Innovative Facilitating of Learning to Foster Holistic Professionals in the Oral Hygiene Profession

by

Noluthando Loveness Buthelezi

Submitted in fulfilment of the requirements for the degree

MAGISTER EDUCATIONIS

(Curriculum and Instructional Design and Development)

Department of Humanities Education

Faculty of Education

University of Pretoria

Supervisor**:** Prof. Dr P.H. du Toit

December 2020

DECLARATION OF ORIGINALITY

Full names of students: Noluthando Loveness Buthelezi

Student number: 10182587

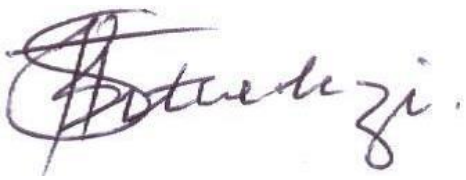
Declaration

1. I understand what plagiarism is and I am aware of the University's policy in this regard.

2. I declare that this dissertation is my own original work. Where other people's work has been used (either from a printed source, Internet or any other source), it has been properly acknowledged and referenced in accordance with departmental requirements.

3. I have not used work previously produced by another student or any other person to hand in as my own.

4. I have not allowed and will not allow anyone to copy my work with the intention of passing it off as his or her own work.



SIGNATURE: **DATE: December 2020**

ETHICAL CLEARANCE

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Faculty of Education

RESEARCH ETHICS COMMITTEE

CLEARANCE CERTIFICATE	CLEARANCE NUMBER: **HU 19/08/01**
DEGREE AND PROJECT	MEd Innovative facilitating of learning to foster holistic professionals in the oral hygiene profession
INVESTIGATOR	Ms Noluthando Buthelezi
DEPARTMENT	Humanities
APPROVAL TO COMMENCE STUDY	25 October 2019
DATE OF CLEARANCE CERTIFICATE	15 December 2020

CHAIRPERSON OF ETHICS COMMITTEE: Prof Funke Omidire

CC Ms Bronwynne Swarts
Prof PH du Toit

This Ethics Clearance Certificate should be read in conjunction with the Integrated Declaration Form (D08) which specifies details regarding:

- Compliance with approved research protocol,
- No significant changes,
- Informed consent/assent,
- Adverse experience or undue risk,
- Registered title, and
- Data storage requirements.

ABSTRACT

Innovative Facilitating of Learning to Foster Holistic Professionals in the Oral Hygiene Profession

Noluthando Loveness Buthelezi

Supervisor: Prof. Dr P.H. du Toit

As a lecturer in the module Orthodontics in the study programme Bachelor of Oral Hygiene, the construct *innovative facilitating of learning* is the one I adopted as I embarked on a self-transformative journey. This dissertation focuses on the professional development of my practice and the self (me). The self-transformative journey taken was not taken independently but with my students who became my co-travellers and co-constructors engaging in a learning process. Engaging in a learning process meant journeying in the steps of the Action Research cycle(s) and being especially observant of Herrmann's Whole-Brain® thinking theory and other learning theories such as constructivist learning, cooperative learning, self-regulated learning and the like.

Keywords: Action research, facilitating learning, oral hygiene programme, professional development, self-transformation, teaching practice, Whole-Brain® thinking theory

EDITOR'S DISCLAIMER

I HATE MISTEAKS

TK LANGUAGE SERVICE
EDITING | PROOFREADING | TRANSLATION
Prof. Dr. Tinus Kühn
+27 82 303 5415 | tinus.kuhn@gmail.com

10 December 2020

TO WHOM IT MAY CONCERN

I, the undersigned, hereby declare that the master's dissertation titled **Innovative Facilitating of Learning to Foster Holistic Professionals in the Oral Hygiene Profession** by **Noluthando Loveness Buthelezi** has been edited.

It remains the responsibility of the candidate to effect the recommended changes.

Prof. Tinus Kühn

ACKNOWLEDGEMENTS

1. To my Saviour, Helper, Redeemer, Giver of all wisdom my LORD and KING Jesus Christ. Thank you for giving me hope and renewing me to your perfect will. I could not have done it without you. You carried me through it all and gave me strength to be myself, a wife, a mother, a friend, a lecturer, a public servant and a student at the same time. When I thought of giving up I was reminded of how you did not give up on me all these years and I was encouraged to continue.
2. To my supervisor, mentor and a giant on whose shoulders I stood, Prof. Pieter H du Toit. Thank you for producing pure gold in me. The real-time challenges you put me under were like fire that had the aim to purify me to the pure gold I have become. You did not spoon-feed me, you did not tell me what to do, but through questioning all my processes and actions, I became a reflective practitioner who learnt to question everything I do and re-reflect to perfect my constructions. I can say through all this, I have grown not only as a lecturer but as a person. This was a transformative journey and you made it worthwhile. My sincerest thanks are due to you
3. To my husband, my spiritual pastor and my supporter: Evidence Buthelezi. Thank you for your constant support and provision. You used your finances to pay for someone to take care of our son while I was busy even on weekends; you willingly suggested that we get extra hands to clean the house when I could not. The food you bought when I could not cook added an hour or two for me to work on my dissertation. If it had not been for your love and support I would not have been here today. Thank you for partnering with God to bring the best out of me.
4. To my son, Prince Buthelezi, the one who fulfilled my need for nurturing. You are only two years old and yet your emotional intelligence makes me praise God daily. Your sweet little voice that said, *Bye Mommy* every time I left home for work gave me courage to work without worrying about you. You understood when I said *Mommy has to work* even when you were still excited about us playing ball and building a tower together. Your quick loud *Amen* every time I read the Bible during your sleeping time told me you wanted me to put you to sleep so I could have time to work on my dissertation. Thank you for your understanding. You are such a blessing.
5. To my friends at work and at church who inspired me to do better. We were all in the same season of becoming scholars and you encouraged me to carry on. Thank you.

DEDICATION

I dedicate this dissertation to everyone who was once told they were nothing and they could not achieve anything in life. This dissertation is tangible evidence that there is nobody who is nothing and who cannot achieve anything. I was once told that but look at me now. I urge you to rise above the negative words that have been spoken to you. Work hard, be diligent, change your mind-set, challenge yourself, learn from your mistakes and from the mistakes others have made. Rise above what you see. You can do it. God does not want you to fail.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

CHAPTER 1: MY FOUNDATION MIX

1.1 Introduction

This study aimed at my professional development that in turn transformed the learning experiences of my students. I aimed to transform myself and my practice as Du Toit (2013), Fleming (2012) and Frankford, Patterson and Konrad (2000) advocate. Du Toit (2013) is of the opinion that transforming – and in my case, the transforming of my teaching practice (Du Toit, 2012) is to some extent dependent on how I facilitate learning. My belief is scholarly supported by what Du Toit (2012) and McNiff (2002) advocate. They are of the opinion that improving my work − practice − does not benefit only me, but it also benefits others −my students and the organisation at large. Slabbert, De Kock and Hattingh (2009:118) also share similar sentiments when they state that a facilitator of learning is "the ultimate determinant for educational transformation". This means if I had decided not to be a lifelong learner/professional learner (Zuber-Skerrit, Fletcher & Kearney, 2015), my students would possibly not have had the opportunity to maximise their full potential (Slabbert *et a*, 2009).

A higher quality of teaching and learning (Slabbert *et al.*, 2009) has become a necessity as it is in the latter that transformation transpires. A higher quality of teaching and learning means effective facilitating of learning and engagement of students in the process of teaching and learning. I regard the transforming of self and my teaching practice as the foundation that I need to lay with a view to building my practice on a firm scholarly basis. Any professional development, should it be on an informal level such as attending workshops, or formally enrolling for a mainstream qualification, such as the Post-Graduate Certificate in Higher Education (PGCHE) that I discuss under the heading "My practice as a lecturer" in this chapter is solely dependent on myself taking responsibility for my professional development as a lecturer. By making this statement I affirm my wish to act as a self-regulated professional (De Boer, Du Toit & Bothma, 2015; Du Toit, 2018) as I want my students to become self-regulated individuals as students and prospective professionals, an attribute every person should have.

During my formal enrolment in the PGCHE I became aware of the Whole-Brain® thinking theory (Herrmann, 1996) and action research (McNiff & Whitehead, 2010), which have since made it possible for me to engage in foundational literature related to my research project. Whole-Brain® Action Research (WBAR) (Du Toit, 2013) gave me the opportunity to rethink, re-reflect or dual-reflect on my practice as a lecturer. Through this journey I experienced the importance of self-empowerment (Wolvaardt & Du Toit, 2012) to improve one's professional

practice. It is important that I make the reader aware of the different practices I am involved in and the context that my research stems from. This is explained in the sections headed “My practice as an Oral Hygienist” – my profession in Health Sciences – and “My practice as a lecturer/facilitator of learning” in higher education. These are subsequently discussed.

1.1.1 My Practice as an Oral Hygienist

The programme Bachelor of Oral Hygiene (BOH) was introduced in 1972 (Potgieter, 2007) at the School of Dentistry that is one of the schools in the Faculty of Health Sciences in a higher education institution in South Africa. At the time, the programme or field of study was introduced as a two-year diploma in Oral Hygiene and later in 2011 (University of Pretoria, School of Dentistry, 2020) it was upgraded to degree status and renamed a Bachelor of Oral Hygiene, adding one extra year to the previous two academic years of study. In November 2011 I acquired my qualification as an oral hygienist at the University of Pretoria; this was revolutionary as I was soon going to be exposed to the world of work at an orthodontic practice − a specialised practice that deals with the correction and function improvement of the teeth, jaws and muscles around the face (Littlewood & Mitchell, 2019).

My first encounter with the world of work in an orthodontic practice was an astonishing reality that shook my being a qualified oral hygienist. I was qualified but I was not ready for the world of work; this was due to my undergraduate experiences or realities that did not to a certain extent kindle a lifelong learner within me. Slabbert *et al*. (2009:16) advocate that being a lifelong learner is one of the “essential competencies in the new world of work”. Due to an inefficient learner competency within me, the world of work that I encountered as a newly qualified oral hygienist was not how I had envisioned it to be. At that time I thought I would work on three patients a day as this was the norm while I was enrolled in the undergraduate programme. The reality I encountered was eighty patients shared amongst four oral hygienists, which meant each one of us would see twenty patients a day. Progressing from three to twenty was too much of a stretch.

The missing piece of the puzzle was that the absence of being a lifelong learner in me was a concern that stimulated my passion for facilitating learning, especially in the module/subject orthodontics. This led to the introduction of my current practice as a lecturer that my research emanated from. I discuss my teaching practice below.

1.1.2 My Practice as a Lecturer

As outlined above, my practice as a lecturer originated at the School of Dentistry that is one of the schools in the Faculty of Health Sciences in a higher education institution. This school follows an outcomes- and problem-based curriculum (Harden, Margery & Davis, 1998; Snyman & Ligthelm, 2000) to ensure that students are the focal point during learning opportunities − a student-centred approach (Singhal, 2017) is followed to enhance the quality of teaching and learning (Slabbert *et al*., 2009). This means that more is expected of students in terms of engaging with what is to be learned and how it is to be learned – taking responsibility for own learning, instead of the lecturer teaching. By teaching the lecturer negates the fact that learning is the responsibility of the students.

An opportunity to be part of the lecturing staff at this higher education institution arose in January 2014. This meant that from the outset I was directly involved in the teaching and learning of the Oral Hygiene undergraduate students. As alluded to above, enrolling for a PGCHE, which is the first educational professional development qualification for lecturers at universities and other higher education institutions (Du Toit, 2012) was a professional development journey appropriate for my practice. I attended the PGCHE offered by the Faculty of Education, University of Pretoria. The practice constructs (Greyling & Du Toit, 2008) gained from the PGCHE were the importance of being a self-directed lifelong learner (Candy, 1991; Li, Paterniti & West, 2010; Van Woezik, Koksma, Reuzel, Jaarsma & Jan van der Wilt, 2020) and how self-professional development (Bailey, Curtis, Nunan & Fan, 2001; Du Toit, 2012) stem from this competency.

Exposing my students to the realities of the world of work was the consideration when designing learning tasks for learning opportunities. I wanted to ensure that my students did not have illusive perceptions of what to expect in orthodontic practice, but instead experienced their professional future while they were still in their undergraduate academic years. Exposing students to experiences of the world of work does not only ready students for their post-graduate journey, but it also aids in building a professional image and identity, self-confidence, the ability to work in a team of professionals, and most importantly, the ability to make meaning about real-life problems and become a critical thinker as oral hygienists; these qualities are attributes of the 21st century (De Boer, Du Toit & Bothma, 2015) that are expected from all professionals.

Under the heading “Knowing the self” below I discuss the Whole-Brain® thinking theory that forms the epicentre theory of my study. I highlight how becoming ready for the world of work is closely connected to knowing the self in terms of one’s thinking preferences.

1.2 Knowing the Self

The phenomenon of readying students for the work environment required of me to have the understanding and the knowledge of who I was, or knowing the self. The precursory statement is true for my students as well; they need to know who they are as individuals. Having no knowledge of who I am as a lecturer would make it difficult for me to identify areas for self-empowerment. Du Toit (2013) is of the opinion that one cannot empower another person, but it is about self-empowerment as it is an essential ingredient of self-regulated learning (Zimmerman, Banner & Kovach, 1996). This introduces the epicentre theory of my study, namely the Whole-Brain® thinking theory. Herrmann’s Whole-Brain® thinking theory (Herrmann, 1989) was developed from research that assessed human brain activity. The discovery of the different human mental preferences was assessed using the validated and reliable instrument Herrmann’s Brain Dominance Instrument (HBDI®) (Bunderson, 1995). The notion of the different mental preferences influences one’s teaching style, way of solving problems and one’s communication style. Broad discussions of the Whole-Brain® thinking theory and the HBDI are presented in Chapter 2.

1.3 Authenticity of Real-life Challenges

Real-life challenges, as Slabbert *et al*. (2009) posit, initiate learning. As lecturers we are in the position to initiate learning by designing learning tasks that comprise a real-life challenge for our students. However, we as lecturers are faced with real-life challenges that we need to engage with. Slabbert *et al*. (2009) underscore how a real-life problem should exceed the current abilities of an individual. This means that if the real-life challenge is familiar or known to an individual, it possibly has less or no impact required for the highest possible level of learning (Slabbert *et al.*, 2009). Perhaps I am over exaggerating, but my understanding of Slabbert *et al.’s* view of a real-life challenge can be likened to a pandemic such as what we are currently faced with world-wide, namely the novel Corona Virus Disease 19 (Covid-19) (WHO, 2020). This pandemic has exceeded our current abilities. Through Covid-19, the world of education has been practically and logically challenged (Rose, 2020) and we as lecturers in higher education institutions need to come up with effective and prompt solutions

and innovative means of facilitating quality teaching and learning despite the virus. This virus has initiated learning strategies from most if not all lecturing cohorts around the world. Though our academic year plans may have been disrupted we have learnt much about our teaching practices. Many positives have resulted from this real-life challenge. Consequently our unquestioned educational tenets need to be reassessed and visited for effective changes to be adopted.

The aim of my study is not Covid-19 but I am advocating that a challenge should be as authentic as possible and it should make one engage in the process of critical reflective thinking (Claxton, 1999; McNiff & Whitehead, 2010) to change and grow in one way or another. Undiluted or as Slabbert *et al.* (2009:105) put it, "uncompromisingly holistic complex" challenges have the power to transform those who are willing to immerse themselves in the challenge. Challenges are problems and problems have solutions and out of problems we can make meaning based on the principles of constructivism (Von Glasersfeld, 2001) where students construct new knowledge and partake in meaning making. Students enrolled in the BOH programme need to be exposed to the world of Orthodontics and should acquire the ability to solve the problems they are faced with. The challenges I foresee happening in orthodontic practice include that of dropping orthodontic brackets on the floor while getting ready for a bonding procedure (placing braces on the teeth) - (Consult Appendix K for an example of a learning task design). The learning task design (LTD) as Slabbert *et al.* (2009) structure it, is discussed in Chapter 2. It includes the different outcomes and attributes expected of the 21st century student.

Outcomes-based education (OBE) was introduced in South Africa to improve the quality of education post-apartheid and to address the demands for a more skilled labour force (Botha, 2002). One of the characteristics of OBE is that it specifies beforehand what students should be able to do at the end of the learning opportunity, referred to as the learning outcomes (Cretchley & Castle, 2001). According to De Boer, Steyn and Du Toit (2001) the main components of OBE are critical thinking, problem solving, application, appreciation, analysing, synthesising, evaluation of information, multidisciplinary teamwork, communication and socialising. In their study De Boer *et al*. (2001) relate the processes of OBE to the Whole-Brain® thinking approach to learning.

OBE is a student-centred practice (Singhal, 2017) in which the learning goals, teaching and assessment processes, content and pace of learning are determined by both the lecturer and the student (Cretchley & Castle, 2001). The diverse nature of students' brain dominance profiles in higher education (Van den Berg & De Boer, 2001) shows that a lecturer-centred

approach has become insufficient in fostering professionals that are ready for employment (Henard & Roseveare, 2012) as some students' thinking preference(s) may be omitted in a lecturer-centred approach to teaching and learning. Henard and Roseveare (2012) highlight the importance of making students the focal point of all learning opportunities as being that of readying students for the world of work and possess necessary learning outcomes.

The expected learning outcomes of the Bachelor of Oral Hygiene qualification are discussed below.

1.4 Learning Outcomes of the Bachelor of Oral Hygiene Qualification

A field of study like the BOH programme embodies learning outcomes that should be reached by a student prior to acquiring a qualification. These learning outcomes include specific module (subject) outcomes and critical cross-field outcomes (CCFOs) (SAQA, 2019). The specific outcomes are knowledge, competencies, values and skills each student has to master and/or practise at the end of a learning opportunity or when the programme of study is completed (Holmes, 2019). The CCFOs are generic competencies to be acquired for different qualifications in South Africa. These CCFOs are viewed as the life skills that students should master during learning opportunities or in different stages of their study programme (SAQA, 2019). I then linked the CCFOs with the following attributes of the 21st century: "innovative thinking, problem solving skills, multidisciplinary teamwork, communication skills, critical reflection and entrepreneurial and leadership skills" (De Boer, Du Toit & Bothma, 2015:56). The embodiment of these learning outcomes within the BOH programme is illustrated in Figure 1.1 below.

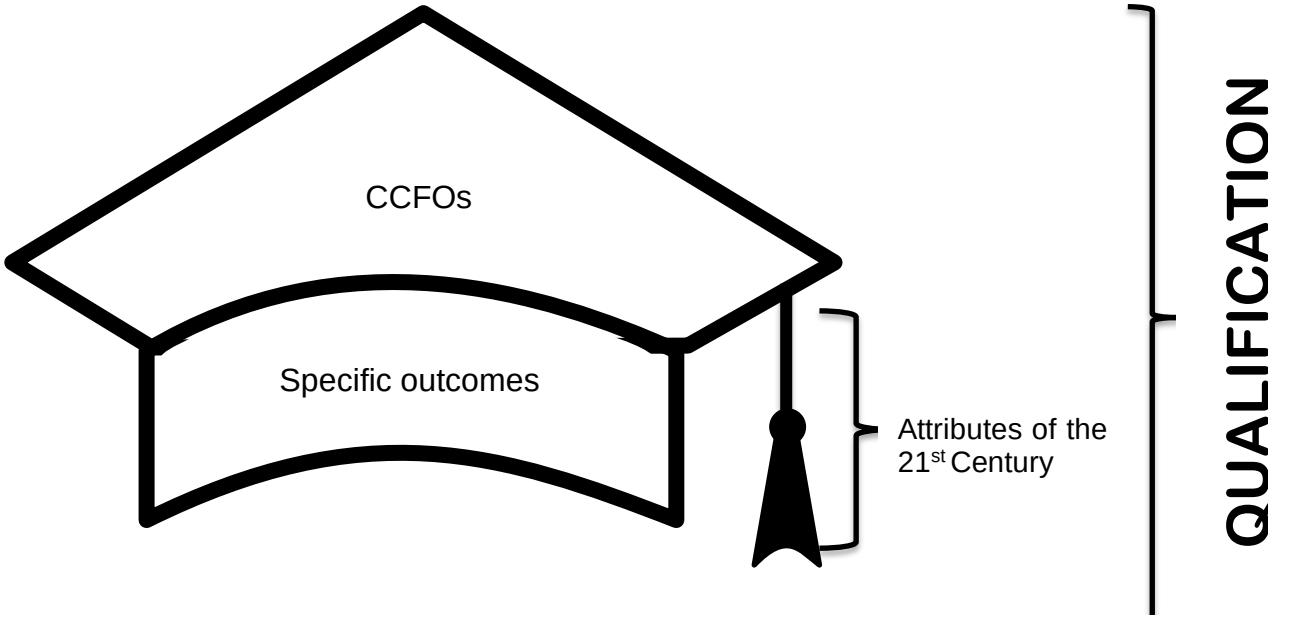


Figure 1.1 Embodiment of different learning outcomes of the BOH programme

A mortar board is worn during the graduation ceremony by a student who has successfully completed his or her studies. To illustrate what each student should have mastered at the time of graduation, I have used a mortar board as a representation of all specific learning outcomes of the entire BOH programme and the CCFOs that are closely linked to the attributes of the 21st century. It is the responsibility of each lecturer that has facilitator of learning as one of the roles (Knowles, 1975; Goodyear & Dudley, 2015) to ensure that the learning opportunities incorporate all these learning outcomes. The CCFOs should be measurable, verifiable and contextualised according to the particular nature of the learning tasks and content of the module. A detailed explanation of the CCFOs to be mastered in the BOH programme is provided in Chapter 2.

My research ideas are explained below.

1.5 The Idea Outside the Square

The term *problem statement* is the norm in traditional research. In my zeal to be a proactive, innovative practitioner and a lifelong scholar I used *the idea outside the square* instead of research problem. The idea outside the square simply means to do something in a different manner and in my case as a lecturer it means to facilitate learning in a different manner. The idea therefore represents the way of facilitating learning and the square represents what Du Toit (2013) calls “my box”, my thinking preference(s) as per my HBDI Herrmann Brain Dominance Instrument (HBDI) profile. He underscores the importance of thinking outside my box, implying thinking from other less preferred quadrant(s) in the Whole-Brain® thinking theory. Therefore *the idea outside the square* is a construct supporting Du Toit’s idea of thinking outside my box (Du Toit, 2013:9). My research idea is therefore to facilitate learning outside my thinking preferences that paves the way to professional development or as Du Toit (2013:10) puts it, “Developing my full potential”.

Developing my full potential does not benefit only me as a lecturer but it also aids in developing my students’ full potential to be ready for the world of work as alluded to in the early paragraphs of this chapter. The Oral Hygiene students perform different orthodontic functions or procedures, such as inter alia, removal and placement of wires, elastics, preparation for the placement of brackets, educating the patients about an appropriate oral hygiene regimen for their needs. Part of my students developing their full potential includes working from the already existing knowledge to seek new knowledge, using the principles of constructivism (Vygotsky, 1978; Von Glasersfeld, 2001). Slabbert *et al*. (2009) state that learning is not about knowing but more about seeking. This means that students should not

just know how to perform the orthodontic procedure stated above but seek to find innovative ways to practise these orthodontic procedures.

In the learning tasks my students had to perform, it was evident that I tried to move away from getting my students to know, and designed the learning tasks in such a way that they became seekers. Apart from seeking in terms of their field of specialisation, it also manifested on a personal level. My learning tasks offered students the opportunity to embark on a journey of seeking who they were – self-discovery and self-renewal; I did the same (Consult the dual model of developing professionalism in Chapter 2). My seeking did not revolve around my field of specialisation only, but included self-discovery and self-renewal. I used the construct Du Toit (2013) uses to enforce the meaning of the concept *self-renewal*: self-transforming or as he puts it: transforming the self. Investing in my professional development and my teaching practice as a lecturer motivated me to create opportunities for my students to discover who they were. To make this happen I chose to take a scholarly approach to all I did. I therefore consider myself a scholar of higher education in the speciality of Oral Hygiene. To demonstrate this scholarly approach I continuously endeavoured to base what I did on constructs to be found in the literature, such as authentic learning.

Authentic learning is a learning theory with characteristics such as immersion; reflection; construction; exploration and holism (Slabbert *et a.l,* 2009). An authentic learning task ensures that the student is immersed in a real-life experience or challenge. While the student solves the real-life challenge, it is important that he[1] should reflect on his actions during his experience and also action-reflect (reflect on observations, planning, actions and reflections) (McNiff, 2016) and meta-reflect (reflect on his own reflection) (Harvey, 2016; Du Toit, 2018) what he is tasked with.

I believe that education is bigger than investing in the development of one's cognitive levels, but that its main purpose should be to produce a transformational leader (Du Toit, 2013) in a student – and in myself as I have to be a role-model in this regard. Being a role-model is one of the attributes of 21st century education.

An outline of the research questions that guided my research is provided next.

[1] For ease of expression only the masculine form of the pronoun is used henceforth.

1.6 Research Questions

The research questions facilitated my action research process. These are the questions I intended to answer as I engaged in action and authentic learning in my action research study. I intentionally asked both primary and secondary research questions to ensure proper implementation and success of the idea outside the square that is explained above.

1.6.1 Primary Research Question

I phrased the primary research question as follows:

- How can I innovatively facilitate learning to foster holistic Oral Hygiene professionals?

1.6.2 Secondary Research Questions

The secondary research questions are a refinement of the primary research question and are phrased as follows:

- Who am I as a facilitator of learning?
- How can I design and implement learning tasks that will contribute to students and myself becoming holistic professionals?
- How can the use of the principles of different learning theories effectively ready my students for the world of work?
- How can the principles of Whole-Brain® thinking be effectively employed during my facilitating of learning?

These questions are all guided by notions of the ontological and epistemological existentialism of both my students and myself.

1.7 My Epistemological View

An epistemological view is the study of questions such as, *What is knowledge, how does a person get to know something and what are the bases of true knowledge*? (Schwandt, 2001). A constructivist paradigm was used as a lens through which I view my study. Constructivists believe that reality is constructed by individuals and groups (Bergh & Geldenhuys, 2013). Constructivism (Von Glasersfeld, 2001) is based on the belief that knowledge is socially constructed and created from within, and for a particular group or context (Zuber-Skerritt & Perry 2002). The constructivist paradigm is used by both myself as a researcher and participant, and by my students as we −the respondents and I − were in an emic positionality during the data collection process. In my emic positionality I

constructed knowledge about my practice as I did analysis of qualitative data provided by the respondents who were my students, my colleague and myself after the learning opportunities. My students who were the respondents in my study in their emic positionality, constructed knowledge/meaning as they individually and/or collaboratively resolved the challenges that were presented to them during the learning opportunities.

1.8 The AR-chitect

The construct *AR-chitect* in my research is a replacement for the traditional term − research design. The reason for using this construct is the first two letters of the word *architect*. The use of uppercase is intentional as the letters represent the abbreviation for action research (AR), which is the research design I chose. The word *architect* is derived from the Latin word *archictectus* that originates from the Greek word *architékton* that means *master builder*. I view action research as the master builder of the entire research. The construct AR-chitect is suitable as it highlights my passion for constructing meaning and thinking out of the box.

As alluded to above, the research design I chose was action research (AR). AR involves different research perspectives and approaches that are philosophical, epistemological, and methodological (Kemmis & McTaggart, 2000). I chose AR as my research design because it afforded me the opportunity to engage in meta-learning that Coghlan and Brannick (2005) define as a process of learning about learning and that I associate with Harvey (2016) and Du Toit's (2018) idea of reflecting on own reflection. The advantages of using this research design are that it is inexpensive, cost-effective in terms of time, and fun activities encourage respondents to be involved in the study. There is also an enhanced relationship between myself as the researcher and my students (respondents) and this is evident in the dual model of developing professionalism discussed in Chapter 2. The disadvantages of using AR according to Maree (2016) and McKay and Marshall (2000) are that generalisability and transferability are affected and limited.

1.8.1 The Strength of the AR-chitect

For the purpose of my study, I positioned myself inside the researcher self-study perspective (McNiff & Whitehead, 2010) and my presence in the study influenced what I did with the respondents (Herr & Anderson, 2014).

Qualitative and quantitative data sets were used to aid deeper exploration of my teaching practice and answering the research questions. The aim of collecting qualitative data was

to explore and understand the meaning made by the respondents in each of the three learning opportunities they were engaged in. The quantitative data measured by a Likert scale gave an indication of the students' views about the set questions. The latter is discussed in detail in Chapter 3.

In the next section I outline the legal restrictions that I considered prior and during the collection of data.

1.9 Within Legal Restriction

Since action research is done in a real-life environment or setting and involves close and open interaction with the respondents, it was important to pay close attention to ethical considerations (O'Brien, 1998). To ensure ethical practice, I obtained ethical clearance from both the Faculty of Education and the Faculty of Health Sciences prior to data collection. Informed consent was given by the respondents at the beginning of the study. The data collection was strictly anonymous and confidential.

1.10 Amalgamation

This section gives a brief outline of how I combined the chapters to construct my dissertation.

Chapter 1 provides the background and introduction to my study as well as a brief overview of the chapters. In Chapter 2 the review of literature and the construct frame of my study are outlined. The literature review in Chapter 2 is based on the work done by relevant scholars. In Chapter 3 the methodology, design, data presentation and interpretation of this study are presented and discussed in detail. In Chapter 4 the research findings and conclusion are stipulated and recommendations are made.

CHAPTER 2: THE PILLARS IN CONVERSATION WITH ME

2.1 Introduction

As a scholar in the Oral Hygiene programme, I adopted the principles of lifelong learning that are interdependent on the principles of self-regulated learning and self-transformation. It is important that I highlight my stance on the importance of learning from the scholars that took the journey before me. In IsiZulu we say, *Indlela ibuzwa kwabaphambile*, which has a direct translation, *A journey is travelled by asking those who have travelled it before you.* In my constructions and as a passionate constructivist I regard the relevant scholars and their scholarly work as the pillars on which my study rests. These pillars address me because they speak to me and my practice; they are relevant to what I am doing. The most important function of a pillar in a building is to give strength or support to the entire building; the pillars in conversation with me add strength to my research and result in the rigour and the validity of this study. This chapter discusses the pillars −the construct framework – consisting of the chosen learning theories which were incorporated into the learning task design.

Good facilitating of learning is the ability of the lecturer to balance and precisely position these pillars for quality learning to occur. It is clear that metaphorically I refer to the construct frame as a *pillar*. This communicates the manner in which I view the construct frame, just as other authors have metaphorically described the theoretical framework as a *scaffold* (Lester, 2005:458) or a *blueprint* (Osanloo & Grant, 2016). Below I introduce and discuss the construct frame.

2.2 Construct Frame

The construct frame is depicted visually below. In this design, the core/epicentre theory − Whole-Brain® thinking theory (Herrmann, 1999) −is positioned at the centre of the sunflower. The justification for this is to highlight and underscore the importance of the Whole-Brain® thinking theory in the journey to self-transformation and practice transformation. In this study, the work of Herrmann was not used independently but is integrated with the scholarly work of Von Glasersfeld (2001) who propagates constructivism; Zimmerman *et al*. (1996) who foreground self-regulated learning; Gillies (2007) who is known for cooperative learning; Bonwell and Eison (1991), champions of action learning and Duch, Groh and Allen (2001) known for problem-based learning where real-life problems/challenges are used as an activator for learning. Figure 2.1 depicts the construct frame that is discussed in detail.

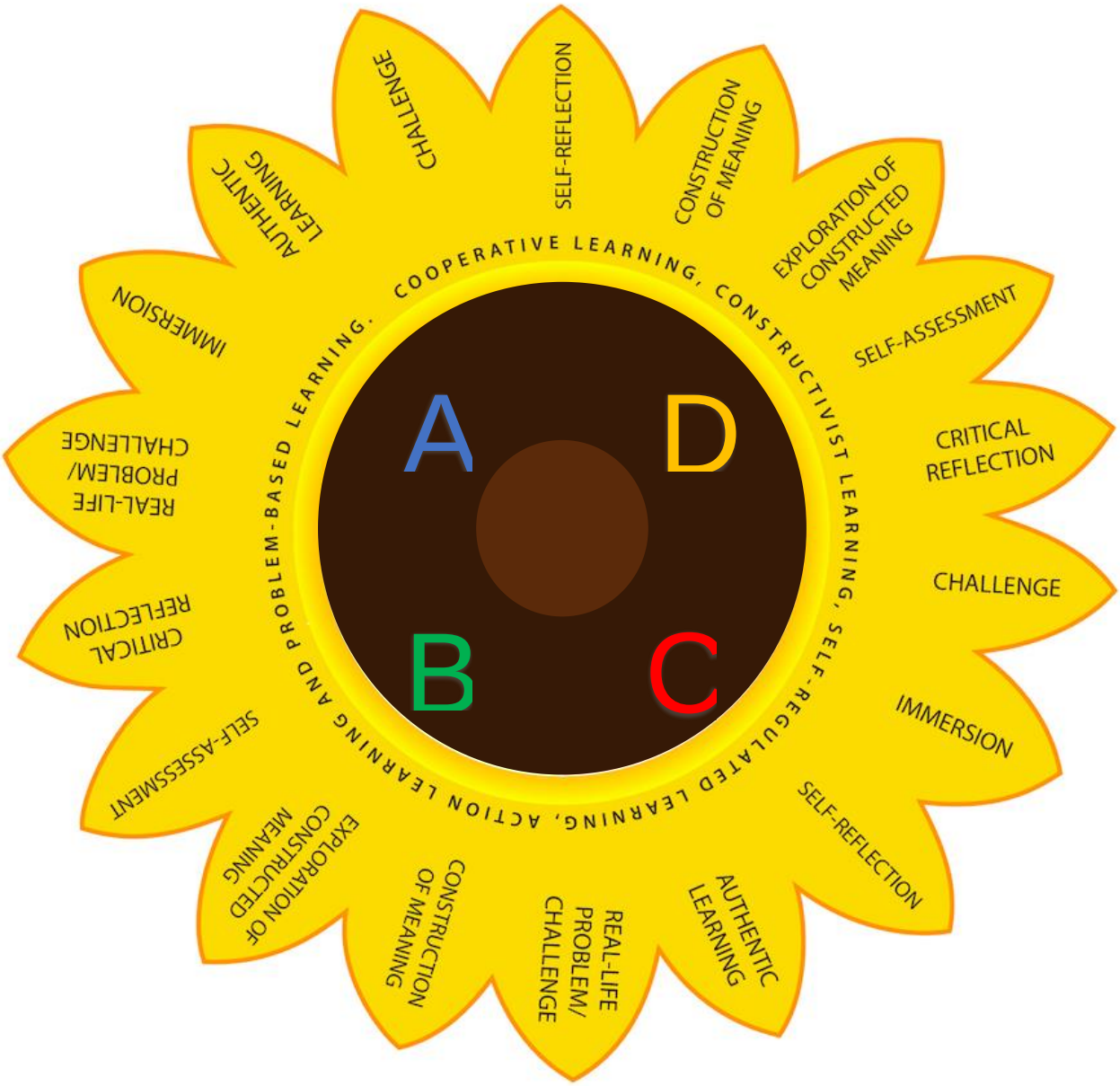


Figure 2.1 The theory framed in the sunflower

In the diagram theories that are the pillars of this study are visible and framed in the sunflower. To justify the use of a sunflower as the representation of the construct framework, I explain the diagram above as follows: The sunflower has a core for bearing seeds and petals to display its splendor. The seeds of a sunflower are harvested and pressed to produce oil. A commonsense perspective of the latter is that the oil is a lubricant and a lubricant can be used to prevent cracking and damaging of a human skin or of machinery, for example. Since the seed-bearing core represents the Whole-Brain® thinking model, the idea I am advocating is that without the intentional incorporation of Whole-Brian® thinking theory principles in designing a learning task, the unoiled students − students' whose

learning preferences are not considered − can be bruised by this omission as they do not have the opportunity to maximise their full potential.

As seen in the diagram, the learning theories are placed close to the seed-bearing core. This has been done to communicate the relation of Whole-Brain® thinking theory with learning theory. The petals consist of what students should be doing during the learning opportunity. The activities that are to take place during the learning opportunity are grounded on the learning theories. To summarise, the metaphor of the sunflower is to advocate that students learn at a highest possible level of learning if and when Whole-Brain® thinking theory and the mentioned learning theories are incorporated into the learning task design.

Each of the learning theories is extensively discussed in the following paragraphs, beginning with the Whole-Brain® thinking theory.

2.2.1 The Whole-Brain® Thinking Theory

The seminal work of Ned Herrmann (1989) was taken from the work of Paul MacLean, who introduced the Triune brain theory, and Sperry's left-brain right-brain model. It was the work of MacLean that became the driving force behind the development of Whole-Brain® theory. Herrmann's Whole-Brain® thinking theory was developed from research that assessed human brain activity (MacLean, 1952). According to Herrmann (1989), an individual's thinking preference(s) is determined by which of the four quadrants of the brain is dominant. Figure 2.2 shows the Whole-Brain® model.

