critical factor in the workplace.

In addition, Nsemo *et al.* (2013) and Mizuno-Lewis *et al.* (2014) argued that employers also tended to provide limited support to their employees because they trivialised the importance of CPD engagement. In fact, some employers preferred to follow a 'tick box' approach by completing questionnaires in accruing the minimum CEUs annually. Consequently, this stagnates the professional growth and development of employees. Austin (2013) and Ikenwilo and Skatun (2014) therefore advised the need for employers to adopt a 'pro-CPD culture' to increase employees' motivation and to learn new techniques and skills. This, in turn, would benefit the workplace and increase employees' job satisfaction. Moreover, Archer *et al.* (2015) argued that the literature on self-directed and self-reflective learning is unclear, and that the evidence found from their study does not provide definitive guidance on whether CPD should, or should not, be included in re-registration policies of professional and regulatory bodies.

A critical point that needs to be mentioned is that the SADTC (2016a) is considering CPD compliance as a criterion for dental technicians and technologists to register annually.

Overall, this literature review has outlined the challenges associated with the structural and functional design of CPD and the accruing of CEUs by dental technicians and technologists. This was explained using a discussion on the factors enabling and constraining CPD participation and engagement. Subsequently, a brief explanation on CPD awareness; funding and time for CPD activities; systematic tracking of CPD activities; family responsibilities and the motivation for CPD participation followed. The foregoing literature review, however, also revealed that there are many unanswered questions. The philosophical stance of the research design and methodological rationale used in the present study are described in Chapter Three, followed by Chapter Four which systematically examines and reports on the knowledge, perception, compliance and challenges of dental technicians and technologists in KwaZulu-Natal towards CPD.

Chapter Three: Research Design and Methodology

This chapter details the quantitative and descriptive cross-sectional research design and methodology used to understand the knowledge, perceptions, compliance and challenges of CPD experienced by dental technicians and technologists in KwaZulu-Natal. Notably, this study used a two-part research design namely, a pilot and a main study. Initially, the reasons for conducting the pilot study are explained, followed by the methodological description of the main study.

3.1 Introduction to Research Design and Methodology

Research methodology is the specific procedures or techniques used to identify, select, process, and analyse information about a topic. Researchers follow a specific research methodology path to conduct their research. Furthermore, it shows the path through which a researcher formulates their problem and objectives and present their results from the data obtained during the study period (Creswell 2019).

Observation and deductive reasoning provided the basis for the initiation of this study. The SADTC and DENTASA members acknowledged that there has been a lack of compliance with CPD by dental technicians and technologists (South African Dental Technicians Council Road Show 2018; Dental Technology Association of South Africa 2017). This non-compliance adversely affects the growth of the profession in terms of members' registration with the council. In conjunction with this, the SADTC audits dental technicians and technologists annually for CPD compliance. Furthermore, Mr Goosen (SADTC council member) critically pointed out that there is a "flattening growth as members are decreasing, which is placing the SADTC in a precarious position" (South African Dental Technicians Council Road Show 2018).

Leedy and Ormrod (2010), and Polit and Beck (2012) highlighted that quantitative research is used to explain, predict, and control phenomena that can be generalized to other persons and places. They elaborated that quantitative research does not attempt to detect cause-and-effect relationships in an effort to change or manipulate phenomena. Instead, it is a formal, objective, systematic process to obtain information and describe variables and their relationships. Resonating with the aforementioned

authors, Khaldi (2017) noted that the main characteristic of a quantitative research design is that a formal measuring instrument is used to provide numeric information, which is statistically analysed. This confirms that the paradigm of positivism is being followed. Positivism is premised on a knowable world that can be measured objectively and quantifiably (Khaldi 2017).

Traditionally, research paradigms make certain assumptions about the world 'that is'; in the case of this study, there is an objective reality that researchers ought to try and uncover as they conduct their research (Merriam and Tisdell 2016). There is also an assumption that the role of the researcher is neutral and the main purpose is to discover an objective reality. More recently, Kivunja and Kuyini (2017) outlined that a positivistic orientation assumes that reality exists 'out there' and that it is observable, stable and measureable. In addition, the aforementioned experts posited that a cross-sectional study is conducted at a single point of time, and in the case of this study is dependent on the opinions of participants who may differ around key characteristics yet are similar in other characteristics. Moreover, a cross-sectional study may be entirely descriptive and used to assess the frequency and distribution of the research area in a particular population group.

3.2 Pilot Study

The pilot study was used to validate the questionnaire. In heeding the advice of Khaldi (2017), the pilot study further assisted in determining the feasibility of the main study by testing the efficiency of the research instrument and protocols, identifying variables of interest and deciding how to operationalize each one.

3.2.1 Research Setting, Sample Population and Sampling Strategy

The sample population consisted of registered dental technicians and technologists in KZN. Initially, and as conveyed to the researcher in an email sent by Ms Fraser (SADTC administrator) on the 17 April 2019, there are 114 registered dental technicians in KZN[1]. As guided by the statistician (personal communication with Mr

[1] Dental technicians and technologists are registered with the SADTC as technicians. The list obtained from the SADTC does not differentiate between employers and employees. Cognisance of this was taken in the design of the questionnaire.

Singh on 24 April 2019), a 10% sample of the study population (n=11) was used for the pilot study. Participants were randomly selected from the list of dental technicians (n=114) obtained from the SADTC. As recommended by Alvi (2014), this involved an independent person selecting numbers from a hat to ensure equal probability of selection. The numbers drawn were recorded until 11 participants were selected **(Table 3.1)**. The participants from the pilot study were excluded for the main study.

Table 3.1: Summary of Participants

Participants	Gender	Race
1	Female	Indian
2	Female	Black
3	Male	White
4	Male	Black
5	Female	White
6	Female	Black
7	Female	Black
8	Male	Indian
9	Female	Indian
10	Male	Indian
11	Female	Black

3.2.2 Data Collection

Dental technicians and technologists completed an anonymised 'custom designed' questionnaire, which detailed several demographic variables. As illustrated in **Appendix 1**, there were five sections with a total of 26 survey questions, some of which were 5-point Likert scale questions. There were also six open-ended questions, which allowed free responses about CPD participation and suggestions for accruing CEUs. While evaluation has long been an integral part of learning, researchers struggle with developing an evaluation system that measures the value of the learning function. Various evaluation models have been considered, however Kirkpatrick's four level evaluation model (2013) presented in ***Table 3.2*** continues to be widely used and

adapted to other evaluation models to date. As illustrated in ***Table 3.3*****,** Kirkpatrick's Four-Level Training Evaluation Model (2013) critically guided the development of the questionnaire.

Table 3.2: Kirkpatrick's Four-level Training Evaluation model

Level	Component of Change	Description
Level 1	Reaction: Attendance to CPD activities	Evaluates dental technologist and technicians' satisfaction with a CPD activity/training through data relating to their perception/satisfaction with the programme, delivery, instructors, and environment.
Level 2	Learning acquired from attending CPD activities	Evaluates dental technologists and technicians' changes in knowledge, skills, or attitudes from attending CPD activities.
Level 3	Behaviour Change	Evaluates the post-learning behaviour or the performance of dental technologist and technicians in her or his laboratory.
Level 4	Organizational Performance of the dental laboratory	Evaluates the tangible results (such as improvement in laboratory practice, and other quantifiable aspects of organizational performance) from CPD activities.

3.2.3 Data Collection and Analysis

Ethical clearance **(IREC 011/19)** to collect data was obtained from the Durban University of Technology institutional research ethics committee **(*Appendix 3*)**. Participants completed written consent forms ***(Appendix 2)***, which also explained the purpose together with the ethical requirements of the study. Data was collected over a two week period. To maintain credibility of the data collection processes, prior arrangements were made with each participant to complete the questionnaire, which after completion was placed into a sealed box. The research supervisor opened the box containing the completed questionnaires and ensured that the data were correctly recorded. Subsequently, the data was statistically analysed using SPSS (Version 25®). Descriptive (univariate and bivariate analysis) and inferential (Mann Whitney test and Chi Square Test) statistics were used to analyse the data ($p<0.05$).

Table 3.3: Questionnaire aligned with Kirkpatrick's Training Evaluation model

Sections of the Questionnaire		Corresponding level of Kirkpatrick Training Evaluation Model
1	Focuses on dental technicians/technologists demographic details.	N/A
2	Assesses the dental technicians/ technologists opinions and perceptions of CPD in general.	**Level 1 – Reaction** *(Dental technologist and technicians' satisfaction with the CPD, its delivery, the CPD instructors, and overall environment)*.
3	Aims at measuring CPD awareness.	**Level 1 – Reaction** *(Dental technologist and technicians' satisfaction with the CPD, its delivery, the CPD instructors, and overall environment)*.
4	Uses a 5-point Likert scale to assess CPD participation. It further includes open-ended questions to provide valuable qualitative data.	**Level 2 – Learning** *(Evaluates dental technologist and technicians' changes in knowledge, skills, and attitudes from attending CPD activities).*
5	Assesses the barriers that dental technicians/technologists face regarding CPD.	**Level 1 – Reaction** *(Dental technologist and technicians' satisfaction with the CPD, its delivery, the CPD instructors, and overall environment)*.
6	Provides a platform for the dental technician/technologist to provide suggestions to facilitate the achievement of CEU's.	**Level 3 – Behaviour Change** *(Evaluates the post-learning behaviour or the performance of dental technologist and technicians in her or his laboratory).*

3.2.4 Validity and Reliability of the Questionnaire

Content validity ensured that the survey questionnaire focused on the concepts and constructs that emerged from the review of literature on CPD. The reliability of the questionnaire was assessed through Cronbach's alpha index, which indicates whether a questionnaire is accurately designed in terms of measuring the variables of interest and measures the latent variables, hidden or unobservable variables (Tavakol and Dennick 2011).

3.2.5 Results of the Pilot Study

In consultation with the statistician (Personal communication with Mr Singh on 2 June 2019), there was a bi-directional flow or negative covariance for ***Question 9.6*** in ***Appendix 1*** – "*In my opinion CPD is costly to the dental technician/ technologist*". This

question was therefore rephrased as "*In my opinion CPD is **not** costly to the dental technician/ technologist".*

3.3 Main Study

This phase of the study endeavoured to assess dental technicians' and technologists' perceptions, compliance and challenges with CPD. A point that deserves to be mentioned is that this study developed an online questionnaire to collect the data, which is the point of departure for the next section.

3.3.1 Structural and Functional Design of the Online Questionnaire

In July 2019 a partnership was entered between the researcher and Mr Francois van der Merwe who is the founder of Guild, an online knowledge management systems company. Guild provides a complete and non-biased CPD administration and analytics system that provides multi-level and data-driven insights into the nature and progress of CPD within a mandated profession. The Guild system focuses on output-based learning, which is achieved through automatic organising, tracking and submission of CPD related activities. As this study demonstrates, an advanced survey and questionnaire builder was developed using Ecmascript2015, HTML5 (Hypertext Mark-up Language) and CSS3 (Cascading Style Sheet). This functions via the Google Cloud Platform, which supports single page applications. A critical point to be noted is that prior to participants completing the online questionnaire, the supervisor checked for internal consistency by testing and retesting the online questionnaire. This helped to ensure that questions were correctly phrased and that the system did not create any potential bias.

In view of the objectives of the study (***Section 1.4***), an additional question on the participant's geographic location of their current employment (*"In which province are you currently (or last) employed/working")* was included in the online questionnaire **(*Appendix 4*)** to enable Guild to select participants from KZN only. Dental technicians' and technologists' email addresses were obtained from the SADTC list of registered and practising members (Personal communication with Ms Fraser, SADTC administrator on 17 April 2019).

From a systems perspective, dental technicians and technologists had a single entry into the system. Structurally, Guild ensured that dental technicians and technologists could stop at any point and complete the questionnaire at their own pace and convenience. Re-entry into the system, however, was not permitted after the complete submission of the questionnaire online. The Guild system tracked dental technicians and technologists using their TE numbers. This was important for the SADTC to award the 10 CEUs earned. Notably, the awarding of 10 CEUs is in response to dental technicians and technologists expressing at the 2018 DENTASA AGM that a self-reflection of their experiences on the CPD system would enable them to develop further. The SADTC CPD committee therefore supported the inclusion of a new sub-category (Sub-category F6, "*Participating in a survey or completing a questionnaire that is aligned to a formal postgraduate qualification"*) to the SADTC CPD 006 framework, which is a guiding document on the methods of accruing CEUs **(*Appendix 5*)**.

3.3.2 Sampling Strategy, Target Population and Research Setting

Purposeful sampling was used to select and invite registered dental technicians and technologists (*n=103*) in KZN to complete the online questionnaire. Purposeful sampling is a technique that involves identifying and selecting individuals or groups of individuals knowledgeable about, or experienced with, a phenomenon of interest (Creswell 2019).

3.3.3 Data Collection, Data Analysis, Validity and Reliability

Data collection occurred from the 9 - 30 November 2019. Following the completion of an online consent form ***(Appendix 2)***, dental technicians and technologists completed the online questionnaire via a link (https://guild.expert/), which they received through the SADTCs short messaging system (SMS) and email platform. The data was statistically analysed (SPSS Version 25®) as per the explanation in ***Section 3.2.3***, with $p<0.05$ set as significantly different.

In considering the advice of Scharp and Sanders (2018) and Vaismoradi and Snelgrove (2019), the open-ended data from the survey was analysed by thematic

coding. This included organising and categorising the data into manageable themes, patterns, trends and/or relationships. The analysis of the observations occurred at two levels. Firstly, by capturing the common phrases from the responses in the questionnaire. This is referred to as first level coding, which is the process of analysing qualitative text data by taking them apart to see what they yield before putting the data back together in a meaningful way (Creswell 2019). This led to the common phrases being grouped into sub-themes and main themes. This is referred to as second level coding which is the process of identifying segments of text that are better suited in smaller codes rather than just one larger theme. This two-level analysis valuably created a conceptual space in providing a creative way of understanding the open-ended responses. As previously explained in ***Section 3.2.4,*** content validity and Cronbach's Alpha was used to maintain the validity and reliability of the study.

Overall, this chapter has explained the research design and methodology used in this study. The subsequent chapter provides a detailed discussion of the results.

Chapter Four: Results and Discussion

This chapter presents the results and discussion of the research by addressing the objectives outlined in Chapter One, that is to elicit the: (1) knowledge of CPD by dental technicians and technologists in KZN; (2) perceptions towards CPD by dental technicians and technologists in KZN; (3) compliance rates of dental technicians and technologists in meeting the CPD requirements; and (4) challenges experienced by dental technicians and technologists in fulfilling CPD requirements. Results were statistically analysed to examine the objectives outlined above, which are supported by tables and figures. As previously mentioned ***(See Section 1.7 in Chapter 1)***, the results presented in this chapter are from dental technicians and technologists who reside in the province of KZN. Direct quotations from the open-ended questions are stated verbatim and are italicised. The chapter concludes with a summary of the results and discussion.

4.1 Demographic Information of Dental Technicians and Technologists who participated in the study

The demographic characteristics of dental technicians[2] namely, age, gender, marital status, discipline specialisation and highest qualifications obtained are presented in ***Table 4.1***. Nulty (2008) identified that online surveys yield an average response rate of 33.3%. From 103 potential participants, 83 dental technicians in KZN responded to the survey. This constitutes a response rate of 81%, which is deemed to be acceptable.

As illustrated in ***Table 4.2***, the ratio of males to females who participated in the study was approximately 3**:**2 (*57.8%**:**42.2%*). From the respondents, 25% were females within the age category of 30 to 39. This formed 14.5% of the total age group who participated in the study. The majority of dental technicians who participated in the study were between 30 and 50 years old (74.7%). The participants' age range was between 26 - 66 years old with an average mean age of 42 years old.