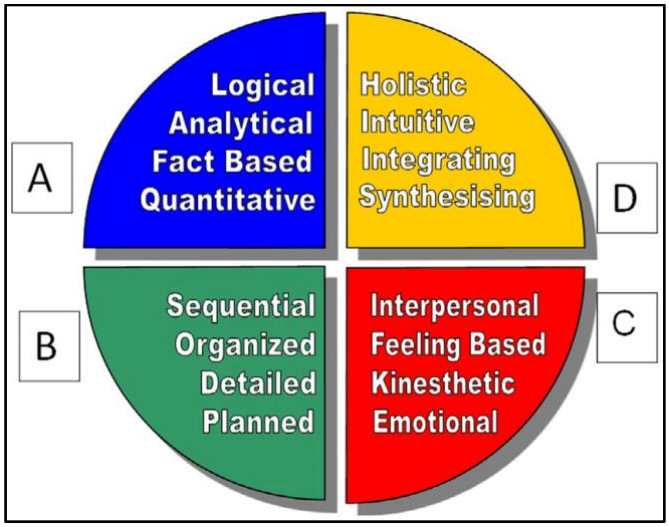


Figure 2.2 Herrmann's Whole-Brain® thinking model (Source: Herrmann, 1999)

The model indicates the four quadrants with their different modes of thinking. Herrmann designed a metaphorical Whole-Brain® based on the notion of left and right brain thinking. He divided the brain into four quadrants; the upper left he identified as the A quadrant, lower left as the B quadrant, lower right as the C quadrant and the upper right as the D quadrant. He then associated each quadrant with specified qualities. Quadrant A is associated with individuals who are logical, fact-based and analytical. Quadrant B is associated with individuals who prefer planning, organising and elaborative information. Quadrant C can be associated with individuals who favour emotions, feelings and working with other people while Quadrant D is associated with individuals who prefer to be holistic, spontaneous and creative. The specialties in each quadrant inform the principles of Whole-Brain® thinking in that even though each person has his or her own thinking preference(s) he or she is more than capable of thinking and or learning in a less preferred quadrant(s). It is when individuals are challenged to learn, think or teach out of their comfort zone (preference) that Whole-Brain® thinking, learning and teaching take place.

Herrmann's Whole-Brain® theory views brain dominance as a cognitive skill that can be intentionally developed through a holistic teaching strategy (Hughes, Hughes & Hodgkinson, 2017). A holistic teaching strategy allows a balance of the brain's four core skills, based on the four quadrants of the brain to enable diversified learning. As such, Herrmann (1989) posits that one's thinking preference is not fixed and that learning is not path-dependent, regardless of one's brain dominance, implying that thinking preferences can be situationally or circumstantially learnt and one can be challenged to learn holistically regardless of a preferred way of thinking.

Real-life is diverse, meaning it is not fixed to one quadrant of the Whole-Brain® thinking theory but it circumstantially presents itself in all the Whole-Brain® theory quadrants and requires one to use specific qualities of different quadrant(s) at a given point in time. Therefore, the diverse nature of life means one has to think diversely in everyday life. Thinking diversely means thinking holistically by following a Whole-Brain® thinking approach to life. As much as we all have our preferences with regard to the way we think, learn or teach, it is important that we challenge ourselves to think or do things in the way we less prefer. Why is this important? Life requires this kind of thinking from all individuals. Those who choose to think in their preferred mode only may find it difficult to interact or engage in real-life situations.

One of the roles of a lecturer is to design learning tasks that challenge and motivate students to learn deeply and effectively, and to be able to create their own meaning about the set

learning outcomes – a student-centred approach. The latter focuses on how students think and learn according to their thinking preference(s) and how they can be challenged to think out of their thinking preference(s) to foster whole-brained holistic professionals − the desired product or exit learning outcome. Some researchers argue that thinking preferences are unique to individuals and that the lecturer's role, therefore, is to "marry" the individual's preferred thinking and the learning task he or she is exposed to (Nadkarni, 2003). I would like to replace the word *marry* with embed; this means the learning preferences of the students must be embedded in the learning task. Embedding the students' preferences highlights that Whole-Brian® thinking is an integral part of learning. In addition, Nadkarni (2003) suggests that individuals are most likely to learn when this match is achieved. It is important to accommodate students' thinking preferences but also consider and incorporate their less preferred quadrant(s) of the Whole-Brain® theory. This means all four quadrants of Whole-Brain® thinking theory should be considered during the learning opportunity to motivate and challenge the students as they immerse themselves in the learning task.

In this century, it is important that as lecturers we design learning tasks that are effective and relevant to the future of our students. This is even more applicable to students in higher education institutions as they should be well prepared for the world of work. The research conducted by Knowles (1990); Buzan (1991); Jensen (1996); Ornstein (1997) has shown that incorporation of Whole-Brain® thinking in the learning opportunity makes learning effective. To support the argument, De Boer, Steyn and Du Toit (2001) posit that the Whole-Brain® learning model effectively meets the diverse needs of students. In their book De Boer, Du Toit, Scheepers and Bothma (2013) state that when lecturers use the principles of Whole-Brain® learning and thinking, the students can develop their full learning potential (Slabbert *et al.*, 2009). They (De Boer *et al.*, 2013) add that lecturers have to take their students' learning preferences into account when designing learning tasks for learning opportunities.

To determine the thinking preference(s) of an individual, the Herrmann's Brain Dominance Instrument (HBDI) is used. The HBDI is a profiling instrument that consists of 120 generic questions to test one's thinking, learning and behavioural traits. The HBDI can indicate one or more individual preferences. It also indicates how one's preference(s) changes when the individual is under pressure. Once an individual has answered the generic questions, the system generates a thinking profile for the individual. From this data one becomes aware of one's thinking preference(s) and thus is able to use this knowledge in one's personal and

professional life. As a passionate constructivist I visualise each quadrant of Whole-Brain® thinking model as having a door from one quadrant to another; a quadrant represents a room. There are doors we prefer to keep open, but it is important to know we have the keys to access and open other doors. In Figure 2.3 and Figure 2.4 below I randomly present two different profiles to show that even though any individual has preferred thinking, he or she can self-transform to be a whole-brained individual.

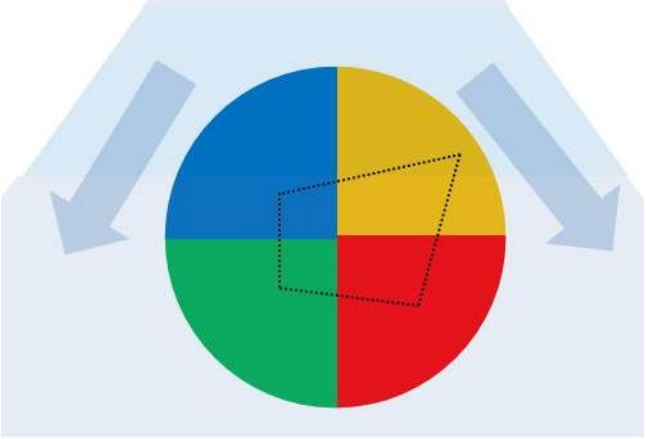


Figure 2.3 An example of a brain dominance profile

Figure 2.3 is an example of a brain dominance profile. The arrows on the sides are an indication of the set way of thinking of an individual. Being aware of one's brain profile and doing nothing about it, is like having a key to long-longed for victory but not to use it. Having knowledge of one's brain profile means one has to maximise one's potential by using one's preference(s) better and improving or opening the doors to one's less preferred quadrants (rooms). To use one's less preferred quadrants requires of one to face circumstances or life challenges that will force one to use the keys to open other doors.

Being involved in diverse real-life challenges transforms an individual. This means though one may have a preferred manner of thinking, one's ability to interact with different life challenges that require different specialties in specific quadrant(s) can transform one into an individual that is able to think and do things in all four quadrants of the Whole-Brain® thinking theory. Figure 2.4 below is an example of a brain profile with all quadrants balanced. This by no means implies that we should have a brain profile like the one presented in Figure 2.4, but I am advocating that we have access to all the quadrants and thus should be able to use our less preferred quadrants when the need arises to be able to solve the challenges we are faced with and develop our full potential in our personal and professional lives.

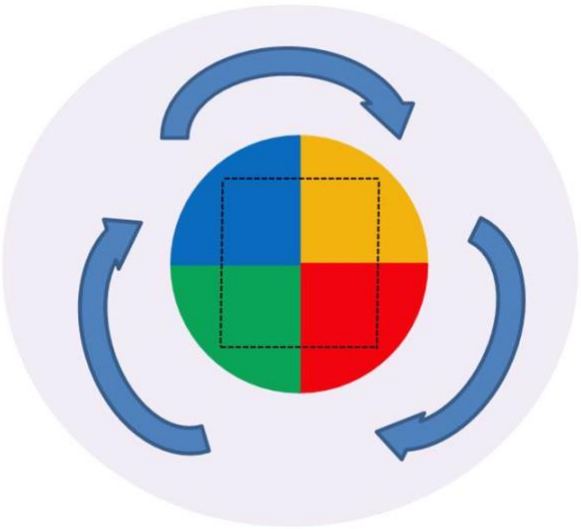


Figure 2.4 An example of a Whole-Brain® thinking profile

In the next section I discuss the views on designing a learning task, learning opportunity, engaging students in their learning and the assessment of learning.

2.2.2 Learning Task Design, Learning Opportunity, Engaging Students and Assessment of Learning

Designing a learning task needs proper and deliberate extensive planning. It is in the design of the learning task that the lecturer can decide which learning theories would be best for the learning outcomes intended. The Whole-Brain® thinking theory has to be embedded in the learning task. The lecturer has to consider the learning preferences of the students. It is important that the less preferred quadrants are also incorporated. The idea is to design a learning task for a learning opportunity in which each of the four quadrants is represented.

The inclusion of all the quadrants of the Whole-Brain® thinking theory when designing the learning task is done through adopting other learning theories. I will start with constructivist learning theory. Toetenel and Rienties (2016) state that when incorporating constructivist learning theory in one's teaching, the lecturer needs to consider and ask the following questions:

- What will students do in the course?
- How much will they be reading?
- Will they do any practical work?

Toetenel and Rienties (2016) consider only three questions that a constructivist needs to consider when designing a learning task. I believe that the questions they ask limit authentic learning and Whole-Brain® thinking and learning. A constructive learning task designed in the manner stated by Slabbert *et al.* (2009) seems to be more beneficial in achieving the goals of constructivist learning theory. Slabbert *et al.* (2009) ask the following questions:

- How can I as a facilitator initiate constructivist learning? This question raises the importance of a constructivist learning approach to commence in the planning stage of the learning task design.
- How can I uncompromisingly present a real-life challenge in its holistic complexity? Asking oneself this question ensures that one ponders the real-life challenge one has chosen to present to students. Will it stir or trigger that which one wishes one's students to probe and engage in? Is it authentic? Is it likely that students will encounter this real-life challenge in the world of work? All these can be extra questions the facilitator needs to ask herself[2] when choosing the real-life challenge to present to students. The manner in which the challenge is presented communicates the urgency of the challenge.
- How can I maintain learning and engage students in creative construction of new meaning?

  Even though one plans how one would maintain learning and engage students in creative thinking during the planning phase, sometimes what one plans does not work, depending on what I would call the class atmosphere. Sometimes one starts out and students are not so motivated or perhaps they are scared to share their existing constructions with the members of their group. This kind of class atmosphere does not encourage students, so it becomes the responsibility of the lecturer to ask questions that will make possible students' participation and change the class atmosphere to be conducive to deeper learning.

- How can the learning task execution ensure that students maximise their potential to become self-fulfilled individuals?

The lecturer can ensure this by having direct contact with each student in a group; hence the environment where learning takes place needs to allow one to have access to each student in a group. Some students are introverts and do not find it easy to communicate in

[2] For ease of expression only the feminine form of the pronoun is used henceforth.

a group while extroverts may tend to take over and the learning becomes focused on them. It is the lecturer's responsibility to ensure that this does not take place. Each student must have an opportunity to contribute to the construction of new meaning. Self-fulfilment comes when students realise they co-created the meaning. Another way to ensure that students are self-fulfilled individuals is through the presentation of challenges. The challenges have to start as low level tasks (easy according to the cognitive level of the students) and progress to high level challenges that are more difficult to solve as in Bloom's taxonomy (Anderson, 1994). When students start with easy tasks they gain confidence to engage with more complex challenges. An example of the higher order of thinking given to students is one where students have to evaluate their clinical competencies through creating a portfolio to showcase their professional growth and development.

- What constructive feedback will I give to students?

  This question is answered as one engages students during the learning opportunity. Giving feedback to the whole class is important but group feedback is just as important. The feedback stage does not have to engage the lecturer only; students play a very important role in giving feedback to one another. Students can learn much from what their peers tell them.

- How can I enhance the constructed meaning to the highest possible quality level?

  This can be achieved during the construction of new meaning. The lecturer needs to ask questions for students to seek deeper meaning. The facilitator has to be creative in doing this in such a manner that students start asking similar questions and probe every point they raise. The line of development is from the lecturer as the director of deep learning to students themselves becoming directors and masters of their learning. As a lecturer one does not want students to depend on one; they should become self-sufficient, self-enquiring, self-reflective, self-fulfilling and self-transformative.

A learning task designed in the manner discussed makes it inevitable for students and the facilitator of learning to become lifelong learners and to be transformed or to become transformational leaders (Smit & Du Toit, 2016). Slabbert *et al.* (2009) refer to lecturers as the ultimate determinants of educational transformation and I agree on this idea because if I as the lecturer decide not to transform my teaching practice, student learning can be stagnant. Therefore, when lecturers transform education, we transform our students and

ultimately they transform themselves – an intrapersonal attribute/intelligence (Gardner, 1993) that is expected of all professionals.

The learning task design determines what will happen during the learning opportunity. Learning task design can be defined as the application of theories relating to learning and instruction with the aim of creating experiences and learning material to support these experiences (Toetenel & Rienties, 2016). Conole (2012:121) adds that learning opportunity design is a “methodology for enabling lecturers to make more informed decisions on how they go about designing learning activities and interventions, which are pedagogically informed and make effective use of appropriate resources and technologies”. A learning task design model such as that of Slabbert *et al*. (2009) (Consult Appendix K) informs and gives clear indications of what is to take place during the learning opportunity. The learning design taxonomy by Toetenel and Rienties (2016) is illustrated in Table 2.1; it indicates activities and assignments undertaken by students and should be aligned with the learning outcomes and assessment strategies.

Table 2.1: Learning design taxonomy

	Type of activity	Examples of activity
Assimilative	Attending to information	Read, watch, listen, think about, access, observe, review, study
Finding and handling information	Searching for and processing information	List, analyse, collate, plot, find, discover, access, use, gather, order, classify, select, assess, manipulate
Communication	Discussing module-related content with at least one other person (student or tutor)	Communicate, debate, discuss, argue, share, report, collaborate, present, describe, question
Productive	Actively constructing an artefact	Create, build, make, design, construct, contribute, complete, produce, write, draw, refine, compose, synthesise, remix
Experiential	Applying learning in a real-world setting	Practise, apply, mimic, experience, explore, investigate, perform, engage
Interactive/adaptive	Applying learning in a simulated setting	Explore, experiment, trial, improve, model, simulate
Assessment	All forms of assessment, whether continuous, end of module, or formative (assessment of learning)	Write, present, report, demonstrate, critique

Source: Toetenel and Rienties (2016)

My view on the assessment methods and instruments is that it depends on the type of learning theory being used. For example, constructivist learning uses continuous assessment to allow for changes or adaptation of the constructed meaning that aids continuous improvement (Henson, 2015). Focusing on assessing one's own practice and teaching methods, and reflecting on each learning opportunity can also enhance the learning of students. The development of instruments for assessment should also be student-centred. According to Taylor and Hamdy (2013) the learning theories highlighted in the earlier section are required for the development of evaluation systems and instruments. These can be used to measure the expected competencies and outcomes. Assessment should be linked to specific learning outcomes. The lecturer should encourage discussions, debates, reflection, self- and peer-evaluation to increase learning opportunities (Taylor & Hamdy, 2013). In their book De Boer *et al.* (2001) tabulate the complementation of Outcome

Based Education (OBE) outcomes and Whole-Brain® thinking theory. Table 2.2 shows the relationship.

Table 2.2: Whole-brain learning combined with the outcomes-based approach

Process necessary to achieve outcomes	**Associated quadrant in the whole-brain model**
Critical thinking	A, B, C and D
Problem solving	A, B, C and D
Application	B
Appreciation	A, B, C and D
Analysing	A
Synthesising	D
Evaluation of information	A, B, C and D
Teamwork	C
Communication	A, B, C and D
Socialising	C

Source: de Boer *et al*. (2001)

I link Table 2.2 with the Critical Cross Field Outcomes (CCFOs) (SAQA, 2019) and the attributes of the 21st century (De Boer, Du Toit & Bothma, 2015) and give examples under each CCFO and its relevance in the Oral Hygiene programme, specifically the module Orthodontics.

- The Oral Hygiene student should be able to identify and solve problems relating to oral health practices of patients through the use of critical and creative thinking.

BOH students are required to solve the problems they encounter as they treat their patients in a clinical setting. These problems could include non-compliant patients representing with bad oral hygiene. Students need to solve this problem through critical and creative thinking. In most if not all cases, patients with bad oral hygiene during the orthodontic treatment attended multiple discussions and demonstrations on the subject of how to keep a healthy smile during the treatment and after. Students need to be able to identify that either the latter is not functional for the specific patient and think of alternative means (brushing techniques) to solve the problem. Identification of a problem is important under this CCFO; incorrect

identification of a problem will not solve the problem. For example, the patient could be having bad oral hygiene not necessarily because she is unable to brush effectively, but maybe because she is going through financial difficulty ad cannot afford to buy a new toothbrush. For this CCFO to be effectively mastered, the attribute of 21st century education, namely effective communication is crucial in solving a problem.

- The Oral Hygiene student should work effectively with her peers, dentists, dental specialists, teachers from different schools where she performs her community services and with her patients.

The above CCFO can be linked to the principles of cooperative learning (Gillies, 2007) and socio-constructivist learning (Vygotsky, 1978). The Oral Hygiene student should acquire the skill to work effectively with a professional team, which includes a dental specialist, dentist and dental assistants. Multidisciplinary teamwork ensures effective and ethical patient treatment and care.

- Organising and managing oneself and one's activities responsibly and effectively as a professional in Oral Hygiene will contribute to one's becoming a self-regulated learner.

The latter CCFO assesses the individual Oral Hygiene student taking full responsibility for her own learning through employing the principles of self-regulated learning theory (Zimmerman, Banner & Kovach, 1996; Ning & Downing, 2015) and meta-learning (Slabbert *et al.*, 2009). For example, the Oral Hygiene student is given the task to compile a reflective portfolio as a final examination. This is a portfolio that aims to assist the student to grow her metacognition skills (Flavell, 1976; Slabbert *et al.*, 2009) and ability to engage in reflective practices (McNiff & Whitehead, 2010; Turky, 2017). It is the responsibility of the student to organise and manage the process, effectiveness and the outcome of the portfolio and continuously reflecting on it. The aspects of growing metacognition skills are evident in the execution of the skill of planning (organise and manage), reflecting on the implementation and the outcome – as per the three phases proposed by Biggs (1985).

- Collect, analyse, organise and critically evaluate information relating to oral hygiene.

An Oral Hygiene student should be able to collect information regarding the oral health needs of the community or a school they have chosen for community service learning. The student should be able to perform a needs analysis of the specific community and critically

evaluate their oral health needs to prepare and perform relevant oral hygiene services and treatment. Online services can be offered by the students through innovative means such as creating a Google form with questions to assess the situation of the community and collect information. The students can then analyse the collected data/information to evaluate and organise relevant oral health assistance for the community.

- Communicating effectively as an Oral Hygiene student using visual, and/or language skills in the modes of oral and/or written persuasion.

The Oral Hygiene student must be able to communicate effectively with her patients using different patient education media or apparatus. For example, the student can communicate a brushing technique to a young patient using pictures or an animated video; what is communicated is supported by an array of educational material with a view to communicating effectively. The Oral Hygiene student must also communicate effectively with colleagues and a dental team that may be multidisciplinary. Communication in dentistry becomes an essential competence to master as this is one of the 21st century attributes students have to enact in the world of work. Most fear patients have of dentistry and oral hygiene is due to ineffective communication skills of the practitioner (White, Kruger & Snyman, 2008).

I design learning tasks (Consult Appendix K for an example of a learning task design) with an aim of addressing the above mentioned CCFOs and attributes of the 21st century. A learning task incorporating these CCFOs and attributes challenges students in such a way that they are expected to master skills at a high cognitive, affective and psychomotor learning outcome level as proposed in Bloom's taxonomy (Anderson, 1994; Wilson, 2016). Next I share ideas on how learning task design, learning opportunity, engaging students and learning assessment can be strengthened during teaching practice.

2.2.3 Strengthening my Teaching Practice

Understanding how students think, learn and respond in relation to their brain dominance strengthened my teaching practice when I designed learning tasks, facilitated the process of learning and ensured student engagement. To illustrate this, De Boer, Steyn and Du Toit (2001) summarise the different quadrants of the Whole-Brain® model and the students' expectations as per their thinking preferences. In Table 2.3 De Boer, Steyn and Du Toit (2001) depict what students with different thinking preference(s) could anticipate from the four quadrants of the Whole-Brain® model. Their findings played a huge role during the

learning task design stage and the learning opportunity. I could anticipate what students would expect during the learning opportunity and consolidate their anticipations in my planning and this strengthened my teaching practice.

Table 2.3: Students' anticipation of learning in relation to brain dominance

The student with an upper left quadrant thinking preference anticipates:	**The student with an upper right quadrant thinking preference anticipates:**
• Precise, to the point, information • Theory and logical rationales • Proof of validity • Research references • Textbook readings • Numbers, data	• Fun and spontaneity • Playful approaches • Pictures, metaphors, overviews • Discovering and exploration • Quick pace and variety in format • Opportunity to experiment
The student with a **lower left quadrant thinking preference anticipates:** • Organised, consistent approach • Staying on track, on time • Complete subject chunks • A beginning, middle & end • Practice and evaluation • Practical applications • Examples • Clear instructions/ expectations	**The student with a lower right quadrant thinking preference anticipates:** • Group discussion • Sharing, expressing ideas • Kinesthetic, moving around • Hands on learning • Personal connection • Emotional involvement • User friendly learning • Use of all senses

Source: De Boer, Steyn and Du Toit (2001)

Table 2.3 contains examples of what can be done during the learning opportunity to ensure that the learning preference(s) of the students is considered. To give an example, the learning opportunity can engage students to read a scholarly article and this will accommodate students who have a quadrant A preference. Students in quadrant B can be considered through the written and verbal communication of the task with clear time indicators for each task. Quadrant C students can be accommodated through division of the students into groups and quadrant D students can be considered through the incorporation of a video clip in the learning task. What students anticipate is important and so is the knowledge of what students struggle with. In the following paragraph I discuss what students struggled with according to their brain dominance profile.

Wium, Pitout, Human and Du Toit (2017) state what students struggle with (Consult Figure 2.5) according to their brain dominance profiles. For me as a lecturer possessing this knowledge assists me during the design of the learning task. The fact that the students

struggle with what Wium *et al.* (2017) emphasise, does not mean students should not be challenged on what they struggle with or prefer less. In their study they found that students in Health Care Sciences have less preference for quadrants C and D, which means the lecturers in these disciplines should challenge students to use these less preferred quadrants. They suggest learning opportunities that include synthesising the learning tasks, working in groups brainstorming, reflection and role-play will facilitate Whole-Brain® thinking for these students (Wium *et al.*, 2017).

De Boer *et al*. (2013:275) list the emotions and tasks students struggle with in each of the Whole-Brain® quadrants. As stated above, this is important to know because it can assist the lecturer during the design of learning tasks presented during the learning opportunities. In Figure 2.5 below I have adapted their design.

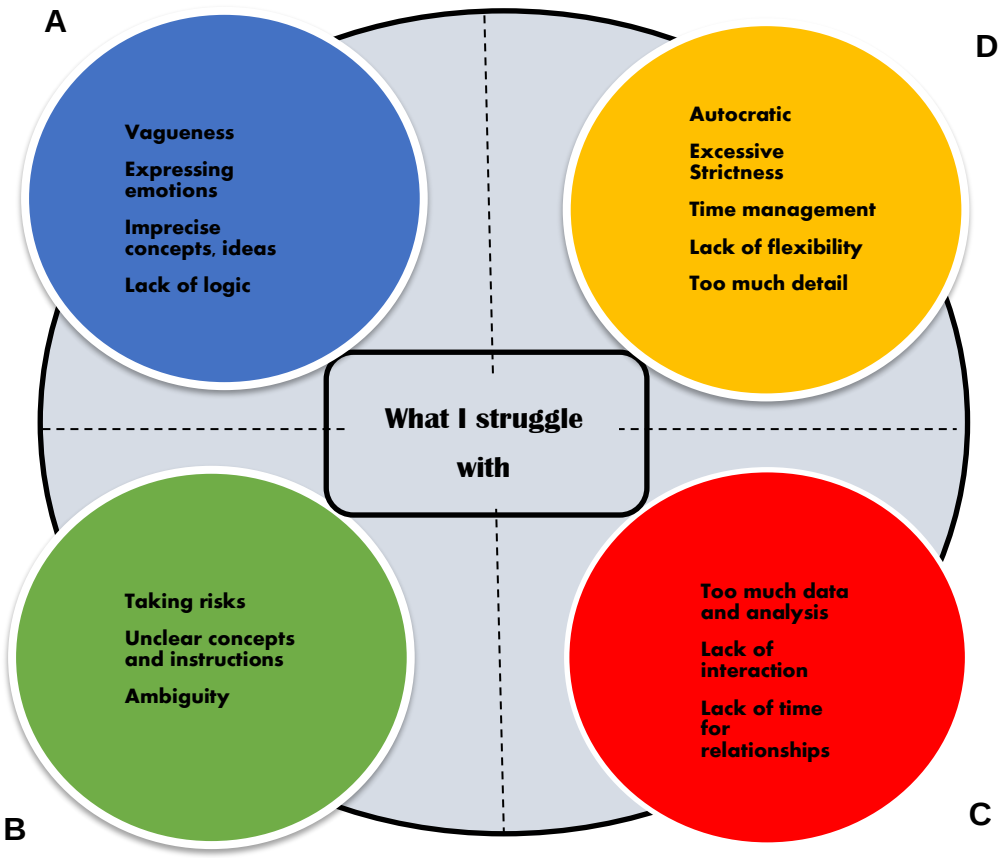


Figure 2.5 Adaptation of De Boer *et al*. (2013: 275) of what students struggle with

To facilitate the use of the principles of a “good theory” (De Boer, Du Toit & Bothma, 2015) known as Whole-Brain® thinking, students must be encouraged to take part in a variety of

learning tasks that are designed to immerse them in all four quadrants, even the less preferred ones (Hughes *et al.*, 2017). For example, a learning task that combines textbook reading, spontaneity, playfulness, music, group interaction, structure and behavioural modification can enhance Whole-Brain® thinking, teaching and learning.

In the following section I discuss my Whole-Brain thinking mix.

2.3 Whole-Brain® Thinking Mix

As alluded to in the earlier sections of this chapter, the word *pillar* is a construct or a metaphor used as a representation of a framework. The Whole-Brain® thinking theory is used independently but mixed with other theories to strengthen the foundations of my teaching practice. In the next section I discuss each ingredient of the Whole-Brain® thinking mix.

2.3.1 Cooperative Learning

Cooperative learning refers to "students working and studying together in a group to perform tasks and accomplish expected goals" (Yi & LuXi, 2012:166). It is a way of learning where students can engage with one another to master learning outcomes (Yamarik, 2007). The definition of Yi and LuXi (2012) is somehow limiting and suggests that the main goal of cooperative learning is to perform tasks in groups and reach the expected goal. I am of a different opinion as I believe that cooperative learning serves the purpose of making an individual discover who she is, the intrinsic self and acquiring intra- and interpersonal skills (Gardner, 1993). My view on the latter is extrapolated from the learning tasks that students engage in during cooperative learning, where students get to know their abilities to communicate (inter-personal skill) with the members of the group or emanate self-confidence (intra-personal skill) during group presentation, for example. I am also in support of what Hammar Chiriac (2011) says about how interaction and the cooperation among students influence their learning and their ability to solve problems as a group. With this being said it is not a hidden fact that the call to work in groups can be a great challenge for some students, leading to group work failure (Hammar Chiriac, 2014).

Some students do not like cooperative learning because group work is exhausting since one has to work and reason with other people, which implies social interaction. Even though it is laborious for some students, different learning does take place during cooperative learning; this may include specific learning outcomes and also what Gillies and Boyle (2010) refer to as group knowledge. This makes cooperative learning theory a very important learning

theory to incorporate during learning opportunities. Students in the 21st century need to learn the skills of working in harmony with one another. Cooperative learning propagates skills such as the ability to work in a multidisciplinary team − an attribute of the 21st century. Through cooperative learning one is challenged to self-reflect and get to know virtues and the lacking skills that one is not usually aware of.

As stated above, learning does take place during cooperation between students; this is supported by what other researchers (Johnson, Johnson & Stanne, 2000; Yamarik, 2007; Hornby, 2009; Yi & LuXi, 2012) suggest, that cooperative learning yields better academic performance than individual or competitive learning. The other positive advantage of cooperative learning is that it enthuses students and encourages social interaction (Hornby, 2009). For a lecturer it is important that students are engaged in the learning process; they have to be consumed by the interactions taking place. In the 21st century, social interaction are regarded as one of the attributes of multidisciplinary team work. Cooperative learning can be optimised when the students are grouped according to the Whole-Brain® thinking model to create Whole-Brained groups. Connecting this with my idea of open doors, each group should have all the doors of the Whole-Brain® thinking theory open. In this way students can challenge one another's ideas or viewpoints because of their different ways of thinking, communicating and approaches to problem-solving. They need to discover ways in which they can work in harmony with one another and become team players.

Malatji (2016) refers to positive interdependence that underscores the importance of all members of a group to participate and have a clear understanding that they will individually and collectively benefit from working together. Malatji (2016:35) posits that "students must feel they need each other in order to complete the task; they swim or sink together". Even though students must take full responsibility for engaging in cooperative learning, it is also the responsibility of the lecturer to ensure that all members of a group are actively involved, without one student taking over the learning experience.

Gillies (2007) posits that successful cooperative groups are established on five key elements: positive interdependence (Malatji, 2016), promotive interaction, individual accountability, interpersonal and small-group skills, and group processing. In these learning elements that I support there are intangible qualities that are developed, exposed and generated in an individual involved in the cooperative group. It is clear that Whole-Brain® thinking cannot be used in isolation from other learning theories, including cooperative learning. The responsibility of ensuring successful cooperative learning does not lie with the students alone. Lecturers have the responsibility to engage students in cooperative learning

by designing learning tasks that will incorporate this learning theory to initiate learning (Ding, Li, Piccola & Kulm, 2007; Yi & LuXi, 2012).

Next I outline the relationship between cooperative learning and a community of practice.

2.3.2 The Relation between Cooperative Learning and a Community of Practice

For lecturers to incorporate cooperative learning principles during learning opportunities they need to be cooperative professionals themselves. The saying. “You cannot take people where you have never been yourself” is relevant. It highlights the need for lecturers to have the experience of how, what and why cooperative learning in the first place. My involvement in the study programme PGCHE exposed me to the principles of cooperative learning. I was not only exposed but I engaged and immersed myself in this learning theory and through this I was challenged to self-reflect on who I was and my value in the group I had been assigned to. Being a cooperative lecturer relates to the ability for me to be part a community of practice that can be defined as a group of people with similar academic norms and values, working together towards achieving a specific goal (Wenger, 1999). Wenger (1999) emphasises that a simple community cannot be addressed as a community of practice. He posits the following three characteristics that are crucial for a community to be called a community of practice.

1. The **domain** that signifies the knowledge, identity and the area of interest that brings the community together.
2. The **community** that is the group of people for whom the domain is meaningful and they work with one another to learn.
3. The **practice** that includes the body of knowledge, skills or expertise that the group shares and develops together (Wenger, 2004).

The idea of associating cooperative learning and a community of practice highlights the importance for lecturers to engage students in a cooperative learning experience in such a manner that they yearn to belong and value the community of practice. A group of individuals that are members of a community of practice learn to construct and make new meaning about the domain. This leads to another ingredient of facilitating learning, namely constructivist learning theory.

2.4 Constructivist Learning

Constructivists view learning as the process of constructing new knowledge through linking it with existing knowledge (Taylor & Hamdy, 2013; Henson, 2015; Bada & Olusegun, 2015; Singhal, 2017). According to Henson, (2015) constructivists agree on using the principles of cooperative learning in that they believe that working in small groups can improve learning. Since students work in small groups during constructivist learning, the learning can be improved as students engage in learning, solving problems and interacting with their individual existing constructions. Schunk (2012:230) posits that "A person's constructions are true to that person but not necessarily to everyone else". This can increase the challenge in a group, but it is a beneficial challenge as students can learn to work in harmony with one another. The challenges or problems that arise while students work in groups align constructivist learning with a student-centred approach to teaching and learning.

A student-centred approach to teaching assumes students to be the focal point during the learning opportunity (Singhal, 2017). The lecturer in the 21st century needs to ensure that learning opportunities are student-centred; in business terms students become one's customers, and when students are viewed as customers, the lecturer's aim is to market learning in a way that centres around the learning and thinking needs of students. Ensuring a student-centred approach to teaching can be done through incorporating real-life challenges as a trigger for constructivist learning. This allows students to think more deeply about the content rather than simply storing and repeating transmitted ideas (Haartsen-Geven & Sandberg, 2007). Haartsen-Geven and Sandberg (2007) state that constructivist learning is active, reflective, cooperative and authentic. Bada and Olusegun (2015) support this when they state that in constructivist learning theory students need to "actively construct knowledge in their minds" (Bada & Olusegun, 2015:66). Since students are the main agent in the knowledge acquisition process the constructivist learning opportunity is not executed well enough if the students are not the active agents in the process of knowledge construction. Cooperstein and Kocevar-Weidinger (2004:142) suggest the following aspects for assessing whether the constructivist learning theory has been applied:

- Students construct their own meaning – "students are not passive beings".

  I support the above point. I view students as active beings who are capable of constructing their own meaning. This means as a lecturer I have to refrain from viewing students as passive beings but design learning tasks which will engage students in constructivist learning.

- New learning builds on prior knowledge – “students must make links between old and new knowledge”.

  This means while students are working in groups and each individual has prior knowledge, the students should be able to use existing knowledge to solve the problem so that new knowledge can be built.

- Learning is enhanced by social interaction – “students have the opportunity to interact and share their ideas with others”.

  As stated in the previous paragraph, social interaction improves the learning of students. This means each member of a group must communicate effectively (attribute of the 21st century) with group members.

- Meaningful learning develops through authentic tasks – activities are linked to real-life situations.

  This means as a lecturer, I should design tasks that consist of real-life problems; students should at some point in their life encounter the challenge they had to solve during the learning opportunity.

In the next section I discuss self-regulated learning.

2.5 Self-regulated Learning

Ning and Downing (2015) define self-regulated learning as one’s ability to monitor and regulate one’s own learning purposefully and intentionally through the use of various cognitive, metacognitive and behavioural strategies. The cognitive strategy involves students’ utilisation of rehearsal, organisational and elaboration strategies to facilitate the management and comprehension of information and the construction of new meaning. The metacognition dimension involves strategies such as goal setting and self-testing to monitor and evaluate one’s learning progress. Vula, Avdyli, Berisha, Saqipi and Elezi, (2017) posit that metacognition allows students to understand and monitor their abilities to encode, modify and retrieve information (cognitive process). Other authors such as Schraw, Crippen and Hartly (2006) perceive independent application of metacognition as being essential but not sufficient for self-regulation and solving of problems. They advocate that all self-

regulated learning components − cognitive, metacognitive and motivation − should be balanced and be applied together to achieve efficacy.

Some students are naturally self-regulated; I would assume that most quadrant B dominant individuals are more self-regulated than others. Self-regulation can be facilitated by the lecturers through numerous pre-planned strategic learning tasks that enable students to practise self-regulation until there is no need to monitor them. In a university context I would suggest that self-regulated learning be introduced as early as in the first year so that by the final year of study all students are independent self-regulated learners who will soon enter the world of work as professionals. As prospective professionals they need to contribute to professionalism and building their own oral hygienist identity. The professional identity of an oral hygienist is a self-regulated process. In the next paragraph I discuss the relationship between self-regulatory and professional identity.

2.5.1 Self-regulated Learning and Professional Identity

Professional identity is a very important phenomenon in the oral hygiene profession. The literature describes professional identity as “self-image which permits feelings of personal adequacy and satisfaction in the performance of the expected role” (Ewan, 1988:85). Paterson, Higgs, Wilcox and Villeneuve (2002:6) define professional identity as “the sense of being a professional”. Paterson *et al.* (2002) point out having professional identity is a significant outcome of self-regulated learning. This means students without professional identity may not be self-regulated. As part of this research, I designed a learning task for a learning opportunity headed “Professional identity in an orthodontic practice” (Consult Appendix M). I view professional identity as an integral part of developing a lifelong learner in a student. Cruess and Cruess (2016) posit that when one acquires professional identity, one should act, think and feel like a professional; for example, my students have to act, think and feel like oral hygienists. This is achieved by use of authentic life challenges which gives each student an opportunity to be a professional and engage in learning tasks which prepare them to enter their future (real-world of work) with confidence. Professional identity is an individual student quality; hence I regard it as a product of self-regulated learning.

Research has shown that the application of self-regulated learning is directly related to academic performance (Ning & Downing, 2015), motivation (Zusho & Edwards, 2011), satisfaction and learning experience (Ning & Downing, 2011). According to Ning and

Downing, (2015) self-regulated students generally learn more deeply than those who are not self-regulated learners. Self-regulated students experience the lowest level of test anxiety (Ning & Downing, 2015) while those who are not, experience the highest level of stress and lack interest in academic studies (Heikkilä, Lonka, Nieminen, & Niemivirta, 2012). Self-regulated learning affords the student the opportunity to learn how to learn (Slabbert *et al.*, 2009). Slabbert *et al.* (2009) state that self-regulated learning practices enable the student to be a lifelong learner through the acquisition of "five Rs: readiness, resourcefulness, resilience, remembering and reflectiveness" (Slabbert *et al.*, 2009:110).

Becoming a lifelong learner is inevitable in education. When education is embedded in one, one cannot help but become a lifelong learner. Becoming a lifelong learner means one has to be active in one's learning. This leads to another learning theory, which is action learning. Slabbert *et al.* (2009) describe action learning as active participation in real-life encounters to gain knowledge, skills and attributes and eventually fundamental human virtues. Fundamental human virtues according to Slabbert *et al.* (2009) are divided into two entities: intrapersonal and interpersonal human virtues that can be linked to the work of Gardner (1993) on multiple intelligences. Intrapersonal human virtues include self-confidence, motivation, initiative, effort, perseverance, common sense, responsibility, independence, joy and love. Interpersonal human virtues are humanisation, communication, dealing with feelings, justice and forgiveness, love and leadership (Slabbert *et al.*, 2009). All these virtues constitute professional identity.

Active learning that can be used interchangeably with action learning is said to be an effective technique for students to learn, apply, integrate and construct their own meaning about a phenomenon (Bonwell & Eison, 1991). Active learning occurs when students are actively involved in solving a real-life challenge they are engaged in. Self-regulated students can easily practise action learning, but students who are not self-regulated learners need a lecturer to incorporate action learning in the learning opportunity to engage them in the learning task. Effective action learning manifests when students are engaged in a real-life problem/challenge. This means that to facilitate action learning the lecturer needs to incorporate another learning theory, namely problem-based learning (PBL) in the learning task. In the next paragraph I explain what PBL entails.

2.5.2 Problem-based Learning

"Problem-based learning is a student-centered educational method which aims to develop problem-solving skills through self-directed learning as a lifetime habit and teamwork skills"

(Ali, 2019:73). PBL is a learning theory that allows students to learn while being actively engaged in a real-life problem (Yew & Goh, 2016). According to Yew and Goh (2016) in PBL students can be given the opportunity to solve problems in a collaborative setting and engage in self-regulated learning practices, using self-reflection. They stipulate that the philosophy of PBL is that learning can be considered "constructive, self-directed, collaborative and contextual" (Yew & Goh, 2016:75-76) practice. To support this Dolmans, Michaelsen, Van Merrienboer and Van Der Vleuten (2015) posit that PBL is a student-centered approach in which problems are the cultivation for learning. PBL is characterised by (1) learning through solving problems; (2) small group sessions; (3) group learning facilitated by a lecturer, and (4) learning through self-study (Dolmans, Michaelsen, Merrienboer & Van der Vlueten, 2015). In PBL complicated problems are used to cultivate student learning to identify the concepts and principles they need in solving the problem (Duch, Groh & Allen, 2001). Students work collaboratively and constructively. Duch *et al*. (2001) stipulate that problem-based learning addresses the learning outcomes of the university student, such as those discussed in CCFOs and the attributes of the 21st century discussed earlier in this chapter. Burch (2001) posits that problems transport students from the classroom to tangible, real-life environments that stimulate their curiosity and creativity. Lecturers need to ensure that problem-based learning is active and actioned rather than passive and absorbed.

The following section consists of the discussions around critical reflection and professional development.

2.6 Critical Reflection and Professional Development

My professional development did not start when I joined the University of Pretoria as a lecturer, but when I was an undergraduate student at the same university. This is supported by Korkko, Kyro-Ammaia and Turunen (2016) when they state that professional development starts at the time of student training. At the time of my undergraduate training as an Oral Hygiene student, I viewed my lecturers as my role models; hence, when I joined the university, I did what I saw my lecturers doing when engaged in teaching, learning and doing assessment. With times evolving, it is imperative that I do not become stagnant in my teaching practice but transform it to align with the attributes of 21st century teaching. The journey of teaching practice transformation starts with reflection, hence my choice of choosing action research as my research design as it afforded me the opportunity to reflect.

Zuber-Skerritt, Fletcher and Kearney (2015) attest that critical reflection is vital in professional learning and development.

In my professional development journey it is essential that I do constant reflection to improve my practice and thus engage students in transformative learning experiences through the adoption of relevant thinking and learning theories. To support the latter statement, Watson (2014) posits that professional development is said to increase student learning experiences. Employing Whole-Brain® thinking principles to my practice requires a quality amount of time and is personally challenging as I am expected to move away from my comfort zone − my thinking and learning preference − to think holistically with each and every planning session of a learning opportunity (Du Toit, 2012). The nature of Whole-Brain® thinking theory proves to be self-developing. It challenges me to think holistically instead of looking at things in my own preferred manner. The more I engage with this challenge of thinking outside the box, the more I am self-transforming into a whole-brained individual.

In the next section, I discuss the dual model of developing professionalism.

2.6.1 Dual Model of Developing Professionalism

Some authors advocate that professionalism is a social construct (Peel, 2005; Cruess & Cruess, 2016). The latter highlights the importance of walking the journey of professional development with a community that will walk with you. Patton, Parker and Tannehill (2015) point out that increasing professional capital is about facilitating lecturers to help themselves more effectively. Smit and Du Toit (2016) indicate that mentoring can be used to propagate novice lecturers' professional development. This shows that through a proper mentor-mentee relationship, the mentee develops an urge to develop herself professionally (self-regulated and self-transformative). Amongst other models of professional development, coaching strategies and self-reflection have shown to improve teaching practice (Patton *et al.*, 2015). Hobson, Maxwell, Stevens, Doyle, and Malderez (2015) posit that mentoring and coaching are the most effective means of maintaining professional development.

In planning professional development it is important to find a mentor who can monitor and challenge one. I believe that if all higher education lecturers can have mentors who understand their responsibilities, our higher education system will change drastically and meet the needed manpower for the work environment. This is not to say that mentoring and coaching are the only strategies that can change the education system. Mentorship should awaken an urge in the one who is mentored to want to know and do more – to become a self-regulated lifelong learner. As much as it is important for myself to be mentored, I see

myself as a role model and a mentor for my students. Below is a depiction of the dual model of developing professionalism for my students and myself.

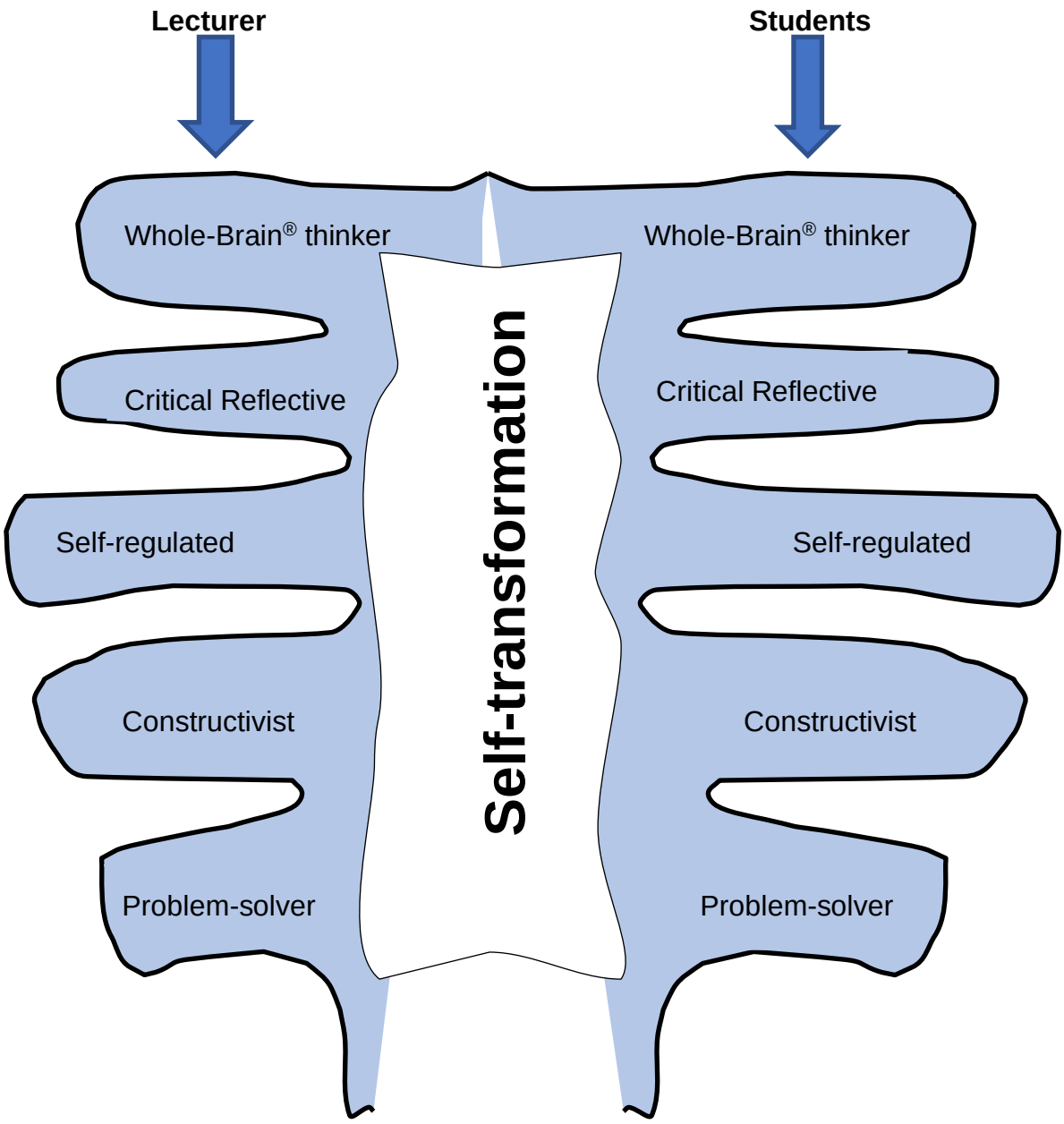


Figure 2.6 Dual model of developing professionalism

The visual above indicates the qualities that contribute to professionalism that aids self-transformation ultimately to lecturers and students becoming a lifelong learner. The visual indicates the duplication of synchronous qualities that both the student and the lecturer need to cultivate individually. I suggest that to develop professionalism the lecturer and the student need to be Whole-Brain® thinkers. The principles of Whole-Brain® thinking are discussed in earlier sections of this chapter. The highlight is that even though a lecturer or

a student may have her own preference(s) of thinking or doing things, she is not bound to these preference(s) but can develop her least preferred quadrant to think and do things holistically through the incorporation of all the quadrants of the Whole-Brain® theory. McNiff and Whitehead (2010:30) are of the opinion that "one cannot improve someone or educate them because people improve and educate themselves". I agree on this point of view, but advocate that it is important that I give my students the opportunity to improve and educate themselves through incorporation of challenges that require Whole-Brain® thinking practices. Professionalism is a self-transformative "do it yourself journey". The same applies to critical reflection. Being critically reflective is a practice with the focus on the self. Critical reflection is vital for individual learning and development; it enables the individual to be well prepared and to plan for constantly evolving and complex challenges in this 21st century (Zuber-Skerritt *et al.*, 2015).

Being critically reflective as mentioned above is a practice focusing on the self; this is why I have included self-regulatedness in the model. I cannot over-emphasise the importance of being a self-regulated lecturer or student. Being a constructivist is important; being a lifelong learner needs one to interact with others, share their ideas and learn from their ideas to construct new meaning. I therefore view being a constructivist an important determinant in developing professionalism. The ability to solve problems as one of the attributes of 21st century education should be the innate ability of both the lecturer and student. Life presents challenges and a professional individual should be able to solve those problems, be it individually or collaboratively.

2.7 Amalgamation

This chapter discussed the conceptual framework and the importance of engaging students in different learning theories. The work of scholars applicable to this study was discussed and my views were stipulated. I concluded the chapter by highlighting the importance of professional development for both myself as a lecturer and my students. In the next chapter I discuss the AR-chitect of my study and I present and interpret the data collected.

CHAPTER 3: THE AR-CHITECT, DATA PRESENTATION AND INTERPRETATION

3.1 Introduction

The meaning of the metaphor *AR-chitect* is discussed in Chapter 1. As a constructivist, I embarked on a journey of meaning making about my practice. McNiff and Whitehead (2010) view action research as being about knowledge creation; the knowledge created stems from my action research of my practice. The meaning making process resides within the action research spiral as I had to reflect on what my students − respondents − and my colleague had to say about my practice as reported per each of the three action research cycles I had embarked on. My Whole-Brain® thinking profile and action research therefore informs my practice. This implies that an asset-based approach (Du Toit, 2012) is adopted and I consider my HBDI® profile (Herrmann International, 2016) as an asset through which my practice can be transformed. In addition I consider myself as a human resource asset. My enrolment in PGCHE as discussed in Chapter 1 was a self-transformative journey which I now use as an asset in my continuous journey of transforming the self (I) and my practice.

The action research process comprises what I refer to as the power chain spiral that represents the action research spiral (McNiff & Whitehead, 2016).

Data collection was done using a combination of qualitative and quantitative data sets. The data sets were generated from the respondents and myself, using questionnaires that consisted of both closed and open-ended questions.

This chapter outlines the research paradigm (constructivist paradigm), research design (action research) and the research methods used to collect data. The action research spiral is included to indicate the actions that took place during data collection. My HBDI® profile is represented and interpreted.

3.2 Research Paradigm

A research paradigm I adopted and that was better suited to the process of transforming the self and my practice was constructivism. Constructivists believe that reality is constructed by individuals and groups (Bergh & Geldenhuys, 2013). This means constructivists considers the self (individual person) and a group of people (my practice that comprises my students). Constructivism (Von Glasersfeld, 2001) is based on the belief that knowledge is socially constructed and created from within, and for a particular group or context (Zuber-Skerritt & Perry, 2002). The constructivist paradigm was used by both myself as researcher

and participant and by my students as we were in emic positionality during the data collection process (Consult the dual model of developing professionalism in Chapter 2). In my emic positionality I constructed knowledge about myself and my practice. My students who were the respondents in my study, also in their emic positionality, constructed knowledge/meaning as they individually and/or collaboratively resolved the challenges that were presented to them during the learning opportunities.

3.3 Research Design

The research design I chose was action research (AR). The reason for choosing action research as my research design was that it afforded me the opportunity to develop my professionalism. McNiff and Whitehead (2010) state that action research is about two things: (1) the action that stipulates what you do, and (2) research that includes how you learn about and explain what you do. This study considered action research (AR) as a driving process for self-transformation; this changed the goal of AR into more than solving a problem but a constant process of reflecting (Zuber-Skerrit, Fletcher & Kearney, 2015). When reflecting, one embarks on a process of critical self-introspection that makes AR a process of knowledge creation (McNiff & Whitehead, 2010). The most important advantage of using AR is that though I had finished collecting data for my study, I could still continue maximising my full potential through continued knowledge or meaning creation. As a higher education scholar in Oral Hygiene, the use of AR became my lifetime commitment to ensure that my practice is relevant, innovative and progressive.

3.3.1 The Action Research Model

The action research model in Figure 3.1 shows the action steps I followed as I continuously engaged in the systematic AR process. I started by reflecting on my current practice. I continued with planning what I could do to transform my practice and then implemented my innovative idea(s) to bring about transformation. After the changes had been implemented I observed the transformative actions and then reflected. The action research spiral consisting of different cycles, each with its own steps, is repeated for as many times as required. Figure 3.1 is a diagram showing the action research spiral. I labelled Figure 3.1 the Power chain spiral to highlight my passion for Orthodontics. A power chain is one of the materials used to close the spaces between teeth. Each circle in a power chain is connected to another. AR requires the researcher to move from one AR cycle to another and that is what brings about transformation − either self-transformation or practice transformation and in this way a gap or space is closed. Through the connections of the power chain the strength is

maximised when closing the spaces between the teeth. In action research the *space* that is the gap or what needs transformation is closed as the action researcher engages in the reflective steps seen in the AR spiral.

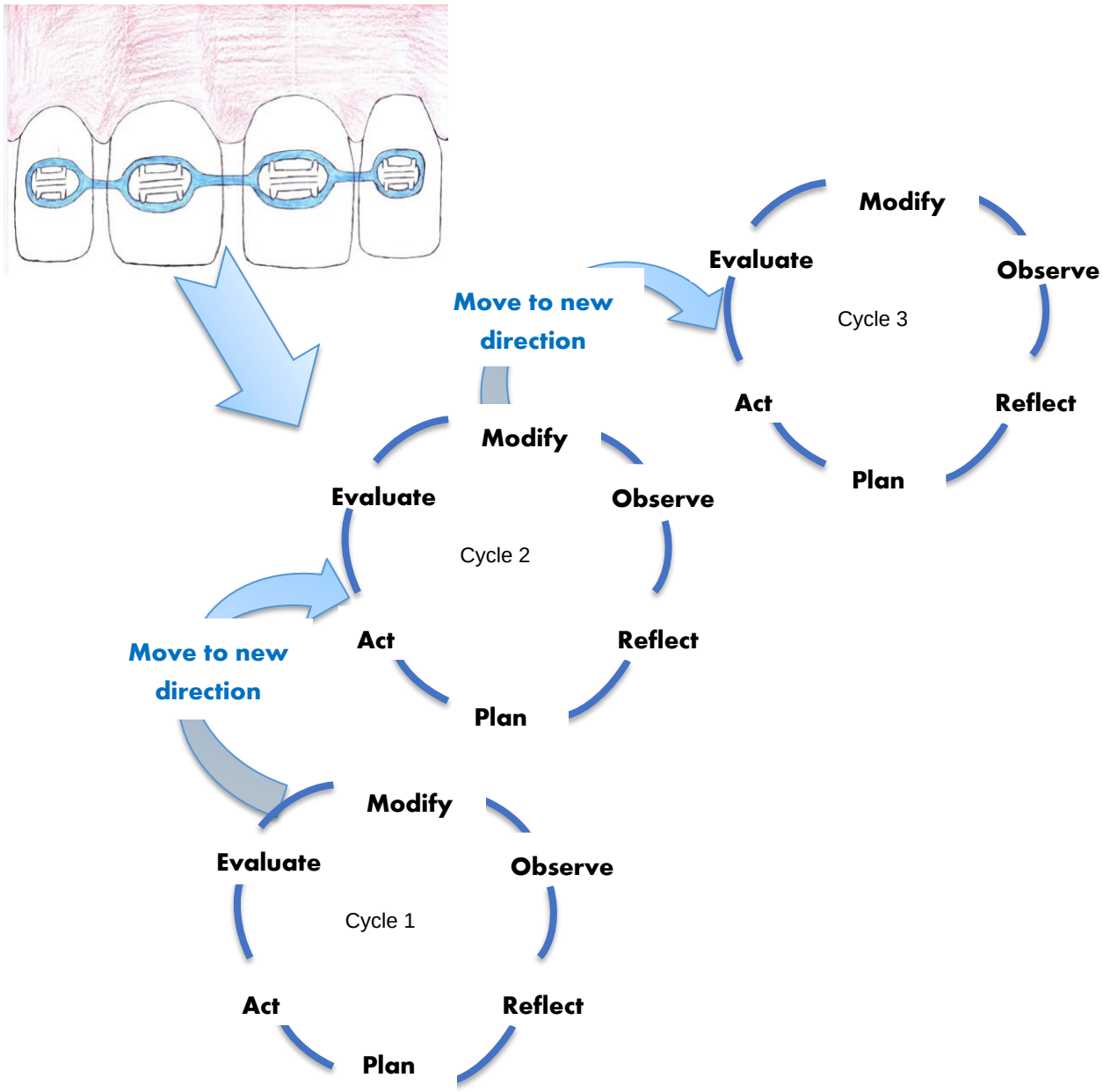


Figure 3.1 Power chain spiral adapted from the action research cycle (McNiff, 2016:27)

I specifically show three cycles because I utilised three learning opportunities in which data was collected for the study, but action research still continued even after data had been collected. To transform the self and my practice I used different research methods that afforded me the opportunity to reflect and gain knowledge about my practice. This is discussed in the section below.

3.3.2 Research Methods

Qualitative and quantitative data sets were used to acquire knowledge about myself and my practice and to answer the research questions formulated for the study. A qualitative research approach aims at "exploring and understanding the meaning individuals or groups ascribe to a social or human problem" (Creswell, 2013:4). Creswell (2013) states that this type of research is characterised by the use of words or open-ended questions and the data is typically collected in the participants' setting. The research methods and complimenting tools used to collect data (Hesse-Biber & Leavy, 2011) were inter alia:

1. Text analysis; my Herrmann Brain Dominance Profile (HBDI) that provided both qualitative and quantitative data was analysed to answer the question, *Who am I?* The analysis of this text alerted me to my least preferred quadrants and I transformed to become a whole-brained individual;
2. Self-assessment questionnaire (Consult Appendix G), which consisted of qualitative and quantitative data that was a reflective tool and focused on self-reflection about myself and my practice and begot self-transformation;
3. Peer-assessment questionnaire (Consult Appendix H and Appendix I) that was incorporated in data gathering to gain knowledge about myself, my students and my practice from an outsider's perspective, and
4. Students' feedback questionnaire (Consult appendix J) consisting of both quantitative and qualitative data to gain knowledge about my practice from the respondents' view. Other methods of data collection, such as interviews (individual or focus group interviews) were not used to prevent broad analysis of different data.

It is important that I mention that ethical clearance expectations from both the Faculty of Education and the Faculty of Health Sciences were met prior to collecting data (Consult Appendices A and B). Ethics principles such as that of ensuring confidentiality, anonymity and voluntary participation of respondents were observed throughout the data collection period. The data collected is presented and interpreted in the next section.

3.4 Data Presentation and Interpretation

This section presents the data I collected that aided knowledge construction about my practice and ultimately transformation of both myself and my practice. I interpreted the data through narratives. In Figure 3.2 I show the three AR cycles of the AR spiral which represent what took place in each action research cycle.

Figure 3.2 Evidence of AR cycle during data collection

Prior to the first day of data collection I planned for the learning opportunity. The planning was done and this is seen on the learning task design (Consult Appendix K). I adapted the learning task design template by Slabbert *et al*. (2009) to design the learning task for the first learning opportunity. The examples of what I did and considered on each action research step are seen below.

- Reflection

  Constructive reflection was the foundation of my action research. I reflected on my initial practice and identified areas in which I wanted to see transformation. To reflect constructively, the first question I asked myself was, *What is happening in my practice at the moment?* At that point the answer was, *I go to class and I present my PowerPoint slides, in some of the days, I ask students questions about the subject matter to trigger interactive discussions and at the end I would ask if there are any questions*. My second question was, *What is it about my current practice that I do not like and would wish to transform*? The answer to this question was, *My students are not adequately involved during class because I do not give them the opportunity to participate and learn on their own*. The third question was, *Now what am I going to do about it?*

  It is from these questions and their respective answers that I realised that I needed to consider an innovative strategy to transform my practice and ultimately myself.

- Planning

  I made use of the learning task design as seen in Appendix K to effectively plan my learning opportunities. This helped me understand the learning outcomes and the curriculum content the students needed to be engaged in during the learning opportunity. As part of planning, the real-life challenge which needed to be presented to students had to be well constructed and thought of. Deciding on an appropriate real-life challenge was time consuming but this was the most important part of planning because without it, it would have been difficult to transform my practice. I had to think and plan on how I want the learning environment to be for the learning opportunity. I had to also keep in mind that I have students with different thinking preferences thus I needed to plan the learning task(s) that would ensure that all four quadrants of the Whole-Brain® thinking are represented during the learning opportunity. This is another time consuming task, but it ensures that all students can be challenged at the highest level of thinking and learning possible.

  My verbal and written presentations were planned prior to the learning opportunity. It was important that I plan how I would do the verbal and written presentation. I also planned how learning would be maintained during the learning opportunity, how I would give feedback to the students regarding the task they were engaged in and how I would consolidate the learning task.

- Implementation

  Under this step, the implementation of what was planned is put in to action. I did my verbal presentation, gave the students the written presentation then the students could begin solving the real-life challenge(s). It is worth mentioning though that at times things do not go as planned, however, the lecturer must always have an alternative plan for the learning opportunity to continue.

- Observation

  Observations do not necessary start at the time when students start solving the challenge, but should start immediately as the lecturer walks in to the learning space or as the students walk in the learning environment. Observation is important because there are disturbances that can hinder learning during the learning opportunity, for example, the mental and physical state of the students. Observing the facial expressions and body language of the students can help a lecturer understand the mental, emotional and physical state of the students. What is observed can also lead to a change of plans.

  Observation can be done simultaneously with verbal presentation, through observing the reaction on students' faces as you present the real-life challenge. Some may shake their heads which may mean they disagree with what you are saying or that they can feel the urgency brought by the challenge and why it is important to solve it.

  In instances where students are required to work in groups, I may further challenge them to work with other students whom they were not familiar with, to do this, I used name tags to ensure that students are grouped with students they are not friends with. In this way the students were removed from their comfort zones- a real-life challenge on its own. I then observed how they worked with each other and whether or not they were forming a community of practice in their groups and even as a class.

  When students are presented with a challenge, they can, at times, ask me questions with the intention of finding the answers from me. In such cases I challenged the students by responding with a question rather than the answer they were looking for. Through doing this one is able to observe how engaged students are on the learning task.

- Reflection (reiteration as part of planning for the second day of data collection)

  This step means I have to reflect again to identify areas which need improvement and revise the plan for the next action research cycle/ learning opportunity. Since action research is a reiterative, the above stages can be repeated as many times as required.

The next section illustrates my Herrmann Brain Dominance Profile.®

3.4.1 My Herrmann Brain Dominance Profile®

The Herrmann Brain Dominance Instrument® (HBDI®) (Herrmann, 2016) as mentioned in Chapter 2 is a "self-report instrument" (Du Toit, 2013:5), a profiling instrument that consists of 120 generic questions to test one's thinking, learning and behavioural traits. The HBDI® is able to isolate and measure the strengths of the preference in each quadrant. To present a profile, the individual's responses are compared to each other, resulting in a four-quadrant profile which displays the value of each preference for each of the four quadrants (Herrmann, 1999).

The HBDI® indicates one's preferences. It also indicates how one's preferences change under pressure. The visual plot of my Whole-Brain® thinking preference is presented from the most to the least preferred quadrants as C>B>D>A. This shows that I prefer C quadrant mode of thinking which had a value of 95. According to my answers to the questions the descriptors of my thinking preference I selected are *musical*, *emotional* and *spiritual*. These are my day-to-day mental preferences in life. My mental preferences at work under quadrant C are *teaching* and *interpersonal*.

My second preferred quadrant is quadrant B with a value of 78 points. According to my answers to the questions the descriptors of my thinking preference I selected are *detailed* and *dominant* as my key descriptor. My work elements include *organisation* and *implementation*. The next preferred quadrant after C is D with 63 points. What describes me best in this quadrant is that I prefer being *imaginative* and *holistic*. My work elements indicated that I am *creative* and *innovative*. My least preferred quadrant is quadrant A with a value of 45 points. *Critical* is the characteristic that describes my preference in this quadrant.

Consequently I present my HBDI® data summary and my HBDI® profile finalised by Herrmann International (2016) in Table 3.1 and Figure 3.3 respectively. My HBDI® indicates the quantitative data where the values of my preference(s) are indicated. The qualitative data is also indicated through the descriptions of my preference(s).

Table 3.1: My HBDI® Data Summary

HERRMANN BRAIN DOMINANCE INSTRUMENT
DATA SUMMARY

id: HNTV1014

NAME	NOLUTHANDO BUTHELEZI	GENDER	F	GROUP	172997
OCCUPATION	Dental Hygienist			DATE	27 07 2016

	COLUMN A UPPER LEFT	COLUMN B LOWER LEFT	COLUMN C LOWER RIGHT	COLUMN D UPPER RIGHT
PROFILE SCORES	45	78	95	63
PREFERENCE CODE	2	1	1	2
ADJECTIVE PAIRS	3	6	8	7
KEY DESCRIPTORS (*MOST DESCRIPTIVE)	factual quantitative critical x rational mathematical logical analytical	conservative controlled sequential detailed x dominant * speaker reader	emotional x musical x spiritual x symbolic intuitive talker reader	imaginative x artistic intuitive holistic x synthesiser simultaneous spatial
WORK ELEMENTS	analytical 2 technical 3 problem solving 5 financial 4	organisation 5 planning 2 administrative 3 implementation 5	teaching 4 writing 3 expressing 3 interpersonal 4	integration 2 conceptualising 2 creative 5 innovating 4
ADOLESCENT EDUCATION EDUCATIONAL FOCUS OCCUPATION HOBBIES	[redacted]	[redacted]	[redacted]	[redacted]

	primarily right	right some left	mixed	left some right	primarily left
HAND DOMINANCE		X			

	day	equal	night
ENERGY LEVEL		X	

	none	some	frequent
MOTION SICKNESS			X

	introverted								extroverted
INTROVERT/EXTROVERT					X				

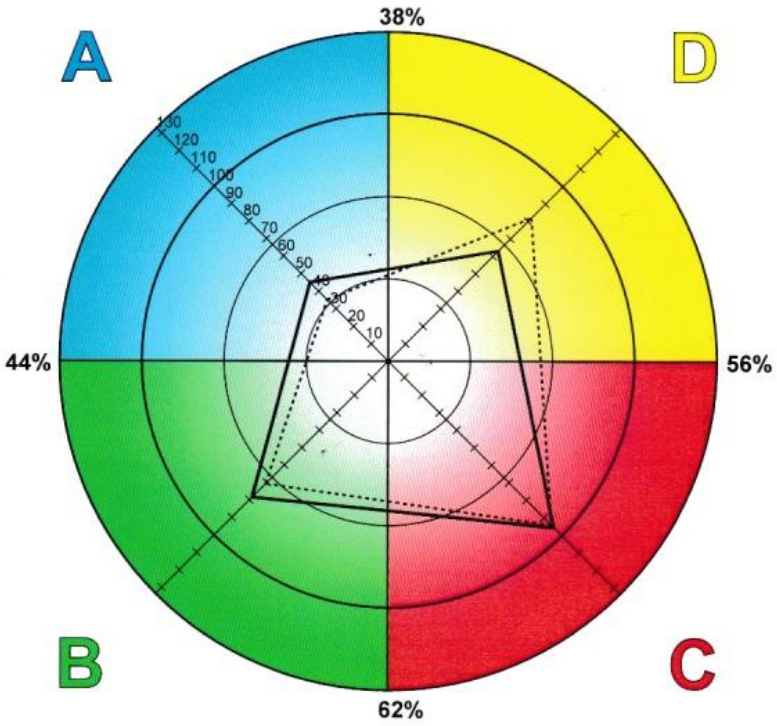


Figure 3.3 My HBDI Profile

This is qualitative data which shows each quadrant of the Whole-Brain® Thinking theory. Each quadrant has the descriptors which makes this visual (figure 3.3) of a qualitative data in nature. The quantitative data is also indicated in the value point for each quadrant.

My preference code indicates that my profile is a double dominant profile with two primaries (most preferred quadrants) falling in the lower left B and lower right C quadrants. My profile is characterised by very strong preferences in *conservative thinking* and *controlled behaviour* with a desire for *organisation* and *structure* as well as *detail* and *accuracy* (B quadrant). The primary C quadrant is present in *interpersonal skills* and *sensitivity to feelings*. It may indicate *emotion* and perhaps *interest in music* and a sense of *spirituality*. It would also be likely to demonstrate sensory intuition or *gut feel*. The two lower primaries represent an important duality for one to resolve within myself. The opposing quality of control and structure, contrasting with the emotional and interpersonal feelings can cause internal conflict. The clear secondary preferences of the upper modes, both upper left A and upper right D, are characteristic of my profile, with l*ogical* and *analytical* processing in the upper left A quadrant and *holistic* and *creative thinking* in the upper right D quadrant.

Occupations typical of people with this profile such as mine include human resource professionals and those in counselling and helping positions − particularly where there is a heavy administrative load. Executives, nurses, some secretaries and homemakers may also show a similar profile. Work that is considered most satisfying to me would include getting things done on time, working with others, writing expressively, solving customer issues and building relationships.

Table 3.2 below shows my preferences and what I overlook when communicating, problem solving and making decisions.

Table 3.2 My do's and don'ts in communication, problem solving and decision making (Adapted from Herrmann's international, 2016).

	My comfort zone (Do's)	My challenge/area of improvement (Don'ts)
Communication approaches	• Step-by-step unfolding of topic I am comfortable when things are broken down in to clear chronological steps • Practical answers to *who*, *what*, *when*, *where* and *how* I am very practical in the way I do things. I find comfort when there are practical steps I can use to answer questions • Understanding how others will react I am inclined to reflecting on how other people would react when I communicate somethings • The personal touch I am happy when I apply myself in any situation	• Data and facts Reading articles for an example is not a natural thing to me. • Technical accuracy This is a challenge I am working on. Embarking on this scholarly work is also transforming me • Visuals Understanding complicated visuals is also a challenge. I would rather chose to ignore the visual then try to understand it
Problem solving strategies	• Step-by-step method When it comes to solving problems I am comfortable	• Defining a problem I have a challenge with defining a problem, because I can be critical, I

	to organise and solve it step-by-step • Time line principles Time line assist me to monitor the progress of any activity needing my attention • Team process The success of solving problems as a team is dependent on the logistics of the team	tend to also see problems where there is no problem
Making decisions	I may ask: • What is the appropriate sequence? I need to know the correct steps to take • How will this affect others? I work with people and I get concerned about their feelings when making decisions	• Taking risk Taking risk is something I have to force myself to do. • Gathering facts I am not keen to gathering fact prior to making decisions

3.4.2 Assessment of my Teaching Practice

As stated in the earlier sections of this chapter, to assess my teaching practice, the feedback questionnaires (Consult Appendices G, H, I and J) that are designed according to the principle of learning-centredness (Du Toit, 2012) were handed to students after each of the three learning opportunities. The feedback questionnaires were answered by my students, my colleague who was present to observe my practice and by myself. Each questionnaire consisted of two sections, where section A assessed my contribution in three categories and the students' contribution to the learning opportunity based on their observations or perceptions. Under my contribution, category I assessed the manner in which I inspired students; category II assessed my ability to initiate learning and category III assessed my ability to maintain learning. In the students' contribution, category I assessed whether the student did contribute to her own and her peers' learning. Category II and III assessed the student's self-regulatedness. The questionnaire allowed each respondent to give comments

that are presented and interpreted under qualitative data. Figure 3.4 shows the quantitative data as per the students' responses in section A (which consists of three categories) of the questionnaire attached as Appendix J. It is to be noted that day 1, 2 and 3 are used to represent the action research cycles 1, 2 and 3.

3.4.2.1 Student Feedback Day 1 Section A

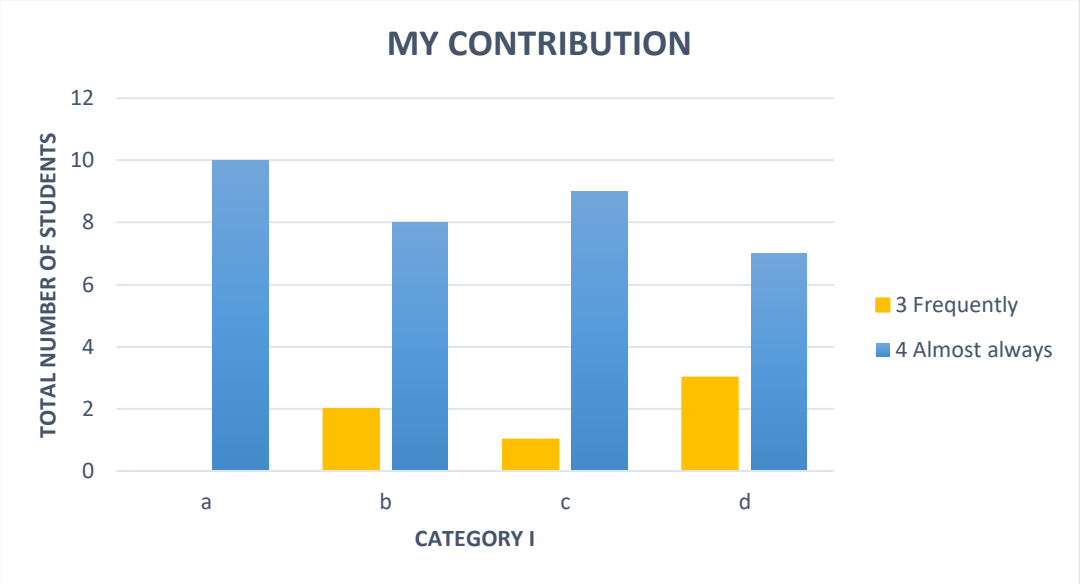


Figure 3.4 Day 1 Students' feedback Section A, category I

All questions that were measured using a Likert scale where 1 = *Hardly ever*; 2 = *Occasionally*; 3 = *Frequently* and 4 = *Almost always*. All ten students responded that I almost always showed enthusiasm for the subject matter and the learning task. Eight students felt that I almost always expressed myself well while two students felt I frequently expressed myself well. Nine students indicated that I almost always promoted insight into the importance and significance of real-life challenges, and one student felt I did so frequently. For my ability to provide learning opportunities that were lively and encouraging, seven students felt I almost always did so while three students indicated that I frequently did.

Next I present the students' feedback on Section A, category II of the questionnaire.