[2]Dental technicians and technologists are registered with the SADTC as technicians. A dental technician graduates with a National Diploma in Dental Technology and is recognised as an employee. A dental technologist graduates with a Bachelor of Technology in Dental Technology and can be an employee and employer. The list obtained from the SADTC does not differentiate between dental technicians and technologists. From this point forward, dental technicians and technologists will be referred to as dental technicians.

Table 4.1: Summary of Frequency and Percentage of Participants' Demographics

Category	Frequency	%
Age	**n = 83**	**%**
20 – 29	9	10.8
30 – 39	33	39.8
40 – 49	29	34.9
50 – 59	9	10.8
60 – 69	3	3.6
70 +	0	0
Gender	**n = 83**	**%**
Male	48	57.8
Female	35	42.2
Marital Status	**n = 83**	**%**
Divorced	15	18.1
Married	36	43.4
Single	30	36.1
Widow	2	2.4
Specialization	**n = 83**	**%**
Cobalt chrome	5	6
Crown & bridge	18	21.7
Orthodontics	14	16.9
Prosthetics	13	15.6
Multidiscipline	33	39.8

Category	Frequency	%
Highest Professional Qualification	**n= 83**	**%**
National Diploma	21	25.3
National Higher Diploma	21	25.3
B Tech	38	45.8
M Tech	3	3.6
D Tech	0	0
Employment Status	**n = 83**	**%**
Employee	47	56.6
Laboratory owner	36	43.4
No. of Years Employed as a Dental Technician / Technologist	**n = 83**	**%**
1 – 9	20	24.2
10 – 19	38	45.9
20 – 29	17	20.2
30 +	8	9.7
Member of Professional Association	**n = 83**	**%**
Yes	44	53
No	39	47

Table 4.2: Gender distribution by age

Age Group	%	Male	Female	Total
20 - 29	Count	6	3	9
	% within Age	66.7%	33.3%	100.0%
	% within Gender	12.5%	8.6%	10.8%
	% of Total	**7.2%**	**3.6%**	**10.8%**
30 - 39	Count	12	21	33
	% within Age	36.4%	63.6%	100.0%
	% within Gender	25.0%	60.0%	39.8%
	% of Total	**14.5%**	**25.3%**	**39.8%**
40 - 49	Count	19	10	29
	% within Age	65.5%	34.5%	100.0%
	% within Gender	39.6%	28.6%	34.9%
	% of Total	**22.9%**	**12.0%**	**34.9%**
50 - 59	Count	8	1	9
	% within Age	88.9%	11.1%	100.0%
	% within Gender	16.7%	2.9%	10.8%
	% of Total	**9.6%**	**1.2%**	**10.8%**
60 - 69	Count	3	0	3
	% within Age	100.0%	0.0%	100.0%
	% within Gender	6.3%	0.0%	3.6%
	% of Total	**3.6%**	**0.0%**	**3.6%**
Total	**Count**	**48**	**35**	**83**
	% within Age	57.8%	42.2%	100.0%
	% within Gender	100.0%	100.0%	100.0%
	% of Total	**57.8%**	**42.2%**	**100.0%**

Consistent with Mizuno-Lewis *et al.* (2014), and as depicted in ***Table 4.1,*** dental technicians between the ages of 30-39 preferred engaging in online CPD activities such as questionnaires. Dental technicians older than 40 years, by contrast, preferred formal face-to-face CPD interaction. This correlates with the average age of dental technicians attending the 2018 DENTASA AGM. Moreover, the accounts from the open-ended questions corroborate this:

> *"I prefer face to face interaction. Online is good but to learn at my age is difficult, face to face is a better learning tool".*

> *"CPD should be hands-on and face to face. When I studied, everything was thought to me directly and dental technology is a hands-on profession not online".*

There were also a higher number of married (43.4%) than single (36.1%) respondents, together with 18.1% who were divorced. With regard to professional specialisation, 6% of dental technicians in KZN specialise in Cobalt Chrome; 21.7% Crown and Bridge; 16.9% Orthodontics; 15.7% Prosthetics; and 39.8% are multidiscipline dental technicians ($p<0.001$). In terms of respondents' employment status, no significant difference was found between dental technologists, who constituted 43.4% of the total sample population, and employees who constituted 56.6% of the total sample population.

In addition to their diploma, the results revealed that 75% of the respondents have achieved a higher qualification in Dental Technology ***(Figure 4.1)***. A fair percentage of dental technicians (53%) in KZN belong to a Dental Technology professional association ($p=0.583$).

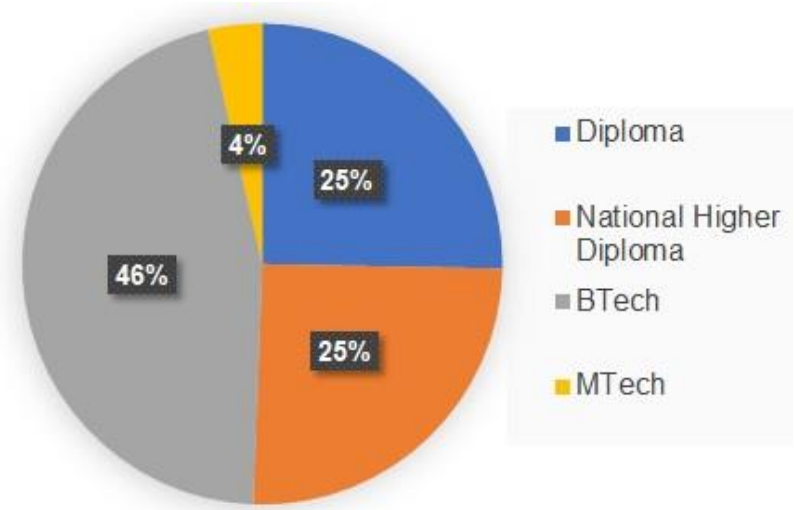

Figure 4.1: Professional Qualification of Dental Technicians

4.2 Reliability Statistics

The Cronbach's alpha value reflected in ***Table 4.3*** was above 0.70, which suggests that respondents scored consistently for all items in the questionnaire.

Table 4.3: Cronbach's alpha scores

Question	Number of Items	Cronbach's alpha
Q9	7	0.931
Q10	3	0.887
Q13	8	0.938
Q17	4	0.793
Q18	3	0.730

4.3 Correlations

Appendix 5 shows the Spearman's Correlations, which were computed across the five sections of the Likert scale. It is worth noting that a positive Spearman's Correlation value indicates a direct proportional relationship between the variables, whereas a negative value indicates an inverse relationship. There was a general

trend in the analysis across the negative correlations, which are further explained in subsequent sections of this chapter.

4.4 Kaiser-Meyer-Olkin Measure of Sampling Adequacy, Bartlett's Test of Sphericity, Factor Analysis and Chi-Square Results

Factor Analysis was performed for the data obtained from the Likert-Scale questions to identify underlying variables and to explain the pattern of loading within a set of observed variables. As shown in ***Table 4.4***, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO >0.50) and Bartlett's Test of Sphericity (p<0.05) test results indicated that the data was factor analysable.

Table 4.4: KMO and Bartlett's Test

Question	Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Bartlett's Test of Sphericity		
		Approx. Chi-Square	df	Sig
Q9	0.891	576.502	21	0.000
Q10	0.707	142.071	6	0.000
Q13	0.879	587.476	28	0.000
Q17	0.683	130.788	6	0.000
Q18	0.661	51.408	3	0.000

With the exception of Question 10, the factor analysis results revealed that the average loading of items per theme for all questions was above the acceptable Eigen values (>0.5) ***(Table 4.5)***. This implies that the statements that constituted these questions perfectly measured what it set out to measure. It is noted that the variables that constituted Question 10 loaded along two components (sub-themes), which suggests that respondents identified different trends in terms of their perceptions of CPD, generally.

Table 4.5: Rotated Component Matrix

Question Number	Question	Component 1	Component 2
9. Opinions of CPD in general			
9.1	Improves Professional Competency	0.921	
9.2	Improves Knowledge	0.895	
9.3	Improves Practical Skills	0.933	
9.4	Improves Professional Standards	0.930	
9.5	Supports learning for advancing technology	0.939	
9.6	Is not costly to the Dental Technician / Technologist	0.288	
9.7	Is an investment to the employer	0.865	
10. Perceptions of CPD in general			
10.1	Conducted during working hours	0.014	0.997
10.3	Conducted as a webinar	0.871	0.121
10.4	Conducted as a pre-recorded lecture	0.934	-0.047
10.5	Conducted as an online lecture	0.903	-0.031
13. I am aware of			
13.1	Requirements for CPD compliance?	0.846	
13.2	Importance of CPD?	0.778	
13.3	Purpose of CPD?	0.791	
13.4	Number of CEU's required annually?	0.886	
13.5	Random audits conducted by the SADTC every 2 years?	0.846	
13.6	Penalties for non-compliance?	0.852	
13.7	Guidelines made available by the SADTC?	0.855	
13.8	CPD opportunities available?	0.824	
17. I have access to			
17.1	Online Journals	0.591	
17.2	Opportunities to undertake CPD	0.859	
17.3	Transport to attend CPD activities	0.925	
17,4	Funds to attend CPD workshops / Seminars	0.743	
18. My CPD participation is hindered by			
18.1	Limited time	0.801	
18.2	Limited financial support	0.763	
18.3	Being unable to participate due to shortage of staff	0.851	

4.4.1 Objective 1: To elicit the knowledge of CPD by dental technicians and technologists in KZN.

The reaction criteria of the Kirkpatrick's Four-level Training Evaluation model ***(Section 3.2.2 in Chapter 3 – Table 3.2)*** guided Section 2 *(opinions and perceptions)* of the questionnaire.

4.4.1.1 Opinions on CPD

With the exception of Question 9.7, the Chi-square results ($p<0.05$) presented in ***Table 4.6*** indicate that there were significant differences between the way respondents scored.

Table 4.6: Chi square Results: Opinions of CPD

Question	Chi Square p-value
9.1 Improves Professional Competency	0.000
9.2 Improves Knowledge	0.000
9.3 Improves Practical Skills	0.000
9.4 Improves Professional Standards	0.000
9.5 Supports learning for advancing technology	0.000
9.6 Is not costly to the Dental Technician / Technologist	0.000
9.7 Is an investment to the employer	0.092

Note: *$p<0.05$ indicates that there were significant differences between the way respondents scored.*

As depicted in ***Figure 4.2,*** there were high levels of agreement amongst dental technicians with regards to CPD improving professional competency (61%); knowledge (69.5%); practical skills (54.9%); and professional standards while supporting learning for advancements in technology (67%). Analogous to Mathers, Mitchell and Hunn (2012), it can be inferred from the results in ***Figure 4.2*** that dental

technicians participate in CPD activities to improve various professionally based skills. Excerpts from the open-ended questions further corroborate this:

> *"As a specialised Orthodontic Laboratory I attend CPD courses to update my knowledge and improve my skills as the profession advances rapidly."*

> *"CPD is good as it keeps us abreast. It helps with keeping us updated with the most practical skills. The knowledge we learnt at university, it helps enhance it."*

> *"I am aware that CPD is an advantage to our knowledge, skills, and advancement in the industry. It assist with me acquiring new skills and knowledge."*

Despite the positive responses above, a small number (12%) of dental technicians noted that:

> *"Attending CPD activities are a waste of time and takes me away from my work. I have the skills and knowledge I obtained from the university."*

> *"CPD does nothing for me. Sitting at the table and doing work is important in learning. We waste too much time doing these activities and we learn only for that time."*

Dental technicians strongly disagreed that CPD is cost effective (76.9%). This finding resonates with Henwood and Flinton (2012), Nsemo *et al*. (2013) and Johnson *et al*. (2014), who cited that the most common cause of CPD non-compliance was the associated high costs. Consequently, dental technicians conveyed that:

> *"Attending all of these courses are very expensive. When we started this course at university, no one told us we will need to attend CPD training."*

> *"CPD attending is always expensive and sometimes unnecessary."*

> *"Going for these CPD exercises are costly and we as lab owners do not have the time or money to go for all these things, especially if we are 1 man labs."*

> *"Money is a problem. Dental technicians are paid very little. We cannot afford to attend for all these CPD activities".*

"Living in a small town it means travelling to and from places to get the CPD point. I do not have the fund to attend CPD activities in the bigger cities all the time".

Although there was a low level of agreement about CPD being an investment for the employer (43.9%), it was still higher than the levels of disagreement (32.9%). Nsemo *et al*. (2013) and Mizuno-Lewis *et al*. (2014) revealed that employees received limited support to attend CPD activities as their employers perceived that there are no professional rewards and recognition in CPD participation. Contrary to their findings, participants in this study confirmed that CPD is an investment to the employer.

Dental technicians' accounts from the open-ended questions corroborate this:

"Employers and workers benefit from CPD opportunities. The lab benefits."

"Definitely an investment to the individual and the employer. Although attending all the time does get costly, there is positive benefit for both."

"CPD is definitely good for dental techs and lab owners. They need to improve the quality of work produced. Dentists are upgrading all the time. Dental Techs and labs need to keep updated."

Dental technicians, who believed that CPD was not an investment, conveyed that:

"The employee must be responsible for their own CPD. They cannot expect employers to pay for everything. If they leave work, they take their knowledge with them."

"CPD is very expensive to go for. I do not think it helps us in any way."

"No one from our lab is expected to attend any courses. If anyone attends, it must be on their own as CPD auditing is an individual thing, not the lab."

It must be noted that the challenges associated with CPD being expensive are further addressed later in this chapter.

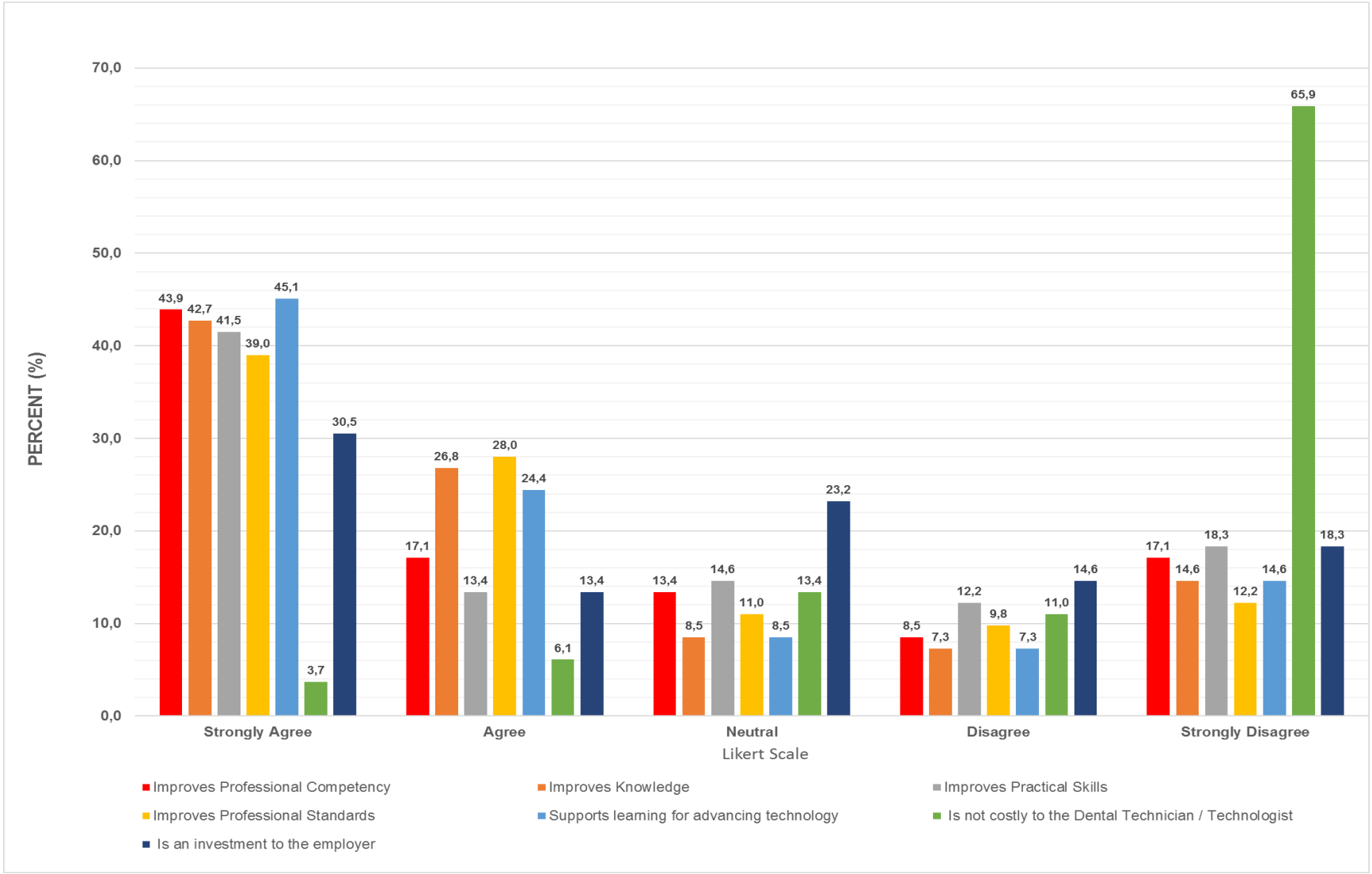

Figure 4.2: Dental Technicians' and Technologists' Opinions of CPD

4.4.2 Objective 2: To elicit the perceptions towards CPD by dental technicians and technologists in KZN.

4.4.2.1 Perceptions of CPD

The Chi-square results (p<0.05) presented in ***Table 4.7*** shows that there were significant differences in the way respondents scored.