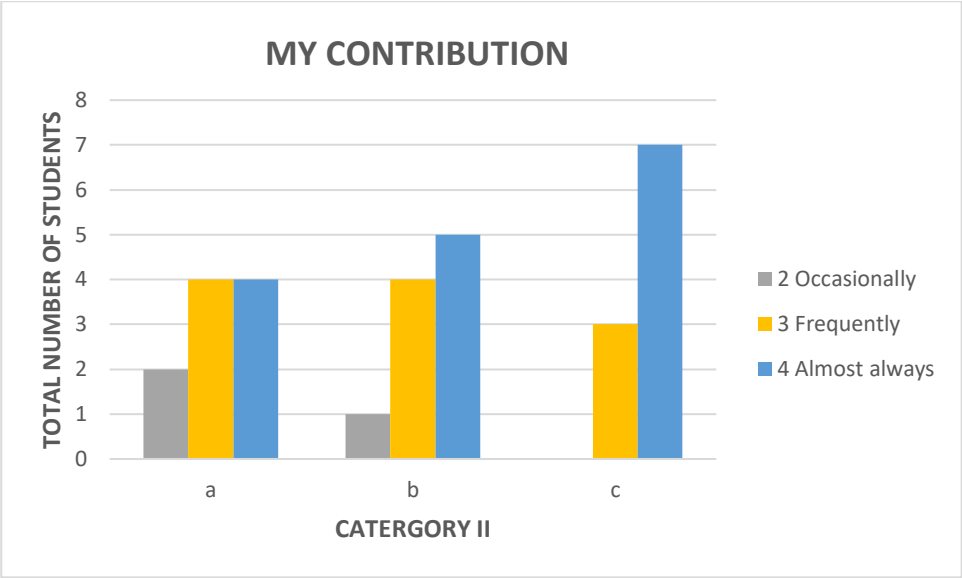


Figure 3.5 Day 1 Students' feedback Section A, category II

When assessing my ability to initiate learning, four students felt I almost always created a climate conducive to deep learning; four students indicated that I frequently did so while two students thought I occasionally did so. Regarding clearly stating the purpose and the learning outcomes of the learning opportunity, five students indicated that I almost always stated the purpose, four felt I frequently did, while one indicated that I did so occasionally. Seven students felt I almost always linked learning to real-life situations, while three indicated that I frequently did so.

In Figure 3.6 on students' perception of my ability to maintain learning, five students felt I promoted lecturer-student discussion to allow students to develop an enquiring mind, while four students indicated that I frequently did so. Only one student felt I did so occasionally. Regarding my ability to encourage students to construct their own understanding (constructivism), nine students indicated that I almost always encouraged them to construct their own meaning; one student felt I did this frequently. Eight students indicated that I almost always provided for learning style flexibility, while two felt I only frequently did so. Regarding my ability to encourage students to express themselves freely and openly, five students indicated that I almost always did this and the other five felt I did this frequently. Four students felt I considered critical thinking and self-reflection an integral part of self-regulated learning, while five felt I did this frequently. Only one student felt I did so occasionally. Eight students indicated that I created opportunities for cooperative learning, and two believed I did so only occasionally.

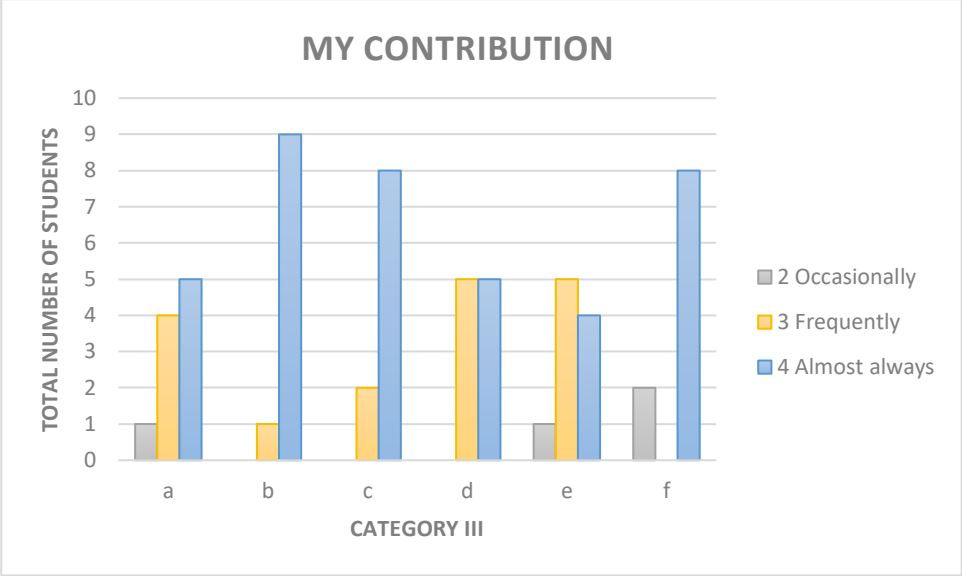


Figure 3.6 Day 1 Students' feedback Section A, category III

The students could add general comments under section A of the questionnaire; their narratives are presented in Table 3.3. The comments given by the students form part of qualitative data, as their narratives are laden with their personal meaning(s).

3.4.2.2 Student Comments Section A Day 1

Table 3.3 displays the narratives given by my students under the comments section of the questionnaire.

Table 3.3: Respondents' comments on my contribution[3]

Respondent	Comments under my contribution
1	*I personally don't do very well in group tasks so this was challenging. My preferred learning way is explanation of something given to me then I get a challenge. I tend to be slower if I have to get instructions when my background about the subject is blurry. I need to revise before class or get hints on what to prepare.*
2	*The activities are very well designed, in such a way they are real-life situations that we may / will encounter in the clinic. Although the activities are very time limited they teach us to be able to work on time but can be stressful sometimes.*
3	*I found the task to be rather challenging, as some aspects were not performed in a clinical setting. The bracket exercise to me was more*

[3] The responses are provided verbatim and have not been edited.

	challenging, but I enjoyed working with the group. Some figured out other aspects to the task, which I did not even notice. It was a rather fun exercise. Mrs. Buthelezi was well-prepared and challenged me with the task at hand. Thank you for a great effort and still encouraging us while we struggled.
4	*The preparedness and organisation of the learning environment is out of this world. She really shows enthusiasm and passion for creating learning opportunities.*
5	*Well conducted and very informative.*
6	*This was a good activity which really puts us in real-life situations as we will be exposed to this in the orthodontic practice. I think one thing that can be improved is properly explaining the instructions as they were not very clear on paper and that was confusing at the start.*
7	*The lecturer made it an uncomfortable but yet enjoyable learning opportunity for me because I do enjoy working with people but it would be nicer if we were in smaller groups so we can all have something practical to do.*
8	*Lecturer is well prepared for work and helpful when students want / need help. Not always giving answers (spoon feeding), but allows students to think and reflect on work, even on clinicals. I like that today's exercise showed me how to place brackets, wish I had learnt that in first year. Would like to get more exposure instead of clinical ward only. Visit an Ortho practice maybe.*
9	*The lecturer is very enthusiastic about the module and the reason of the module. She works hard to ensure that we can apply theory to practice at the end of the course / degree. She also pushes us to discover our own voice as a health Care professional and ensures that we will be able to practise as confident individuals / professionals.*
10	*Well-constructed learning session. Information prior to group work was explained well. Time allocation for each task should be included to ensure all tasks for the specific learning session are achieved and also to allow a discussion + reflection session after the tasks have been completed.*

I agree on the comments above. I indeed transformed the learning space and made it conducive to the learning of my students. Consult Figure 3.7.

Figure 3.7 The set-up of the learning environment

It was important that I placed the Whole-Brain® thinking theory colours on the table so that my students could understand their significance as they developed into holistic professionals. When I asked my students whether they knew what Whole-Brain® thinking is about, only one student indicated that they had heard about it. I explained the concept and highlighted its significance and why, though they had their preferred way/s of thinking, they still needed to think and do things in their less preferred manner to withstand the real-life challenges and fit into our society.

A student commented that the task was challenging to him/her (Consult Table 3.3 above). This is what I need to see during the learning opportunity; the student needs to be challenged and this is the indication that one has to introduce something new. The task required of the students to use existing knowledge to create new knowledge − a constructivist learning approach. Consult Figures 3.8, 3.9, 3.10 and 3.11 indicating the tasks that were given to students during this learning opportunity. A learning task design in Appendix K indicates what was expected of the students.

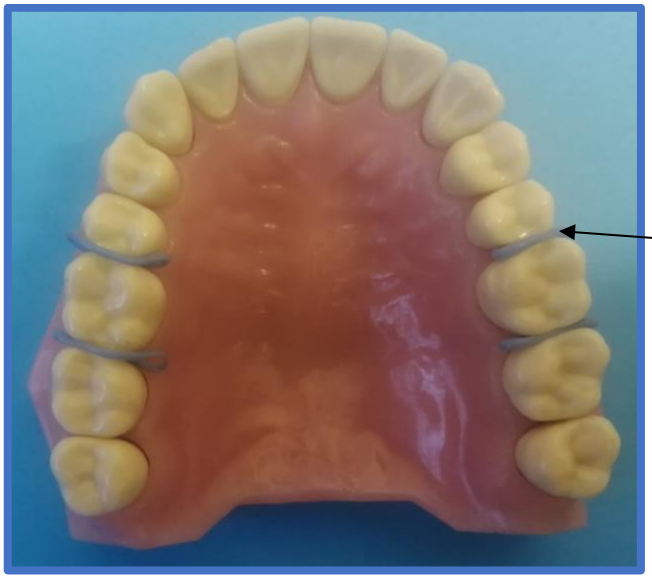


Figure 3.8 Task I Placement of separating elastic

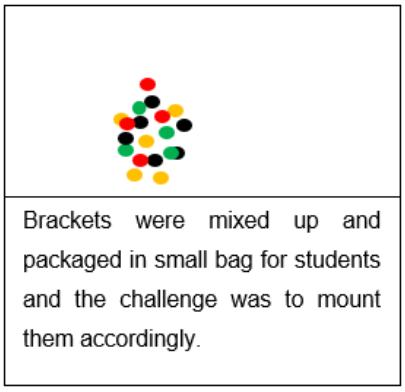
In this task students were expected to read the instructions and make a decision on what they needed to do and how they should perform it. I did not tell them which teeth to place with specific material. The instruction was, *You are instructed to place bands on a patient; indicate which procedure you will perform first and how you will perform it*. Both groups knew which instrument − separating elastic plier − and material − separating elastic − to use and how to use it. They also knew on which teeth to place these elastics. The students also knew which instructions to give to the patient after placement of these elastics. In my opinion they performed this task in a competent manner.

Figure 3.9 Task II Mounting of different systems of orthodontic bracket

For task II, I placed the different bracket systems (braces that are not the same) in a small bag. Students were challenged to sort the bracket according to the tooth number (each bracket is made for a specific tooth and as an oral hygienist one must know which bracket

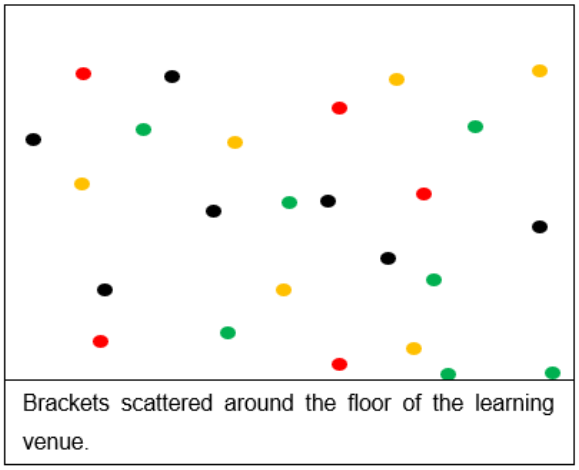
should be placed on a specific tooth). They also needed to know the direction in which each bracket should be placed on the tooth. To present this task, a verbal and written instruction was given to students. The written presentation reads, *while preparing for a bonding procedure (placement of braces), you accidentally drop the tray with the orthodontic brackets*. Under this task students needed to mount the brackets according to how they should be placed on the teeth.

Upon reflecting on this learning opportunity, I wrote a poem specifically for this task (see below). Figures 3.10 and 3.11 indicate how the challenge was presented and how after reflecting, I should have represented it.



Brackets were mixed up and packaged in small bag for students and the challenge was to mount them accordingly.

Figure 3.10 Initial presentation



Brackets scattered around the floor of the learning venue.

Figure 3.11 Ideal presentation of a challenge

Next is another task that students needed to engage in during the learning opportunity.

Figure 3.12 shows the mounting of buccal tubes and the site of bracket indicators on the orthodontic bracket. In this challenge I wanted to assess students' practice of bracket positioning during a bonding procedure. The students were to indicate how the buccal tubes (the braces for the back teeth) are to be placed on each quadrant of the mouth. To resolve the challenge the buccal tubes were to be drawn with the hooks facing backwards and closer to the gums (gingiva). The black, green and red dots indicate where the bracket indicators − markings on each brace − should be positioned when the procedure of placing braces is performed.

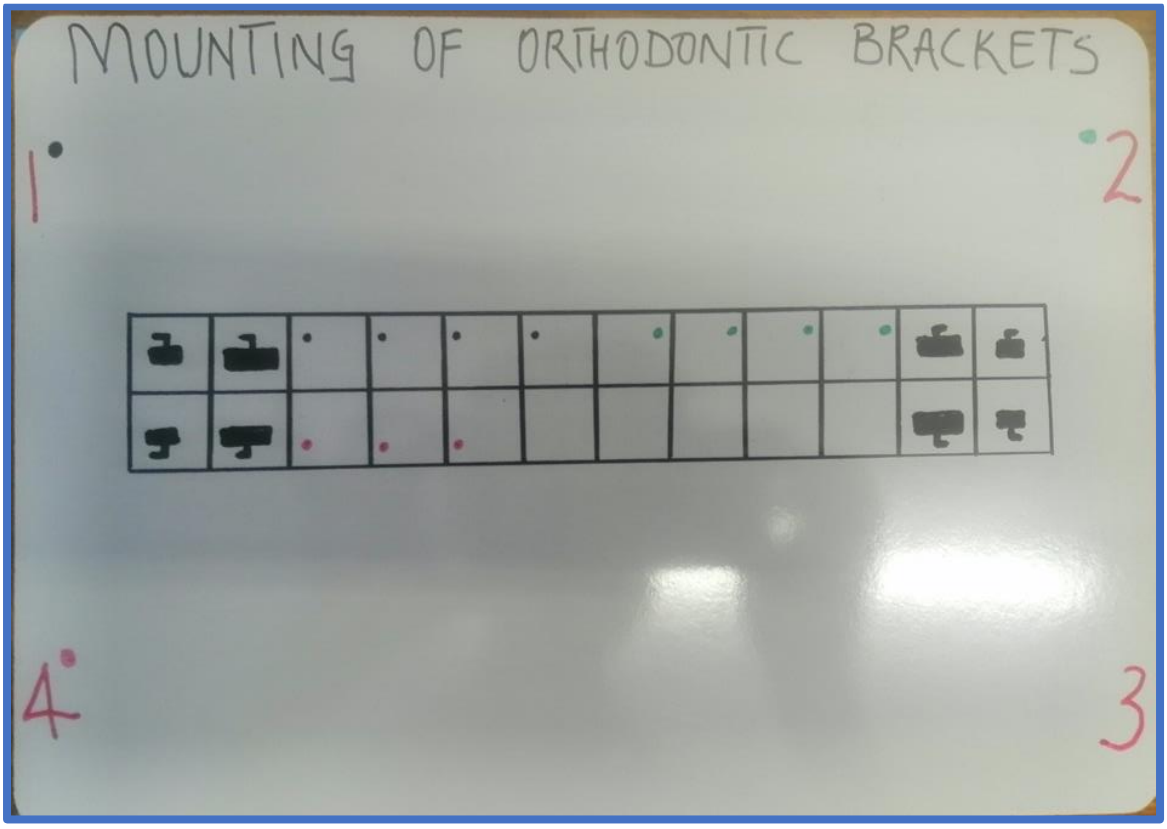


Figure 3.12 Task III Indication of buccal tubes positioning and the site of bracket indicators

In Figure 3.12 the students were challenged to feel the archwires mounted on the A4 paper and give the name of the archwire through writing the size, material, shape and state under which phase of treatment can the archwire be used.

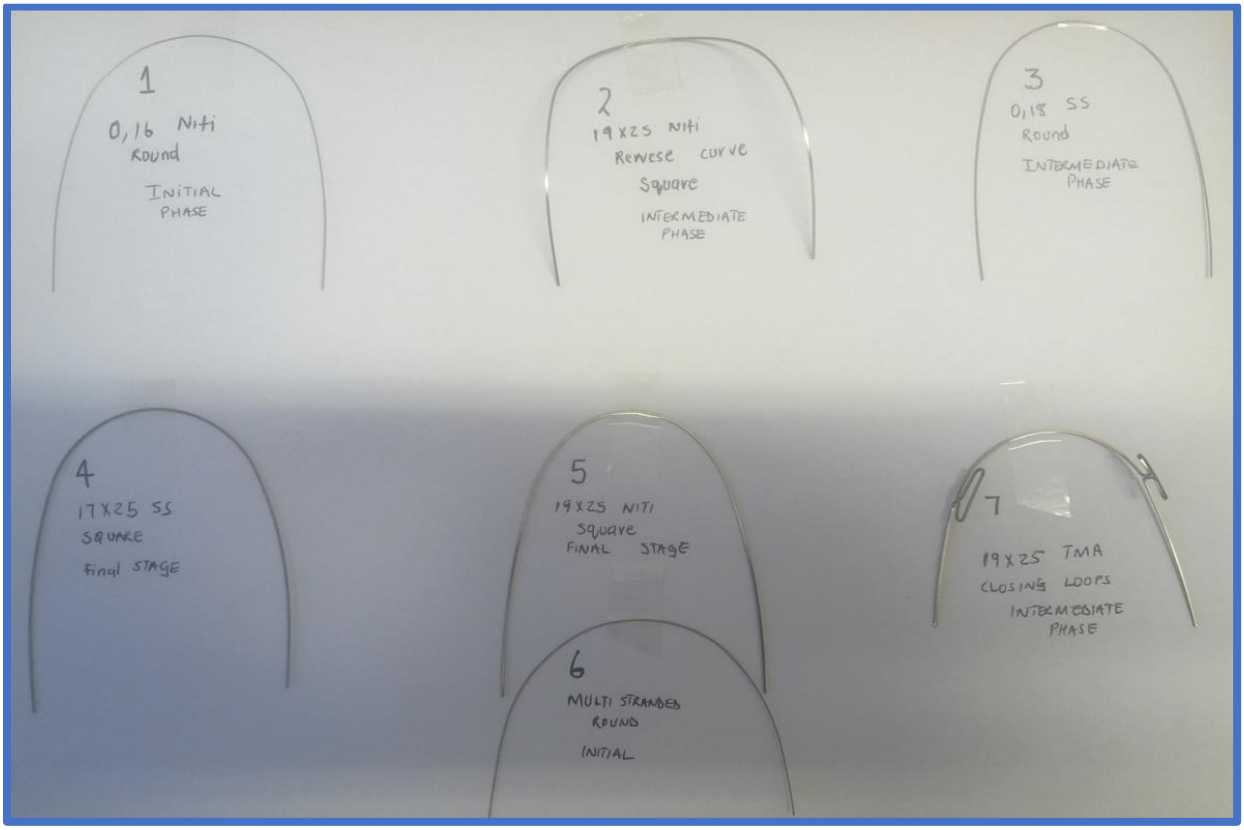


Figure 3.13 Task IV Identification of archwire material, size and shape

In this task the different archwires were mounted on a chart and students were challenged to identify the archwire through touching the archwires and assessing (1) which material is used to manufacture the archwire, (2) what size archwire it is, (3) what shape, and (4) when in the stages of orthodontic treatment they would use the archwire.

In the next short section I present my innovative reflection through poetry after the first learning opportunity.

3.4.2.3 Innovative Dialogue in a Form of Poetry after the First Learning Opportunity

In my passion to become a creative non-traditional researcher, I adopted Du Toit's (2018) style of challenging students to write a poem to explain what they have learned and in his case, his students had to write about their research design − action research. He regards poems as being a creative, innovative scholarly act and I support this. The poem below is my creative scholarly act. It was written to express what was going on in my mind after the first learning opportunity. The poem itself is reflective as I asked myself questions to ponder and come up with a strategy and a plan to do things better.

What if I …

'The real-world of Orthodontics' presents:

Yet while preparing for your patient's bonding procedure, you accidentally drop all the Orthodontic bracket on the floor

Mmhhh?

Is this real and undiluted?

A story, a written story called verbal and written presentation

What if I…..

said no story and I wrote no story

What if I…..

Did it as authentic as it was supposed to be

What if I…..

come in with the orthodontic bracket on a tray and "accidentally" drop the tray

a sudden catch of breath and then a

big bang and **messy scattering** of bracket **all over** the learning venue

What a mess!!

And yet students would jump from their seats

pick up the mess without reading the story

a spark for

Learning to take place.

The search, the seeking, the finding and the mounting

All this done as a team

A problem solver, a critical thinker

An effective communicator

The students' feedback on section B that assesses their contribution to the learning opportunity is provided below.

3.4.2.4 Student Feedback Section B Day 1

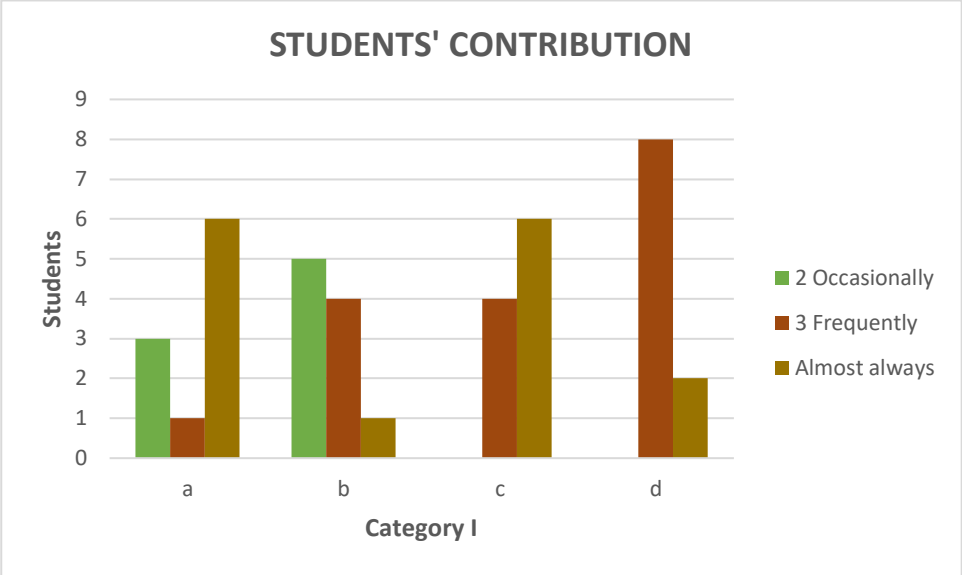


Figure 3.14 Day 1 Students' feedback Section B, category I

Figure 3.14 shows students' self-assessment. Six students felt they almost always showed enthusiasm for the subject matter and learning task, while one student felt they did so frequently. Three students indicated that they were occasionally enthusiastic about the subject matter. One student indicated that they almost always expressed themselves well. Four students felt they frequently expressed themselves well while five indicated that they did so only occasionally. Regarding gaining insight into the importance and significance of the subject matter, six students indicated that they had almost always gained insight while four students felt they frequently did. Eight students indicated that they frequently participated in making the learning opportunity lively and encouraging while two students felt they almost always contributed to such a learning opportunity.

Figure 3.15 shows students' feedback on category II of Section B.

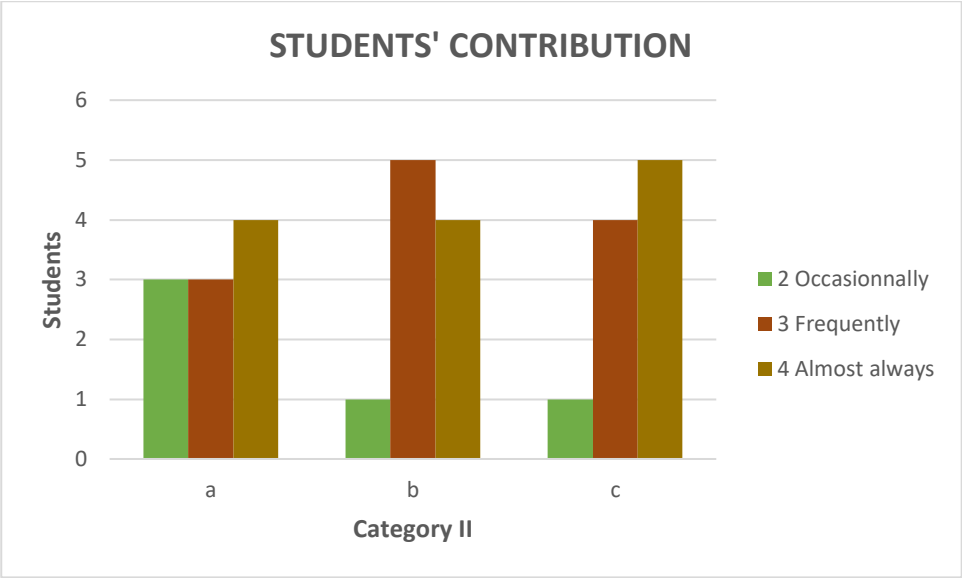


Figure 3.15 Day 1 Students' feedback Section B, category II

Figure 3.15 is a visual representation of how students assessed themselves in category II. Four students indicated that they co-created a climate that was conducive to deep learning, and three students indicated that they frequently or occasionally co-created such a climate. Four students felt they continuously attempted to link their learning to real-life situations, while five indicated they frequently did so. One student indicated that she occasionally linked her learning to real-life situations. Five students indicated that they attempted to construct a big picture of the multidimensional nature of the learning opportunity, while four felt they frequently did so and one student stated they did so occasionally.

In Figure 3.16 I show students' feedback on category III of Section B.

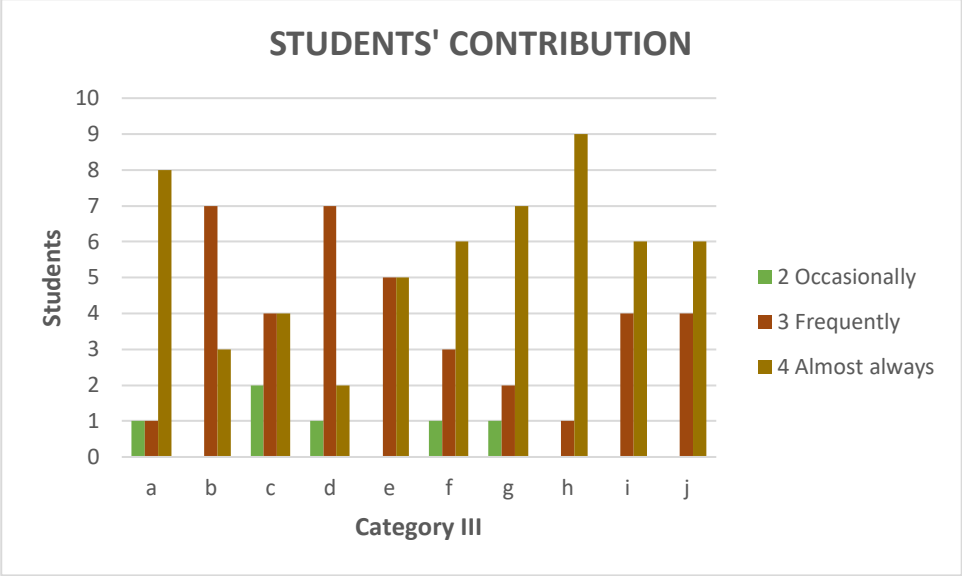


Figure 3.16 Day 1 Students' feedback Section B, category III

In category III Figure 3.16 indicates the students' perceptions of their contribution to the learning opportunity. Eight students indicated that they almost always took part in lecturer-student discussions to allow them to develop an enquiring mind while one student felt they frequently did so; one student indicated they occasionally did so. Seven students indicated that they constructed their own understanding and material frequently, while three students felt they almost always constructed their own understanding. Two students indicated that they occasionally sought opportunities for developing their learning style flexibility, while four felt they almost always and frequently did so. Seven students indicated that they frequently created opportunities to express themselves freely and openly, while two felt they almost always did so and one student indicated that they did so occasionally. Five students felt they almost always and another five students frequently reconsidered many of their former attitudes and values concerning their learning. Six of my students indicated that they almost always gained better understanding of themselves, while three felt they frequently did so and one student indicated that she did so occasionally. Seventy per cent of students indicated that they almost always developed a greater sense of responsibility, two indicated that they did this frequently, while one student felt they occasionally did so. Nine students indicated that they almost always contributed to their peers' learning, while one felt they frequently did so. Six students indicated that they almost always sought to inculcate critical thinking and self-reflection as an integral part of their self-directed learning, and four indicated that they frequently did so. Six students indicated that they almost always actively took part in cooperative learning opportunities, while four students felt they did so frequently.

The students' comments on their contribution during the learning opportunity are presented in Table 3.4.

3.4.2.5 Students' Comments Section B, Day 1

The qualitative data presented in Table 3.4 indicates the written narratives of students' perceptions about their contributions to their learning.

Table 3.4: Students' comments on their contribution

Respondents	Comments by students on their contribution
1, 4 & 6	-
2	*I enjoy being part of the activities. I learnt so much in just one session which most of them are things we face at the ward (Ortho ward) they will be very helpful.*
3	*The exercise was rather challenging. I did not prepare anything beforehand, but I do realise that we did not need to prepare. At first I did not understand the bracket system, but it became easier as we worked together. I really enjoyed working with my group and everyone had some form of contribution to the group. We all were able to have a voice during the exercise, which made it fun and enjoyable. I also loved to see what strengths each of us had, when we need to work together as a team. Thank you.*
5	*Was very informative and good to be part of.*
7	*I gave myself a 2 for expressing myself well because I feel like in group work, once things become personal during the task, it changes the atmosphere of the group, but when it comes to answering questions, we're all able to give each other opportunities.*
8	*Teamwork helps me to contribute and voice myself (self-growth). I also like that when working together, I am able to learn from my peers as well and also to get help from them when I'm stuck. When doing exercise I did not link it to outside world because I was too busy caught up in finishing it. I like how far I have grown as an individual and as an Oral Hygiene student.*
9	*I enjoy the module and the learning opportunities given to us as students. I enjoy helping others understand concepts, whilst also gaining new insight regarding other topics. This is an environment where I am not afraid to make mistakes, as I understand that it also gives a chance for me to better my understanding and knowledge of the module.*
10	*Highly motivated to learn even more :-)*

While the students had the opportunity to write down their observations regarding me as their lecturer during this learning opportunity, it was important that they also wrote down their observations of themselves. I was a disappointed to see that three in ten students did not comment. Was this because they did not observe anything of significance about themselves during the learning opportunity? I do not know.

As I read and reflected on the comments above I made the following meaning out of these comments. I am considerate of my students' learning while planning the learning opportunities. The planning itself is centred on my students and my belief that they are not passive beings. It is clear that I allow students to work together in groups and they help one another as they interact with the real-life challenges presented to them. I view making mistakes as part of learning and I am delighted to see that my students feel that I create a learning environment that makes them feel at ease even when they make mistakes. I like to instil into my students the concept of being a lifelong learner. Students also have the opportunity to discover one another's abilities and work in harmony with one another as this is a skill they will need in the world of work.

The next section contains the student feedback on the second day of data collection. The questionnaire is still the same as presented above.

3.4.3 Student Feedback Section A Day 2

On day two of data collection students were given the same questionnaire to assess my contribution to their learning (Section A) and their contribution to their own learning. Figure 3.17 shows what students indicated about my contribution.

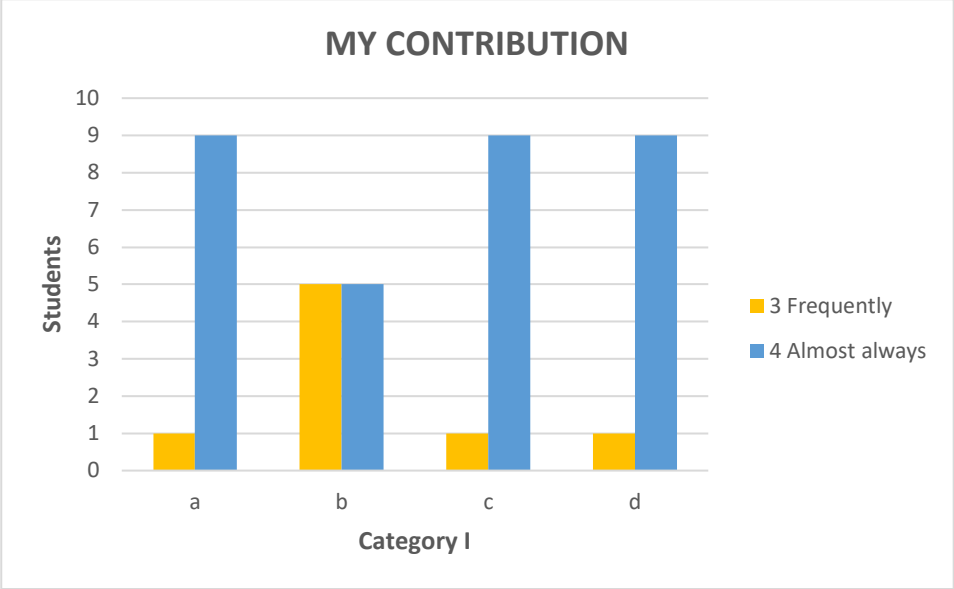


Figure 3.17 Day 2 Students' feedback Section A, category I

Nine students felt that I almost always showed enthusiasm for the subject matter while one student felt I frequently did so. Five students felt that I almost always expressed myself well while five students felt I frequently did so. Nine students indicated that I almost always promoted insight into the importance and significance of real-life challenges, and one student felt I did this frequently. Regarding my ability to provide learning opportunities that are lively and encouraging, nine students felt I almost always did while one student indicated that I did so frequently.

Figure 3.18 shows what students indicated in category II of section A of the questionnaire.

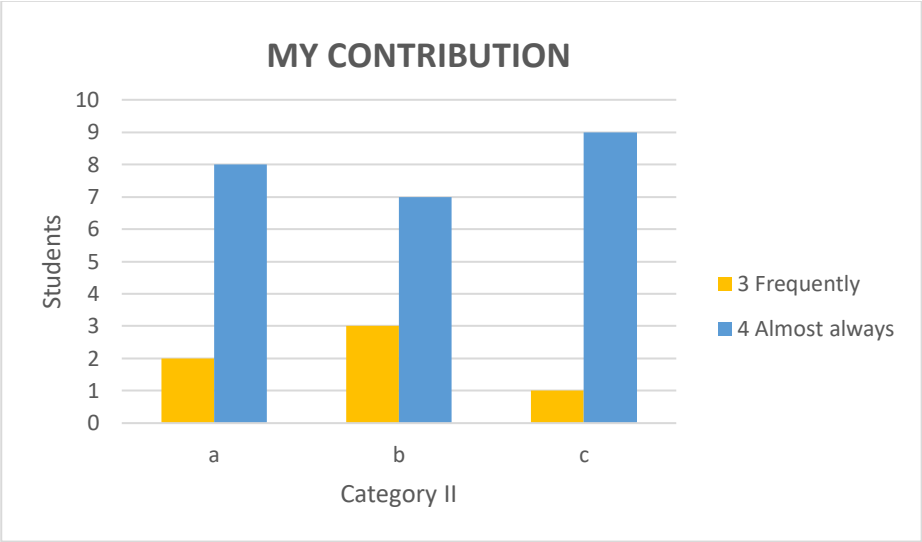


Figure 3.18 Day 2 Students' feedback Section A, category II

When assessing my ability to initiate learning, eight students felt I almost always created a climate conducive to deep learning, while two students thought I frequently did so. Regarding clearly stating the purpose and the learning outcomes of the learning opportunity seven of my students indicated that I almost always stated the purpose while three felt I frequently did. Nine students felt I almost always linked learning to real-life situations, while one indicated that I frequently did so.

The students' feedback on category III of section A is presented in Figure 3.19.

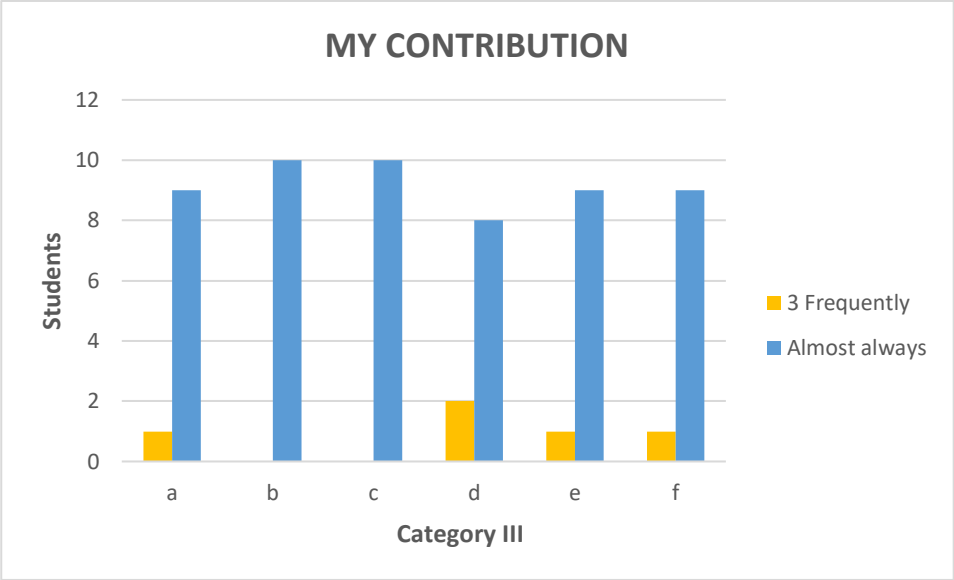


Figure 3.19 Day 2 Students feedback Section A, category III

When it comes to my ability to maintain learning, nine students felt I promoted lecturer-student discussions to allow students to develop an enquiring mind, while one student indicated that I frequently did. Regarding my ability to encourage students to construct their own understanding (constructivism), all 10 students indicated that I almost always encouraged them to construct their own meaning. All my students indicated that I almost always provided for learning style flexibility. Eight students indicated that I almost always encouraged students to express themselves freely and openly, and two of the students selected *frequently* as indicator. Nine students felt I almost always considered critical thinking and self-reflection as an integral part of self-regulated learning, while one felt I did this frequently. Nine students indicated that I created opportunities for cooperative learning, and one believed I did so frequently.

The students had to provide comments on my contribution to their learning; Table 3.5 contains their narratives.

3.4.3.1 Students' Comments Section A Day 2

Table 3.5: Students' comments on my contribution

Respondent	Comments by students on my contribution
1	*This was my favourite / preferred way of leaning. The Kahoot brings out a challenging / competitive part of me (also has digital aspect). Then the video (being about a person I actually know kept me interested). Individual work first before group work made me centre my thoughts first then share them with others when I was clear on what I was saying.*
2	*I thoroughly enjoyed today and again realised that we have all the opportunities and Mrs. Buthelezi to help us evolve in proactive reflective oral hygienists, but it comes back to each one as a person. If we don't use our resources or our lecturer's help to learn and evolve, it is our own fault if we don't grow.*
3	*The session was very significant and helped think further and in the future to what we would like to be. One of the challenges I encountered was with regards to the Kahoot. The quiz was good in terms of revision and I did have adequate knowledge but was not certain about some of the answers but I had previous knowledge of it. It was good to hear from the other peers what they took from the video and applied when brainstorming together and considering other viewpoints.*
4	*Today's session was much more fun as the lecturer changed the type of activity but still focused on reflective learning and community of practice. This is very effective as we got to learn not only from her but also from our peers and to reflect from within. I encourage this type of teaching / learning style.*
5	*Today's task was very nice and fun. It was good to hear how it is in the private practice from someone whom we are familiar with. Personally, I feel like I learnt a lot about how I should be, the change that I should be striving for internally before I even work on patients. The lecturer was also so open to learning and rubbing off her enthusiasm on us. It was really awesome.*
6	*Well conducted and conducive for proactive learning. Very informative and encouraging to me as a student.*
7	*Could the work be uploaded on Click-up, we are learning about thing but do not have access to them forever. Is it possible for the slides to be on ClickUP because I think the module is there?*

8	*This was one of the greatest lectures. There was great interaction between lecturer and students. It was really encouraging to participate and induced a lot of critical thinking.*
9	*The session was really informative and encouraging. Motivates me to not only focus on now, but on then. We are here for a greater time than this, becoming a lifelong learner will allow you not only to better yourself, but will be beneficial to the patients as well.*
10	*I really enjoyed today's session. It was more of a reflective opportunity than an academic session. It made me see ways to improve my learning and link what I am doing currently when in the clinic and what I should really start doing. This session was very useful linking the real world with where were are now as learners. The exercises provided were very productive and also enjoyable.*

After the second learning opportunity, I reflected on what took place on the first day prior to preparing for this day. I reflected on my observations and my experiences during the first learning opportunity. I then read the comments of my students and my colleague and reflected again. Upon reflecting I decided to write a poem about my attitude.

My Attitude - My Compass

I took upon a journey

destination meaning making

I had a plan- layers of papers- my proof

I started with my journey

And I realised

My attitude- my compass

My compass?

I want to go to north and yet the arm says go

North-west

I have to be in control

The feeling is north and now it is south

It's me, I have to deal with me

What is happening?

I thought it was supposed to go according my proof

Remember?

My proof says I start at 1 then move to 2 and move to 3

What is this 1 then 4 then 3?

This compass- my attitude

It's learning, it's exploring, it is experimenting

My attitude is my compass

My direction, the teller of my destination

I have to fix my attitude, I have to make meaning of this

It will not always go according to the proof

Be positive in whichever direction you take

Plan but be flexible

My attitude – my compass

My attitude, my compass is a term I thought of as I was reflecting. I was feeling so discouraged because my students did not complete solving the real-life challenges I presented to them. Time was limited; I had timed the challenges according to the time it took me to solve these challenges, but I did not consider that my students would be working in groups and not individually. Since they were working in groups there were more delays in completing the task. These included the time they had to take to explain some of the instructions to their group members so that they could all work as a group. Realising my planning mistake resulted in an uncomfortable feeling of giving up. This was because it took so much time to do the planning. How could I not have considered the time factor? This negative feeling made me realise that I had to learn. I decided to change my attitude and plan my second learning opportunity. This made me realise that my attitude determined how I would deal with my future planning − hence my attitude, my compass.

I felt more positive when planning for the second learning opportunity. I became more creative and I longed to hear some noise from my students as they solved the real-life challenge I presented to them. This learning opportunity was titled, *Becoming a reflective, proactive oral hygienist*. I asked one of my former students to share a video clip about her experience of moving from university to the world of work. This clip covered the challenges she faced and what she wished she had known prior to exiting the university. I incorporated self-regulated learning after my students watched the video clip. Each student was required to reflect and make decisions regarding how they would escape certain challenges. Cooperative learning was practised as the students worked together in groups to solve the real-life challenge I presented.

The students' comments indicate how they experienced the learning opportunity as significant to their future of being professional oral hygienists. The question that I could ask is, *Was this because the real-life challenge presented to them was easy to solve?* I do not think so. I would rather support the importance of feeling that one is part of something. This learning opportunity allowed for interactive learning and I believe the students experienced it as the significant one as they were interacting with one another in a safe environment conducive to deeper learning. The personal experiences shared by the former student on the video clip struck up a conversation. This was about the students, their individual lives as future professional oral hygienists. It was a personal learning opportunity and it was real and authentic. Who sleeps while talking about their possible future anyway? They had to note its significance. I had learnt the importance of centring my learning opportunity on my

students. It was about their becoming competent professionals and lifelong learners in the first place.

A student mentioned that my enthusiasm rubbed off on them. This made me smile. I did it! What benefit was there if I as a facilitator of learning was enthusiastic about a subject but my students were not? None. It is about the students. The same student commented that I was open to learning. This was humbling. It is an indication that a facilitator of learning should still remain a learner. I am a lifelong learner. This indicates my identity as a lecturer and as an oral hygienist and this is addressed in the first chapter. In most cases lecturers do not want to be viewed as learners by their students; they are viewed as carriers of knowledge who are ready to transmit knowledge to the students. I am not like that, I have knowledge but I am humble enough to know I do not know it all. My openness to learning puts me in a position of being a role model for my students; what I do they will also do.

In the following section, I present the student feedback on how they contributed to their learning.

3.4.3.2 Students' Feedback Section B Day 2

The quantitative data given by students on their contribution to their learning is indicated below. Figure 3.20 represents what students selected under category I.

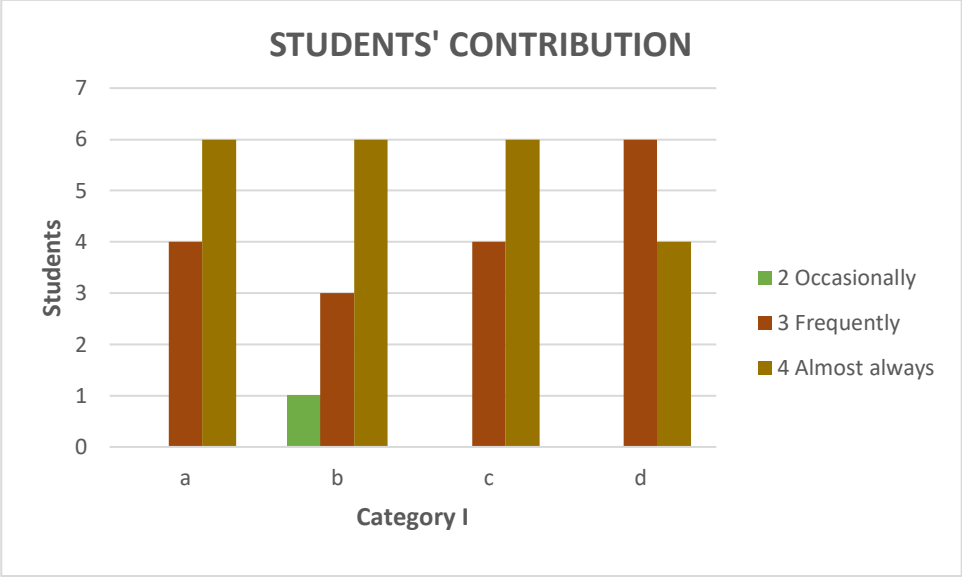


Figure 3.20 Day 2 Students' feedback Section B, category I

Figure 3.20 shows students' self-assessment. On their ability to contribute to one another's learning, six students felt they almost always showed enthusiasm for the subject matter and learning task, while four students felt they did so only frequently. Six students indicated that

they almost always expressed themselves well. Three students felt they frequently expressed themselves well while one indicated that they only occasionally did so. Regarding gaining insight into the importance and significance of the subject matter, six students indicated that they almost always gained insight while four felt they frequently did. Six students indicated that they frequently participated in a way that made the learning opportunity lively and encouraging while four students felt they almost always participated in a way that rendered the learning opportunity lively and encouraging.

Figure 3.21 indicates the students' responses to their contribution to their learning in category II.

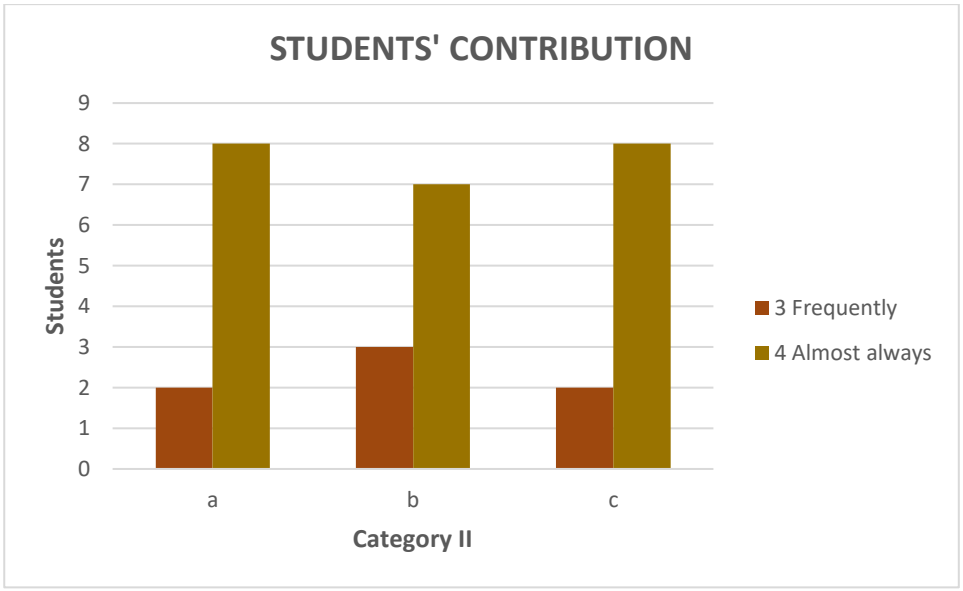


Figure 3.21 Day 2 Students' feedback Section B, category II

Figure 3.21 is a visual presentation of how students assessed themselves in category II. Eight students indicated that they almost always co-created a climate conducive to deep learning; two students indicated that they frequently co-created a climate conducive to deep learning. Seven students felt they almost always continuously attempted to link their learning to real-life situations, while three students indicated they did so only frequently. Eight students indicated that they attempted to construct a big picture of the multidimensional nature of the learning opportunity, while two felt they frequently did so.

The students' selections in category III of section B are presented in Figure 3.22.

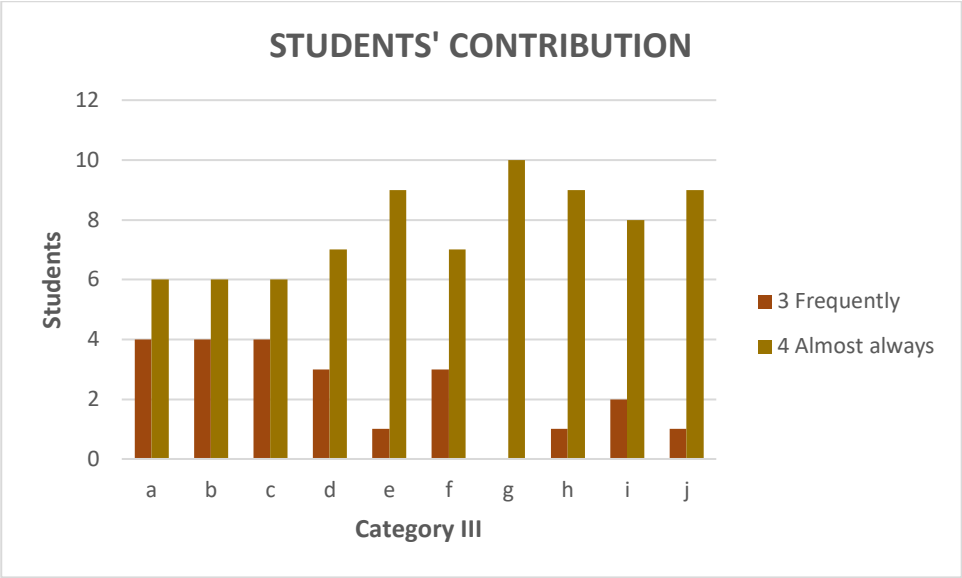


Figure 3.22 Day 2 Students' feedback Section B, category III

Figure 3.22 indicates the students' perceptions of their contributions to the learning opportunity. Six students indicated that they almost always took part in lecturer-student discussions to allow them to develop an enquiring mind while four students felt they frequently did so. Six students indicated that they almost always constructed their own understanding and material (constructivism), while four students felt they frequently constructed their own understanding. Six students indicated that they almost always sought opportunities for developing their learning style flexibility, while four students felt they frequently did so. Seven students indicated that they almost always created opportunities to express themselves freely and openly, while three felt they frequently did so. Nine students felt they almost always reconsidered many of their former attitudes and values concerning their learning while one felt they frequently did so. Seven students indicated that they almost always gained better understanding of themselves, while three felt they frequently did so. All 10 students indicated that they almost always developed a greater sense of responsibility. Nine students indicated that the almost always contributed to their peer's learning, while one felt she frequently did so. Eight students indicated that they almost always sought to inculcate critical thinking and self-reflection as an integral part of their self-directed learning, and two students indicated that they frequently did so. Nine students indicated that they almost always took part actively in cooperative learning opportunities, while one felt they did this frequently.

The qualitative data in the form of the written narratives of the students is tabulated in Table 3.6.

3.4.3.3 Students' Comments Section B Day 2

Table 3.6: Students' comments on their contribution

Respondent	Comments by students on their contribution
1	*We worked nicely in a group. All of us are very calm and observant people so working together was amazing. I was able to express myself and let others express themselves.*
2	*I enjoyed working in the team today, for we were more effective than the previous session. I also enjoyed receiving insight from a previous student that is now working in the private environment.*
3	*I think the group activity allows collaboration and hearing what the others are saying and thinking. But it was a good activity and everyone participated as well.*
4	*I learnt a lot about myself and I was really able to reflect on what and how I've been doing / work and try to seek ways to better myself and see how I can ensure that I am prepared for the outside world. After all, my preparedness is my own responsibility.*
5	*I gained a better understanding of myself and I allowed myself to be participative and interactive with my peers by expressing myself properly and adding input.*
6	*It was a great experience to be a part of. Very conducive to learning and participative in lectures.*
7	*It was really great. Thank you.*
8	*I appreciated partaking in the group discussions as well as individual work because I got to learn a lot about myself and how I work with a team.*
9	*I really enjoyed this study outcome. Upon revising last week's work, I decided to make a summary about brackets, arch wires etc. and allow myself to understand everything more and becoming more competent.*
10	-

Understanding how students perceived their learning experience is crucial as I have indicated that the learning opportunity should focus on the growth and development of students; the lecturer should create the opportunity for students to engage in a self-transformative challenge. Hearing my students' voice is absolutely important. I need to know whether they recognise the transformation taking place within the self.

The comments in Table 3.6 point out that for collaborative learning to happen, all students in a group have to have a chance to partake in the learning process. When engaging students in collaborative learning, it is important that all students have the opportunity to participate. Collaborative learning does not take place when few members of the group are participating but it is when all members of a group participate that the learning environment can be viewed as a collaborative learning environment. When collaborative learning theory is successfully facilitated, the learning environment becomes conducive to deeper learning. The discussions and sharing of ideas transform the learning environment from being a collaborative learning environment to a constructivist one that leads to the construction of new meaning made by the members of the group.

The next section shows students' feedback on day 3 (last AR cycle) of data collection. The same questionnaire was used to assess my contribution to students' learning and my students' contributions to their learning.

3.4.4 Students' Feedback Section A Day 3

Figure 3.23 shows the students' perceptions of my contribution to their learning in category I of section A of the student feedback questionnaire (Consult Appendix J). The number of respondents was nine instead of 10 on the last day of data collection.

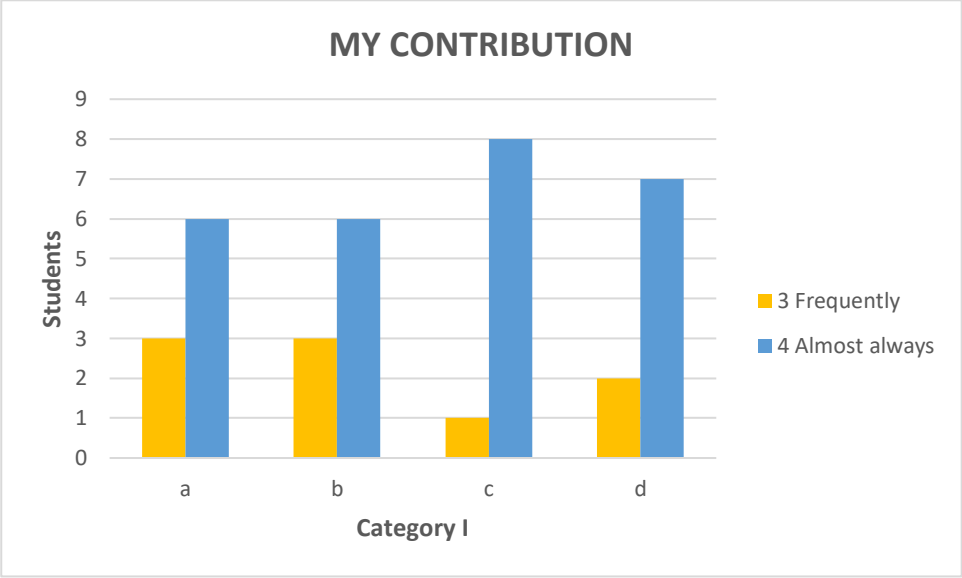


Figure 3.23 Day 3 Students' feedback Section A, category I

Six students felt that I almost always showed enthusiasm for the subject matter while three students felt I frequently did so. Six students felt that I almost always expressed myself well while three students felt I frequently expressed myself well. Eight students indicated that I

almost always promoted insight into the importance and significance of real-life challenges, and one student felt I did this frequently. For my ability to provide learning opportunities that are lively and encouraging, seven students felt I almost always did so while two students indicated that I did so frequently.

Next I illustrate students' observation of my contribution in category II.

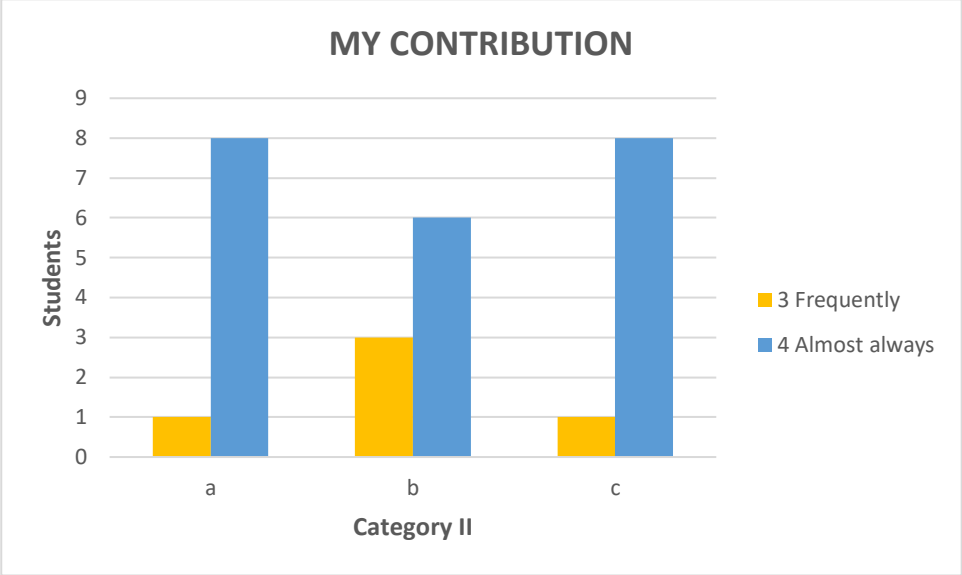


Figure 3.24 Day 3 Students' feedback Section A, category II

When assessing my ability to initiate learning, eight students felt I almost always created a climate conducive to deep learning, one student indicated that I frequently did so. Regarding clearly stating the purpose and the learning outcomes of the learning opportunity, six students indicated that I almost always stated the purpose; three felt I frequently did. Eight students felt I almost always linked learning to real-life situations, while one indicated that I did so frequently.

The students' observations of my contribution to their learning in category III are stipulated in Figure 3.25 and discussed below.

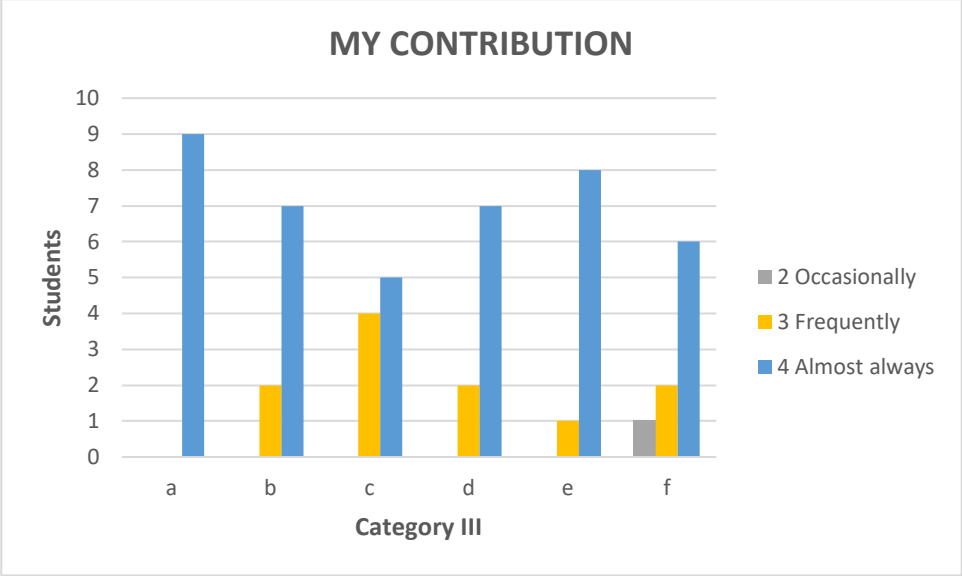


Figure 3.25 Day 3 Students' feedback Section A, category III

Regarding my ability to maintain learning, nine students indicated that I promoted lecturer-student discussion to allow students to develop an enquiring mind. Seven students indicated that I almost always encouraged them to construct their own meaning while two student felt I did so frequently. Five students indicated that I almost always propagated learning style flexibility, while four felt I did so frequently. Regarding my ability to encourage students to express themselves freely and openly, seven students felt I almost always did so and two felt I frequently encouraged free and open expression. Eight students felt I considered critical thinking and self-reflection as integral part of self-regulated learning, while one felt I did so frequently. Six students indicated that I created opportunities for cooperative learning, and two believed I did so frequently, while 1 student felt I did it occasionally.

Table 3.7 consists of the students' comments on my contribution to their learning.

3.4.4.1 Students' Comments Section A Day 3

The qualitative data is represented in the form of written narratives − students' comments on my contribution to their learning.

Table 3.7: Students' comments on the lecturer's contribution

Respondent	Comments by students on my contribution
1	*Today's lecture was all about professional identity and the importance of maintaining it even when we get to the private practices and keep our responsibilities. It was an excellent one, the lecturer gave us a chance to picture how it would be and what would be expected of us.*
2	*Was really informative and helped me as a student.*
3	*The task helped open up eyes of students. Lecturer was well prepared. Gave articles in advance so that everyone knows what is expected from them.*
4	*You were very informative for the lecture. Thank you.*
5, 8 and 9	-
6	*The article that was given assisted further and assisted in terms of answering the questions. Professional identity is important and can affect how one is in the orthodontic practice and helps make decisions and choices. The scenario helped think further as to developing your own professional identity ad making own decisions instead of following the other oral hygienists roles.*
7	*Today's session was very much useful in a way of linking real life situation and what we faced with while in school. I learnt so much about my responsibility.*

This was the final day of data collection − the final action research circle performed for the purpose of my research. The title of the learning task for this learning opportunity was *Professional identity in an orthodontic practice*. I collaborated with the Creative Studios department where I challenged myself to write a script about an oral hygienist who has recently joined the world of orthodontics after graduation. I narrated the video clip and am proud of challenging myself to do this. The collage of the video clip is displayed in Figure 3.26.

Figure 3.26 Collage of a self-narrated video clip

The narrated video clip dealt with a real-life situation encountered by a newly qualified oral hygienist on her first day of work. In this learning opportunity the students were challenged to make meaning about professional identity and its importance in the world of work.

It is clear that the students realised their responsibilities (self-discovery) when going to the world of work. The topic on professional identity was of paramount importance. The fact is we are oral hygienists and our main responsibility as professionals is to assist patients with their oral hygiene regimen to ensure that they maintain good oral hygiene and prevent the occurrence of dental diseases. This means it is our responsibility to ensure that we do not lose our professional identity and honour our oath to take care of our patients.

Through this learning opportunity the students were made aware of their future and had to make decisions about who they wanted to be. The opportunity for my students to picture themselves in the world of work before they were exposed to it was priceless and I viewed it as authentic learning. The harsh realities of life must be displayed to students so that while they are still students they can master the very important skills that will assist them to navigate through life in the world of work. These skills include communication, problem solving, decision making, being effective team players, innovation, critical thinking and more. A student lacking these skills when qualifying will find the world of work to be too difficult.

The quantitative data of students' responses in section B is discussed below.

3.4.4.2 Students' Feedback: Section B Day 3

The students' observation of their contribution to their learning in category I is presented in Figure 3.27.

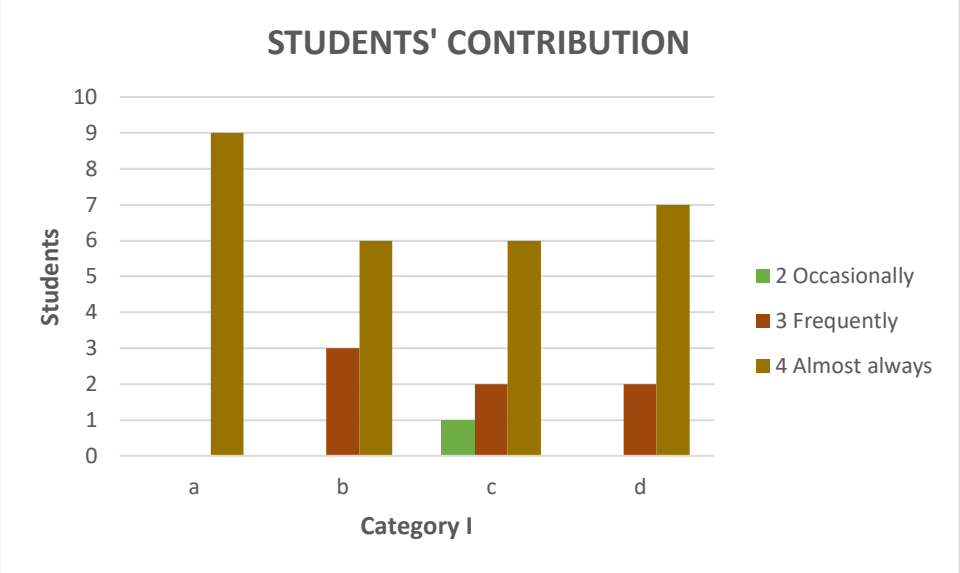


Figure 3.27 Day 3 Students' feedback Section B, category I

Figure 3.27 indicates students' self-assessment. All nine students felt they almost always showed enthusiasm for the subject matter and learning task. Six students indicated that they almost always expressed themselves well while three students said they did so frequently. Regarding gaining insight into the importance and significance of the subject matter six students indicated that they almost always gained insight while 2 felt they frequently did and one indicated that they occasionally did. Seven students indicated that they almost always participated in a way that rendered the learning opportunity lively and encouraging while two students felt they frequently participated in such a manner.

Figure 3.28 indicates the students' observations of their contribution in category II.

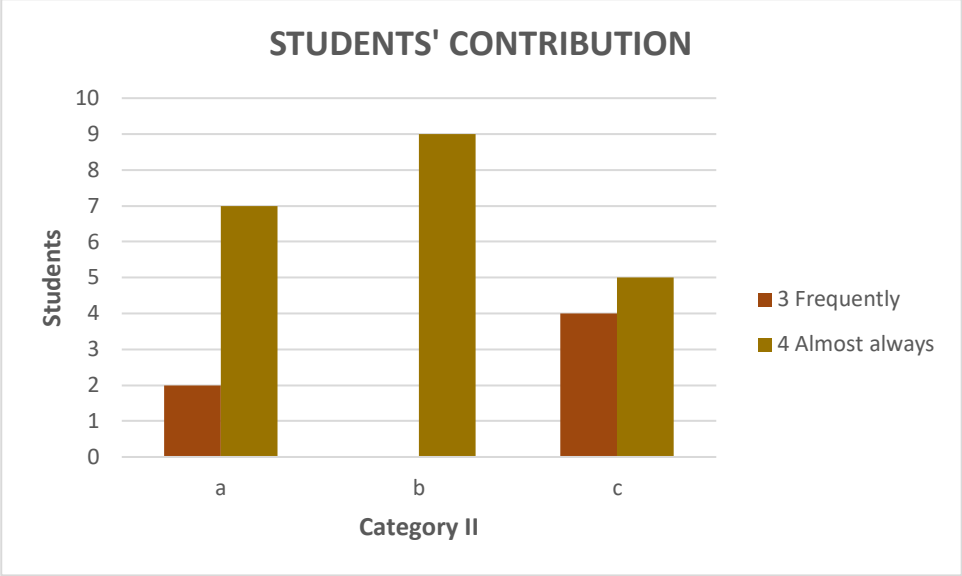


Figure 3.28 Day 3 Students' feedback Section B category II

Figure 3.28 is a visual presentation of how students assessed themselves in category II. Seven students indicated that they co-created a climate that was conducive to deep learning; two students indicated that they frequently co-created such a climate. All nine students felt they almost always attempted to link their learning to real-life situations. Five students indicated that they almost always attempted to construct a big picture of the multidimensional nature of the learning opportunity, while four felt they frequently did so.

The presentation of students' observations regarding their contributions to their learning in category III follows.

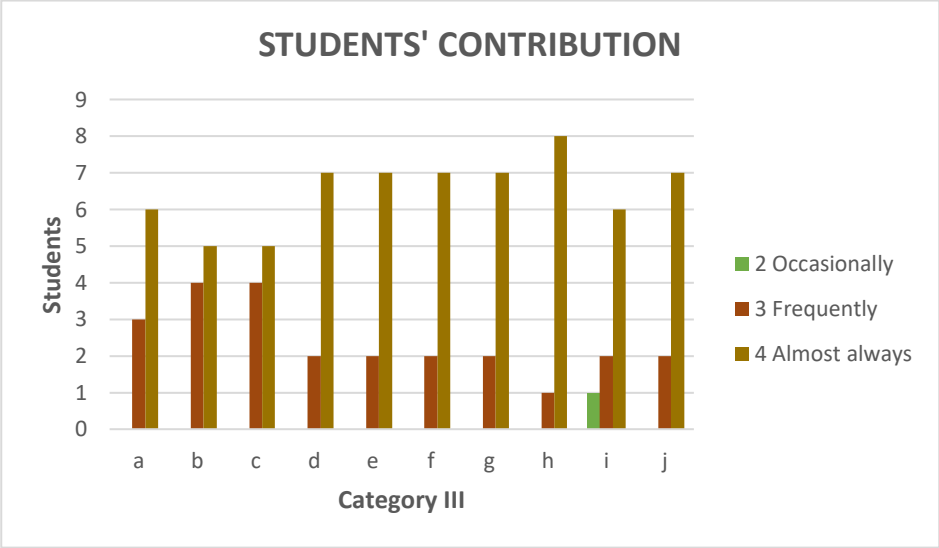


Figure 3.29 Day 3 Students' feedback Section B, category III

Figure 3.29 indicates the students' perceptions of contributions to the learning opportunity. Six students indicated that they almost always took part in lecturer-student discussions to allow them to develop an enquiring mind while three felt they frequently did so. Five students indicated that they constructed their own understanding and material (constructivism) almost always, while four students felt they frequently constructed own understanding. Five students indicated that they almost always sought opportunities for developing their learning style flexibility, while three students felt they frequently did so. Seven students indicated that they almost always created opportunities to express themselves freely and openly, while two felt they frequently did so. Seven students felt they almost always reconsidered many of their former attitudes and values concerning their learning while two students felt they did this frequently. Seven students indicated that they almost always gained a better understanding of themselves, while two felt they frequently did so. Seven students indicated that they almost always developed a greater sense of their responsibility while two felt they frequently did so; eight indicated that they almost always contributed to their peers' learning, while one felt they did so frequently. Six students indicated that they almost always sought to inculcate critical thinking and self-reflection as an integral part of their self-directed learning, and two students indicated that they frequently did so while one felt they did this occasionally. Seven students indicated that they almost always actively took part in cooperative learning opportunities, while two felt they did so frequently.

The comments by students on their contribution to their learning are presented in Table 3.8.

3.4.4.3 Students' Comments: Section B Day 3

Table 3.8 consist of qualitative data which is the comments by students on their observation of themselves during the learning opportunity.

Table 3.8: Students' comments on their contribution

Respondent	Comments by students on their contribution
1	I gained knowledge and I participated a bit in the decision-making cases, which was very nice and I do feel a sense of growth and excitement for private practises.
2	Was really informative and helped me as a student.
3	The task helped realise more truth about outside world of being a professional OH. The questions which I had were answered and made me feel at ease.

4	I learnt the importance of developing a professional identity while I am still in school to ensure that I am able to stand firm for what I believe and stand firm in our professional responsibilities.
5	Thank you!
6	Pre-reading the article beforehand and preparing for class helped with completing the activity and thinking critically when answering the questions as well.
7 and 9	-
8	Improving working with group members without dismissing others' opinions; understanding them and trying to incorporate that as a group.

The comments of the students indicate how they were challenged to think critically, make decisions for the future, work as a team and to discover who they were (self-discovery). I keep saying this and I will repeat it, the planning of the learning opportunity should focus on the students. The students have to see growth in themselves and should have a longing to learn more. The real-life challenges presented to them should give the students satisfaction and an enquiring mind after they have solved the challenge. Through this the students discover new things about themselves and they are motivated to be problem solvers and lifelong learners.

The next section contains quantitative data of the observations of my peer during the three days of data collection.

3.4.5 Peer Feedback Day 1, 2 and 3

Two types of questionnaire were given to my colleague who observed the three learning opportunities. The first questionnaire that consisted of section A (lecturer's contribution) and section B (students' contribution) (Consult Appendix H) was used to assess my teaching practice. This questionnaire consisted of both quantitative data measured by a Likert scale where 1 = *Hardly ever;* 2 = *Occasionally*; 3 = *Frequently* and 4 = *Almost always*. The qualitative data gained from this questionnaire consisted of the comments that my colleague made. The other questionnaire (Consult Appendix I) was used to assess my learning opportunity and the process of my facilitating learning. This questionnaire aimed at collecting qualitative data.

The following section indicates my colleague's observation of my contribution to student learning in category I.

3.4.5.1 Peer Feedback Section A

Figure 3.30 shows the observations of my peer on all three days of data collection for Section A, category I.