Table 4.7: Chi square Results: Perceptions of CPD

Question	Chi Square p-value
10.1 Conducted during working hours.	0.000
10.2 Conducted after working hours / weekends.	0.000
10.3 Conducted as a webinar.	0.000
10.4 Conducted as a pre-recorded lecture.	0.000
10.5 Conducted as an online lecture.	0.000

Note: *p<0.05 indicates that there were significant differences between the way respondents scored.*

As illustrated in ***Figure 4.3***, a fair percentage of dental technicians (43.9%) agreed that CPD activities should be conducted during working hours. Although this result is commensurate with the findings of various studies (Anderson, Pang and Aarts 2012; Barnes *et al*. 2013; Johnson *et al*. 2014; Summers 2015), dental technicians conveyed that this can risk them earning an income:

> *"If I attend during my normal working time. I will have to put in unpaid leave. It means that my income is at risk, therefore, after hours and weekends are the correct times for CPD activities."*

> *"Must be done after hours. We work during the day. If done during working time, I will not get paid for that time I am away from the lab."*

In contrast to the above results, 41% of dental technicians preferred attending CPD activities over the weekends and after hours:

> *"Being a lab owner. We are available only after hours and weekends. During the working time, it becomes a problem."*
>
> *"Excellent if it is done only on weekends. We need to earn money during working hours."*
>
> *"I am a single mum. I own my own lab. I work alone with a plaster assistant. I cannot attend during working hours. I can definitely attend weekends."*
>
> *"My weekend are my time. CPD should be done during any other time. We must be able to separate work and home time."*

Furthermore, and as presented in Appendix 5, the results of the Spearman's correlations indicated that the value between CPD activities "conducted during working hours" against those "conducted after working hours / weekends" is -0.863. It can be inferred that dental technicians who complete CPD training during working hours do not necessarily participate in CPD activities after working hours or over weekends, and *vice versa*. This is consistent with the studies of Gawugah, Jadva-Patel and Jackson (2011), Mathers, Mitchell and Hunn (2012) and Naidoo (2016). Dental technicians stated that *"when they do CPD, working time is the best"* and *"if they do it during working time, they do not do any CPD during weekends".* They further indicated that "*Weekends is their time to rest, not work".*

Another point that deserves to be mentioned is that 14% of dental technicians did not see the merit of attending CPD activities:

> "*I do not do CPD because it is useless. We learnt at college, what more they want us to do. We work and learn at the same time*."
>
> "*I do not think it should happen at all, even if it is online, webinar or anything else. CPD activities have no value."*

The aforementioned results support the SADTCs (2019) claim that there are high levels of CPD non-compliance amongst their members.

In terms of an online delivery mode, a higher percentage of dental technicians confirmed that CPD should be conducted as webinars (80.5%); pre-recorded (82.9%); and online (84.2%) lectures ***(Figure 4.3)***. These results resonate with Stokes *et al*. (2015) and Moonasar (2018), who reported that online CPD related activities and webinars are easily accessible and cost effective. They declared that:

> *"CPD offered on digital media would be more time efficient and cost effective".*
>
> *"Online Surveys are much more convenient and accessible for all".*
>
> *"Online, webinars are perfect. It will allow us to do it at our leisure. It is flexible and can be done at our own time at home, afterhours."*
>
> *"Webinars are easy. Online is convenient. I am not based in any major city. It allows me to do it at my convenience and I do not have to travel".*

Apart from training materials being available online, a virtual CPD system "reduces travelling costs" such as "airfares and accommodation". Furthermore, and corroborating with Govranos and Newton (2014) and Stokes *et al.* (2015), professionals can learn in the comfort of their own personalised space. Notably, apart from an online automated CPD system lessening the administrative burden of a cumbersome manual process by streamlining the CPD operational processes, CEUs can be effectively monitored and tracked. This is consistent with Gould, Papadopoulos and Kelly (2014) and the Society and College of Radiographers (2019).

In contrast to an online CPD delivery platform, some respondents maintained that while *"online is good",* "*face-to-face is a better learning tool".* Hence, they suggested that *"CPD should be hands-on, as dental technology is a hands-on profession".* Apart from confirming Vahed, McKenna and Singh's (2016) description of the Dental Technology profession, which was outlined in Section 1.1 of Chapter 1, the aforementioned results support Gould, Papadopoulos and Kelly's (2014) argument that face-to-face CPD activities provide personalised engagements between CPD facilitators and participants.

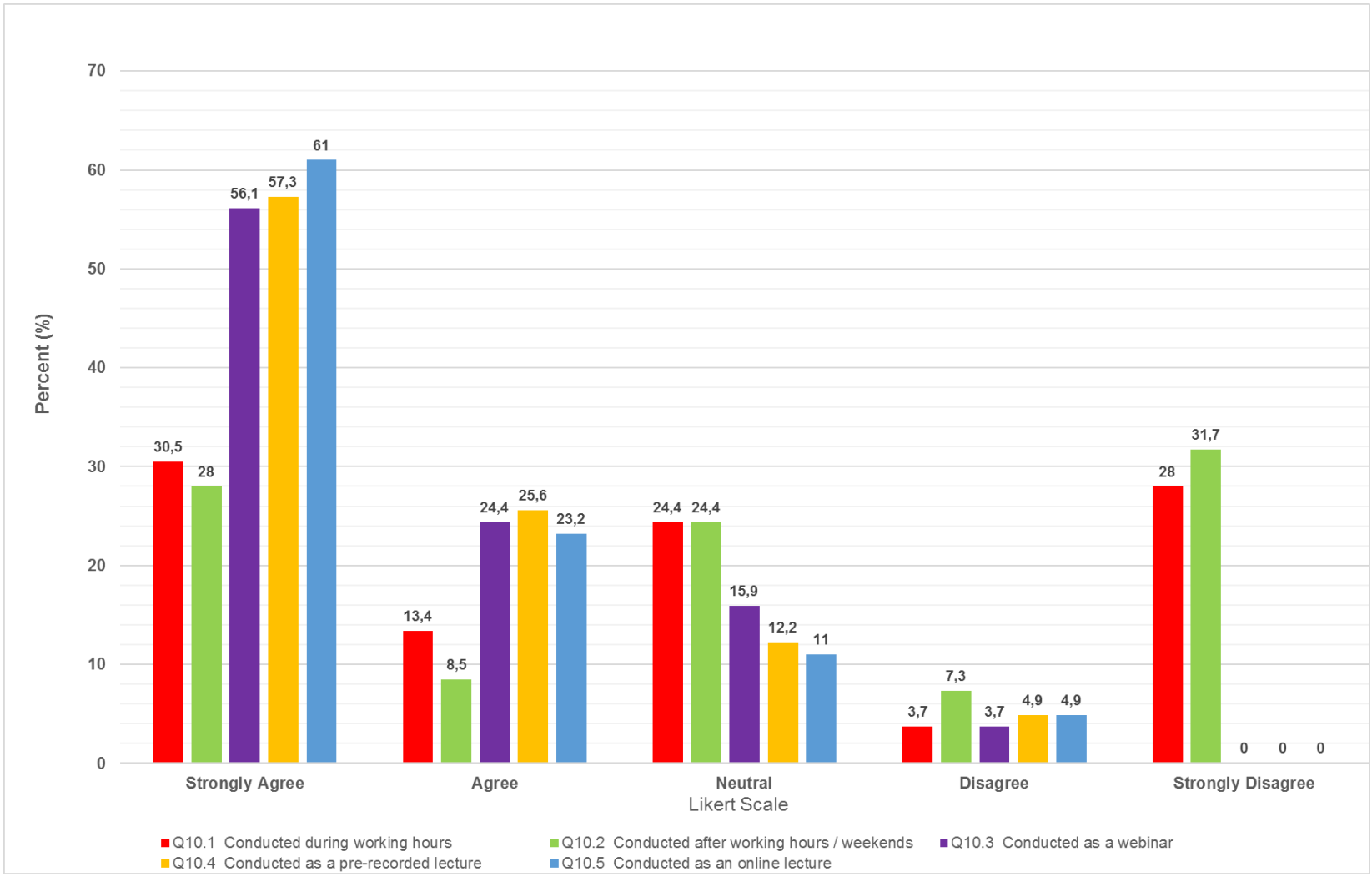

Figure 4.3: Dental Technicians' and Technologists' Perceptions of CPD

Table 4.8: Chi square Results - General awareness of CPD

Questions	Chi Square p-value
13.1 Requirements for CPD Compliance?	0.000
13.2 Importance of CPD?	0.000
13.3 Purpose of CPD?	0.000
13.4 Number of CEU's required annually?	0.000
13.5 Random audits conducted by the SADTC every 2 years?	0.000
13.6 Penalties for non-compliance?	0.002
13.7 Guidelines made available by the SADTC?	0.004
13.8 CPD opportunities available?	0.988

Note: *p<0.05 indicates that there were significant differences between the way respondents scored.*

There were low levels of awareness amongst dental technicians on the penalties for non-compliance (43.9%); guidelines made available by the SADTC (41.5%); and CPD opportunities available to the profession (34.1%). Similar to the findings of Moonasar (2018) where healthcare professionals were not compliant because they were unaware of the CPD guidelines and opportunities to accrue CPD points, dental technicians declared that:

> *"Coastal (Eastern Cape) & Rural technicians (Free state, Northern KZN, Northern Cape, Karoo, etc) do not have the opportunities technicians in areas such as Gauteng, Durban & cape Town have to earn CPD - The guidelines and ways to get our CPD needs to better defined".*

> *"I do not get to know anything from the council. I am unaware of the guidelines and how to achieve my CPD goal for the year."*

> *"I do not know of any guidelines and penalties. I think that the SADTC must send us a full document with everything about CPD."*

It can further be argued that a dental technician being unaware of CPD guidelines is a result of them not regularly accessing the SADTC website to keep astride of the Council's information. This is supported by 70% of dental technicians, who confirmed

that they were aware of CPD being mandatory and monitored by the SADTC. In fact, 60% confirmed that they frequently visited the SADTC website:

> *"By visiting the SADTC website, I am informed and updated. I also keep ahead of the game with my compliance".*

> *"As a lab owner and dental technician. I have to ensure that I keep abreast of the latest news regarding the profession, therefore visit the SADTC website and I know all of the above".*

It is noted, and a cause for concern, that 40% of dental technicians intentionally chose not to visit the SADTC website:

> *"I do not visit the SADTC website, because it is useless. I am a people person. I like if they come see me face to face to inform me of the requirements".*

> *"I do not visit the SADTC website. I do not see the importance of doing any CPD courses".*

> *"I do not visit website. I do not know how to acquire my minimum number of CPD points and what are the consequences of me not meeting them every year."*

From the aforementioned statements, it can be gathered that dental technicians who are not accessing CPD information and activities through the SADTC website are disadvantaging themselves by not keeping up with the technological advancements in laboratory-based practices. This supports Laal (2013), Laal, Laal and Aliramaei (2014) and Talati's (2014) arguments that CPD non-participation adversely Influences the upskilling of professionals, which is critical to them providing credible oral healthcare services to the patient.

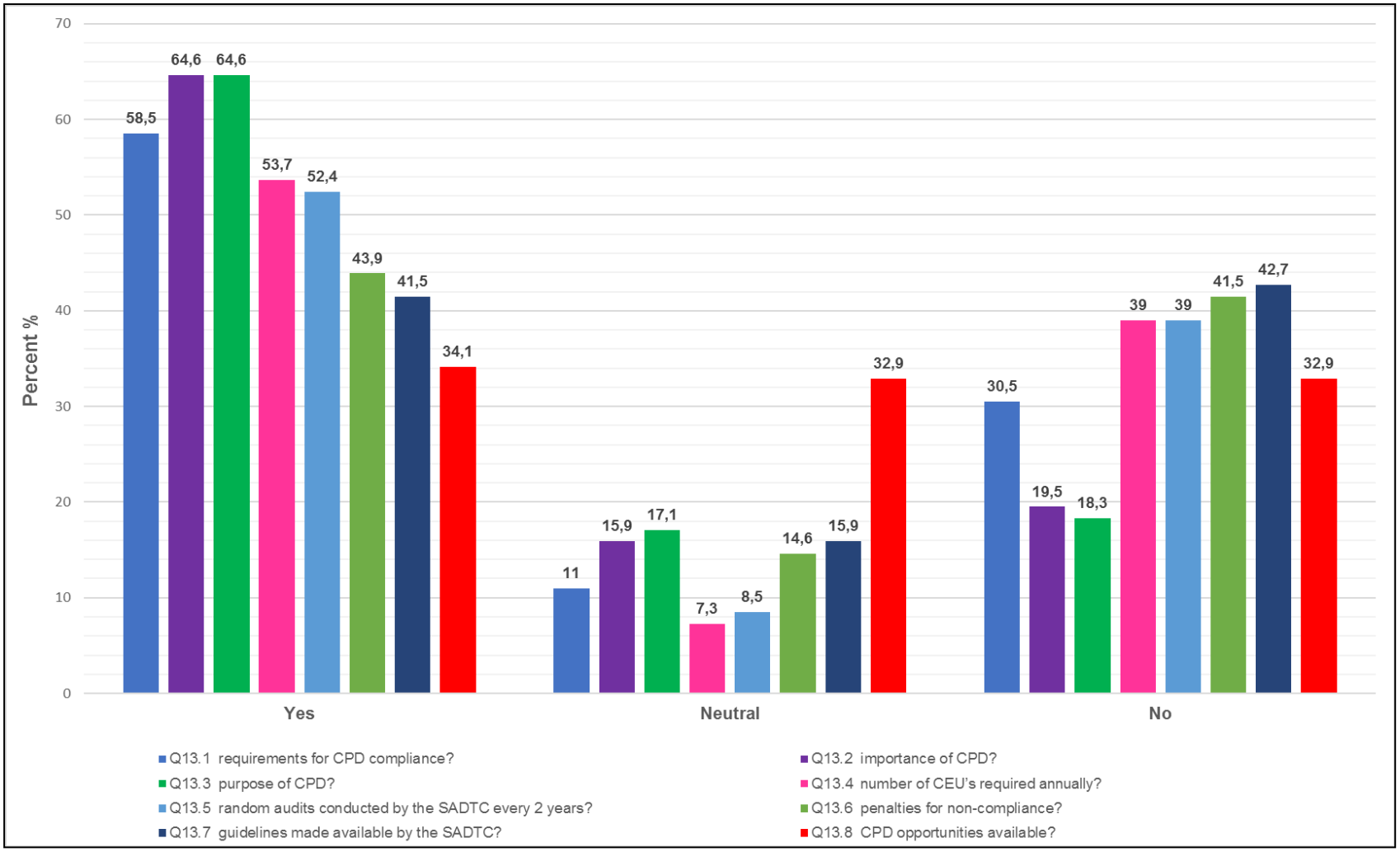

Figure 4.4: Dental Technicians and Technologists Awareness of CPD

With reference to ***Question 14*** of ***Appendix 4,*** it must be noted that the selection of more than one option was allowed. The results reported in the section below therefore reflect the number and not the percentage of dental technicians who responded per option of accruing CEUs. From a list of 17 options in ***Figure 4.5***, dental technicians confirmed that attending or presenting at conferences and seminars (n=59); responding to a CPD approved questionnaire (n=56); and attending an annual general meeting (AGM) of an accredited professional association (n=40) are the most common methods of accruing CEUs. This correlates with Gould, Papadopoulos and Kelly's (2014) findings. Although considered as the least effective modes of learning, the above authors revealed that workshops and conference attendance were the popular forms of CPD participation. The open-ended excerpts from dental technicians further corroborate this:

> *"I attend Dentasa AGM and lectures. Although it is costly and time consuming, I ensure I attend since it is mandatory".*

> *"Completing online questionnaire like this is perfect. I would not normally do CPD, but because it's an easy online questionnaire, I am doing it".*

> *"I attend roadshow, conferences and AGMs. I like to see people and interact with them".*

Although outlined in the CPD 006 document of the SADTC ***(Appendix 5)***, article publication (n=23) and attending Dental Technology curriculum meetings (n=22), by contrast, were revealed to be uncommon methods of accruing CEUs. In light of the ongoing debates on curriculum structure of the recently approved Bachelor of Health Sciences (BHSc) in Dental Technology, which is to be implemented in 2021, there is a glaring absence of the profession's involvement with training institutions (Dental Technology Association of South Africa 2018). The recommendations from the recent accreditation of the Dental Technology programme at DUT further support this.