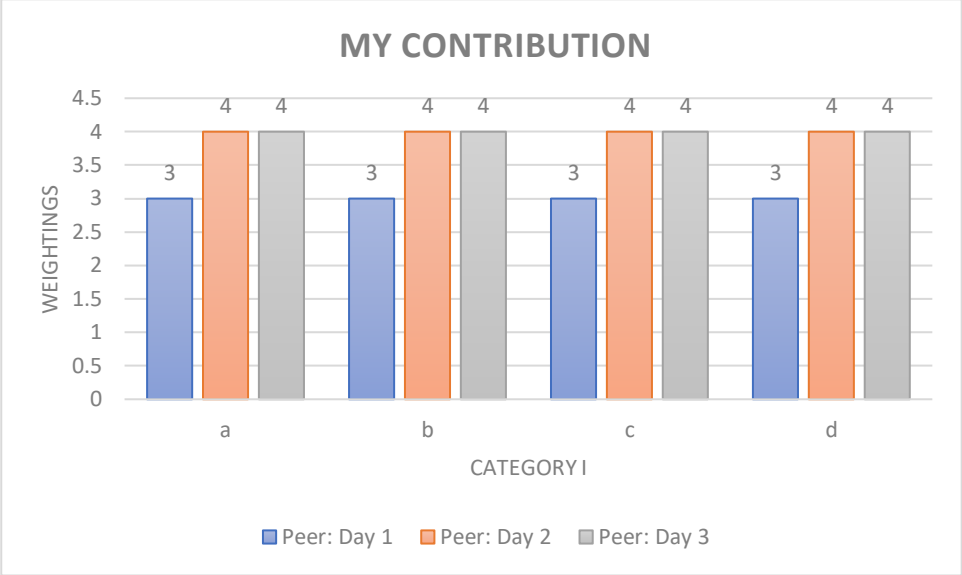


Figure 3.30 Day 1, 2 and 3 Peer feedback Section A, category I

On day 1 my colleague indicated that I frequently showed enthusiasm for the subject matter and learning task. On day 2 and 3 she indicated that I almost always showed enthusiasm for the subject matter. When assessing my ability to express myself well, she indicated on day 1 that I frequently did and on day 2 and 3 she observed that I almost always expressed myself well. I frequently promoted insight into the importance and significance of the subject matter on the first day of data collection. The second and the third day indicated that I almost always promoted insight into the importance and significance of the subject matter. My colleague observed that I frequently provided a lively and encouraging learning opportunity on day 1 while on day 2 and 3 she observed that I almost always provided lively and encouraging learning opportunities.

Figure 3.31 shows the bar graph of my peer's observation of my contribution to student learning in category II.

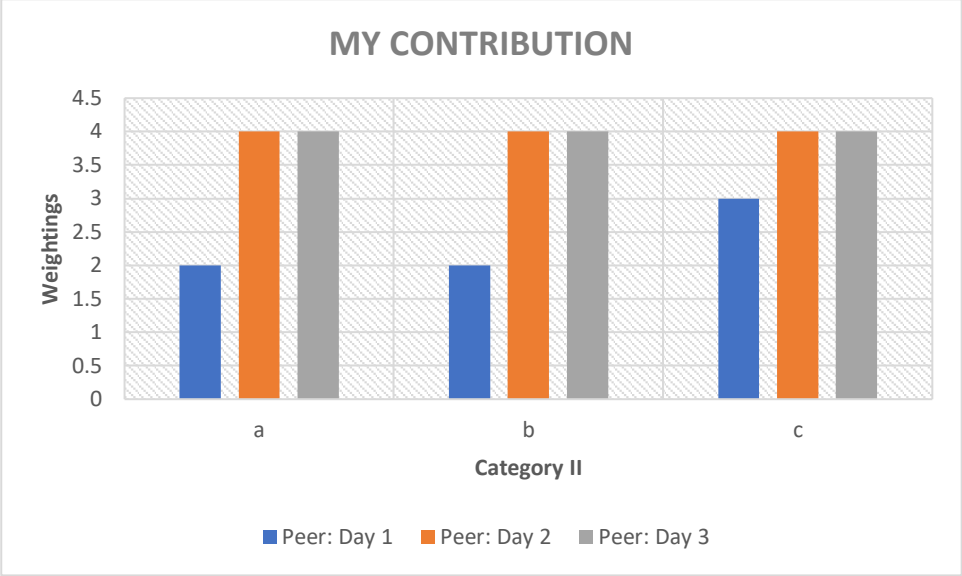


Figure 3.31 Day 1, 2 and 3 Peer feedback Section A, category II

In category II on day 1 my colleague observed that I occasionally created a climate conducive to deep learning, while she observed that I improved and almost always created a climate conducive to deep learning on day 2 and 3. On day 1 I occasionally clearly stated the purpose and learning outcomes of the learning opportunity and on day 2 and 3 I almost always stated the purpose. Regarding linking learning to real-life situations my colleague observed that I frequently did this on day 1 but almost always linked learning to real-life situations on day 2 and 3.

The presentation of my contributions in category III is provided in Figure 3.32.

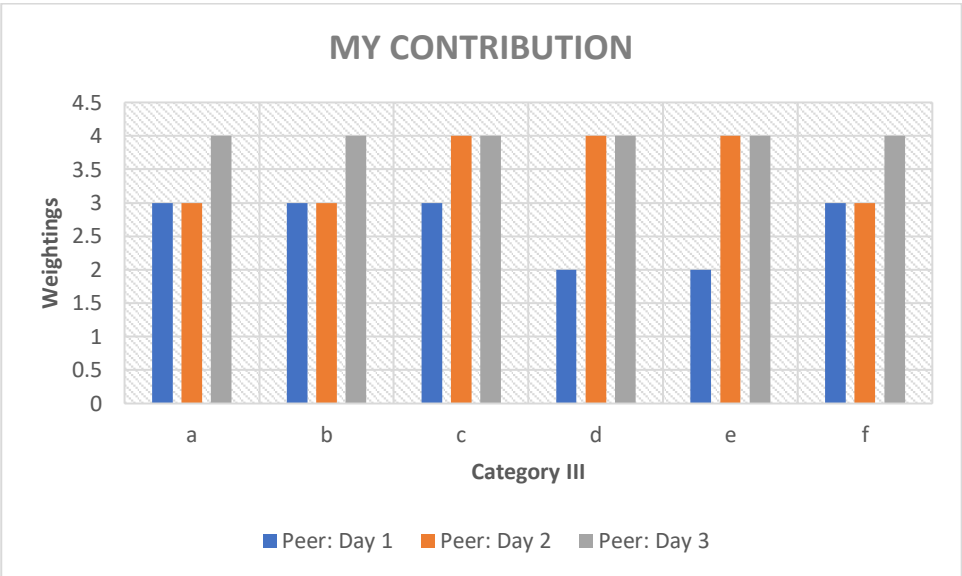


Figure 3.32 Day 1, 2 and 3 Peer feedback Section A, category III

For category III my colleague observed that I frequently promoted lecturer-student discussion to allow students to develop an enquiring mind on both day 1 and 2 while on day 3 I did this almost always. On day 1 and 2 my colleague observed that I frequently encouraged my students to construct their own understanding and material and she observed that on day 3 I almost always did so. Regarding my ability to provide a whole brain learning opportunity and challenge students beyond their comfort zone, my colleague indicated that on day 1 I frequently did this while on day 2 and 3 I almost always did. On day 1 my colleague observed that I occasionally encouraged my students to express themselves freely and openly while on day 2 and 3 she observed that I almost always did so. According to her observation my colleague noted that on day 1, I occasionally inculcated critical thinking and self-reflection as integral part of self-regulated learning while on day 2 and 3 I almost always did this. On day 1 and 2 my colleague observed that I frequently created opportunities for cooperative learning while on day 3 she observed that I almost always did so.

The comments given by my colleague are tabulated in Table 3.9.

3.4.5.2 Peer's Comments on the Contributions of Both the Students and Myself

Below is the qualitative data presentation in a form of written narratives by my colleague after observing the learning opportunities.

Table 3.9: Peer's comments on my contribution and students' contributions

Days of Data collection	Comments by my peer on my contribution	Comments by my peer on students' contribution
1	- *Started well with students using whole brain learning exercise got students inclined to teaching (Ice breaker - Good)* - *Did not really state the purpose of the setup nor verbal explanation of the task as written on the Learning Task Sheet (It could have saved time on individual explanation during the actual activity).* - *Little space in between to allow time for questions and feedback on each task, perhaps give lesser activity (3 tasks at a go did not allow time for clarity seeking nor feedback, and task were not completed).*	- *Students were enthusiastic, but observed; not the whole class was actively engaged.* - *Students do work independently and critically work to solve the cases given.* - *Could improve on allowing all students to be free and open to give input, others were left out.*

	- *Good authentic case study – perhaps give a flip classroom in future to prepare student and save time.* - *Teamwork achieved and collaboration learning observed, even though you missed to see other students who were not engaged.*	
2	- *The whole exercise from Kahoot, was shared visually, discussed and talked about it, feedback was given immediately.* - *Whiteboard marker was used to highlight important concept - especial the one student struggled with video, Kahoot, whiteboard was used to enhance teaching and learning*	- *All the exercises given today encouraged students to work collaboratively and to challenge their own understanding of ortho concepts and practice.*
3	- *The lecturer is enthusiastic about her module, she has shown great passion in teaching the content and using authentic real world practices.* - *Great skills in working with Communication abilities of students.*	- *Got all students engaged and participated.* - *Integrated other modules into the module Orthodontics.* - *Excellent! Reasoning of students was beautiful.*

The next section consists of the quantitative observation by my colleague regarding the students' contribution to their learning.

3.4.5.3 Peer's Feedback Section B Day 1, 2 and 3

Figure 3.33 indicates my peer's observation of the contribution of my students to their learning.

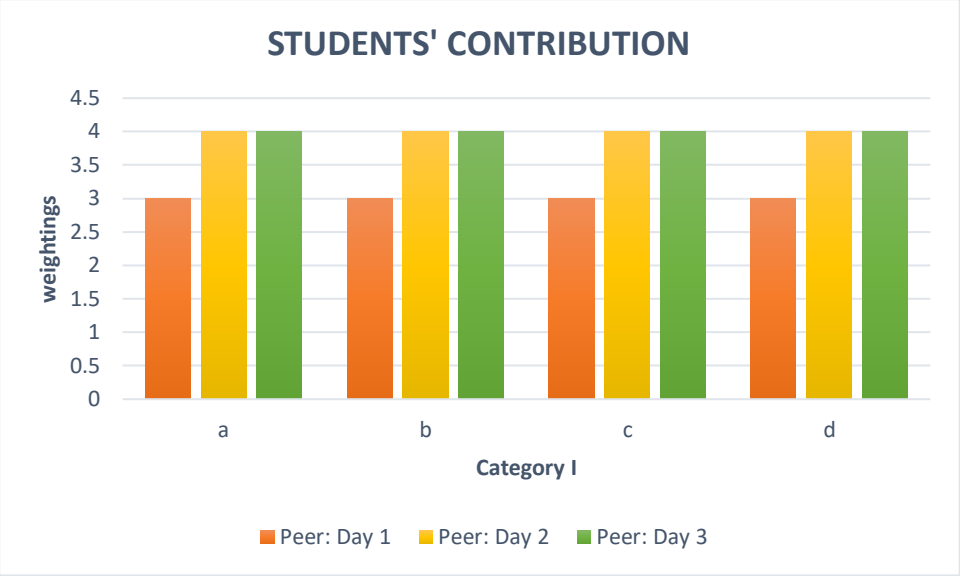


Figure 3.33 Day 1, 2 and 3 Peer feedback Section B, category I

On day 1 my colleague observed that my students frequently showed enthusiasm for the subject matter and learning tasks, while on day 2 and 3 she indicated that the students almost always showed enthusiasm for the subject matter. Regarding the manner in which my students expressed themselves my colleague observed that on day 1 they frequently expressed themselves well while on day 2 and 3 they almost always did so. My colleague reported that on day 1 my students frequently gained insight into the importance and significance of the subject matter, while on day 2 and 3 they almost always did so. My students frequently participated in such a way that the learning opportunity became lively and encouraging on day 1 and almost always on day 2 and 3.

Figure 3.34 shows my peer's observation of students' contribution in category II.

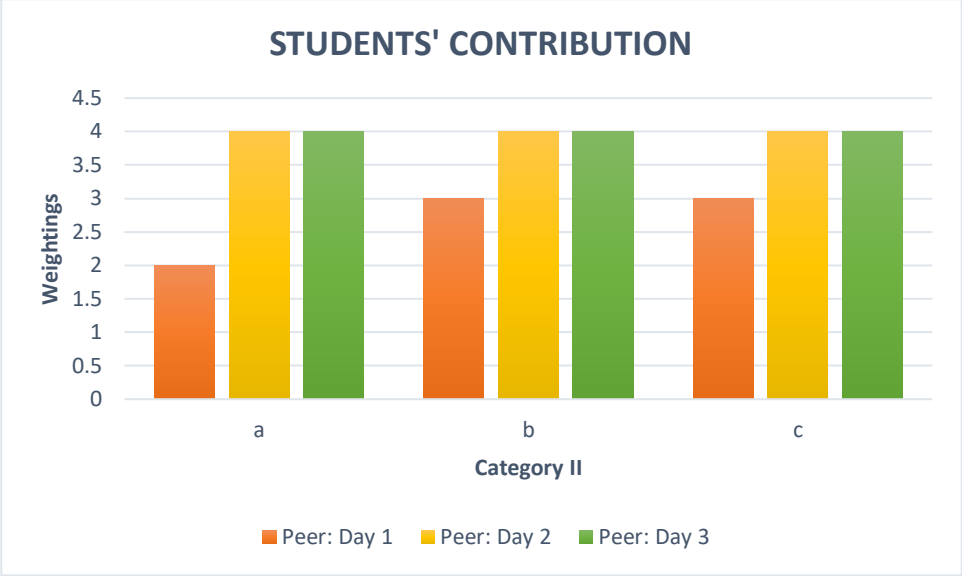


Figure 3.34 Day 1, 2 and 3 Peer feedback Section B, category II

In category II my colleague observed that my students occasionally co-created a climate conducive to deep learning on day 1 and improved by almost always doing this on day 2 and 3. My students frequently attempted linking their learning to real-life situations on day 1, while on day 2 and 3 they almost always did so. According to the observations of my colleague, my students frequently attempted to construct a big picture of the multidimensional nature of the learning opportunity on day 1, while they almost always did this on day 2 and 3.

Figure 3.35 below reflects my peer's observation on students' contribution for category III.

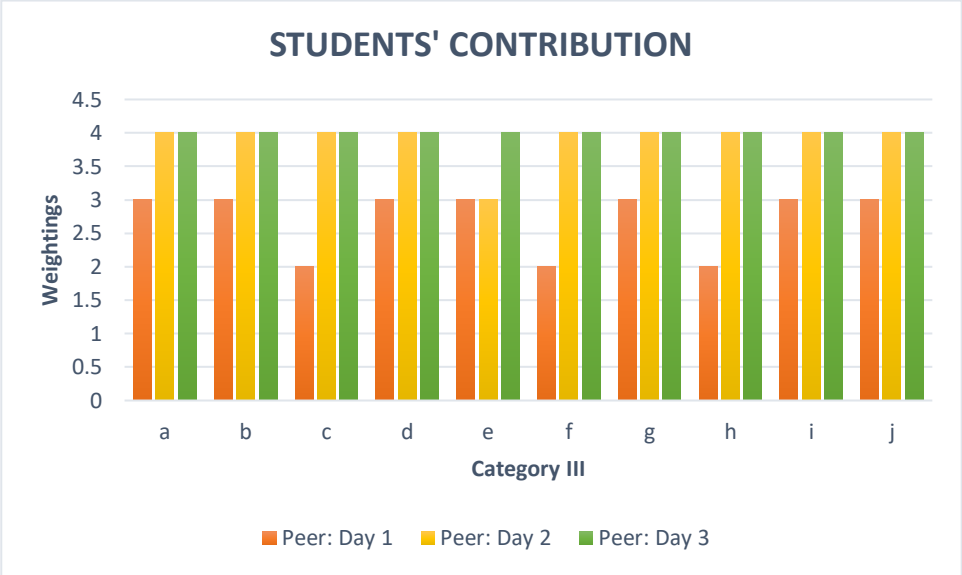


Figure 3.35 Day 1, 2 and 3 Peer feedback Section B, category III

Day 1 indicates that my students frequently took part in lecturer-student discussions to allow themselves to develop an enquiring mind, while on day 2 and 3 they almost always did this. My students frequently constructed their own understanding and material on the first day of data collection, while on day 2 and 3 they almost always did this. My colleague observed that my students occasionally created opportunities for developing whole brain learning opportunities. However, it was observed that on day 2 and 3 they almost always did so. My students were observed frequently to make use of opportunities to express themselves freely and openly on day 1 and almost always did this on day 2 and 3. On day 1 and 2 my students frequently reconsidered many of their former attitudes and values, while on day three they almost always did so. My colleague observed that my students occasionally gained a better understanding of themselves on day 1, while almost always doing so on day 2 and 3. My students were observed frequently to develop a greater sense of their own responsibility on day 1, while on day 2 and 3 they almost always did so. It was observed that my students occasionally contributed to their peers' learning on day 1, while on day 2 and 3 they were observed almost always to have done so. My students frequently inculcated critical thinking and self-reflection as integral part of their self-directed learning on the first day of data collection while on day 2 and 3 they almost always did so. My colleague observed that my students frequently actively took part in cooperative learning opportunities and establishing communities of practice on day 1, while on day 2 and 3 they were recorded as almost always doing so.

As stipulated above, my peer was given two questionnaires. The following qualitative data summarises the comments made by my peer on my ability to design, initiate and maintain learning.

3.4.5.4 Peer's Comments on my Ability to Design, Initiate and Maintain Learning

My colleague gave comments on each of the learning opportunities and this is tabulated in Table 3.10 below.

Table 3.10: Peer's comments on my ability to design, initiate and maintain learning

Days of Data Collection	Comments by my peer
1	- *Well-structured and organised* - *Students were enthusiastic, the lecture room selected was conducive to the activities planned. Could improve on the set up of tables, so that you don't have students sitting far from each other (a circle perhaps).*

	- *Most students actively participated, but concerns about the few 10 each group who were quick and not noticed (not all learning styles were catered for) Charts were given out late / hence the proposal for fewer activities with instructions and time management for tasks clearly explained at the beginning.* - *Give sufficient time for task and feedback session is just as important. Overall well done with the innovation.*
2	- *Class started very well − did revision of the previous task.* - *A reflection in practice.* - *Kahoot exercise − well prepared − All students were active and enjoyed it.* - *The teaching and learning were enhanced by a video and the video presenter was an alumnus and did not use a YouTube download - Students were taught by a real example. This was an excellent choice.* - *Time management − excellent and monitored.* - *The lecture achieved the outcomes, students were active, collaborated and a community of practice through a real time video of a student in orthodontic practice was established.*
3	- *Students were well prepared before class using an article; to assess their readiness, a Kahoot was used. All students demonstrated that they did study for the class* - *A live video − lecturer narrated the content. This was creative.* - *Students showed they enjoyed learning from this class and were confident compared to the first class where they were shy. They are now more related; active in their groups and engaged in the whole class discussions.* - *Lecturer moving swiftly from one group to the other and probed students to think deeply about what they are discussing*

The following section consists of my quantitative and qualitative self-assessment data.

3.4.6 My Feedback on my Teaching Practice

Giving self-assessment feedback after each of my learning opportunities was the starting point to reflect on what had happened. For self-assessment of my teaching practice, I used the same questionnaires that my students and my colleague used. Although self-assessment may seem subjective, it was important for me to maintain objectivity. I ensured that I answered the questionnaire before browsing my students' or my peer's responses. I did this to ensure that my judgements were not in any way influenced by what I could have seen when reviewing the responses. The questionnaire consisted of different sections and

categories that could be measured with a Likert scale with 1 = *Hardly ever;* 2 = *Occasionally*; 3 = *Frequently* and 4 = *Almost always*.

The quantitative feedback on my contribution to students learning is presented in Figure 3.36.

3.4.6.1 My Feedback Section A Day 1, 2 and 3

Figure 3.36 indicates my contribution to students' learning in category I.

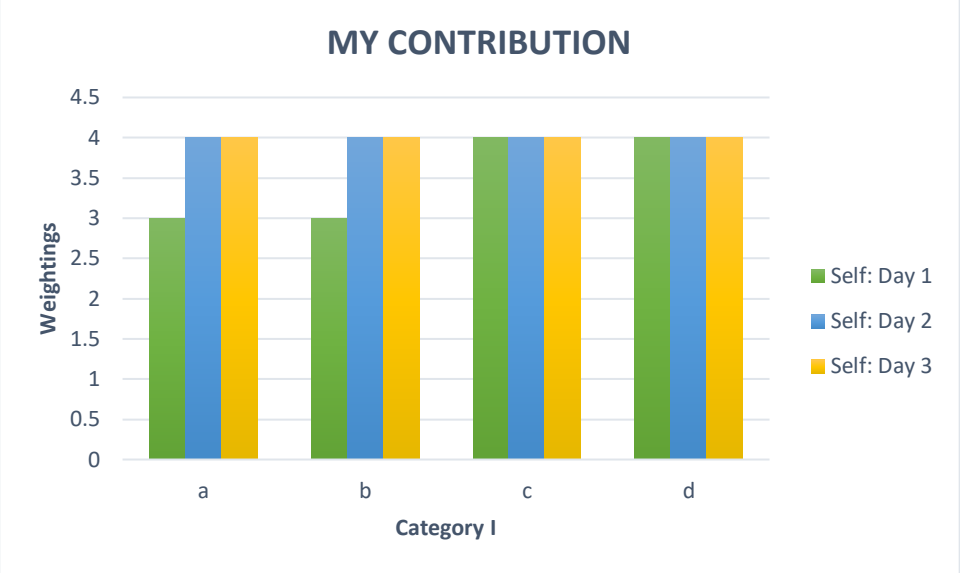


Figure 3.36 Day 1, 2 and 3 my feedback Section A, category I

On day 1 I indicated that I frequently showed enthusiasm for the subject matter and learning task. On day 2 and 3 I indicated that I almost always showed enthusiasm for the subject matter. When assessing my ability to express myself well, on day 1 I indicated that I frequently did so and on day 2 and 3 I felt I almost always expressed myself well. I almost always promoted insight into the importance and significance of the subject matter on day 1, 2 and 3 of data collection. I felt I almost always provided a lively and encouraging learning opportunity on all three days of data collection.

Figure 3.37 shows my contribution to students' learning in category II.

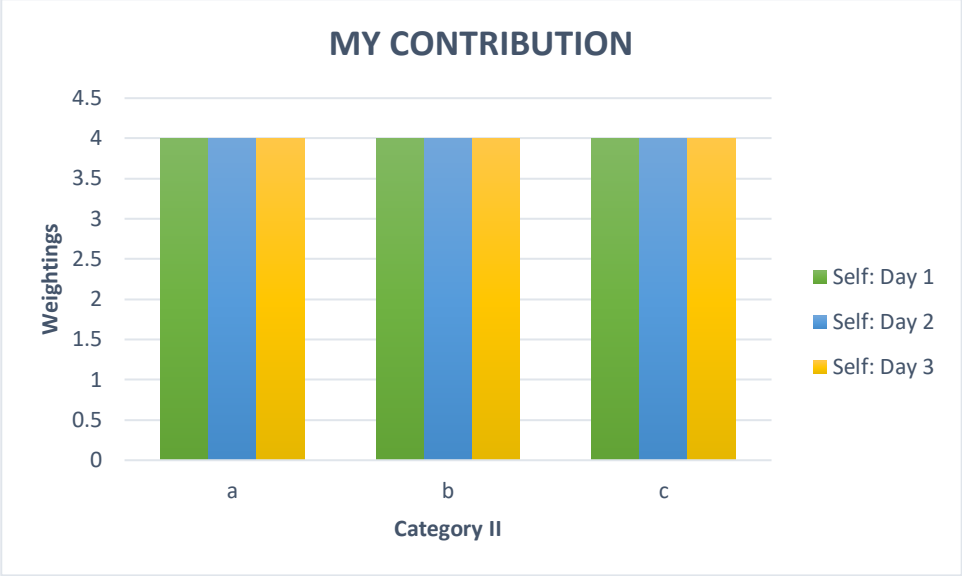


Figure 3.37 Day 1, 2 and 3 my feedback Section A, category II

For category II on day 1 I recorded that I almost always created a climate conducive to deep learning. I indicated that I almost always stated the purpose and learning outcomes of the learning opportunity clearly on all the three days of data collection. I almost always linked learning to real-life situations on day 1, 2 and 3.

Figure 3.38 indicates my contribution to students' learning in category III.

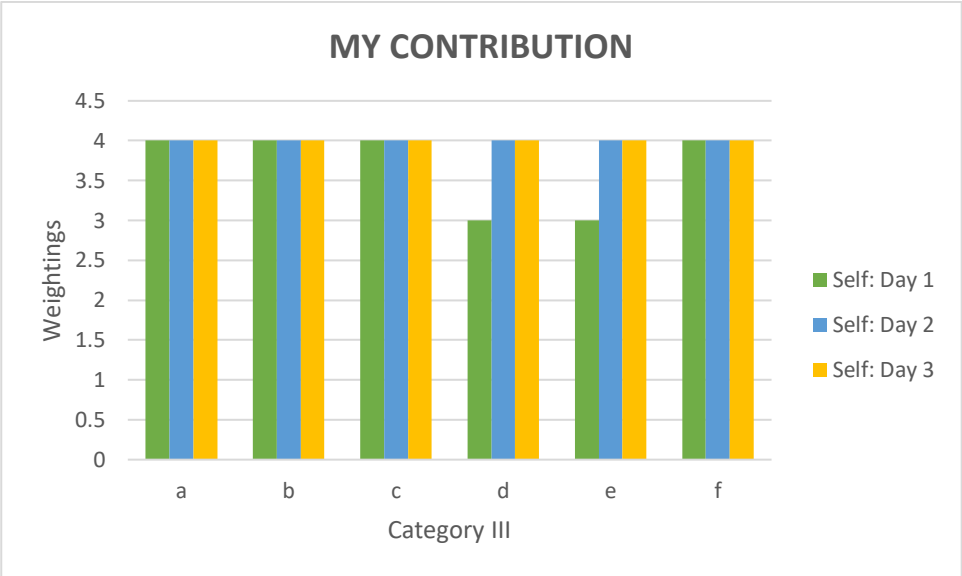


Figure 3.38 Day 1, 2 and 3 my feedback Section A, category III

In category III I almost always promoted lecturer-student discussion to allow students to develop an enquiring mind on day 1, 2 and 3. On day 1, 2 and 3 I almost always encouraged my students to construct their own understanding and material. Regarding my ability to

provide a whole brain learning opportunity and challenge students beyond their comfort zone, I indicated that on all three days I almost always did this. On day 1 it was indicated that I frequently encouraged my students to express themselves freely and openly while on day 2 and 3 I almost always did this. According to my records I indicated that on day 1, I frequently inculcated critical thinking and self-reflection as integral part of self-regulated learning while on day 2 and 3 I almost always did so. On day 1, 2 and 3 I almost always created opportunities for cooperative learning.

I also assessed my students' contribution to their learning, and my findings are indicated in Figure 3.39.

3.4.6.2 My Feedback: Section B Day 1, 2 and 3

Below my feedback on my students' contribution to their learning under category I is presented.

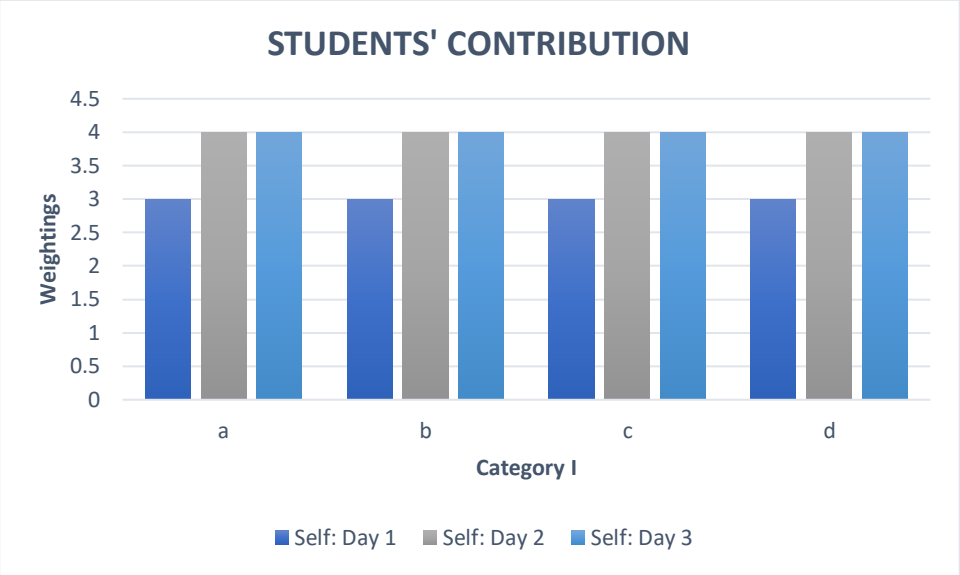


Figure 3.39 Day 1, 2 and 3 my feedback Section B, category I

On day 1 I observed that my students frequently showed enthusiasm for the subject matter and learning tasks, while on day 2 and 3 I indicated that they almost always showed enthusiasm for the subject matter. Regarding the manner in which my students expressed themselves, I observed that on day 1 it was indicated that they frequently expressed themselves well while on day 2 and 3 they almost always did so. My observation report for day 1 indicated that my students frequently gained insight into the importance and significance of the subject matter, while on day 2 and 3 they almost always did so. My students frequently participated in such a way that the learning opportunity became lively and encouraging as was determined on day 1 and almost always on day 2 and 3.

My observation of students' contribution in category II is indicated in Table 3.40.

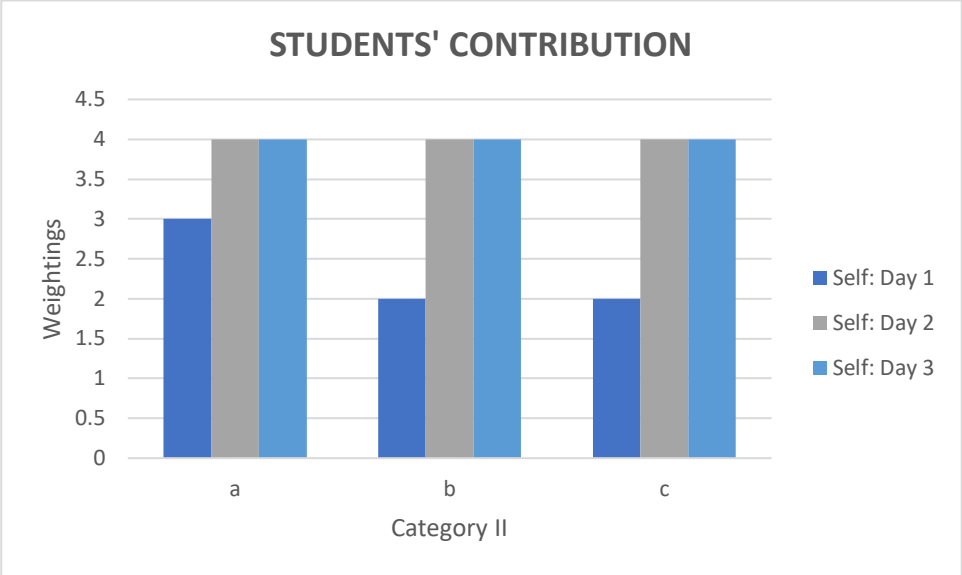


Figure 3.40 Day 1, 2 and 3 my feedback Section B, category II

In category II I observed that my students frequently co-created a climate conducive to deep learning as was determined on day 1 and improved by almost always doing this as was found on day 2 and 3. My students occasionally attempted linking their learning to real-life situations on day 1, while on day 2 and 3 they almost always did so. According to my observation, my students occasionally attempted to construct a big picture of the multidimensional nature of the learning opportunity as was found on day 1, while they almost always did so according to day 2 and 3.

The students' contribution in category III according to my observation is presented in Figure 3.41.

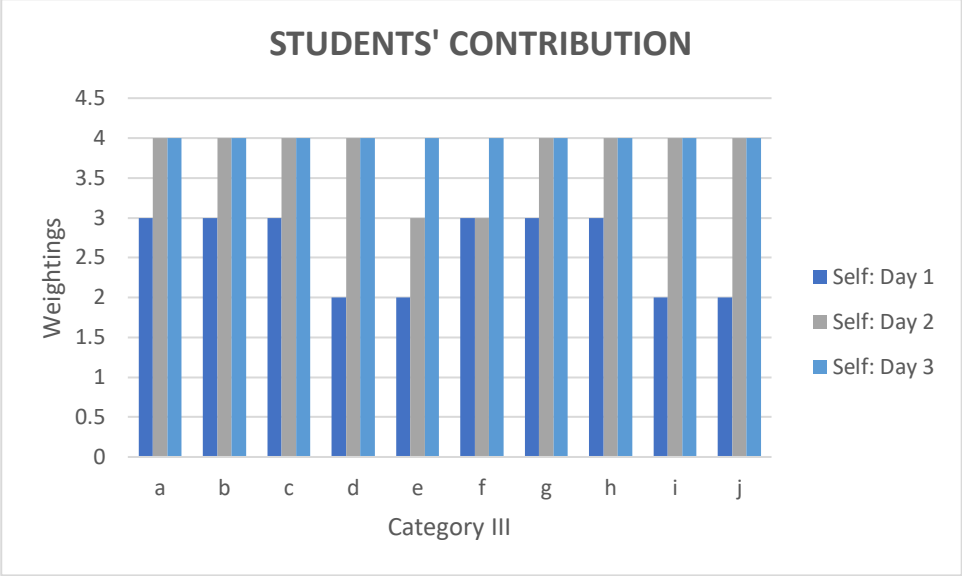


Figure 3.41 Day 1, 2 and 3 my feedback Section B, category III

Figure 3.41 indicates that on day 1 my students frequently took part in lecturer-student discussions to allow themselves to develop an enquiring mind, while according to day 2 and 3 they almost always did this. My students frequently constructed their own understanding and material on the first day of data collection, while on day 2 and 3 they almost always did so. I observed that my students frequently sought opportunities for developing whole brain learning opportunities. It was observed, however, on day 2 and 3 that they almost always did so. My students were observed to have occasionally made use of opportunities to express themselves freely and openly on day 1 and almost always did so according to day 2 and 3. On day 1 my students occasionally reconsidered many of their former attitudes and values, while day 2 indicated that they did this frequently and day 3 indicated that they almost always did. I observed that my students frequently gained understanding of themselves on day 1 and 2, while almost always doing so on day 3. My students were observed frequently to have developed a greater sense of their own responsibility on day 1, while on day 2 and 3 they almost always did. I observed that my students frequently contributed to their peers' learning on day 1, while on day 2 and 3 it was observed that they almost always did so. My students occasionally inculcated critical thinking and self-reflection as integral part of their self-directed learning according to the first day of data collection while on day 2 and 3 they almost always did this. I observed that my students occasionally actively took part in cooperative learning opportunities and establishing communities of practice on day 1, while on day 2 and 3 it was recorded as they almost always did.

My comments that form part of qualitative data are presented in Table 3.11.

3.4.6.3 My Comments on my Contribution and Students Contributions Day 1, 2 and 3

Table 3.11 contains my comments on contributions to learning.

Table 3.11: My comments on the contributions of myself and my students

Days of data collection	My comments on my contribution	My comments on students' contribution
1	*I prepared well for this learning opportunity. Students knew what was expected of them. The written instructions were clear. The time allocated for this learning opportunity was not enough to solve the real-life challenge. Even though the learning outcomes or learning product was not produced by students, I think the task given to them challenged them and they could reflect and learn beyond the classroom perimeters. The task challenged students to become lifelong learners, which is one of the competences I wished to instil into my students.*	*Students seemed not to understand what team work entails. They were presented with a task to solve as a group, but some students within a group formed their own group of two. Students did not critically think and question their decisions. They did not probe or show that they were immersed in the learning task presented to them. I had to through constructive questioning ask them probing questions to facilitate deeper critical thinking. Towards the end of the learning opportunity, students presented their constructs. During this time I expected peer-assessment to take place where students questioned what their peers were presenting to enhance learning but students only listened to their peers' presentation and seemed to have accepted what their peers were saying.*
2	*The learning task was designed appropriately. The different instructional media, such as video, game, whiteboard and paper chats enhanced learning for students. Incorporating a video clip of the past Oral Hygiene graduate who worked in an orthodontic practice enhanced the understanding of what a community of practice in the world of Orthodontics entails. I facilitated learning by asking students probing questions about becoming a proactive, reflective oral hygienist. Students understood how important*	*The students were actively involved in their learning process and questioned their own constructs on the subject matter. All students in each group participated. A reflective process took place when students had to reflect on their readiness for the world of work. I am proud of them. Some students need to practise self-regulated learning and reflect on each learning opportunity to assess their learning/understanding of concepts.*

	reflection is if one has intentions to improve one's practice. Cooperative learning was enhanced through students working together to solve the real-life challenges presented to them. I really loved to see how my students were motivated throughout the learning opportunity. The organisation and grouping of students made it easy for me to gain access to each student at any point in time.	
3	*This was an authentic learning opportunity. The students were given a scholarly article on professional identity to read, analyse and reflect upon. I also collaborated with the relevant department to create a video clip that I personally narrated. This tool/media enhanced learning. Self-regulated learning was assessed through a Kahoot game where I assessed whether students did read, reflect and analyse the article. Students enjoyed working in groups and I could clearly see the joy in their faces. I randomly selected a presenter at the end to ensure that all students participated while they worked in groups. The real-life challenge was clear and authentic as what students had to solve or create meaning on was what an oral hygienist is faced with on a daily basis in the world of work – Orthodontic practice.*	*The Kahoot game that students had to play individually and seemed to have enjoyed, indicated that students did read and understand the article given to them prior to the learning opportunity. The students enjoyed the video I created in collaboration with creative studios. I will definitely use this media tool again. Students seemed to enjoy working in groups compared to our first learning opportunity. I saw smiles, laughter and complete immersion and engagement of all students as they interacted with the real-life challenge presented to them. Students were motivated to learn from their mistakes and from the mistakes made by their future colleagues.*

3.5 Amalgamation

In this chapter, I presented the research paradigm, research design and research methods chosen for the study. The presentation and interpretation of data were discussed. In the next chapter I present my findings and answer the research questions. Conclusions are drawn and recommendations for further study are made.

CHAPTER 4: THE TREASURE ROOM

4.1 Introduction

The idea of a treasure room stems from my understanding of what research entails. Research includes the searching for the meaning of a specific phenomenon. In my case I was searching for the meaning of myself and my practice. I regard the research journey travelled as a treasure. The treasure room is therefore the metaphor used to describe my discoveries about myself and my practice.

The purpose of this chapter is to indicate the findings and answer the research questions posed in Chapter 1. I start by giving the summary of findings to the secondary research questions as I feel the primary research question should be answered last. Answering the secondary research questions first led to answering the primary research question.

4.2 Summary of my Findings

Transforming myself and my practice aided my professional development and that of my students. In Chapter 1, I stipulate the research questions posed for the study. In Chapter 2, the framework for the research is discussed, based on learning theories incorporated into my teaching practice. The research paradigm, research design, data presentation and interpretation are presented in Chapter 3 with a view to answering the research questions. The summary of findings is presented through addressing the secondary research questions and ultimately the primary research question.

4.2.1 Secondary Research Question 1: *Who am I?*

To answer this question, I engaged with the qualitative and quantitative data sets of my HBDI® that indicate that my Whole-Brain® thinking profile is a double dominant profile (Consult Table 3.1 and Figure 3.3) with the primary preference in the lower left B and lower right C quadrants. This is who I am and it indicates how I prefer to do things. The knowledge of who I am provides the foundation for my professional development and is a directive on what I need to focus on and challenge myself with to become a holistic individual with the ability to think and function in all the quadrants. It is important that I am aware of what I prefer and what I avoid. What I avoid becomes the focus area for self-empowerment (Du Toit, 2013). This means I had to challenge myself to think and do things in the secondary preferences – the upper left A and upper right C quadrants. This was and still is a challenge.

Embarking on an action research journey required me to think and do things holistically – using all the modes of thinking that can be linked to the respective quadrants.

I challenged myself through embarking on this self-transformative journey. My bold step of *taking the risk* (D quadrant) to conduct this research is the first evidence of my challenging myself to do things outside my preference(s). The writing of the initial draft research proposal that required of me to be a professional learner (Zuber-Skerritt *et al.*, 2015) and search for *facts* (A quadrant) through studying the publications of different scholars and educationist with similar interests as mine was a challenge and a process I did not prefer but I was willing to challenge and develop myself professionally. This was the case throughout the study process – I had to think in a scholarly fashion, making my views and findings known by means of scholarly discourse. I rose to the challenge to be *innovative* and *creative* (D quadrant) when I designed the framework (Consult Figure 2.1) and the creative and innovative headings given in the dissertation.

In the next section I address the second secondary research question.

4.2.2 Secondary Research Question 2: *How can I design and implement learning tasks that will contribute to students and myself becoming holistic professionals?*

Designing and implementing a learning task that contributes to my students and myself being holistic professionals is imperative. Embarking on an action research study gave me the opportunity to transform my practice in aid of the professional transformation of my students.

The template of a learning task design (Consult Appendices K, L and M) by Slabbert *et al.* (2009) was adapted to incorporate Whole-Brain® thinking theory in the planning and designing of learning tasks with a view to giving the students and myself the opportunity to think and do things "out of my box" (Du Toit, 2012).

Designing a learning task needs proper and deliberate extensive planning. It is in the design of the learning task that I as the lecturer can make use of the principles of learning theories that will contribute to students achieving the learning outcomes intended. Whole-Brain® thinking theory has to be embedded in the learning task. To ensure that my students and I became holistic professionals, I had to consider the learning preferences of the students and ensure that the less preferred quadrants were incorporated. The idea is to design a learning task in which each of the four quadrants is represented. Even though I did not know

the learning preferences of my students, which was a limitation to the study, I ensured that all the quadrants were represented in each of the learning opportunities.

To answer this secondary research question I underscore the importance of having a learning task design template to follow. The learning task design forces and guides one to have a plan for the learning opportunity. In a learning task design one stipulates one's outcomes and plans the real-life challenge to engage students in deep learning. As a planner of the learning task, I also benefit while I am planning as I am being challenged to generate tasks that will challenge students to be holistic professionals. In this way not only my students get the opportunity to maximise their potential (Slabbert *et al.*, 2009) but I as a professional learner learn to be a holistic professional.

Next I answer the third secondary research question.

4.2.3 Secondary Research Question 3: *How can the use of the principles of different learning theories effectively ready my students for the world of work?*

The answer to this research question is to plan how one would incorporate the learning theories when designing the learning task for the learning opportunity. One cannot overestimate the importance of a learning task design. It is time-consuming and in my opinion cannot be done overnight; it requires focused attention, consultation of relevant literature and multiple reflections. As part of the planning, I scrutinised the literature to learn more about the learning theories for adult learners and selected the ones that were suitable to achieve the readiness of students for the world of work. I consulted the CCFOs (SAQA, 2019) that are the outcomes to be achieved by students prior to entering the world of work. The CCFOs were then associated with the attributes of 21st century education. The CCFOs must be incorporated into the learning task design as one of the outcomes to be achieved. I explained my stance on this in Chapter 1 where I used a mortar board to indicate the outcomes each student needs to master at the time of graduation (Consult Figure 1.1).

The real-life challenge presented to students has to be authentic. A discussion on the authenticity of a real-life challenge can be found in Chapter 1. The challenge presented to students is what initiates learning; the learning theories must be embedded within a challenge just like the inclusion of the four quadrants of the Whole-Brain® theory.

For students to be ready for the world of work they should experience and be knowledgeable about what goes on in the world of work. The world of work in my context is the orthodontic

practice that my current student cohort will individually be employed in. It is therefore imperative that I present a challenge that relates to the world of Orthodontics. In this way students are challenged and their skills honed for their future careers. The incorporation of the CCFOs and the attributes of 21st century education in the learning task design ensures that students engage in collaborative, constructivist, self-regulated, problem-based and active learning that empowers students to be ready for the world of work. This is proven by the comments of the students after the three learning opportunities they engaged in. It was on the first day that the students did not like working in groups (collaborative learning) but on the second day they valued working with one another and saw the value of teamwork as of the attributes of 21st century education. In the world of work Oral Hygiene students need to work in multidisciplinary teams.

It is important that I highlight the *grace* of action research in transforming my practice. Although I planned learning tasks that would ready students for the world of work, things did not always go according to plan during the implementation stage (Consult my poem titled *My attitude my compass).* Action research is *graceful* as it provides multiple opportunities to reflect and plan again if the learning task does not go according to plan.

4.2.4 Secondary *Research* Question 4: *How can the principles of the Whole-Brain*® Theory be effectively employed during my facilitating of learning?

I had to plan how I would engage students in a learning opportunity that would incorporate their thinking preference(s) and still challenge them. During the facilitating of learning the purpose was to ensure that students were engaged in learning and thinking in all the quadrants. Chapter 2 provides a broad explanation of how employing the principles of Whole-Brain® thinking is essential for student transformative learning.

It is important that students are aware of what Whole-Brain® thinking entails and complete their HBDI® so that they know their thinking profiles and know where they need to improve. To ensure that my students gained insight into this theory, I explained it to them on the first day. Therefore when I task my students to read an article to find certain facts or give them orthodontic brackets to organise, or to work in groups, or design an innovative oral hygiene pamphlet, they know the aim for giving them such tasks is to challenge them to think in all quadrants.

Next I answer the primary research question.

4.2.5 Primary Research Question: *How can I innovatively facilitate learning to foster holistic Oral Hygiene professionals?*

The primary research question aimed to find ways of innovatively facilitating learning with a view to seeing my students become holistic oral hygiene professionals. As much as this question seems to focus on the students, the focus is also on my professional development based on the notion that facilitating learning is a professional act that requires development. This means I have to display and have a professional attitude and be willing to take a self-transformative journey for my students to model the same.

To answer the primary research question I would like to start by saying that as a lecturer, I determine whether I want to see transformation in my practice. Slabbert *et al.* (2009:118) posit that facilitators of learning are "the ultimate determinants of educational transformation". Therefore to innovatively facilitate learning that fosters holistic professionals in the oral hygiene profession implied that I needed to be a professional learner (Zuber-Skerrit, Fletcher & Kearney, 2015) willing to transform myself and my practice (Du Toit, 2013).

Innovative facilitating of learning is based on the firm foundations of scholars who have taken the journey. As a lifelong learner, I had to be willing to learn in all the stages of my journey. I view innovative facilitating of learning as an art. Although I had learnt from different scholars I needed to implement creatively what I had learned from my practice in a constructivist fashion. In this way I could make new meaning. Innovative facilitating of learning is dependent on proper planning and this is emphasised in the discourse above.

A holistic oral hygiene professional is one with the ability and flexibility to think and do things according to all four quadrants of Whole-Brian® thinking.

The section below is the Whole-Brain® meta-reflection. The construct *meta-reflection* became the driving force in my professional development and in transforming my practice.

4.3 Whole-Brain® Meta-reflection

The construct *Whole-Brain® meta-reflection* is used by Du Toit (2018) to underscore the importance of looking at the self from different perspectives. Reflecting on my reflections (Du Toit, 2018 & Harvey, 2016) is a process that Du Toit refers to as a self-regulated, meta-cognitive act. He points out that re-reflecting allows one to gain a deeper understanding of the importance of reflecting as one of the steps in the action research cycle. Embarking on

a trajectory of becoming a reflexive practitioner was instrumental in realising my wish to act as a role model of a lifelong learner for my students. During reflection I am able to discover things about myself and my practice and it is in this process that I continuously learn. Moreover, by reflecting at a meta-level on my reflection I learn about how I reflect. It can be compared to the principles of meta-cognition or meta-learning – in my case professional meta-learning. Meta-reflection is a scholarly act that transcends the execution level of reflecting.

Recommendations for future research are made in the next section.

4.4 Recommendations

As a result of the scholarly journey I have taken and the transformative practice I engaged in, I make the following recommendations for my colleagues in the School of Dentistry and for future research.

- Find a supervisor with a passion for transformation of teaching practice.
- Get students to complete the HBDI® to know what their strengths and weaknesses are and what they need to challenge themselves in to maximise their full potential.
- I recommend that all my colleagues in the School of Dentistry engage in action research studies to transform themselves and their practice.
- The formation of a community of practice in the schools of dentistry in South Africa with the aim to collaborate with international scholars in Oral Hygiene or with Faculties of Health Science.

4.5 Amalgamation

My passion for action research and my understanding of the positive impact of embarking on an action research study have resulted in this scholarly work. My action research trajectory described by means of this master's dissertation has culminated in this insight: *When we meta-search, meta-seek and meta-probe we finally get it right and it's not just about getting it right but it's more about the meaning we make*. As a passionate lifelong learner who took the arduous journey during the difficult times of Covid-19 I am proud to have developed my full potential despite the pandemic. My secondary Whole-Brain® preference(s) that are the upper left A and upper right D quadrants were challenged and are in many instances in contradiction with my primary preferences (lower left B and lower right

C quadrants) but the persistent attitude to challenge myself has transformed me and my practice. The meta-reflection process that has become a religious act throughout the research journey gives me the boldness to say I have developed and grown to be an asset to the scholarship of teaching and learning in higher education.

REFERENCES

Ali, S.S. (2019). Problem Based Learning: A student-centered approach. *English Language Teaching*, 12(5), 73-78.

Anderson, L.W. (1994). Bloom's taxonomy. Chicago: University of Chicago Press.

Bada, S.O., & Olusegun, S. (2015). Constructivism learning theory: A paradigm for teaching and learning. *Journal of Research and Method in Education*, 5(6), 66-70.

Bailey, K.M., Curtis, A., Nunan, D., & Fan, D. (2001). Pursuing professional development: The self as source*. Heinle and Heinle,* Boston: MA

Bergh, Z., & Geldenhuys, D. (2013). Psychology in the work context (5th ed). Cape Town: Oxford University Press.

Biggs, J.B. (1985). The role of meta-learning in study processes. *British Journal of Educational Psychology,* 55(3),185-212.

Bonwell, C.C., & Eison, J.A. (1991). Active learning: Creating excitement in the classroom. *ERIC Digest*. Washington DC: George Washington University.

Botha, R.J. (2002). Outcomes-based education and educational reform in South Africa. *International Journal of Leadership in Education*, *5*(4), 361-371.

Bunderson, C.V. (1995). The validity of the Herrmann Brain Dominance Instrument. In Herrmann, N. (ed) *The creative brain*. (2nd ed). USA: Quebecor Printing Book Group.

Burch, K. (2001). PBL, politics, and democracy. The power of problem-based learning. Virginia: Stylus publishing, 193-205.

Buzan, T. (1991). Use both sides of your brain. (3rd ed). USA: Plume Books.

Claxton, G. (1999). Wise up: The challenge of lifelong learning. London: Bloomsbury.

Coghlan, D., & Brannick, T. (2005). Doing action research in your own organization. London: Sage.

Conole, G. (2012). Designing for learning in an open world. UK: Springer Science and Business Media.

Cooperstein, S.E., & Kocevar-Weidinger, E. (2004). Beyond active learning: A constructivist approach to learning. *Reference Services Review*, 32(2), 141-148.

Creswell, J.W. (2013). Research design: Qualitative, quantitative, and mixed methods approaches. Thousand Oak: Sage.

Cretchley, G., & Castle, J. (2001). OBE, RPL and adult education: Good bedfellows in higher education in South Africa? *International Journal of Lifelong Education*, 20(6), 487-501.

Cruess, S.R., & Cruess, R.L. (2016). Professionalism as a social construct: The evolution of a concept. *Journal of Graduate Medical Education*, 8(2), 265-267.

De Boer, A., Steyn, T., & Du Toit, P.H. (2001). A whole brain approach to teaching and learning in higher education. *South African Journal of Higher Education*, 15(3), 185-193.

De Boer, A.L., Du Toit, P.H., Scheepers, D., & Bothma, T. (2013). Whole Brain® Learning in higher education: *Evidence-based practice*. Oxford: Chandos.

De Boer, A.L., Du Toit, P.H., & Bothma, T. (2015). Activating Whole Brain® innovation: A means of nourishing multiple intelligence in higher education. *TD: The Journal for Transdisciplinary Research in Southern Africa*, 11(2), 55-72.

Ding, M., Li, X., Piccolo, D., & Kulm, G. (2007). Teacher interventions in cooperative-learning mathematics classes. *The Journal of Educational Research*, 100(3), 162-175.

Dolmans, D., Michaelsen, L., Van Merrienboer, J. & Van Der Vleuten, C. (2015). Should we choose between problem-based learning and team-based learning? No, combine the best of both worlds! *Medical Teacher*, 37(4), 354-359.

Duch, B.J., Groh, S.E., & Allen, D.E. (2001). The power of problem-based learning: A practical "how to" for teaching undergraduate courses in any discipline. USA: Stylus Publishing

Du Toit, P.H. (2012). Using action research as process for sustaining knowledge production: A case study of a higher education qualification for academics. *South African Journal of Higher Education*, 26(6), 1216-1233.

Du Toit, P.H. (2013). Social transformation starts with the self: An autobiographical perspective on the thinking style preferences of an educator. *South African Journal of Education*, 33(4), 1-12.

Du Toit, P.H. (2018a). A meta-reflection on my emerging as a scholar of action research. *South African Journal of Higher Education*, 32(6), 425-439.

Du Toit, P.H. (2018b). Reflecting on more than 20 years of involvement in a postgraduate higher education qualification for academics: May I dare use an auto-ethnographic lens? *The Journal for Transdisciplinary Research in Southern Africa,* 14(2), 1-12.

Ewan, C. (1988). Becoming a doctor. The medical teacher. Edinburgh: Churchill Livingstone.

Flavell, J. (1976). Metacognitive aspects of problem solving. The nature of intelligence. New Jersey: Hillsdale.

Fleming, T. (2012). The self in transformation: What gets transformed in transformative learning? In C.J. Boden & S.M. Kippers. Pathways to Transformation: Learning in Relationship. Little Rock, AK: Information Age Publishing.

Frankford, D.M., Patterson, M.A., & Konrad, T.R. (2000). Transforming practice organizations to foster lifelong learning and commitment to medical professionalism. *Academic Medicine*, 75(7), 708-717.

Gardner, H. (1993). Frames of mind: The theory of multiple intelligences. (2nd ed.). UK: Fontana Press.

Gillies, R.M. (2007). Cooperative Learning: Integrating theory and practice. USA: Sage.

Gillies, R.M., & Boyle, M. (2010). Teachers' reflections on cooperative learning: Issues of implementation. *Teaching and Teacher Education*, 26(4), 933-940.

Goodyear, V., & Dudley, D. (2015). “I’m a facilitator of learning!” Understanding what teachers and students do within student-centered physical education models. *Quest,* 67(3), 274-289.

Greyling, W.J., & Du Toit, P.H. (2008). Pursuing a constructivist approach to mentoring in the higher education sector. *South African Journal of Higher Education*, 22(5), 957-980.

Haartsen-Geven, M., & Sandberg, J. (2007). Developing constructivist learning environments: A management framework. *Interactive Technology and Smart Education*, 4(3), 147-160.

Hammar Chiriac, E. (2011). “Research on group work in education,” In emerging issues in compulsory education. New York: Nova Science Publishers.

Hammar Chiriac, E. (2014). Group work as an incentive for learning – students' experiences of group work. *Frontiers in Psychology*, 558 (5), 1-10.

Harden, M., Margery H., & Davis, R. (1998). The continuum of problem-based learning. *Medical Teacher*, 20(4), 317-322.

Harvey, M. (2016). Editorial – Reflection for Learning in Higher Education. *Journal of University Teaching and Learning Practice,* 13(2), 1-20.

Heikkilä, A., Lonka, K., Nieminen, J., & Niemivirta, M. (2012). Relations between teacher students' approaches to learning, cognitive and attributional strategies, well-being, and study success. *Higher Education*, 64(4), 455-471.

Henard, F., & Roseveare, D. (2012). Fostering quality teaching in higher education: Policies and practices. An IMHE Guide for Higher Education Institutions, *OACD Publiching*.1-53.

Henson, K.T. (2015). Curriculum planning: Integrating multiculturalism, constructivism, and education reform. Long Grove: Waveland Press.

Herr, K., & Anderson, G.L. (2014). *The action research dissertation: A guide for students and faculty*. USA: Sage.

Herrmann International. (2016). Herrmann Brain Dominance Instrument. Herrmann International Africa: Queenswood.

Herrmann, N. (1996). The Whole Brain business book: Unlocking the power of Whole Brain thinking in organizations and individuals. New York: McGraw-Hill.

Herrmann, N. (1999). The theory behind the HBDI and Whole Brain technology. *Better results through better thinking*: Retrieved from Herrmann International Online in May 2020.

Herrmann, S.L. (1989). The creative brain. *Training and Development Journal,* 35(10), 10-16

Hesse-Biber, S.N. Leavy, P. (2011). The practice of qualitative research*. Thousand Oaks,* CA: Sage.

Hobson, A., Maxwell, B., Stevens, A., Doyle, K., & Malderez, A. (2015). Mentoring and coaching for teachers in the further education and skills sector in England. UK: London.

Holmes, A.G. (2019). Learning outcomes – a good idea, yet with problems and lost opportunities. *Educational Process: International Journal (EDUPIJ)*, 8(3), 159-170.

Hornby, G. (2009). The effectiveness of cooperative learning with trainee teachers. *Journal of Education for Teaching*, 35(2), 161-168.

Hughes, M., Hughes, P., & Hodgkinson, I.R. (2017). In pursuit of a 'whole-brain' approach to undergraduate teaching: Implications of the Herrmann brain dominance model. *Studies in Higher Education*, 42(12), 2389-2405.

Jensen, E. (1996). Brain based learning. California: Del Mar, Turning Point Publishing.

Johnson, D.W., Johnson, R.T., & Stanne, M.B. (2000). Cooperative learning methods: A meta-analysis. University of Minnesota: Minneapolis.

Kemmis, S., McTaggart, R., & Nixon, R. (2013). The action research planner: Doing critical participatory action research. *Springer Science & Business Media.*

Kemmis, S., & McTaggart, R. (2000). Participatory action research: Handbook of qualitative research. *Thousand Oaks, CA, Sage*.

Knowles, M. (1990). The adult learner: A neglected species. USA: Gulf Publishing Company.

Knowles, M. (1975). Self-directed learning: A guide for learners and teachers. Broadway: New York. Association press.

Korkko, M., Kyro-Ammala, O., & Turunen, T. (2016). Professional development through reflection in teacher education. *Teaching and Teacher Education*, 55, 198-206.

Lester, F.K. (2005). On the theoretical, conceptual, and philosophical foundations for research in mathematics education. *ZDM Mathematics Education,* 37(6), 457–467.

Li, S.T.T., Paterniti, D.A., & West, D.C. (2010). Successful self-directed lifelong learning in medicine: A conceptual model derived from qualitative analysis of a national survey of pediatric residents. *Academic Medicine*, 85(7), 1229-1236.

Littlewood, S.J., & Mitchell, L. (2019). An introduction to orthodontics. USA: Oxford university press.

MacLean, P.D. (1952). "Some psychiatric implications of physiological studies on frontotemporal portion of Limbic System (visceral brain)." *Electroencephalography and Clinical Neurophysiology* 4 (4): 407–418.

Malatji, K.S. (2016). Moving away from rote learning in the university classroom: The use of cooperative learning to maximise students' critical thinking in a rural university of South Africa. *Journal of Communication*, *7*(1), 34-42.

Maree, K. (2016). First steps in action research. First steps in research. Pretoria: Van Schaik Publishers, 134-158.

McKay, J., & Marshall, P. (2000). Quality and rigour of action research in information systems. *ECIS 2000 Proceedings*, 38 (1), 1-9.

McNiff, J., & Whitehead, J. (2010) You and your action research project. London: Routledge.

McNiff, J. (2002). Action research for professional development*:* Concise advice for new Action researchers*.* Dorset*:* England*.* Retrieved in October 2020.

McNiff, J. (2016). Writing up your action research project. New York: Routledge*.*

Nadkarni, S. (2003). Instructional methods and mental models of students: An empirical investigation. *Academy of Management Learning and Education*, 2(4), 335-351.

Ning, H.K., & Downing, K. (2011). The interrelationship between student learning experience and study behaviour. *Higher Education Research and Development*, 30(6), 765-778.

Ning, H.K., & Downing, K. (2015). A latent profile analysis of university students' self-regulated learning strategies. *Studies in higher education*, 40(7), 1328-1346.

O'Brien, R. (1998). An overview of the methodological approach of action research. University of Toronto: Faculty of Information Studies.

Ornstein, R. (1997). The right mind: Making sense of the hemispheres. Washington, DC. Harcourt Brace & Company.

Osanloo, A., & Grant, C. (2016). Understanding, selecting, and integrating a theoretical framework in dissertation research: Creating the blueprint for your "house". *Administrative Issues Journal: Connecting Education, Practice, and Research*, 4(2): 1-15.

Paterson, M., Higgs, J., Wilcox, S., & Villeneuve, M. (2002). Clinical reasoning and self-directed learning: Key dimensions in professional education and professional socialisation. *Focus on Health Professional Education*, *4*(2), 5-21.

Patton, K., Parker, M., & Tannehill, D. (2015). Helping teachers help themselves: Professional development that makes a difference. *NASSP Bulletin*, 99(1), 26-42.

Peel, D. (2005). Dual professionalism: Facing the challenges of continuing professional development in the workplace. *Reflective Practice*, 6(1), 123-140.

Potgieter, E.M. (2007). A brief history of the oral hygiene profession in South Africa (1968-2003). *South African Dental Journal*, 62(6), 254-257.

Rose, S. (2020). Medical student education in the time of COVID-19. *Jama*, 32 (21), 2131-2132.

Schraw, G., Crippen, K.J., & Hartley, K. (2006). Promoting self-regulation in science education: Metacognition as part of a broader perspective on learning. *Research in Science Education*, 36(1-2), 111-139.

Schunk, D.H. (2012). Learning theories an educational perspective. Boston, MA: Pearson.

Schwandt, T. A. (2001). *Dictionary of qualitative inquiry* (2nd ed.). Thousand Oaks, CA: Sage.

Singhal, D. (2017). Understanding student-centered learning and philosophies of teaching practices. *International Journal of Scientific Research & Management Studies*, 5(2), 5123-5129.

Slabbert, J.A., De Kock, D.M., & Hattingh, A. (2009). The brave 'new' world of education: Creating a unique professionalism. Cape Town: South Africa. Juta and Company Ltd

Smit, T., & Du Toit, P.H. (2016). Transforming beginner teacher mentoring interventions for social reform. *South African Journal of Education*, 36(3).

Snyman, W. D., & Ligthelm, A.J. (2000). The new Pretoria curriculum. *Journal of the South African Dental Association,* 55(11), 642-648.

South African Qualifications Authority. (2019). Retrieved from SAQA online in April 2019

Taylor, D.C., & Hamdy, H. (2013). Adult learning theories: Implications for learning and teaching in medical education. *AMEE Guide No. 83. Medical Teacher*, 35(11), 1561-1572.

Toetenel, L., & Rienties, B. (2016). Learning Design – Creative design to visualise learning activities. Open learning*: The Journal of Open, Distance and e-learning*, *forthcoming,* 31(3), 233-244.

Turky, M. (2017). Enhancing metacognition skills by using reflective E-portfolio. *Digital Design and Publish Research Unit,* 1-11.

University of Pretoria, School of Dentistry. (2020). Community dentistry; *History of the department*, Pretoria. Retrieved in June 2020

Van den Berg, D., & De Boer, A. (2001). The value of the Herrmann Brain Dominance Instrument (HBDI) in facilitating effective teaching and learning of criminology. Acta Criminologica. *Southern African Journal of Criminology*, 14(1), 119-129.

Van Woezik, T., Koksma, J., Reuzel, R., Jaarsma, D., & Jan van der Wilt, G. (2020). How to encourage a lifelong learner? The complex relation between learning strategies and assessment in a medical curriculum. *Assessment & Evaluation in Higher Education*, 45(4), 513-526.

Von Glasersfeld, E. (2001). Radical constructivism and teaching. *Prospects*, 31(2), 161-173.

Vula, E., Avdyli, R., Berisha, V., Saqipi, B., & Elezi, S. (2017). The impact of metacognitive strategies and self-regulating processes of solving math word problems. *International Electronic Journal of Elementary Education*, 10(1), 49-59.

Vygotsky, L.S. (1978). Mind in Society. Cambridge: Harvard University Press.

Watson, C. (2014). Effective professional learning communities? The possibilities for teachers as agents of change in schools. *British Educational Research Journal*, 40(1), 18-29.

Wenger, E. (1999). Communities of practice: Learning, meaning, and identity. *Institute of Research in Learning,* UK: Cambridge University Press.

Wenger, E. (2004). Knowledge management as a doughnut: Shaping your knowledge strategy through communities of practice. *Ivey Business Journal*, 68(3), 1-8.

White, J.G., Kruger, C. & Snyman, W.D. (2008). Development and implementation of communication skills in dentistry: An example from South Africa. *European Journal of Dental Education*, 12(1), 29-34.

Wilson, L.O. (2016). Anderson and Krathwohl–Bloom's taxonomy revised. Understanding the new version of Bloom's Taxonomy. Boston, MA: Pearson Education Group.

Wium, A.M., Pitout, H., Human, A., & Du Toit, P.H. (2017). An analysis of thinking preferences across three health care disciplines. *Innovations in Education and Teaching International,* 54(1), 33-41.

Wolvaardt, G., & Du Toit, P.H. (2012). Action research-driven professional development: Developing transformational health care managers and creating learning organisations. *South African Journal of Higher Education*, 26(6), 1249-1264.

World Health Organisation. (2020) R&D Blueprint and Covid-19. Retrieved in July 2020.

Yamarik, S. (2007). Does cooperative learning improve student learning outcomes? *The journal of Economic Education*, 38(3), 259-277.

Yew, E., & Goh, K. (2016). Problem-based learning: An overview of its process and impact on learning. *Health Professions Education*, 2(2), 75-79.

Yi, Z., & LuXi, Z. (2012). Implementing a cooperative learning model in universities. *Educational studies*, 38(2), 165-173.

Zimmerman, B.J., Bonner, S., & Kovach, R. (1996). Developing self-regulated learners: Beyond achievement to self-efficacy. *American Psychological Association.* Washington, DC.

Zuber-Skerritt, O., Fletcher, M., & Kearney, J. (2015). Professional learning in higher education and communities: Towards a new vision for action research. UK: England, Macmillan Publishers.

Zuber-Skerritt, O., & Perry, C. (2002). Action research within organisations and university thesis writing. *The Learning Organization*, 9(4), 171-179.

Zusho, A., & Edwards, K. (2011). Self-regulation and achievement goals in the college classroom. *New Directions for Teaching and Learning*, (126), 21-31.

APPENDICES

Appendix A: Ethical Approval by the Faculty of Education

Ms Noluthando Buthelezi

Dear Ms Buthelezi REFERENCE: HU 19/08/01

We received proof that you have met the conditions outlined. Your application is thus approved, and you may start with your fieldwork. The decision covers the entire research process, until completion of the study report, and not only the days that data will be collected. The approval is valid for two years for a Masters and three for Doctorate.

The approval by the Ethics Committee is subject to the following conditions being met:

1. The research will be conducted as stipulated on the application form submitted to the Ethics Committee with the supporting documents.

2. Proof of how you adhered to the Department of Basic Education (DBE) policy for research must be submitted where relevant.

3. In the event that the research protocol changed for whatever reason the Ethics Committee must be notified thereof by submitting an amendment to the application (Section E), together with all the supporting documentation that will be used for data collection namely; questionnaires, interview schedules and observation schedules, for further approval before data can be collected. Non-compliance implies that the Committee's approval is null and void. The changes may include the following but are not limited to:

• Change of investigator,

• Research methods any other aspect therefore and,

• Participants.

The Ethics Committee of the Faculty of Education does not accept any liability for research misconduct, of whatsoever nature, committed by the researcher(s) in the implementation of the approved protocol.

Upon completion of your research you will need to submit the following documentations to the Ethics Committee for your Clearance Certificate:

• Integrated Declaration Form (Form D08),

• Initial Ethics Approval letter and,

• Approval of Title.

Please quote the reference number HU 19/08/01 in any communication with the Ethics Committee. Best wishes

_____

Prof Liesel Ebersöhn

Chair: Ethics Committee Faculty of Education

Appendix B: Ethical Approval by the Faculty of Health Sciences

Approval Certificate New Application

Ethics Reference No.: 627/2019

Title: Innovative Facilitating of Learning to Foster Holistic Professionals in the Oral Hygiene Profession

Dear Mrs NL Buthelezi

The New Application as supported by documents received between 2020-01-23 and 2020-03-11 for your research, was approved

by the Faculty of Health Sciences Research Ethics Committee on its quorate meeting of 2020-03-11.

Please note the following about your ethics approval:

• Ethics Approval is valid for 1 year and needs to be renewed annually by 2021-03-16.

• Please remember to use your protocol number (627/2019) on any documents or correspondence with the Research Ethics Committee regarding your research.

• Please note that the Research Ethics Committee may ask further questions, seek additional information, require further modification, monitor the conduct of your research, or suspend or withdraw ethics approval.

Ethics approval is subject to the following:

• The ethics approval is conditional on the research being conducted as stipulated by the details of all documents submitted to the Committee. In the event that a further need arises to change who the investigators are, the methods or any other aspect, such changes must be submitted as an Amendment for approval by the Committee.

We wish you the best with your research.

Yours sincerely

_____

Dr R Sommers

MBChB MMed (Int) MPharmMed PhD

Deputy Chairperson of the Faculty of Health Sciences Research Ethics Committee, University of Pretoria

The Faculty of Health Sciences Research Ethics Committee complies with the SA National Act 61 of 2003 as it pertains to health research and the United States Code of Federal Regulations Title 45 and 46. This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes, Second Edition 2015 (Department of Health)

Appendix C: Permission letter: School of Dentistry

Professor JG White
The Acting Chief Executive Officer

School of Dentistry
Faculty of Health Sciences

Permission to Perform an Action Research Study with Oral Hygiene Final Year Students in the School of Dentistry

Dear Professor JG White

I am an Oral Hygienist/Lecturer in the Department of Orthodontics at the School of Dentistry. I am currently enrolled for a Master's in Education in the Faculty of Education, University of Pretoria. I am requesting your permission to perform my study at Pretoria Oral and Dental Hospital. The title of the study is: **Innovative Facilitating of Learning to Foster Holistic Professionals in the Oral Hygiene Profession.** The study is aimed at improving my teaching/facilitating of learning practice. In order to improve or innovatively facilitate learning, I will consider the epicentre theory of my proposed study- the whole-brain thinking theory. It is important that as a facilitator of learning I consider the thinking and learning diversities of my students with each learning tasks presented during the learning opportunities.

During data collection, all the participants (final year oral hygiene students) who gave consent will be required to participate during the learning opportunities through solving the learning task challenges presented to them. The students will also be required to complete an anonymous closed and open ended questionnaire. The data will be collected on three learning opportunity sessions. A colleague who have signed a declaration of responsibility will also attend all three learning opportunities to observe and assess my facilitating of learning.

I undertake not to proceed with the study until I have received the letter of approval from Faculty of Health Sciences Ethics Committee, University of Pretoria.

Yours sincerely

_____

Mrs N.L Buthelezi

Student number: 10182587

PERMISSION TO DO RESEARCH STUDY AT THE SCHOOL OF DENTISTRY AS REQUESTED IS HEREBY APPROVED/ NOT APPROVED

_____ _____

PROF JG WHITE **DATE**

Acting CEO/Chair School of Dentistry

FACULTY OF HEALTH SCIENCES

Appendix D: Permission Letter: Deputy Dean of Teaching and Learning

Professor V Steenkamp
The Deputy Dean: Teaching and Learning
Faculty of Health Sciences

Permission to Perform an Action Research Study with Oral Hygiene Final Year Students in the School of Dentistry

Dear Professor Steenkamp

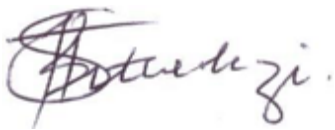
I am an Oral Hygienist in the Department of Orthodontics at the School of Dentistry. I am currently enrolled for a Master's in Education in the Faculty of Education, University of Pretoria. The title of the study is: **Innovative Facilitating of Learning to Foster Holistic Professionals in the Oral Hygiene Profession.**

My proposal has been approved by the Faculty of Education Ethics Committee and I am requesting permission to conduct an action research study which will take place on the premises of the School of Dentistry with the Oral Hygiene final year students. The study is aimed at improving my teaching/facilitating of learning practice. In order to improve or innovatively facilitate learning, I will consider the epicentre theory of my proposed study- the whole-brain thinking theory. It is important that as a facilitator of learning I consider the thinking and learning diversities of my students with each learning tasks presented during the learning opportunities.

During data collection, all the participants (students) who gave consent will be required to participate during the learning opportunities through solving the learning task challenges presented to them. The students will also be required to complete an anonymous closed and open ended questionnaire. The data will be collected on three learning opportunity session. A colleague who have signed a declaration of responsibility will also attend all three learning opportunities to observe and assess my facilitating of learning.

I undertake not to proceed with the study until I have received the letter of approval from the Faculty of Health Sciences Ethics Committee, University of Pretoria.

Yours sincerely



Mrs N.L Buthelezi
Student number: 10182587

PERMISSION TO DO RESEARCH STUDY AT THE SCHOOL OF DENTISTRY AS REQUESTED IS HEREBY APPROVED/ NOT APPROVED

_____ _____

PROF V STEENKAMP **DATE**

THE DEPUTY DEAN: TEACHING AND LEARNING

FACULTY OF HEALTH SCIENCES

Appendix E: Consent Letter: Respondents

STUDENT'S INFORMATION & INFORMED CONSENT DOCUMENT

Dear Student

I am enrolled for a Master's in Education in the Faculty of Education, University of Pretoria. You are invited to volunteer to participate in my research project on:

STUDY TITLE: Innovative Facilitating of Learning to Foster Holistic Professionals in the Oral Hygiene Profession

This letter gives information to help you to decide if you want to take part in my study. Before you agree you should fully understand what is involved. If you do not understand the information or have any other questions, do not hesitate to ask me. You should not agree to take part unless you are completely happy about what is expected.

The aim of the study is to improve my teaching practice- this is the way I facilitate learning during learning opportunities. It is important that I consider that you as my students are diverse in the way you think and learn. This means that all the learning opportunities will incorporate your thinking and learning diversities. You will be expected to participate in all the learning tasks which will be presented to you during the three learning opportunities taking place at the time of data collection. Participating during learning opportunities will involve solving a learning challenge that will be presented to you, and also anonymously completing the questionnaires with open and closed ended questions that will be given to you. A minimum of ten (10) minutes will be needed from you to complete the questionnaire per learning opportunity. To complete the questionnaire you will need to select the most appropriate answer on the Likert scale provided and also fill in your opinion about the learning opportunity. Completing a questionnaire will be done after each learning opportunity and you will be given privacy, so you complete the questionnaires confidentially. A video recording will be taken to help me reflect on what happened during the learning opportunities. Kindly take note that the video will not be shown to anyone else and will only be viewed by myself in a safe and private environment.