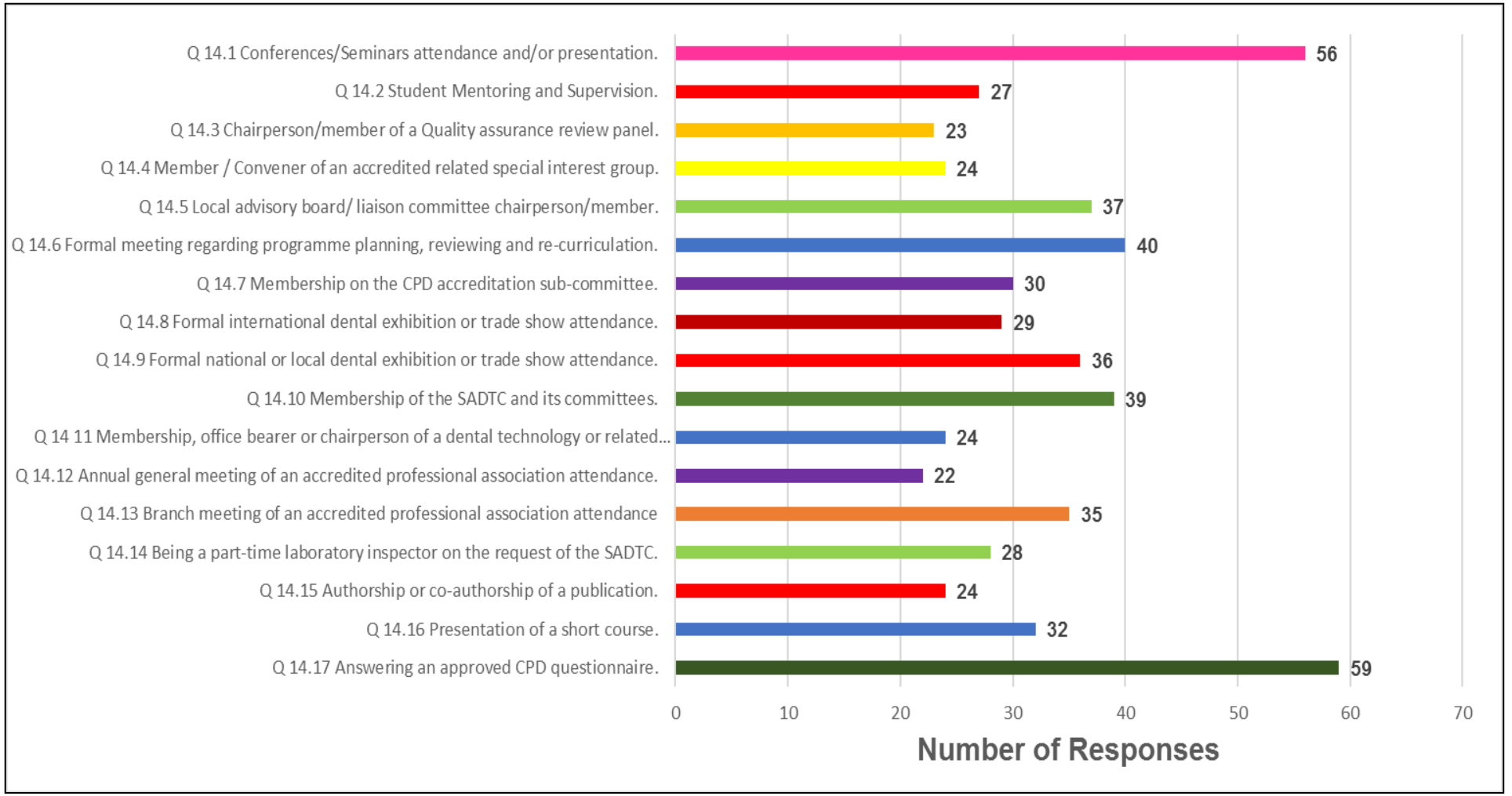

Figure 4.5: Dental Technicians and Technologists Awareness of methods of accruing CEU's

More importantly, and from a higher education perspective, the professions' engagement in the education and training of student dental technicians will enable the students to be better prepared for industry. Another noteworthy point to mention is that this area of work is currently being researched. The data is being collected by using a CPD online system to help the profession to accrue CEUs, while providing important feedback to DUT on their graduates.

4.4.2.2 Participation in CPD

Close to 81% of dental technicians confirmed they participation in mandatary CPD activities, of which 42% engaged annually while 30% engaged monthly. The reasons cited by dental technicians (27%) for not engaging in mandatory CPD activities are that:

> *"CPD is costly if the course is not near and we have to travel out of town".*

> *"Employers do not allow us to attend during working hours without cutting our pay".*

> *"Time, Staff and Money are the 3 most important things affecting our participation. We cannot leave work and not get paid to attend."*

The aforementioned results are consistent with the findings of Anderson, Pang and Aarts (2012); Barnes *et al*. (2013); Johnson *et al*. (2014) and Prescott-Clement *et al*. (2015), particularly professionals who attended CPD activities during and outside of their normal working days incurring a loss in their income.

4.4.2.3 Accessibility to CPD

With the exception of Question 17.4, the Chi-square results ($p<0.05$) presented in ***Table 4.9*** indicate that there were significant differences between the way respondents scored.

Table 4.9: Chi square Results - Access to engagement in CPD

Question	Chi Square p-value
17.1 Online Journals	0.000
17.2 Opportunities to undertake CPD	0.000
17.3 Transport to attend CPD activities	0.000
17.4 Funds to attend CPD workshops / Seminars	0.062

Note: *p<0.05 indicates that there were significant differences between the way respondents scored.*

Consistent with the results of the studies by Govranos and Newton (2014) and Stokes *et al.* (2015), dental technicians access online journals (90.4%) and have opportunities to undertake CPD (66.3%). A fair percentage of them also confirmed that that they have access to funds (60.2%) and transport (71.1%) to attend CPD workshops/seminars ***(Figure 4.6)***. Dental technicians' accounts from the open-ended questions corroborate this:

> *"I allocate funds every year to attend CPD activities. It is for transport, accommodation and activity fees".*

> *"Anything online is quick, cheap and can be done at home. It is time flexible and convenient".*

> *"Web based and online learning is excellent as it allows us time to complete at our leisure".*

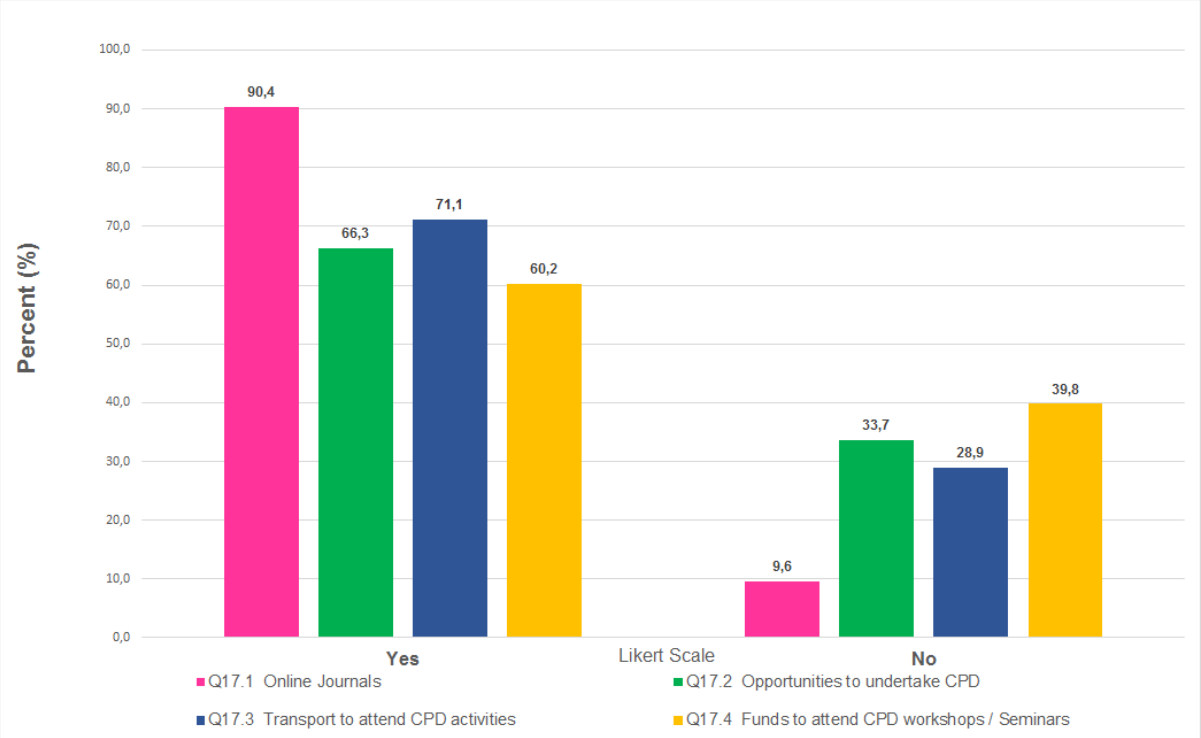

Figure 4.6: Dental Technicians' Access to engagement in CPD

4.4.3 Objective 4: To elicit the Challenges, if any, faced by dental technicians and technologists in meeting the requirements of CPD.

The reaction criteria of the Kirkpatrick's Four-level Training Evaluation model ***(Section 3.2.2 in Chapter 3)*** guided Section 4 *(participation)* of the questionnaire ***(Appendix 4)***.

4.4.3.1 Hindrances to CPD participation

The Chi-square results ($p<0.05$) presented in ***Table 4.10*** shows that there were significant differences in the way respondents scored.

Table 4.10: Chi square Results of the Challenges to CPD participation

Question	Chi Square p-value
18.1 Limited time	0.000
18.2 Limited financial support	0.000
18.3 Being unable to participate due to shortage of staff	0.000

Note: *p<0.05 indicates that there were significant differences between the way respondents scored.*

Analogous to Henwood and Flinton (2012) and Mathers, Mitchell and Hunn (2012), and as depicted in ***Figure 4.7,*** dental technicians agreed that limited time (63.4%) and staff shortages (51.2%) hindered their participation in CPD. Time constraints were also reported by Summers (2015), who revealed that professionals did not participate in CPD activities as they had high workloads which often resulted in them working after hours. Moreover, excerpts from the open-ended questions further corroborate the aforementioned results:

> *"Time is always a problem when it comes to attending any course. The lab is always busy and we have no time".*

> *"Work takes up a lot of time. We always swamped with work. It is hard to make time to come to meetings and courses".*

> *"I work alone, so time is a problem. I have a 3-month baby. It makes it difficult to attend."*

Apart from the challenge of *"work takes up a lot of time",* dental technicians further conveyed that *"staff issues are always a concern"* because *"someone will not come to work and then we can not attend".* These results are consistent with Moonasar (2018).

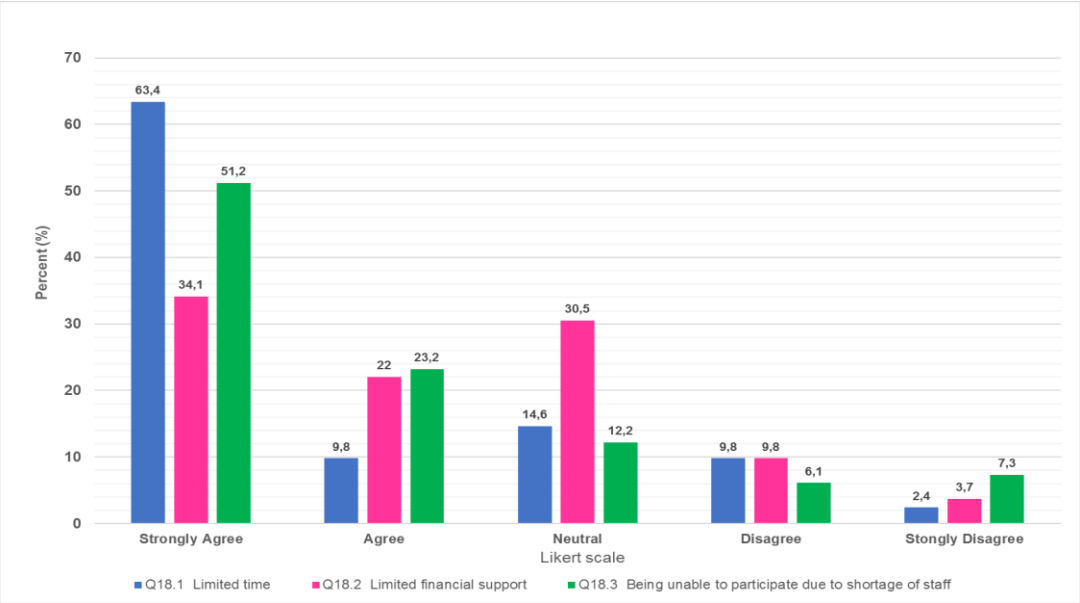

Figure 4.7: Dental Technicians Hindrance to CPD participation

From Figure 4.7, it can be inferred that finance did not hinder CPD participation (56.1%). Regardless of this positive result, dental technology laboratory employers (11%) and employees (47%) were of the opinion that laboratory owners should financially support employees to attend CPD activities. Dental technicians declared that dental laboratory owners should *"assist with payment to attend CPD"* as this *"builds bonds between staff and boss."* This supports Austin (2013) and Ikenwilo and Skatun's (2014) advice that employers are to adopt a 'pro-CPD culture' to motivate employees to learn new techniques and skills.

The aforementioned findings are further supported by the Spearman's correlation results ***(Appendix 6)***, which revealed that due to 'limited time' ***(Q. 19)*** and 'shortage of staff' ***(Q. 21)***, dental technicians perceived that engaging in CPD activities:

- Does not improve professional competency nor improves knowledge.
- Are expensive.
- Should be conducted during working hours.
- Is unimportant and is not a requirement for being compliant.
- Has no purpose, does not require CEUs annually, and is not guided by the SADTC.

In terms of 'limited financial support' ***(Q. 20)***, dental technicians were of the opinion that engaging in CPD activities does not:

- Support the learning of advancements in technology.
- Impact on the random audits conducted by the SADTC every two years.
- Incur penalties for non-compliance.
- Provide CPD opportunities.

4.5 Thematic Analysis: Open-ended Questions

The behavioural change criteria associated with the Kirkpatrick's Four-level Training Evaluation model ***(Section 3.2.2*** in ***Chapter 3)*** guided Section 5 *(Compliance)* of the questionnaire. Data from the open-ended questions were thematically analysed as described in ***Section 3.3.3*** in **Chapter 3**. As shown in ***Figure 4.8***, five prominent themes emerged from Questions 20, 21, 22, 24, 25 and 26 in ***Appendix 4.*** It must be noted that the percentage generated for each theme was obtained by dividing the number of phrases that constituted the main theme by the total number of phrases from each question.

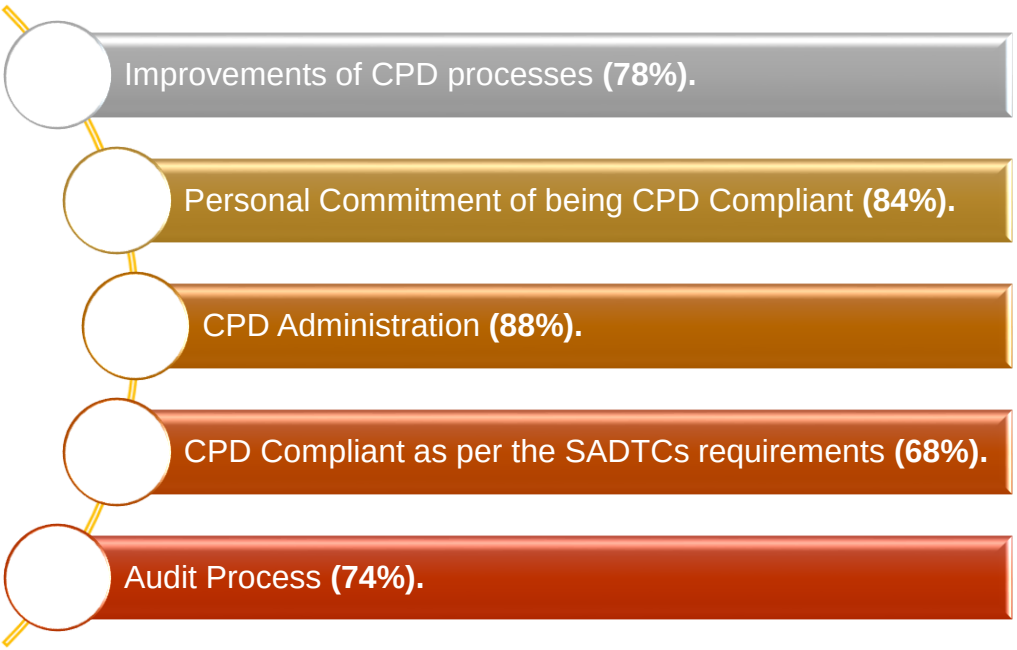

Figure 4.8: Emerging themes from the open-ended questions

Within the 'improvement of CPD process' category ***(Theme 1)***, dental technicians confirmed that ease of access to CPD related activities (52%) and improved CPD communication from the SADTC (26%) positively influenced the CPD processes overall. This motivated them to be CPD compliant ***(Theme 2)*** by attending dental related conferences and/or other activities (53%). Whilst a fair percentage of dental technicians (50%) declared that they did not record nor file their CPD activities ***(Theme 3)***, close to 38% conveyed that they either printed and filed their CPD certificates (17%), or saved their CPD certificates electronically (21%).

In terms of the CPD compliance requirements by the SADTC ***(Theme 4)***, 65% of dental technicians revealed that they kept evidence of their CPD attendance. From the 38% of dental technicians in KZN who were audited by the SADTC, only 18% were CPD compliant. Dental technicians who were non-compliant did declare that the SADTC had granted them a grace period to become compliant. Although 36% of dental technicians indicated that the audit processes were efficient ***(Theme 5)***, 38% of them were of the opinion that it was *"biased and unhelpful"* and that the SADTC behaved "*as a policeman"* when "*they have not given us the tools to be compliant".* Arguably, this appears to be in contravention of the guidelines advocated by the South African National Standards (SANS) (2019), specifically ISO 19011 - 'Guidelines for auditing management systems'. This document makes clear that in determining the extent to which an audit criterion is fulfilled, compliance must be a systematic, independent and documented process for obtaining and evaluating the evidence objectively. In particular, the document outlines the principles of auditing, managing an audit programme and conducting management system audits, as well as guidance on the evaluation of competence of individuals involved in the audit process.

As part of their statutory requirements, the SADTC is responsible for ensuring dental technicians are competent and fit to practise. The practices and protocols for an audit process, however, are absent from the SADTC website (*www.sadtc.org.za*) and no reference is made to it in the CPD 006 guiding document ***(Appendix 5)***, which details the accrual of CEUs. It appears that the SADTC is not adhering to the underpinning principles of ISO 19011, that is, planning, fieldwork, audit report and follow-up review.

Perhaps this is the reason for dental technicians declaring, *"The audit process was poorly executed by SADTC"*. Equally concerning, and correlating with the results mentioned in Section 4.4.3, dental technicians pointed out "*the Council merely checked if we had our points" and "not if we gained any skill or knowledge".* The question that therefore follows is whether the CPD 006 document ***(Appendix 5)*** encourages the accruing of CEUs by attending CPD events only, and not through the development of skills needed for practice. If so, then to what extent is a CPD compliant dental technician both knowledgeable and skilled? Herein lies an area for further research.

4.6 Summary of the Results and Discussion

The majority of dental technicians who responded to the questionnaire were male (57.8%) with the minimum and maximum age of the dental technicians participating in this study being 26 and 66, respectively. Generally, dental technicians were of the opinion that CPD is integral to them developing their laboratory knowledge and skills, especially in an era where laboratory-based technology is advancing. They preferred CPD activities to be conducted during working hours. Dental Technicians were also of the opinion that employers should support the funding of CPD training and allow them to attend CPD training during working hours.

A small percentage of dental technicians only participated in CPD to satisfy the SADTCs requirement for re-certification. Dental technicians further agreed that mandatory CPD engagement is a costly requirement. One way of reducing the financial implications of attending formal CPD activities is to offer the activities via webinars and pre-recorded lectures. Although dental technicians acknowledged the importance and purpose of CPD, they were unaware of article publications and attending Dental Technology curriculum meetings at the Universities of Technology (UoTs) as other methods of accruing CEUs.

Dental technicians have critically pointed out that the audit process conducted by the SADTC is merely a verification process rather than an audit process. This suggests that the criteria governing the accrual of CPD points ***(Appendix 5)*** need to be revised to include a more thorough assessment of the relevant laboratory-based practice skills and knowledge acquired by dental technicians. There also appears to be negligible

adherence to the underpinning audit principles of SANS 19011 (ISO 19011), which is an audit standard document. In general, the SANS 19011 document guides the auditing management system by detailing the principles of auditing, management of an audit programme and conducting management system audits. Additional information on the evaluation of the competence of individuals involved in the audit process is outlined in the SANS 19011 document.

Chapter Five: Conclusion and Recommendations

This chapter addresses how the conclusions were drawn from the objectives of the study in terms of the recommendations, future directions and limitations of the study. Using an online questionnaire underpinned by Kirkpatrick's model, this study achieved the following objectives concerning dental technicians and technologists:

- Knowledge of CPD *(Kirkpatrick's Level 1 – Reaction);*
- Perceptions towards CPD *(Kirkpatrick's Level 1 and 2 – Reaction and Learning)*;
- Compliance to CPD *(Kirkpatrick's Level 1 – Reaction)*; and
- Challenges experienced in being CPD compliant *(Kirkpatrick's Level 1 and 3 – Reaction and Behaviour Change)*.

5.1 Conclusions and Recommendations

The study revealed that the high costs associated with CPD training, relief of time from employers to attend CPD workshops, and understanding the various methods of accruing CEUs were the predominant factors constraining dental technicians from being CPD compliant. Dental technicians were primarily aware of attendance-based CPD activities.

While employer support for CPD engagement is critical, it is ultimately the dental technician's responsibility to accrue their annual CEUs, which is a requirement to being compliant. Dental technicians and technologists should make the time and be responsible in reading and understanding the guidelines outlined in the CPD 006 document, which is readily available on the SADTC website. This would significantly assist them to engage in a variety of activities other than face-to-face attendance at seminars and conferences. Equally important, engaging with CPD virtually and adjusting to the 'new normal' of accruing CEUs during this sustained disruptive period of the COVID-19 pandemic is presently a cost effective method. This requires dental technicians and technologist to be more accountable for their own development.

In addition, employer support in terms of motivation as well as allocation of time and funds is encouraged for effective CPD compliance. Dental laboratory owners are

further encouraged to develop internal company policies to assist staff in attending CPD activities and provide more in-house and work-based CPD activities. They could apply for CEUs to be awarded to their employees' post in-house training and to the employer as a CPD service provider. This will reduce high costs associated with CPD participation, and for staff spending time away from work.

Based on this study, it is recommended that the SADTC consider revising the current Continuous Professional Development CEU accrual document (CPD 006) to align with the profession, which is constantly evolving. Attending a seminar or conference has very little to do with improving practical skills, even though points may be accrued. Interactive learning through the combination of skills and knowledge workshops needs to be promoted, along with study groups, virtual breakfast meetings, and journal clubs. Better alignment of the CPD 006 document to the guidelines of the SANS 19011 can support this approach. Universities of Technology can assist with this by ensuring that CPD training and the CPD 006 document ***(Appendix 5)*** are part of the curriculum to enable student dental technicians to be aware of CPD and learn how they can accrue CEUs after achieving their qualification. Furthermore, engaging with the Health and Welfare Sector Education and Training Authority (HWSETA) and the skills levy fund to source funding for CPD activities for dental technicians and technologists is recommended.

In view of many dental technicians in this study not recording their CPD activities systematically, it is recommended that the SADTC consider a more efficient online database for recording and managing the accrual of CEUs. This could potentially reduce the high stress levels associated with the conduct of random audits. Such a system could also facilitate corrective action for non-compliant members.

5.2 Limitations of the Study

Although this is the first documented study of CPD compliance amongst South African dental technicians and technologists, the results of this study cannot be generalised as the knowledge and perception of dental technicians and technologist was limited to those residing in KZN. Further research is required to analyse the results obtained nationally, together with interviewing relevant stakeholders such as the SADTC and

DENTASA. In particular, it would be beneficial to ascertain the extent to which the criteria governing the CPD 006 document supports the development of the relevant skills and knowledge required for professional practice. Future studies should also examine the auditing practices used by the SADTC in order to determine its alignment with the guidelines set out in the South African National Standard 19011 audit document of 2019.

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APPENDICES

APPENDIX 1- Pilot Study Research Questionnaire

The knowledge, perceptions, compliance and challenges of dental technicians and technologists in KwaZulu-Natal towards Continuing Professional Development.

Your participation in this survey is voluntary. You may stop at any time during the survey. All information in this survey is **ANONYMOUS**

Section 1: Demographic Profile *(Please tick "√" the appropriate box)*

1. Gender	
1.1 Male.	[ ] 1
1.2 Female.	[ ] 2
2. Age: _____ **Years old**	
3. Marital Status:	
3.1 Divorced.	[ ] 1
3.2 Married.	[ ] 2
3.3 Single.	[ ] 3
3.4 Widow.	[ ] 4
4. I specialize in:	
4.1 Cobalt Chrome.	[ ] 1
4.2 Crown and Bridge.	[ ] 2
4.3 Orthodontics.	[ ] 3
4.4 Prosthetics.	[ ] 4
4.5 Multidiscipline areas. ***Please specify:***_____	[ ] 5
5. I am a/an	
5.1 Employee.	[ ] 1
5.2 Laboratory owner.	[ ] 2

6. I have been working as a Dental Technician/Technologist for: _____ **Years**	
7. My highest professional qualification obtained in Dental Technology is a:	
7.1 **National** Diploma in Dental Technology.	[ ] 1
7.2 **National** Higher Diploma in Dental Technology.	[ ] 2
7.3 **B Tech** - Dental Technology.	[ ] 3
7.4 **M Tech** - Dental Technology.	[ ] 4
7.5 **D Tech** - Dental Technology.	[ ] 5

7.6 Equivalent Qualification ***Please specify:***_____	[ ] 6

8. I am currently a member of a professional association that is linked to dental technology.	
8.1 Yes ***Please specify:***_____	[ ] 1
8.2 No	[ ] 2

Section 2: Opinions and perceptions of CPD in general *(Please tick "√" the appropriate box)*

9. In my opinion CPD:	**STRONGLY AGREE [5]**	**AGREE [4]**	**UNDECIDED [3]**	**DISAGREE [2]**	**STRONGLY DISAGREE [1]**
9.1 improves professional competence.	[ ]	[ ]	[ ]	[ ]	[ ]
9.2 improves knowledge.	[ ]	[ ]	[ ]	[ ]	[ ]
9.3 improves practical skills.	[ ]	[ ]	[ ]	[ ]	[ ]
9.4 improves professional standards.	[ ]	[ ]	[ ]	[ ]	[ ]
9.5 supports learning for advancing technology.	[ ]	[ ]	[ ]	[ ]	[ ]
9.6 is costly to the Dental Technician / Technologist.	[ ]	[ ]	[ ]	[ ]	[ ]
9.7 is an investment to the employer.	[ ]	[ ]	[ ]	[ ]	[ ]
9.8 Provide other Comments : _____ _____ _____					

10. CPD should be:	**STRONGLY AGREE [5]**	**AGREE [4]**	**UNDECIDED [3]**	**DISAGREE [2]**	**STRONGLY DISAGREE [1]**
10.1 conducted during working hours	[ ]	[ ]	[ ]	[ ]	[ ]
10.2 conducted during weekends and after hours.	[ ]	[ ]	[ ]	[ ]	[ ]
10.3 conducted as a webinar.	[ ]	[ ]	[ ]	[ ]	[ ]
10.4 conducted as a pre-recorded lecture.	[ ]	[ ]	[ ]	[ ]	[ ]
10.5 conducted as an online lecture.	[ ]	[ ]	[ ]	[ ]	[ ]

10.6 Provide other Comments : _____ _____ _____

Section 3: CPD Awareness *(Please tick "√" the appropriate box)*

11. Do you visit the SADTC website?	
11.1 Yes	[ ]1
11.2 No	[ ]2

12. I am aware of mandatory CPD.	
12.1 Yes	[ ]1
12.2 No	[ ]2

13. I am aware of the:	**YES [1]**	**NEUTRAL [2]**	**NO [3]**
13.1 requirements for CPD compliance?	[ ]	[ ]	[ ]
13.2 importance of CPD?	[ ]	[ ]	[ ]
13.3 purpose of CPD?	[ ]	[ ]	[ ]
13.4 number of CEU's required annually?	[ ]	[ ]	[ ]
13.5 random audits conducted by the SADTC every 2 years?	[ ]	[ ]	[ ]
13.6 penalties for non-compliance?	[ ]	[ ]	[ ]
13.7 guidelines made available by the SADTC?	[ ]	[ ]	[ ]
13.8 CPD opportunities available?	[ ]	[ ]	[ ]
13.9 Provide other Comments: _____ _____ _____			