Once the data is collected and analysed the study could help other facilitators of learning/lecturers to transform their teaching practices (scholarly contribution). The data collected and the finding can also determine areas of improvement in my teaching practice to facilitate life-long transformational leadership I wish to become.

Once you have completed an anonymous open (unstructured and qualitative in nature) and closed (structured and quantitative in nature) ended questionnaire, the completed forms will be taken and kept in a safe place for at least 15 years in the School of Dentistry, Department of Orthodontics together with any other records taken during the time of data collection. It is important that you are fully aware that your participation in this study is voluntary. You can refuse to participate or stop at any time without a need to state any reason. This also means if you wish to withdraw from being part of the study, you can do so without penalty.

It is my responsibility to protect your identity and therefore I will adhere to the University of Pretoria ethical principles as I conduct the study. As you do not write your name on the questionnaires, you give me the information anonymously. I will not be able to trace your information back to you. You will also not be identified as a participant in any publication that comes from this study. You will be given your personal space to fill in the questionnaire to minimize any discomfort.

The Research Ethics Committee, Faculty of Education and the Research Ethics Committee, Faculty of Health Sciences at the University of Pretoria granted written approval for this study. They can be contacted on these numbers, Faculty of Health Sciences: O12 356 3085 and Faculty of Education: 012 420 5656

I would also like to request your permission to use your data, confidentially and anonymously, for further research purposes, as the data sets are the intellectual property of the University of Pretoria. Further research may include secondary data analysis and using the data for teaching purposes. The confidentiality and privacy applicable to this study will be binding on future research studies.

Signing below will indicate your willingness to participate.

Participant's Signature: _____ Date: _____

Thanking you for your participation.

_____ Date: _____

Researcher: Mrs N.L. Buthelezi
Contact details: 012 319 [redacted]

_____ Date: _____

Supervisor: Prof P.H. Du Toit
Contact details: 012 420 [redacted]

Appendix F: Declaration of adherence to ethical principles during classroom observation

Declaration of ethical adherence during classroom observations

As an experienced facilitator of learning and the one who is familiar with the University of Pretoria Ethical Principles, I hereby declare my commitment in observing and assessing the researcher's practice during the three learning opportunity sessions. I declare that all the information and the activities taking place during the data collection process will be kept confidential. I declare that all the participants will not be disclosed to anyone and will be kept confidential.

Name of an observer: _____ (kindly print)

Observer's Signature: _____ Date: _____

Thanking You for your declaration.

_____ D ate: _____
Researcher: Mrs N.L Buthelezi
Contact details: 012 319 2901

_____ Date: _____
Supervisor: Prof P.H. Du Toit
Contact details: 012 420 2817

Appendix G: Self-assessment Questionnaire

Self-assessment of Teaching Practice

Section A: My Contribution as Lecturer

Describing of my contribution to learning in terms of each of the aspects addressed in the items below, using following scale:

1 hardly ever 2 occasionally 3 frequently 4 almost always

		NA	1	2	3
Category I As lecturer I inspire my students by:					
a	showing enthusiasm about the subject matter and learning tasks				
b	expressing myself well (variety in tone of voice)				
c	promoting insight in the importance and significance of the subject matter/constructs and related problems/innovations				
d	providing learning opportunities (sessions) that are lively and encouraging				
Category II As lecturer I initiate learning by:					
a	creating a climate conducive to deep learning				
b	clearly stating the purpose and learning outcomes of the session				
c	linking learning to real-life situations				
Category III As lecturer I maintain learning by:					
a	promoting lecturer-student discussions/academic discourse to allow my students to develop an enquiring mind				
b	encouraging my students to construct own understanding and material (constructivism)				
c	providing for whole brain learning/learning style flexibility (other ways of learning, not only according to students' own preference – challenge beyond comfort zone)				
d	encouraging my students to express themself freely and openly				
e	inculcating critical thinking and self-reflection as integral part of self-regulated learning				
f	creating opportunities for cooperative learning – establishing communities of practice				

General Comments

Section B: Student's Contribution (based on my perceptions/observations)

Describing my students' contribution to their learning in terms of each of the aspects addressed in the items below, using the following scale:
1 hardly ever 2 occasionally 3 frequently 4 almost always

		NA	1	2	3
Category I My students contribute to their own and others' learning by:					
a	showing enthusiasm about the subject matter and learning tasks				
b	expressing themselves well (variety in tone of voice and with confidence)				
c	gaining insight in the importance and significance of the subject matter/constructs and related problems/ innovations				
d	participating in such a way that the learning opportunity (sessions) become lively and encouraging				
Category II My students:					
a	co-create a climate conducive to deep learning				
b	continuously attempt linking their learning to real-life situations				
c	attempt to construct a big picture of the multidimensional nature of the session/their teaching practice				
Category III My students:					
a	take part in lecturer-student discussions/academic discourse to allow them to develop an enquiring mind				
b	construct their own understanding and material (constructivism)				
c	seek opportunities for developing whole brain learning/learning style flexibility (learning in different ways, not only according to their own preference)				
d	make use of opportunities to express themselves freely and openly				
e	reconsider many of their former attitudes and values (concerning learning/facilitating learning, etc)				
f	gained a better understanding of themselves				
g	developed a greater sense of their own responsibility				
h	contribute to their peers' learning (helping them find solutions/answers)				
i	seek to inculcate critical thinking and self-reflection as integral part of their self-directed learning				
j	actively take part in cooperative learning opportunities and establishing communities of practice				

General Comments

Appendix H: Peer-assessment Questionnaire

Peer-assessment of Teaching Practice

Section A: The Lecturer's Contribution

Describing of my peer's contribution to learning in terms of each of the aspects addressed in the items below, using the following scale:

1 hardly ever 2 occasionally 3 frequently 4 almost always

		NA	1	2	3
Category I My colleague inspires his students by:					
a	showing enthusiasm about the subject matter and learning tasks				
b	expressing himself well (variety in tone of voice)				
c	promoting insight in the importance and significance of the subject matter/constructs and related problems/innovations				
d	providing learning opportunities (sessions) that are lively and encouraging				
Category II My colleague initiates learning by:					
a	creating a climate conducive to deep learning				
b	clearly stating the purpose and learning outcomes of the session				
c	linking learning to real-life situations				
Category III My colleague maintains learning by:					
a	promoting lecturer-student discussions/academic discourse to allow his students to develop an enquiring mind				
b	encouraging his students to construct own understanding and material (constructivism)				
c	providing for whole brain learning/learning style flexibility (other ways of learning, not only according to his students' own preference – challenge beyond comfort zone)				
d	encouraging his students to express themself freely and openly				
e	inculcating critical thinking and self-reflection as integral part of self-regulated learning				
f	creating opportunities for cooperative learning – establishing communities of practice				

General Comments

Section B: Student's Contribution (based on my perceptions/observations)

Describing the contribution of my colleague's students to their learning in terms of each of the aspects addressed in the items below, using the following scale:

1 hardly ever 2 occasionally 3 frequently 4 almost always

		NA	1	2	3
Category I My colleague's students contribute to their own and others' learning by:					
a	showing enthusiasm about the subject matter and learning tasks				
b	expressing themselves well (variety in tone of voice and with confidence)				
c	gaining insight in the importance and significance of the subject matter/constructs and related problems/ innovations				
d	participating in such a way that the learning opportunity (sessions) become lively and encouraging				
Category II My colleague's students:					
a	co-create a climate conducive to deep learning				
b	continuously attempt linking their learning to real-life situations				
c	attempt to construct a big picture of the multidimensional nature of the session/their teaching practice				
Category III My colleague's students:					
a	take part in lecturer-student discussions/academic discourse to allow them to develop an enquiring mind				
b	construct their own understanding and material (constructivism)				
c	seek opportunities for developing whole brain learning/learning style flexibility (learning in different ways, not only according to their own preference)				
d	make use of opportunities to express themselves freely and openly				
e	reconsider many of their former attitudes and values (concerning learning/facilitating learning, etc)				
f	gained a better understanding of themselves				
g	developed a greater sense of their own responsibility				
h	contribute to their peers' learning (helping them find solutions/answers)				
i	seek to inculcate critical thinking and self-reflection as integral part of their self-directed learning				
j	actively take part in cooperative learning opportunities and establishing communities of practice				

General Comments

Appendix I: Peer-assessment Questionnaire: Facilitating Learning

Assessment of Learning Opportunity

*Acknowledgement: This entire assessment tool is adapted from Du Toit PH 2016 PGCHE Reader, University of Pretoria

Researcher: _____

Guidelines for Observations

Design	Process of Facilitating Learning		
	Initiating Learning	**Learning**	**Maintaining Learning**
Adequate planning Outcomes specified Structure/sequence/course media	Are the actions successful in challenging students to learn? Is the stated problem a challenge? How is learning climate created? Is there evidence of energy/enthusiasm?	Are all the students involved in learning? Are the students Keen/interested to participate? How is it visible? Are students challenged to ask questions?	How is learning sustained and managed? How does the lecturer support learning? Is learning style flexibility promoted? How does the lecturer react to behavior?

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

Summary statement: Indicate your assessment of the quality of the learning opportunity							
1 75+	Very good, with outstanding features	**2** 68+	Good, with no significant weakness	**3** 60+	Adequate, but requires significant improvement	**4** -55	Poor quality does not meet standards

_____ _____ _____

Assessor Date Mark allocation

Appendix J: Student Feedback Questionnaire

Student Feedback Questionnaire

Effective learning is considered a collaborative effort between students, their peers and lecturer. The design of this questionnaire is based on the principles of learning-centredness. Your thoughtful answers to the following items will provide helpful information to me that can help me enhance students' learning experience, and that of future students.

Section A: Lecturer's Contribution

Describe the lecturer's contribution to learning in terms of each of the aspects addressed in the items below, using the following scale:
1 hardly ever 2 occasionally 3 frequently 4 almost always

		NA	1	2	3
Category I The lecturer inspires students by:					
a	showing enthusiasm about the subject matter and learning tasks				
b	expressing himself well (variety in tone of voice)				
c	promoting insight in the importance and significance of the subject matter/ constructs and related problems/innovations				
d	providing learning opportunities (sessions) that are lively and encouraging				
Category II The lecturer initiates learning by:					
a	creating a climate conducive to deep learning				
b	clearly stating the purpose and learning outcomes of the session				
c	linking learning to real-life situations				
Category III The lecturer maintains learning by:					
a	promoting lecturer-student discussions/academic discourse to allow students to develop an enquiring mind				
b	encouraging students to construct own understanding and material (constructivism)				
c	providing for learning style flexibility (other ways of learning, not only according to students' own preference – challenge beyond comfort zone)				
d	encouraging students to express themself freely and openly				
e	inculcating critical thinking and self-reflection as integral part of self-regulated learning				
f	creating opportunities for cooperative learning – establishing communities of practice				

General Comments

_____

_____

_____

_____

_____

_____

_____

Section B: Student's Contribution (based on your perceptions/observations)

Describe your own contribution to your learning in terms of each of the aspects addressed in the items below using the following scale:
1 hardly ever 2 occasionally 3 frequently 4 almost always

		NA	1	2	3
Category I As student I contribute to my own and others' learning by:					
a	showing enthusiasm about the subject matter and learning tasks				
b	expressing myself well (variety in tone of voice and with confidence)				
c	gaining insight in the importance and significance of the subject matter/constructs and related problems/ innovations				
d	participating in such a way that the learning opportunity (sessions) become lively and encouraging				
Category II As student I:					
a	co-create a climate conducive to deep learning				
b	continuously attempt linking my learning to real-life situations				
c	attempt to construct a big picture of the multidimensional nature of the session/my teaching practice				
Category III As student I:					
a	take part in lecturer-student discussions/academic discourse to allow me to develop an enquiring mind				
b	construct my own understanding and material (constructivism)				
c	seek opportunities for developing learning style flexibility (learning in different ways, not only according to my own preference)				
d	make use of opportunities to express myself freely and openly				
e	reconsider many of my former attitudes and values (concerning learning/facilitating learning, etc)				
f	gained a better understanding of myself				
g	developed a greater sense of my own responsibility				
h	contribute to my peers' learning (helping them find solutions/answers)				
i	seek to inculcate critical thinking and self-reflection as integral part of my self-directed learning				
j	actively take part in cooperative learning opportunities and establishing communities of practice				

General Comments

Appendix K: Learning Task Design Day 1

The World of Orthodontics

LEARNING TASK DESIGN

Adapted from Slabbert, De Kock and Hattingh (2009)

Name of the Facilitator	Noluthando Buthelezi
Personnel number	10182587
Date	February 2020
Module	ORD372. Orthodontics 372
Attributes of the 21st century	The real world of Orthodontics for novice oral hygienists
Time to operationalise LT	45 minutes per session, organising, solving problems, collaborative planning

21st Century Attributes and Assessment Standards

Learning Outcomes		Assessment Standards	
LO 1. • Identifying and solving problem presented to the Oral Hygiene students using critical and creative/innovative thinking. • Working effectively with others as a member of a disciplinary team, group, organisation, community.		○ Students are required to do the following: • Identify from the written instructions the challenge that is presented to them which is: 1. To sort the different bracket systems and mount them according to quadrants and tooth numbers.	

• Organising and managing oneself as a professional in Oral Hygiene and one's activities responsibly and effectively within an orthodontic practice. • Collecting, analysing, organising and critically evaluating information relating to the module Orthodontics. • Communicating effectively using visual, and/or language skills in the modes of oral and/or written persuasion. Oral hygiene students should be able to communicate effectively in a team.		2. To indicate on the mounting boards given the colour codes and its location in each bracket system. 3. To place the separating elastic correctly using the separating elastic plier on the typodont provided. 4. To identify and classify all the arch wires presented to them. The type of archwires must be given, a recommendation of where the specific wire will be utilised, the size of the arch wire must be identified. The material of each archwire must be identified with reasons given as to why the student believe it is the given material. Students must immerse themselves in the learning task. Innovative thinking is the requirement to solve this real-life challenge. Students will work as a team to integrate theory and practice. Excellent communication skills are needed to solve this real-life challenge. Students will be given the opportunity to reflect critically during peer assessment.	

Real-life Challenge

Why do students need to learn these attributes of 21st century education?

It is important that Oral Hygiene students are able to deal with real-life challenges that they could encounter in the world of work after graduation.

An orthodontic practice is one of the very busy practices in dentistry. An oral hygienist in this practice is responsible for different functions that are prescribed by the Health Professionals Council of South Africa (HPCSA).

Because of the workload in the orthodontic practice a student needs to be well prepared and equipped with life skills to aid their professional success.

What are the role, function and value of these attributes in the lives of the students?

Acquiring these attributes is necessary to equip each individual student with the required skills so they are confident and have the boldness to execute the task given to them in the present or future. When these skills are embedded in each student, they will eventually become lifelong learners. Being a lifelong learner leads to constant professional development that leads to an individual becoming a transformational leader. Transformational leaders produce other leaders. Transformational leaders are a necessity in our society.

Where in the lives of the students will they be required to do what you expect them to do? In the clinical wards during their daily clinical sessions as students, and in their daily lives as future oral hygienists.
What is the challenge you want the learners to solve? Most students who graduate are unable to make it in the world of work due to a lack of certain skills that were supposed to be acquired during training. This poses a challenge because it diminishes confidence in an individual that could impact his or her daily function. Students must not find themselves unable to face the world of Orthodontics or life because they were not exposed to real-life challenges during their training.

Critical Cross Field Outcomes

CO 1	Identify and solve problems and make decisions using critical and creative thinking.	X
CO 2	Work effectively with others as members of a team, group, organisation and community.	X
CO 3	Organise and manage themselves and their activities responsibly and effectively.	X
CO 4	Collect, analyse, organise and critically evaluate information.	X
CO 5	Communicate effectively using visual, symbolic and/or language skills in various modes.	X
CO 6	Use science and technology effectively and critically, showing responsibility towards the environment and the health of others.	
CO 7	Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation.	

Attributes of the 21st Century

ATT 1	Innovative thinking	X
ATT 2	Problem-solving skills	X
ATT 3	Team work	X
ATT 4	Communication skills	X

ATT 5	Critical reflection	X
ATT 6	Entrepreneurial and leadership skills	X

Fundamental Human Virtues

Intrapersonal	X	Interpersonal	X
Self-confidence	X	Humanisation	X
Motivation	X	Communication	X
Initiative	X	Dealing with feelings	X
Effort	X	Justice and forgiveness	X
Perseverance	X	Love	X
Common sense	X	Leadership	X
Responsibility	X		
Independence	X		
Joy	X		
Love	X		

LEARNING TASK PRESENTATION

Verbal Presentation

Future colleagues, I would like to welcome you to the WORLD OF ORTHODONTICS

Before we start with the task for today, it is important that you understand that each and every one of you have your preferred way of thinking and learning. It is important that each individual is challenged to think in quadrants that we less prefer. Thinking and learning in all quadrants ensures that each individual thinks and learns in a holistic manner.

I will hand you the cards; kindly choose the card that you think best matches or describes you. Compare your cards with those of your peers.

Learning Task

Task: 1

You have been divided into two groups.

On you table there are tasks presented with labels. Starting from label 1, read the written instructions on each label and perform the task as a group. Once you are done move to the next label until you have completed all the tasks.

When the time allocated to perform the task is used, you will do peer assessment. Each group must showcase what it done, and answer questions posed by their peers or myself.

Written Presentation

Learning Tasks

Label 1

As you are busy preparing for two patients that are booked for their bonding appointment, you accidentally drop all your bracket sets on the floor and the set gets mixed up.

As a group do the following:

1. Mount the bracket according to the specific tooth number on the mounting trays provided.
2. On the mounting board provided you must indicate using the white board markers:
   - How the buccal tubes of the 6s and 7s should be positioned on the mounting boards; clearly indicate where the hook of the buccal tube should face.
   - A HINT: colour indicators for the conventional brackets appear on the mounting board. Use the markers to indicate the colour codes of the brackets and the specific position each colour code is placed on the bracket.

Label 2

The doctor instructed you to place bands on the maxillary 6's (first molars) in order to fabricate a rapid palatal expander for a patient with a narrow maxilla.

Showcase where will you place the separating elastics and what instructions you will give to the patient before and after placing the separating elastics.

Label 3

In your first year of study you leant the theory on archwires used in Orthodontics. You also had an opportunity to work on patients and place these archwires.

The archwire chart has been provided:

1. Identify the type (round, square etc.), size, material and function.
2. On the pictures provided, indicate at which stages/phases of orthodontic treatment would you use which archwire/s:
   - Initial phase
   - Intermediate phase
   - Final phase

AUTHENTIC LEARNING CONTEXT

Organisation of learning space	The learning environment is conducive to a high standard of learning. No distraction or- noise.
Roles, functions and organisation of students	Students' understanding of the importance of the task will ensure that they keep to what is expected of them.
Material and equipment	Charts Markers Orthodontic bracket systems Bracket holders Separating elastic pliers Separating elastics Archwires Computer

END PRODUCT OUTCOMES

The Learning Process

1	Work effectively with your group members to solve the presented challenges.
2	Separate the orthodontic bracket system provided.
3	Organise the orthodontic brackets according to how they should be mounted on the mounting trays.
4	Allocate colour codes for each tooth on the mounting board.
5	Understand the importance of mounting bracket accordingly and the implications that incorrect mounting could have.
6	Creatively give patient-specific instruction when placing separating elastics.
7	Correctly place the separating elastic on the distal and mesial aspect of the 6s of both maxillary quadrants.
8	Correctly identify the type, size, material and function of each archwire provided: 1. Round 0.16 Niti used in the initial stages of treatment. It is flexible and has the ability to correct crowding.

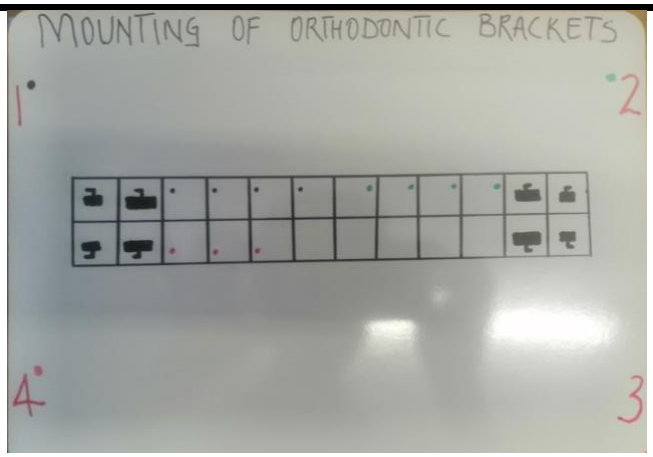
	2. Square 19 x 25 Niti reverse curve wire. Used in the intermediate phases of orthodontic treatment to open the bite. 3. Round 0,18 stainless steel wire, used in the intermediate phases of treatment. Has a better sliding mechanism. 4. Square 17 x 25 stainless steel wire. Final stages of treatment. 5. Square 19 x 25 Niti wire. Final stages of treatment 6. Multi-stranded wire. Initial stages of treatment; here crowding is indicated. 7. Closing loops: intermediate phase. Close the spaces when extractions were done.
9	Peer assessment. Students learn and question what they have done through peer assessment. Thus meaning is created and they critically reflect on what has been done.

The Learning Product

Bracket mounted accordingly

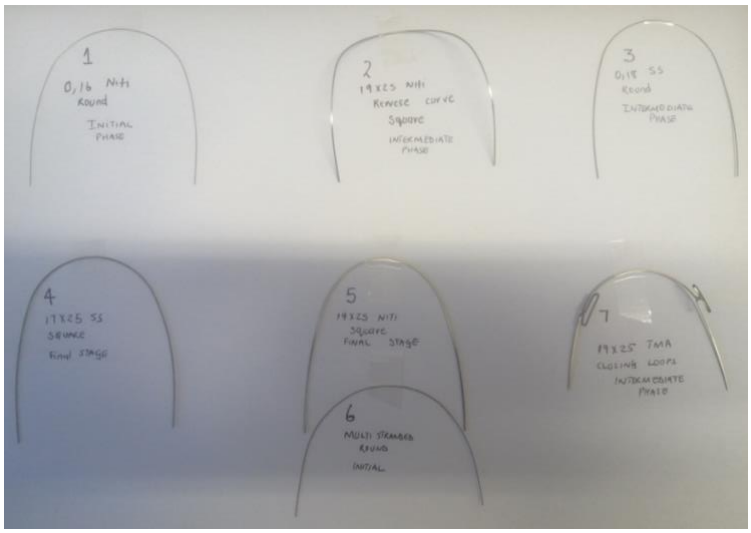
Colour indicators indicated correctly

Buccal tubes and hooks correctly indicated



Separating elastic placed correctly and in the right position

All archwires classified correctly



Appendix L: Learning Task Design Day 2

Becoming a Reflective Proactive Oral Hygienist

LEARNING TASK DESIGN

Adapted from Slabbert, De Kock and Hattingh (2009)

Name of the Facilitator	Noluthando Buthelezi
Personnel number	10182587
Date	24 February 2020
Module	ORD372. Orthodontics 372
Attributes of the 21st Century	Becoming a Reflective Proactive Oral Hygienist
Time to operationalise LT	60 minutes session, reflecting, meta-learning, self- regulatory, collaborative thinking, planning, creation of meaning and meaning making.

21st Century Attributes and Assessment Standards

Learning Outcomes		Assessment Standards	
LO 2 • Identifying and solving challenges presented to the oral hygiene students using critical and creative/innovative thinking. • Working effectively with others as a member of a disciplinary team, group, organisation, community. • Organising and managing oneself as a professional in Oral Hygiene and one's activities		○ Students are required to do the following: • Watch a video clip presented to them and then do the following: 5. Individually reflect on the video watched. Ask yourself the following question: What can I do throughout my academic year to ensure that I am well prepared for the world of orthodontics? What action plans can I practise throughout the academic year to limit unexpected frustrations in the world of orthodontics? 6. After reflecting and introspection, the students should work together in groups of five to peer assess and	

responsibly and effectively within an orthodontic practice. • Collecting, analysing, organising and critically evaluating information relating to self-readiness for the world of Orthodontics. • Communicating effectively using language skills in the modes of oral and/or written persuasion. Oral Hygiene students should be able to communicate effectively in a team.		challenge one another on the points deemed important. 7. Students are to present to the whole class on what they have decided is most important for them to do to be ready for the world of work. Students must immerse themselves in the learning task. Innovative thinking, reflective and active thinking are the requirements to make decisions that will impact their future as oral hygienists in an orthodontic practice positively Students must know the importance of creating a community of practice in their profession to excel as future oral hygienist.	

Real-life Challenge

Why do students need to learn these attributes of 21st century education?

It is important that Oral Hygiene students should be able to deal with real-life challenges that they could encounter in the world of work after graduation.

An orthodontic practice is one of the very busy practices in dentistry. An oral hygienist in this practice is responsible for performing different functions that are prescribed by the Health Professionals Council of South Africa (HPCSA).

Because of the workload in the orthodontic practice, students need to be well prepared and equipped with life skills to aid to their professional success.

What are the role, function and value of these attributes in the lives of the students?

Acquiring these attributes is necessary to equip each individual student with the required skills so that they are confident and have the boldness to execute the task given to them in the present or future. When these skills are embedded in each student, they will eventually become lifelong learners. Being a lifelong learner leads to constant professional development that leads to an individual becoming a transformational leader. Transformational leaders produce other leaders. Transformational leaders are a necessity in our society.

Where in the lives of the students will they be required to do what you expect them to do?

In the clinical wards during their daily clinical sessions as students, and in their daily lives as future oral hygienists.

What is the challenge you want the learners to solve?
Most students who graduate are unable to make it in the world of work due to lack of certain skills that were supposed to be acquired during raining. This poses a challenge because it diminishes confidence in an individual that could impact his or her daily function. Students must not find themselves unable to face the world of orthodontics or life because they were not exposed to real life challenges during their training.

Critical Cross Field Outcomes

CO 1	Identify and solve problems and make decisions using critical and creative thinking.	X
CO 2	Work effectively with others as members of a team, group, organisation and community.	X
CO 3	Organise and manage themselves and their activities responsibly and effectively.	X
CO 4	Collect, analyse, organise and critically evaluate information.	X
CO 5	Communicate effectively using visual, symbolic and/or language skills in various modes.	X
CO 6	Use science and technology effectively and critically, showing responsibility towards the environment and the health of others.	X
CO 7	Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation.	X

Attributes of the 21st Century

ATT 1	Innovative thinking	X
ATT 2	Problem-solving skills	X
ATT 3	Team work	X
ATT 4	Communication skills	X
ATT 5	Critical reflection	X
ATT 6	Entrepreneurial and leadership skills	X

Fundamental Human Virtues

Intrapersonal	X	Interpersonal	X
Self-confidence	X	Humanisation	X
Motivation	X	Communication	X
Initiative	X	Dealing with feelings	X
Effort	X	Justice and forgiveness	X
Perseverance	X	Love	X
Common sense	X	Leadership	X
Responsibility	X		
Independence	X		
Joy	X		
Love	X		

LEARNING TASK PRESENTATION

Verbal Presentation

Last week during our learning opportunity, you had three challenging task they you were required to solve in groups of five. Due to time constraints it was impossible to solve the real-life challenges that were presented to you.

The following task is done as a recap and to test whether you understood the outcomes that were expected from each of you. It is also to establish the level of self-regulatedness each of you has.

I want to assess whether the challenge you were given made you realise where your knowledge is lacking and whether you did go the extra mile to learn and self-teach where necessary.

Let's play the game.

The Learning Task for today.

I have titled today's learning opportunity as follows

Becoming a Reflective Proactive Oral Hygienist: Meaning Making

You will watch a video clip; please ensure that you pay attention as you listen because you will be required to do some tasks after the video clip. If you need to make notes as you listen kindly do so on the paper provided.

Now that you have watched the video of your future colleague answer the following questions individually and through introspection:

What have you learnt from her personal experiences?

What action steps will you take throughout your academic year to ensure that you are ready for the world of orthodontics?

Who is responsible for ensuring your work place preparedness?

You have 10 minutes to do this task.

Now that you have reflected on what you have learnt from the video clip, do the following:

In groups of five select the points you deem most important. Creatively write them in the chat provided.

Select a representative who will present to the rest of the class why you have deemed these specific points most important to you as a group.

You have 15 minutes for group discussion and 10 minutes for presentation.

Written Presentation

Learning Tasks

	Activity	**Time allocated**
Step 1	Actively watch the video clip	10 minutes
Step 2	Individually reflect through answering the questions displayed on the screen.	10 minutes
Step 3	In groups of five, discuss what you have done individually and select the points that you deem important and creatively write them on the chat provided.	15 minutes
Step 4	Choose a representative; present to the rest of the class what you have discussed.	10 minutes per group

Total time allocated for this learning task = 60 minutes

AUTHENTIC LEARNING CONTEXT

Organisation of learning space	The learning environment is conducive to a high standard of learning. The tables are organised so that is it easy to gain access to each student and facilitate learning.
Roles, functions and organisation of students	Students' contribution to the creation of meaning and construction of new meaning will enhance the learning task given to them and aid in acquiring the attributes of 21st century education.
Material and equipment	Laptop Adequate sound Charts Markers

END PRODUCT OUTCOMES

The Learning Process

1	Through self-regulated learning and meta-learning, students are able to reflect, introspect and plan effectively to ready themselves for the world of work.
2	Students are able to communicate effectively their plan to the rest of the team.
3	Students are able to answer the questions asked to them as part of peer assessment.
4	Students are able to contribute valuable learning input in a team to facilitate the success of the team.
5	Students are able to perform a presentation through creativity and innovative means.
6	Students challenge themselves as individuals and one another outside of the learning opportunity to create a community of practice and an element of lifelong learning and self-regulated learning.

The Learning Product

To facilitate constructivist learning the product of this learning task will be what the students produced/ constructed to make meaning.

Appendix M: Learning Task Design Day 3

Professional Identity in an Orthodontic Practice

LEARNING TASK DESIGN

Adapted from Slabbert, De Kock and Hattingh (2009)

Name of the Facilitator	Noluthando Buthelezi
Personnel number	10182587
Date	02 March 2020
Module	ORD372. Orthodontics 372
Attributes of the 21st Century	Professional Identity in an Orthodontic Practice
Time to operationalise LT	45 minutes session, decision making, reflecting, meta-learning, self- regulatory, collaborative thinking, planning, creation of meaning and meaning making.

21st Century Attributes and Assessment Standards

Learning Outcomes		Assessment Standards	
LO 3 • Identifying, decision making and solving challenges presented to the Oral Hygiene students using critical and creative/innovative thinking. • Working effectively with others as a member of a disciplinary team, group, organisation, community. • Organising and managing oneself as a professional in Oral Hygiene and one's activities responsibly and effectively within an orthodontic practice. • Collecting, analysing, organising and critically evaluating information relating to self-readiness for the world of Orthodontics. • Communicating effectively using language skills in the modes of oral and/or written persuasion.		Students are required to do the following: • Study the article given to them and make constructive summaries of what was learnt. Through the use of critical thinking and employment of critical reflection, the student must make meaning of what was learnt which is crucial and core for identity formation. • Watch a video clip and then answer the following questions: 1. Will you continue to work in this orthodontic practice or will you resign with immediate effect? Justify your answer. 2. What do you have to say about your colleagues? Do you think they have professional identity? Why? 3. If you had a patient like Tom in your dental chair, how would you treat him, considering the fact that you are told not to spend time educating patients.	

Oral Hygiene students should be able to communicate effectively in a team.		4. It seems that the culture of this practice is skewed and that there is no need for prevention and promotion of good oral hygiene. How will you change this culture? Students must immerse themselves in the learning task. Innovative thinking, reflective, active thinking and decision making are the requirements that will impact their future positively as oral hygienist in an orthodontic practice. Students must value the importance of acquiring a professional identity while still in training to excel as future oral hygienist.	

Real-life Challenge

Why do students need to master these attributes of 21st century education?

It is important that Oral Hygiene students should be able to deal with real -life challenges that they could encounter in the world of work after graduation.

An orthodontic practice is one of the very busy practices in dentistry. An oral hygienist in this practice is responsible for performing different functions that are prescribed by the Health Professionals Council of South Africa (HPCSA). Because of the specialist nature of orthodontic practice, oral hygienists who work in these practices tend to lose their professional identity. This poses threats to the profession of oral hygienist. It is therefore very important that while students are in training that they become aware of the realities of the orthodontic practice so that they plan accordingly to ensure that they do not lose sight of who they are −oral hygienists.

What are the role, function and value of these attributes in the lives of the students?

Acquiring these attributes is necessary to equip each individual student with the required skills so that they are confident and have the confidence to execute the task given to them in the present or future. When these skills are embedded in each student, they will eventually become lifelong learners. Being a lifelong learner leads to constant professional development that leads to an individual becoming a transformational leader. Transformational leaders produce other leaders. Transformational leaders are a necessity in our society.

Where in the lives of the students will they be required to do what you expect them to do?

In the clinical wards during their daily clinical sessions as students, and in their daily lives as future oral hygienists.

What is the challenge you want the learners to solve?
Most students who graduate are unable to make it in the world of work due to a lack of certain skills that they were supposed to acquire during the training. This poses challenge because it diminishes confidence in an individual that could impact his or her daily function. Students must not find themselves unable to face the world of Orthodontics or life because they were not exposed to real-life challenges during their training.

Critical Cross Field Outcomes

CO 1	Identify and solve problems and make decisions using critical and creative thinking.	X
CO 2	Work effectively with others as members of a team, group, organisation and community.	X
CO 3	Organise and manage themselves and their activities responsibly and effectively.	X
CO 4	Collect, analyse, organise and critically evaluate information.	X
CO 5	Communicate effectively using visual, symbolic and/or language skills in various modes.	X
CO 6	Use science and technology effectively and critically, showing responsibility towards the environment and the health of others.	X
CO 7	Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation.	X

Attributes of the 21st Century

ATT 1	Innovative thinking	X
ATT 2	Problem-solving skills	X
ATT 3	Team work	X
ATT 4	Communication skills	X
ATT 5	Critical reflection	X
ATT 6	Entrepreneurial and leadership skills	X

Fundamental Human Virtues

Intrapersonal	X	Interpersonal	X
Self-confidence	X	Humanisation	X
Motivation	X	Communication	X
Initiative	X	Dealing with feelings	X
Effort	X	Justice and forgiveness	X
Perseverance	X	Love	X
Common sense	X	Leadership	X
Responsibility	X		
Independence	X		
Joy	X		
Love	X		

LEARNING TASK PRESENTATION

Verbal Presentation

You were given an article that you were required to study. Make meaning of what you have studied and make constructive summaries where necessary. The article was about instilling professional responsibility and professional identity in each student.

In order to test you self-regulatedness, I have compiled a short Kahoot game.

Let's play the game.

The Learning Task.

I have titled today's learning opportunity **Professional Identity in an Orthodontic Practice**

You may ask, why is this important? Before I answer the question, I would like to ask you, *How many of you have seen the doctors in the orthodontic ward giving oral hygiene instruction to patients?*

In answering the question on why professional identity in an orthodontic practice is crucially important I would say from experience most oral hygienists in an orthodontic practice lose their professional

identity due to some or other reason. This cannot continue because it is destroying our profession and we are slowly losing the sense of who we really are.

I will do a short presentation in which you will need to watch a video clip and after watching it, you will need to work in your groups to answer the questions displayed on the screen. Once you have discussed in groups, you will need to do a short presentation that will showcase how you have answered the questions displayed. The answers you will provide will be the meaning that you have made from this learning opportunity.

I will randomly choose from each group who will present. This means you need to ensure that everyone is participating and really understands the meaning you will be constructing and making.

Written Presentation

Learning Tasks

	Activity	**Time allocated**
Step 1	Play Kahoot	2 minutes
Step 2	Watch the video.	6 minutes
Step 3	In your groups, answer the questions displayed on the screen. Ensure that everyone is participating as the presenter will be selected randomly.	15 minutes
Step 4	Presentation of your constructed meaning.	5 minutes per group
Total time allocated for this learning opportunity = 45 minutes		

AUTHENTIC LEARNING CONTEXT

Organisation of learning space	The learning environment is conducive to a high standard of learning. The tables are organised so that is it easy to gain access to each student and facilitate learning.
Roles, functions and organisation of students	Students' contribution to the creation of meaning and construction of new meaning will enhance the learning task given to them and aid in acquiring the attributes of 21st century education.
Material and equipment	Laptop

	Adequate sound Charts Markers

END PRODUCT OUTCOMES

The Learning Process

1	Through self-regulated learning and meta-learning, a student is able to reflect, introspect and make effective decisions to ready themselves for the world of work.
2	Students are able to communicate effectively their decisions to the rest of the team.
3	Students are able to answer the questions asked to them as part of peer assessment.
4	Students are able to contribute valuable learning input in a team to facilitate the success of the team
5	Students are able to deliver a creative presentation using the meaning constructed.
6	Students challenge themselves as individuals and one another outside of the learning opportunity to create a community of practice and an element of lifelong learning and self-regulated learning.

The Learning Product

To facilitate constructivist learning the product of this learning task will be what the students produced/ constructed to make meaning of this learning opportunity.