14. I am aware that CEUs can be accrued through: ***(You may choose more than one option)***	
14.1 Conferences/Seminars attendance and/or presentation.	[ ] 1
14.2 Student Mentoring and Supervision.	[ ] 2
14.3 Chairperson/member of a Quality assurance review panel.	[ ] 3
14.4 Member / Convener of an accredited related special interest group.	[ ] 4
14.5 Local advisory board/ liaison committee chairperson/member.	[ ] 5
14.6 Formal meeting regarding programme planning, reviewing and re-curriculation.	[ ] 6
14.7 Membership on the CPD accreditation sub-committee.	[ ] 7
14.8 Formal international dental exhibition or trade show attendance.	[ ] 8
14.9 Formal national or local dental exhibition or trade show attendance.	[ ] 9
14.10 Membership of the SADTC and its committees.	[ ] 10
14.11 Membership, office bearer or chairperson of a dental technology or related professional association (excluding SADTC).	[ ] 11
14.12 Annual general meeting of an accredited professional association attendance.	[ ] 12
14.13 Branch meeting of an accredited professional association attendance	[ ] 13
14.14 Being a part-time laboratory inspector on the request of the SADTC.	[ ] 14
14.15 Authorship or co-authorship of a publication.	[ ] 15
14.16 Presentation of a short course.	[ ] 16
14.17 Answering an approved CPD questionnaire.	[ ] 17

Section 4: CPD participation *(Please tick "√" the appropriate box)*

15. I participate in CPD:	
15.1 Yes	[ ]1
15.2 No	[ ]2

16. I engage in CPD :	
16.1 Daily.	[ ]1
16.2 Weekly.	[ ]2
16.3 Monthly.	[ ]3
16.4 Annually.	[ ]4
16.5 Never.	[ ]5

17. I have access to:	YES [1]	NO [2]
17.1 Online Journals.	[ ]	[ ]
17.2 Opportunities to undertake CPD.	[ ]	[ ]
17.3 Transport to attend CPD activities.	[ ]	[ ]
17.4 Funds to attend CPD workshops / Seminars.	[ ]	[ ]

18. My CPD participation is hindered by	STRONGLY AGREE [5]	AGREE [4]	NEUTRAL [3]	DISAGREE [2]	STRONGLY DISAGREE [1]
18.1 Limited Time.	[ ]	[ ]	[ ]	[ ]	[ ]
18.2 Limited financial support.	[ ]	[ ]	[ ]	[ ]	[ ]
18.3 being unable to participate due to shortage of staff.	[ ]	[ ]	[ ]	[ ]	[ ]

18.4 State other challenges affecting your participation in CPD.

_____

_____

_____

19. I am of the opinion that employers should financially support employees to attend CPD:	
19.1 Yes	[ ]1
19.2 No	[ ]2

19.3 Provide other Comments:

_____

_____

20. Provide any recommendations to improve the CPD process.

Section 5: CPD compliance *(Please tick "√" the appropriate box)*

21. How do you ensure that you are compliant with the SADTC CPD requirements?

22. How do you record and file your CEUs?

23. I have been audited by the SADTC.	
23.1 Yes	[ ]1
23.2 No	[ ]2
NOTE: If you have answered 'Yes' to Question 23, then kindly answer Questions 24, 25 and 26.	

24. I was compliant as per the SADTC CPD requirements.	
24.1 Yes	[ ]1
24.2 No	[ ]2

25. Explain what was required from you:

26. Explain your opinions about the audit process.

Thank you for your time in completing the questionnaire.
Your support is much appreciated.

_____
Mr Naeem Cassim Seedat
Email: naeems@dut.ac.za
Cell no. 0724553222

APPENDIX 2 – Letter of Information/Consent

Thank you for taking an interest in participating in my research

Title of the Research Study: The knowledge, perceptions, compliance and challenges of Dental Technicians and Technologists in KwaZulu-Natal towards Continuing Professional Development.

Principal Investigator/s/researcher: Naeem Cassim Seedat (NH Dip Dental Technology)

Co-Investigator/s/supervisor/s: Dr Anisa Vahed (DTech: Quality), Dr Tufayl Ahmed Muslim (PhD)

Brief Introduction and purpose of the Study:
This study seeks to identify dental technicians and technologists challenges and opportunities to compliance with continuing professional development.

Outline of the procedures:
Your participation in this session is voluntary and involves a ± 20 minutes input into, and discussion on Dental technicians and technologists' challenges and opportunities to compliance with continuing professional development. There are no known or anticipated risks to your participation in this session. You may decline answering any questions that you feel you do not wish to answer, and you may decline contributing to the session in other ways if you so wish. All information you provide will be considered confidential and grouped with responses from other participants. The information collected from this study will be kept for a period of five years in the Department of Dental Sciences (DUT). There are no right or wrong answers to the questions. Each person's experiences and opinions are important. Your honesty in responding will be greatly valued. I can confirm that this study has received ethics clearance through the Institutional Research Ethics Committee (DUT). The final decision about participation is yours.

Risks or discomforts to the participant:
Kindly note that there are no risks involved whatsoever should you choose to participate in this exercise.

Benefits:
There are no benefits attached to your participation in this study.

Reason/s why the participant may be withdrawn from the study:
Kindly note that there will be no adverse consequences should you choose to withdraw from the task.

Remuneration:
There is no remuneration attached for participation. Participation is completely voluntary.
Confidentiality: Participants will be anonymous; hence your personal details will not be required.

Research-related Injury:
The study will not involve physical or chemical contact. Hence, there is no foreseen injury related incident to yourself for your participation.

Persons to Contact in the Event of Any Problems or Queries:
Contact the IREC administrator: Prof C Napier on 031 373 2577 or carinn@dut.ac.za
Contact the research supervisors: Dr Anisa Vahed on 031 373 5159 or via email at anisav@dut.ac.za.
Complaints can be reported to the Director: Research and Postgraduate Support, Prof C Napier on 031 373 2577 or carinn@dut.ac.za

CONSENT - Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Naeem Cassim Seedat, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: **IREC 011/19**.
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

_____	_____	_____	_____
Full Name of Participant	**Date**	**Time**	**Signature**

I, Naeem Cassim Seedat, herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

_____	_____	_____
Full Name of Researcher	**Date**	**Signature**
_____	_____	_____
Full Name of Witness (If applicable)	**Date**	**Signature**
_____	_____	_____
Full Name of Legal Guardian (If applicable)	**Date**	**Signature**

APPENDIX 3 - Institutional Ethics Clearance Certificate

Institutional Research Ethics Committee
Research and Postgraduate Support Directorate
2nd Floor, Berwyn Court
Steve Biko Campus
Durban University of Technology

P O Box 1334, Durban, South Africa, 4000

Tel: 031 373 2375
Email: ...
http://www.dut.ac.za/research/irsd/doctoral_research_ethics

www.dut.ac.za

APPENDIX 3- INSTITUTIONAL RESEARCH ETHICS CLEARANCE CERTIFICATE

19 February 2019

Mr N C Seedat
P O Box 701463
Overport
4067

Dear Mr Seedat

The knowledge, perceptions, compliance and challenges of Dental Technicians and Technologists in KwaZulu-Natal towards Continuing Professional Development

I am pleased to inform you that Full Approval has been granted to your proposal.

The Proposal has been allocated the following Ethical Clearance number **IREC 011/19**. Please use this number in all communication with this office.

Approval has been granted for a period of **ONE YEAR**, before the expiry of which you are required to apply for safety monitoring and annual recertification. Please use the Safety Monitoring and Annual Recertification Report form which can be found in the Standard Operating Procedures [SOP's] of the IREC. This form must be submitted to the IREC at least 3 months before the ethics approval for the study expires.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the IREC according to the IREC SOP's.

Please note that any deviations from the approved proposal require the approval of the IREC as outlined in the IREC SOP's.

Yours Sincerely

Professor J K Adam
Chairperson: IREC

APPENDIX 4 - Main Study Research Questionnaire

The knowledge, perceptions, compliance and challenges of dental technicians and technologists in KwaZulu-Natal towards Continuing Professional Development.

Your participation in this survey is voluntary. You may stop at any time during the survey. All information in this survey is **ANONYMOUS**

Section 1: Demographic Profile ***(Please tick "√" the appropriate box)***

1. Gender	
1.2 Male.	[ ] 1
1.2 Female.	[ ] 2
2. Age: _____ Years old	
3. Marital Status:	
3.1 Divorced.	[ ] 1
3.2 Married.	[ ] 2
3.3 Single.	[ ] 3
3.4 Widow.	[ ] 4
4. I specialize in:	
4.1 Cobalt Chrome.	[ ] 1
4.2 Crown and Bridge.	[ ] 2
4.3 Orthodontics.	[ ] 3
4.4 Prosthetics.	[ ] 4
4.5 Multidiscipline areas. *Please specify:*_____	[ ] 5
5. I am a/an	
5.1 Employee.	[ ] 1
5.2 Laboratory owner.	[ ] 2

6. I have been working as a Dental Technician/Technologist for: _____ Years	
7. My highest professional qualification obtained in Dental Technology is a:	
7.1 National Diploma in Dental Technology.	[ ] 1
7.2 National Higher Diploma in Dental Technology.	[ ] 2
7.3 B Tech - Dental Technology.	[ ] 3
7.4 M Tech - Dental Technology.	[ ] 4
7.5 D Tech - Dental Technology.	[ ] 5

7.6 Equivalent Qualification *Please specify:*_____	[ ] 6

8. I am currently a member of a professional association that is linked to dental technology.	
8.1 Yes *Please specify:*_____	[ ] 1
8.2 No	[ ] 2

Section 2: Opinions and perceptions of CPD in general *(Please tick "√" the appropriate box)*

9. In my opinion CPD:	STRONGLY AGREE [5]	AGREE [4]	UNDECIDED [3]	DISAGREE [2]	STRONGLY DISAGREE [1]
9.5 improves professional competence.	[ ]	[ ]	[ ]	[ ]	[ ]
9.6 improves knowledge.	[ ]	[ ]	[ ]	[ ]	[ ]
9.7 improves practical skills.	[ ]	[ ]	[ ]	[ ]	[ ]
9.8 improves professional standards.	[ ]	[ ]	[ ]	[ ]	[ ]
9.7 supports learning for advancing technology.	[ ]	[ ]	[ ]	[ ]	[ ]
9.8 is not costly to the Dental Technician / Technologist.	[ ]	[ ]	[ ]	[ ]	[ ]
9.7 is an investment to the employer.	[ ]	[ ]	[ ]	[ ]	[ ]
9.8 Provide other Comments : _____ _____ _____					

10. CPD should be:	STRONGLY AGREE [5]	AGREE [4]	UNDECIDED [3]	DISAGREE [2]	STRONGLY DISAGREE [1]
10.1 conducted during working hours	[ ]	[ ]	[ ]	[ ]	[ ]
10.2 conducted during weekends and after hours.	[ ]	[ ]	[ ]	[ ]	[ ]
10.3 conducted as a webinar.	[ ]	[ ]	[ ]	[ ]	[ ]
10.4 conducted as a pre-recorded lecture.	[ ]	[ ]	[ ]	[ ]	[ ]
10.5 conducted as an online lecture.	[ ]	[ ]	[ ]	[ ]	[ ]

10.6 Provide other Comments : _____ _____ _____

Section 3: CPD Awareness *(Please tick "√" the appropriate box)*

11. Do you visit the SADTC website?	
11.1 Yes	[ ]1
11.3 No	[ ]2

12. I am aware of mandatory CPD.	
12.1 Yes	[ ]1
12.3 No	[ ]2

13. I am aware of the:		YES [1]	NEUTRAL [2]	NO [3]
13.10	requirements for CPD compliance?	[ ]	[ ]	[ ]
13.11	importance of CPD?	[ ]	[ ]	[ ]
13.12	purpose of CPD?	[ ]	[ ]	[ ]
13.13	number of CEU's required annually?	[ ]	[ ]	[ ]
13.14	random audits conducted by the SADTC every 2 years?	[ ]	[ ]	[ ]
13.15	penalties for non-compliance?	[ ]	[ ]	[ ]
13.16	guidelines made available by the SADTC?	[ ]	[ ]	[ ]
13.17	CPD opportunities available?	[ ]	[ ]	[ ]
13.18	Provide other Comments: _____ _____ _____			

14. I am aware that CEUs can be accrued through: *(You may choose more than one option)*	
14.18 Conferences/Seminars attendance and/or presentation.	[ ] 1
14.19 Student Mentoring and Supervision.	[ ] 2
14.20 Chairperson/member of a Quality assurance review panel.	[ ] 3
14.21 Member / Convener of an accredited related special interest group.	[ ] 4
14.22 Local advisory board/ liaison committee chairperson/member.	[ ] 5
14.23 Formal meeting regarding programme planning, reviewing and re-curriculation.	[ ] 6
14.24 Membership on the CPD accreditation sub-committee.	[ ] 7
14.25 Formal international dental exhibition or trade show attendance.	[ ] 8
14.26 Formal national or local dental exhibition or trade show attendance.	[ ] 9
14.27 Membership of the SADTC and its committees.	[ ] 10
14.28 Membership, office bearer or chairperson of a dental technology or related professional association (excluding SADTC).	[ ] 11
14.29 Annual general meeting of an accredited professional association attendance.	[ ] 12
14.30 Branch meeting of an accredited professional association attendance	[ ] 13
14.31 Being a part-time laboratory inspector on the request of the SADTC.	[ ] 14
14.32 Authorship or co-authorship of a publication.	[ ] 15
14.33 Presentation of a short course.	[ ] 16
14.34 Answering an approved CPD questionnaire.	[ ] 17

Section 4: CPD participation *(Please tick "√" the appropriate box)*

15. I participate in CPD:	
15.1 Yes	[ ]1
15.3 No	[ ]2

16. I engage in CPD :	
16.1 Daily.	[ ]1
16.6 Weekly.	[ ]2
16.7 Monthly.	[ ]3
16.8 Annually.	[ ]4
16.9 Never.	[ ]5

17. I have access to:	YES [1]	NO [2]
17.1 Online Journals.	[ ]	[ ]
17.2 Opportunities to undertake CPD.	[ ]	[ ]
17.3 Transport to attend CPD activities.	[ ]	[ ]
17.4 Funds to attend CPD workshops / Seminars.	[ ]	[ ]

18. My CPD participation is hindered by	STRONGLY AGREE [5]	AGREE [4]	NEUTRAL [3]	DISAGREE [2]	STRONGLY DISAGREE [1]
18.1 Limited Time.	[ ]	[ ]	[ ]	[ ]	[ ]
18.2 Limited financial support.	[ ]	[ ]	[ ]	[ ]	[ ]
18.3 being unable to participate due to shortage of staff.	[ ]	[ ]	[ ]	[ ]	[ ]

18.4 State other challenges affecting your participation in CPD.

_____

_____

_____

19. I am of the opinion that employers should financially support employees to attend CPD:	
19.1 Yes	[ ]1
19.2 No	[ ]2

19.4 Provide other Comments:

_____

_____

20. Provide any recommendations to improve the CPD process.

Section 5: CPD compliance *(Please tick "√" the appropriate box)*

21. How do you ensure that you are compliant with the SADTC CPD requirements?

22. How do you record and file your CEUs?

23. I have been audited by the SADTC.	
23.1 Yes	[ ]1
23.3 No	[ ]2
NOTE: If you have answered 'Yes' to Question 23, then kindly answer Questions 24, 25 and 26.	

24. I was compliant as per the SADTC CPD requirements.	
24.1 Yes	[ ]1
24.3 No	[ ]2

25. Explain what was required from you:

26. Explain your opinions about the audit process.

Thank you for your time in completing the questionnaire.
Your support is much appreciated.

_____
Mr Naeem Cassim Seedat
Email: naeems@dut.ac.za
Cell no. 0724553222

APPENDIX 5- Continuing Professional Development 006

CONTINUOUS PROFESSIONAL DEVELOPMENT (CPD) January 2018 - December 2019

Re-registration:

A minimum of 30 Continuing Education Units (CEUs) **per year** of which a minimum of 7 CEUs must be derived from Section E (Ethics, Human Rights, Law and Business Practice).

The CEUs indicated below are on an annual basis unless stated otherwise.

CEUs are calculated on the basis of **actual time** allocated on the event programme accompanying the application and is awarded on a proportional basis. (If approved as a one hour event; therefore 1 CEU; and the actual time is only 45min then only 0, 75 can be awarded.

CEUs are only awarded for actual CPD activities and is not applicable to registration, welcome closures and refreshment and such similar items on the event programme.

Category A (Non measurable)

A maximum of 12 of the required CEUs may be obtained/claimed from this category with the exception of A8 and A11.

Ref No.	Credit bearing Activity/Event	No. of CEUs		Evidence to be issued by	Evidence required/Important information
A1	Local advisory/liaison committee chairperson.	**3 CEUs** per formal meeting with a **maximum of 9 CEUs** per year		Local UoT	*The training institution concerned must provide the applicant with documentary evidence.*
A2	Active advisory/liaison committee member	**2 CEU** per formal meeting with a maximum of **6 CEUs** per year		Local UoT	*UoT staff are excluded where this activity is part of their normal institutional duties.* *The training institution concerned must provide the applicant with documentary evidence.*
A3	Chairperson of a QA review panel.	**5 CEUs** per evaluation		Local UoT	*The training institution concerned must provide the applicant with documentary evidence.*
A4	Member of a QA review panel.	**2 CEUs** per evaluation		Local UoT	*The training institution concerned must provide the applicant with documentary evidence.*
A5	Convener of an accredited related special interest group* * No commercial intent.	**6 CEUs** per year for a minimum of 4 meetings or **1,5 CEUs** per meeting per group		Affidavit by the special interest group	*Documentary evidence (Goal or purpose of the group, attendance list, copies of the programme and minutes of meetings must be provided to the CPD Committee to the effect.*

A6	Member of an accredited related special interest group.	**4 CEU** per year for 4 meetings or **1 CEUs** per meeting.		Special interest group convener	*Documentary evidence (Goal or purpose of the group, attendance list, copies of the programme and minutes of meetings must be provided to the CPD Committee to the effect by the convener.*
A7	Formal meeting regarding programme planning, reviewing and re-curriculation involving members of the profession and providers.	Maximum **6 CEU per year**		Local UoT	*Documentary evidence (attendance list and copies of the agenda/s and minutes of meetings must be provided to the CPD Committee to the effect.*
A8	Member serving on the CPD Accreditation Sub Committee will be allowed to earn up to twenty of the required CEUs.	Maximum **20 CEUs**		Affidavit/report by the chair person.	*Awarded to members after an evaluation by the reporting structure and accordingly instructing the Registrar to issue such documentary instruction to the CEU administrators*
A9	Attending a formal international dental exhibition or trade-show	**8 CEU** per day. Maximum 24 **CEUs** per year		Affidavit by the applicant	*Documentary evidence which must include a copy of the airfare, accommodation and entrance payment. The latter is required for each day attended. Dental technicians/technologists working as or for a Dental Trader **may** claim CEUs for attending*
A10	Attending a formal local or national exhibition or trade- show Dental technicians/technologists who are part of the formal Dental Trader compliment may not claim CEUs	**4 CEU** per day. Maximum 12 **CEUs** per year		Affidavit by the applicant	*Documentary evidence which must include documentation from the organizers confirming attendance. Dental technicians/technologists working as or for a Dental Trader **may not** claim CEUs for attending.*

A11	Meetings of the SADTC and its Committees.	**2 CEUs** per structure to a maximum of **20 CEUs** per year		Registrar SADTC	*Awarded to members after an evaluation by the reporting structure and accordingly instructing the Registrar to issue such documentary instruction to the CPD administrators.*
A12	Membership of a dental technology or related professional accredited association (excluding SADTC)	**1 CEU** per association to a maximum of **3**		The CEO/COO of the association	Statement by the structure signed by the CEO/COO
A13	National chairperson of an accredited professional association	**5 CEUs**		The CEO/COO of the association	Statement by the structure signed by the CEO/COO
A14	Chairperson of branch or vice-chairperson of an accredited national professional association.	**4 CEUs**		The CEO/COO of the association	Statement by the structure signed by the CEO/COO
A15	Office bearer at all levels of an accredited professional association excluding the national chair-, vice-chairperson and branch chairperson.	**3 CEUs**		The CEO/COO of the association	*Statement by the structure signed by the CEO/COO*
A16	Attending the AGM of an accredited professional association.	3 **CEUs**		The CEO/COO of the association	*Statement by the structure signed by the CEO/COO*

A17	Attending a branch meeting of an accredited professional association.	**2 CEU** per meeting to a maximum of **4 CEUs** per year		The CEO/COO of the association	*Statement by the structure signed by the CEO/COO*
A18	Part time laboratory inspectors on the request of the SADTC	1 CEU per inspection to a maximum of 6 per six-month contract and a maximum of 10 CEUs per year		Registrar of Council	Statement by the Registrar with a summary (reduced) report
A19	Academic staff serving on academic structures not directly	**1 CEU** per meeting Maximum		Chairperson of the structure at a	*Statement by the chairperson confirming membership and number of meetings attended.*

Category B: (Measurable)

Training and Publications: Dental Technology and related fields.

A maximum of 20 of the required CEUs may be obtained/claimed from this category but not more than 10 from any sub- category, with the exception of B4 which may not exceed 20 CEU's.

This category **excludes** teaching and examining students at undergraduate level, which is part of a registered programme and where a provider employs the presenter/co-presenter/examiner for that specific purpose on a full-time basis.

Any registered professional who is full-time employed by a dental supplier with the purpose of marketing any technology / product / material may not obtain / claim CEUs for B19 and B11

Ref No.	Credit bearing Activity/Event	No. of CEUs		Evidence to be issued by	Evidence required/Important information
B1	Principal author of a peer reviewed publication or chapter in a textbook.	**10 CEUs** per publication		Principal author	• *Certified copy of the article/chapter/ textbook.* • *Affidavit by the author to the effect that he/she is the principal author of the article/chapter/textbook.* • *CV of the principal author focusing on focusing on qualification, experience, publications or research history*

B2	Co-author of a peer reviewed publication or chapter in a textbook**.**	**4 CEUs** per publication		Co-author	• *Certified copy of the article/chapter/ textbook by each co-author entitled to the CEUs.* • *Affidavit by every co-author to the effect that he/she is a co-author of the article/chapter/textbook.* • *CV of the co-author author focusing on qualifications, experience, and publications or research history*
B3	Review of an article/chapter in a textbook/journal.	**3 CEUs** per publication		Reviewer	• *Copy of the original request to conduct the review.* • *Copy of the review report.* • *Affidavit to the effect that the applicant for the CEUs is the reviewer.* • *CV of the reviewer focusing on qualifications, experience, publications or research history.* • *Affidavit to the effect that the applicant for the CEUs is the reviewer.* • *CV of the reviewer focusing on qualifications, experience, publications or research history.*

B4	Presenter/author of a research paper/poster at a conference/refresher course/symposium or similar event.	**6 CEUs** per presentation		Presenter/ author	• *Copy of the research paper/A4 sizes of the poster.* • *Copy of the invitation/acceptance to presenter.* • *Summary of the presentation.* • *Affidavit to the effect that the applicant for the CEUs is the presenter/ author.* • *CV of the presenter/author focusing on qualifications, experience, publications or research history.*
B5	All co-presenters/co-authors of a research paper/poster at a congress/refresher course/ symposium or similar event.	**4 CEUs** per presentation		Co-presenter/ Co-author	• *Copy of the research paper/A4 size of the poster.* • *Copy of the invitation/acceptance to presenter.* • *Summary of the presentation.* • *Affidavit to the effect that the applicant for the CEUs is the co-presenter/co-author* • *CV of the co-presenter/author focusing on qualifications, experience, publications or research history*
B6	Presenter of accredited short courses.	**5 CEUs** per course topic		Accredited provider/ institution	• *Letter of appointment by accredited provider/institution.* • *Outline of the course.* • *CV of the presenter/s focusing on qualifications, experiences, publications or research history.*

B7	All co-presenters of accredited short courses.	**2 CEUs** per course topic		Accredited provider/ institution	• *Letter of appointment by accredited provider/institution.* • *Outline of the course.* • *CV of the co-presenter focusing on qualifications, experiences, publications or research history.*
B8	Answer/complete multiple-choice questionnaires (MCQ) in journals, including electronic journals and or professional association News Letters with required pass mark.	**0.2 CEU** per standard page of prescribed reading and **0.2 CEU** per question		Editorial structure of the journal	• *Original or certified proof of completion and compliance.*
B9	Setting/Compiling/selecting and marking a multiple choice questionnaire (MSQ) in journals, including electronic journals and or professional association newsletters with a required pass mark.	**0.4** CEUs per standard page of prescribed reading, **0.4 CEUs** per question.		Editorial structure of the journal	*CV of the co-presenter focusing on qualifications, experiences, publications or research history.* *Copy of the article, MCQ and answer.*
B10	Attending a formal international short course/workshop/lecture.	**2 CEUs** per hour to a maximum of 10 per day		Formal presenter / provider	• *Documentary evidence from the provider clearly indicating the purpose of the activity.* • *Outcomes achieved.* • *The number of official contact hours must be clearly stated.*

B11	Presenting a national workshop/lecture/ talk/demonstration at an official professional event.	**2 CEUs** per hour to a maximum of 10 per day		Professional event organizer/ presenter	• *Copy of the invitation.* • *Outline of the presentation.* • *CV of the presenter focusing on qualifications, experience, publications or research history.* • *Time duration clearly stated.*
B12	Attending a national lecture/talk/ workshop/demonstration at an official professional event.	**1 CEU** per hour to a maximum of 10 per day		Professional event organizer/ presenter	• *Proof of attendance* • *Copy of the invitation.* • *Outline of the presentation.* • *CV of the presenter focusing on qualification, experience, publications or research history.* • *Time duration clearly stated.*
B13	Presenting a national lecture/talk/ on new dental materials and or technology with the purpose to promote a particular product/technology/brand. (Sales driven)	**1 CEU** per hour to a maximum of 6 per presentation once per year		Agent or its principal	• *Proof of attendance* • *Copy of the invitation.* • *Outline of the presentation.* • *CV of the presenter focusing on qualification, experience, publications or research history.* • *Time duration clearly stated.*

B14	Attending a national lecture/talk/ on new dental materials and or technology with the purpose to investing in a particular product/technology/brand. (Acquisition)	**0,5 CEUs** per hour to a maximum of 3 per presentation once per year		Agent or its principal	• *Proof of attendance* • *Copy of the invitation.* • *Outline of the presentation.* • *CV of the presenter focusing on qualification, experience, publications or research history.* • *Time duration clearly stated.*
B15	Watching a video of a national Lecture/talk/workshop/ demonstration of an official professional event. (i.e. Council Roadshow, presentations, DENTASA Summit, etc.)	**0.2 CEU** per question, maximum of 5 questions per hour of video		Professional event organizer/ presenter	• *Original or certified proof of completion and Compliance.*

Category C: (Measurable)

Demonstrations, hands-on practical and case study presentations

A maximum of 20 of the required CEUs may be obtained/claimed from this category but not more than 20 from any sub-category.

Any registered professional who is fulltime employed by a dental supplier with the purpose of marketing any technology/product/material may not obtain/claim CEUs for C1 and C3.

Ref No.	Credit bearing Activity/Event	No. of CEUs		Evidence to be issued by	Evidence required/Important information
C1	Presenter of an interactive skills workshop with an *assessment of the outcome. *Applicants to define the assessment of the outcome in their application	**4 CEUs** per hour. Maximum **20 CEUs** per day		Presenter/ inviting structure	• *Copy of the assessment material.* • *Outline of the workshop.* • *Objectives of the workshop.* • *CV of the presenter focusing on qualifications, experience, publications, or research history.*
C2	Participant in an interactive skills workshop with an assessment of the outcomes.	**2 CEU** per hour. Maximum **10 CEUs** per day		Presenter/ offering or accredited structure	• *Outcome/results of the assessment.*

C3	Demonstrating new technology/material that is not Product/technology/brand	**2CEUs** per hour to a maximum of **4CEUs**			
C4	Attending a demonstration of new technology/material/technology/br and related (not acquisition driven)	**1 CEU** per hour to a maximum of **2 CEUs** per event			
C5	Main presenter of a case study.	**4 CEUs** per case study presentation			
C6	Co- presenter/s of a case study.	**2 CEU** per case study presentation			

C7	Presenting a national demonstration and hands-on course on new dental materials and or technology with the purpose to promote a particular product/technology/brand. (Sales driven) Hands on referring to the participants doing the hands-on course	**2 CEU** per hour to a maximum of **8** per event per year			• *Proof of attendance* • *Copy of the invitation.* • *Outline of the presentation.* • *CV of the presenter focusing on qualification, experience, publications or research history. Time duration clearly stated.*
C8	Attending a national demonstration and hands-on course on new dental materials and or technology with the purpose to investing in a particular product/technology/brand. (Acquisition) Hands on referring to the participants doing the hands-on course	**0,5 CEUs** per hour to a maximum of 2 per event per year			• *Proof of attendance* • *Copy of the invitation.* • *Outline of the presentation.* • *CV of the presenter focusing on qualification, experience, publications or research history.* • *Time duration clearly stated*

Category D: (Measurable)

Educational involvement

A maximum of 20 of the required CEUs may be obtained/claimed from this category but not more than ~~10~~ 15 from any sub-category

Ref No.	Credit bearing Activity/Event	No. of CEUs		Evidence to be issued by	Evidence required/Important information
D1	External moderator on the request of a training institution for a registered programme at undergraduate level. (Non-salaried)	**3 CEUs** per subject per term/block per level		Local UoT or similar structure	• *Certificate from the local UoT signed by the HOD of Dental Technology.* • *CV of the moderator focusing on qualification and experience.* • *Letter of appointment by the UoT as approved by its Senate.*
D2	External examiner on request of a training institution for a registered programme at undergraduate level. (Non-salaried)	**3 CEUs** per subject per term/block per level		Local UoT or similar structure	• *Certificate from the local UoT signed by the HOD of Dental Technology.* • *CV of the examiner, focusing on qualification and experience.* • *Letter of appointment by the UoT as approved by its Senate.*

D3	A registered dental technician/technologist whose primary income is derived from being self-employed or is an employee with a contract in a dental laboratory but who lectures and/or assists students on a structured part-time basis, with a contractual agreement, at a formal category.	**2 CEUs** per subject per term		Affidavit if self-employed; Employer; Local UoT	• *Proof of permanent employment as an employee or self-employment.* • *Proof of the part-time employment agreement.* • *Clear indication of time duration.*
D4	Guest/occasional lecture at an accredited Institution	**3 CEUs** per hour		Accredited Institution	• *CV of the presenter/supervisor, focusing on* Lecturer/supervisor at an institution *qualifications, experience, publications or*

D5	Related professional who allows and or supervises any student in collaboration with an accredited training institution during Work Integrated Learning (WIL) during the academic year and who is not employed by the institution for that purpose. Student referred to formal registered students in dental technology at an approved institution, or dental students from traditional universities where dentists are trained. (Applicable to both under and post graduate students)	**1 CEU** for every 5 days per bona fide dental laboratory owner/partner if the dental laboratory is accredited as a training laboratory supervising a student per student to a maximum of 4 students per year. **2 CEU** for every 5 days to the assigned supervisor, for every student supervised as part of formal WIL to a maximum of **8 CEUs** per supervisor per year without detailed reporting or portfolio. With reporting and or portfolio the above may be doubled**.**		Local UoT	*These credits are subject to an approved written report by both the student and supervisor.* *Proof of laboratory registration certificate.* *Proof of registration as a practitioner.* *Proof of partnership where applicable.* *Proof of approval of case study by Dental Technology Department/section.* *Proof of the commitment of private practitioners to assist in case studies.* *of feedback and support - external supervisor/s case study processes,*

D6	Acting as externals supervising a BTech case study culminating in a oral presentation, a poster and or article which is part of a formal assessment component and requirement for the completion of the qualification.	**5 CEUs** to the assigned external supervisor, per BTech student supervised with a case study B2 and B5 is over and above if applicable. Maximum **15 CEUs** per year			
D7	Assessing entrants to the National inter institutional Case Study Competition or similar event	**2 CEUs** per hour to a maximum of 15 for the duration of the assessment event		The competition/ event organiser	• Documentary evidence to be provided by the organizer and forwarded to the individual assessors for submission to the SADTC

D8	Caring out duties of the education inspector as appointed by the SADTC	**1 CEU** per day of inspection duties to a maximum of 20 CEUs per year. The annual summative assessments from UoTs 10CEUs			
D9	Acting as internal supervisor for BTech case studies culminating in practical work, a presentation, poster and article which is part of a formal assessment component and requirement for th completion of the qualification.	**10 CEUs** per student to a maximum of 20 CEUs per year		Appropriate UoT	• *Diary per student case* • *Evidence of the quality of feedback and support provided to the student* • *Proof of interaction with external supervisors* • *Joint evaluation pf the case study processes, feedback and satisfaction.*

Category E: (Measurable)

Ethics, Human Rights, Law, Business Practice, Health, Occupational Safety, Lifestyle and related matters

A minimum of 7 CEUs must be obtained in this category.

A maximum of 15 of the required CEUs may be obtained/claimed from the category but not more than 10 from any sub-category.

Ref No.	Credit bearing Activity/Event	No. of CEUs		Evidence to be issued by	Evidence required/Important information
E1	Dedicated workshops, lectures and seminars on dental and related ethics, human rights and medical law.	**4 CEUs** per hour for the presenter and **2 CEU** per hour for a participant**.**		Accredited provider/ facilitator	• *Outline of the workshop/lecture/seminar* • *Outcomes* • *CV of the presenter/facilitator focusing on qualifications, experience, publications or research history.* • *Proof of attendance in the case of participants or* • *Proof of invitation from provider/facilitator in the case of the presenter.*

E2	Related workshop, lecture, seminar and short course that **support** the practice of a dental technician/ technologist.	**4 CEUs** per hour for the presenter and **2 CEU** per hour for a participant**.**		Accredited provider/ facilitator	• *Outline of the workshop/lecture/seminar/short course.* • *Outcomes* • *CV of the presenter/facilitator focusing on qualifications, experience, publications or research history.*
E3	Trustee or board member of a trust or fund. Formally recognized by the SADTC, hold regular meetings and undergoes regular recognized trustee training.	2 CEUs per meeting to a maximum of 6 per year.		Chairperson in collaboration with the registrar of the SADTC	*Outline of the workshop/lecture/seminar/short course.*

E4	Lecture, talk on lifestyle and related matters	1CEU per hour to a maximum of 6 per year		Accredited provider/ facilitator	• *Outline of the workshop/lecture/seminar/short course.* • *Outcomes* • *CV of the presenter/facilitator focusing on qualifications, experience, publications or research history.* • *Proof of attendance in the case of participants or Proof of invitation from provider/facilitator in the case of the presenter.*
E5	Lecture, talk on Occupational Health and Safety and related matters	1CEU per hour to a maximum of 10 per year		Accredited provider/ facilitator	• *Outline of the workshop/lecture/seminar/short course.* • *Outcomes* • *CV of the presenter/facilitator focusing on qualifications, experience, publications or research history.* • *Proof of attendance in the case of participants or Proof of invitation from provider/facilitator in the case of the presenter*

E6	Answering/completing multiple-choice questionnaires (MCQ) in journals, including electronic journals and or professional association News Letters on dental and related ethics, human rights, medical law and topics that **support** the practice of a dental technician/ technologist, with required pass mark.	**0.4 CEU** per standard page of prescribed reading and **0.2 CEU** per question		Editorial structure of the journal	• *Original or certified proof of completion and compliance.*
E7	Answer/complete multiple-choice questionnaires (MCQ) in journals, including electronic journals and or professional association News Letters on lifestyle, Occupational Health and Safety and related matters, with required pass mark.	**0.2 CEU** per standard page of prescribed reading and **0.2 CEU** per question		Editorial structure of the journal	• *Original or certified proof of completion and compliance.*

Category F: (Measurable)

Formal structured learning

A maximum of 20 of the required CEUs may be obtained/claimed from this category and 15 from any sub-category, with the exception of F4 and F5

Ref No.	Credit bearing Activity/Event	No. of CEUs		Evidence to be issued by	Evidence required/Important information
F1	Examiner of a full Masters and Doctoral research dissertation/thesis.	5 **CEUs** per submission for a Masters. 8 **CEUs** per submission for a Doctoral.		Local UoT or similar structure	• *Documentary evidence from the institution concerned.*
F2	Examiner of a part coursework Masters research dissertation.	3 **CEUs** per submission		Local UoT or similar structure	• *Documentary evidence from the institution concerned.*

F3	Participant in related whole qualification that supports the practice of a dental technician/ technologist.	**1 CEU** per formal contact hour of active engagement. To a maximum of 20 per year for the normal duration of acquiring such qualification		Local UoT or similar structure	• *Documentary evidence from the institution concerned.* • *Proof of results, completion of the qualification.* • *Course/qualification outline.*
F4	Related post diploma, master's, doctoral and post-doctoral qualification at the end of each year of study not exceeding the normal duration of the qualification or Official assigned time period.	**20 CEUs** for a **BTech** or equivalent**, 20 CEUs** for a masters per year not exceeding 2 Academic years. **20 CEUs** for a Doctoral per year not exceeding 4 Academic years.		Local UoT or Similar structure	• *Documentary evidence from the institution concerned.* • *Qualification outline.* *Proof of annual progress and completion of the qualification*

F5	Acting as a supervisor or co-supervisor/promoter/study leader for students enrolled for a Master or Doctoral study.	**5 CEUs** per year per candidate at Masters level. **10 CEUs** per year Per candidate at Doctoral level. Standard duration of the qualification: **Masters a maximum of 2 years** **Doctoral a maximum of 4 years**		Local UoT or Similar structure	*Letter of appointment by the UoT or related structure.* *Proof of annual progress and completion of the qualification*

APPENDIX 6 - Spearman's Correlations Computed across Five Sections of the Likert Scale

Correlations: Direct Relationships			
Statements		**Spearman's Correlation POSITIVE**	**p - Value**
Opinions on CPD			
1. Improves Knowledge	Improves Professional Competency	0.815	0.00
2. Improves Practical Skills	Improves Professional Competency	0.802	0.000
	Improves Knowledge	0.724	0.000
3. Improves Professional Standards	Improves Professional Competency	0.813	0.000
	Improves Knowledge	0.815	0.000
	Improves Practical Skills.	0.815	0.000
4. Supports Learning for Advancing Technology.	Improves Professional Competency.	0.753	0.000
	Improves Knowledge.	0.750	0.000
	Improves Practical Skills.	0.851	0.000
	Improves Professional Standards.	0.816	0.000
5. Is not costly to the Dental Technician / Technologist.	Improves Professional Competency.	0.229	0.038
	Improves Practical Skills.	0.233	0.035
6. Is an Investment to the Employer.	Improves Professional Competency.	0.722	0.000
	Improves Knowledge.	0.649	0.000
	Improves Practical Skills.	0.829	0.000
	Improves Professional Standards.	0.713	0.000
	Supports Learning for Advancing Technology.	0.812	0.000
Perceptions of CPD			
8. Conducted as a Webinar	*Is an Investment to the Employer?	0.236	0.033
9. Conducted as a pre-recorded lecture	*Is not costly to the Dental Technician / Technologist.	0.432	0.000
	Conducted as a Webinar	0.724	0.000
10. Conducted as an Online lecture	Conducted as a Webinar	0.712	0.000
	Conducted as a pre-recorded lecture	0.830	0.000
Awareness of CPD			
11. Requirements for CPD Compliance.	*Improves Professional Competency.	0.283	0.010
	*Improves Knowledge.	0.317	0.004
	*Improves Practical Skills.	0.286	0.009
	*Improves Professional Standards.	0.310	0.005
	*Supports Learning for Advancing Technology.	0.343	0.002
	*Is and Investment to the Employer.	0.253	0.022

	*Conducted after working hours / weekends	0.343	0.002
Statements		**Spearman's Correlation POSITIVE**	**p - Value**
12. Important of CPD	*Improves Professional Competency.	0.472	0.000
	*Improves Knowledge.	0.499	0.000
	*Improves Practical Skills.	0.422	0.000
	*Improves Professional Standards.	0.495	0.000
	*Supports Learning for Advancing Technology.	0.464	0.000
	*Is and Investment to the Employer.	0.359	0.001
	*Conducted after working hours / weekends	0.260	0.018
	Requirements for CPD Compliance.	0.636	0.000
13. Purpose of CPD	*Improves Professional Competency.	0.464	0.000
	*Improves Knowledge.	0.399	0.000
	*Improves Practical Skills.	0.404	0.000
	*Improves Professional Standards.	0.426	0.000
	*Supports Learning for Advancing Technology.	0.425	0.000
	*Is not costly to the Dental Technician / Technologist.	0.253	0.022
	*Is and Investment to the Employer.	0.388	0.000
	*Conducted after working hours / weekends	0.381	0.000
	Requirements for CPD Compliance.	0.591	0.000
	Important of CPD	0.823	0.000
14. Number of CEU's required Annually	*Improves Professional Competency.	0.282	0.010
	*Improves Knowledge.	0.330	0.002
	*Improves Practical Skills.	0.287	0.009
	*Improves Professional Standards.	0.308	0.005
	*Supports Learning for Advancing Technology.	0.353	0.001
	*Is and Investment to the Employer.	0.298	0.006
	*Conducted after working hours / weekends	0.321	0.003
	Requirements for CPD Compliance.	0.809	0.000
	Important of CPD	0.560	0.000
	Purpose of CPD	0.598	0.000
15. Random Audits conducted by the SADTC every 2 years	*Improves Professional Competency.	0.259	0.019
	*Improves Knowledge.	0.310	0.005
	*Improves Professional Standards.	0.218	0.050
	*Supports Learning for Advancing Technology.	0.285	0.009
	*Is and Investment to the Employer.	0.240	0.030
	*Conducted after working hours / weekends	0.302	0.006

	Statements	Spearman's Correlation POSITIVE	p - Value
	Requirements for CPD Compliance.	0.664	0.000
	Important of CPD	0.483	0.000
	Purpose of CPD	0.515	0.000
	Number of CEU's required Annually	0.772	0.000
16. Penalties for non-compliance	*Supports Learning for Advancing Technology.	0.242	0.028
	*Conducted after working hours / weekends	0.328	0.003
	Requirements for CPD Compliance.	0.611	0.000
	Important of CPD	0.480	0.000
	Purpose of CPD	0.516	0.000
	Number of CEU's required Annually	0.741	0.000
	Random Audits conducted by the SADTC every 2 years	0.788	0.000
17. Guidelines made available by the SADTC	*Improves Professional Competency.	0.306	0.005
	*Improves Knowledge.	0.314	0.004
	*Improves Professional Standards.	0.248	0.025
	*Supports Learning for Advancing Technology.	0.252	0.022
	*Is and Investment to the Employer.	0.269	0.014
	*Conducted after working hours / weekends	0.375	0.001
	Requirements for CPD Compliance.	0.641	0.000
	Important of CPD	0.475	0.000
	Purpose of CPD	0.512	0.000
	Number of CEU's required Annually	0.753	0.000
	Random Audits conducted by the SADTC every 2 years	0.744	0.000
	Penalties for non-compliance	0.821	0.000
18. CPD opportunities available.	*Improves Professional Competency.	0.321	0.003
	*Improves Knowledge.	0.369	0.001
	*Improves Practical Skills.	0.310	0.005
	*Improves Professional Standards.	0.377	0.000
	*Supports Learning for Advancing Technology.	0.392	0.000
	*Is and Investment to the Employer.	0.271	0.014
	*Conducted after working hours / weekends	0.274	0.013
	Requirements for CPD Compliance.	0.616	0.000
	Important of CPD	0.672	0.000
	Purpose of CPD	0.644	0.000
	Number of CEU's required Annually	0.629	0.000
	Random Audits conducted by the SADTC every 2 years	0.628	0.000
	Penalties for non-compliance	0.646	0.000
	Guidelines made available by the SADTC	0.682	0.000

Hindrance to CPD participation			
19. Limited Time	***Conducted as a webinar**	0.366	0.001
	***Conducted as a pre-recorded lecture**	0.429	0.000
	***Conducted as an Online lecture.**	0.330	0.002
20. Limited financial support	***Conducted during working hours.**	0.221	0.046
	***Conducted as a pre-recorded lecture**	0.290	0.000
	Limited Time	0.426	0.000
21. Being unable to participate due to shortage of staff	***Conducted as a webinar**	0.464	0.000
	***Conducted as a pre-recorded lecture**	0.460	0.000
	***Conducted as an Online lecture.**	0.414	0.000
	Limited Time	0.615	0.000
	Limited financial support	0.493	0.000

Correlations: Inverse Relationships			
Statements		**Spearman's Correlation NEGATIVE**	**p - Value**
7. Conducted after working hours / weekends	Conducted during Working Hours.	-0.863	0.000
10. Conducted as an Online lecture	Is not costly to the Dental Technician / Technologist.	-0.321	0.003
11. Requirements for CPD Compliance.	Conducted during working hours.	-0.347	0.001
13. Purpose of CPD	Conducted as a pre-recorded lecture	-0.221	0.046
	Conducted during working hours.	-0.287	0.009
14. Number of CEU's required Annually	Conducted during working hours.	-0.375	0.001
15. Random Audits conducted by the SADTC every 2 years	Conducted during working hours.	-0.248	0.025
16. Penalties for non-compliance	Conducted during working hours.	-0.354	0.001
17. Guidelines made available by the SADTC	Conducted during working hours.	- 0.406	0.000
18. CPD opportunities available.	Conducted during working hours.	- 0.265	0.016
19. Limited Time	Improves Professional Competency.	- 0.264	0.016
	Improves Knowledge.	- 0.222	0.045
	Is not costly to the Dental Technician / Technologist.	- 0.329	0.003
	Conducted after working hours/ weekends	- 0.223	0.044
	Requirements for CPD Compliance.	- 0.257	0.020
	Important of CPD	- 0.229	0.039
	Purpose of CPD	- 0.265	0.016
	Number of CEU's required Annually	- 0.218	0.050
	Guidelines made available by the SADTC	- 0.304	0.006
20. Limited financial support	Improves Professional Competency.	- 0.277	0.012
	Improves Knowledge.	- 0.237	0.032
	Improves Practical Skills.	- 0.229	0.038
	Improves Professional Standards.	- 0.268	0.015
	Supports Learning for Advancing Technology.	- 0.278	0.012
	Is not costly to the Dental Technician / Technologist.	- 0.375	0.001
	Conducted after working hours / weekends	- 0.255	0.021
	Requirements for CPD Compliance.	- 0.455	0.000
	Important of CPD	- 0.479	0.000
	Purpose of CPD	- 0.464	0.000
	Number of CEU's required Annually	- 0.284	0.010

	Random Audits conducted by the SADTC every 2 years	- 0.271	0.014
	Penalties for non-compliance	- 0.241	0.029
	CPD opportunities available.	- 0.310	0.005
21. Being unable to participate due to shortage of staff	Improves Professional Standards.	- 0.012	0.918
	Is not costly to the Dental Technician / Technologist.	- 0.305	0.005
	Requirements for CPD Compliance.	- 0.289	0.008
	Important of CPD	- 0.247	0.025